

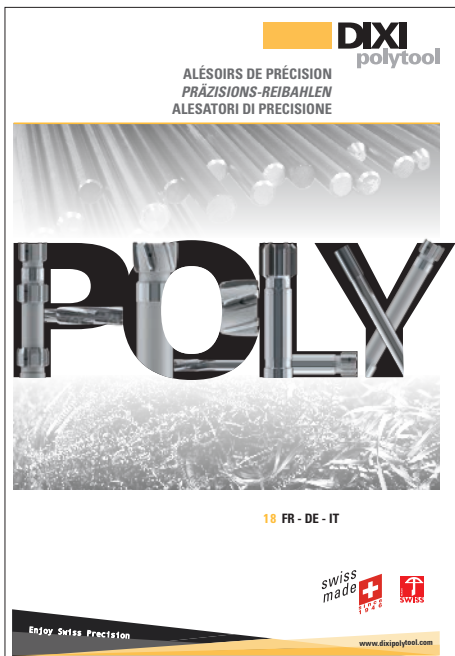


# PRÄZISIONSWERKZEUGE AUS VOLLHARTMETALL UND DIAMANT



swiss  
made





## FIRMENPROFIL

### DIXI POLYTOOL S.A.

DIXI Polytool S.A., Hersteller von Präzisionsschneidwerkzeugen aus Vollhartmetall, Diamant, Formwerkzeuge und Präzisionsreibahlen, ist seit 1946 in Le Locle (Schweiz) ansässig. Das Unternehmen kann sich auf ein starkes F&E-Team stützen, um zahlreiche Branchen wie die Uhrenindustrie, die Medizintechnik, die Drehteilindustrie, die Luft- und Raumfahrt, die Automobilindustrie und die Kunststoffverarbeitung zu bedienen.

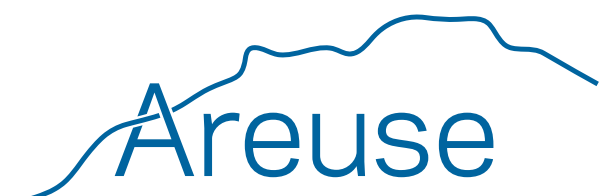
Durch die Einführung eines Lean-Projekts und kontinuierliche Investitionen in den Maschinenpark, wird die Produktivität der 250 Mitarbeiter ständig optimiert.

Bei uns wird Qualität und Umweltschutz großgeschrieben, daher hat DIXI Polytool S.A. ein zertifiziertes Managementsystem gemäß den Normen ISO 9001 und ISO 14001 eingeführt.

#### EINE UMWELTBEWUSSTE HALTUNG

Seit mehreren Jahren verwendet DIXI Polytool S.A. ausschließlich 100% Recyclingpapier, sowie Druckertinte mit natürlichen Farbstoffen.

Darüber hinaus nutzen wir für den gesamten Betrieb ausschließlich grüne Energie. Dies ist unser Engagement für eine nachhaltige Entwicklung...



**BOHREN**



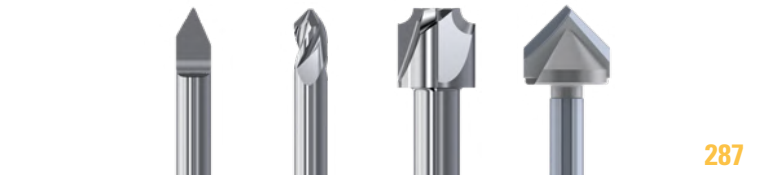
3

**FRÄSEN**



89

**GRAVIEREN / FASEN**



287

**ABTRENNEN / ABWÄLZFRÄSEN**



313

**GEWINDEN**



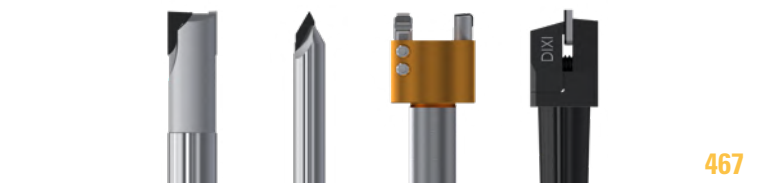
349

**REIBEN / AUSBOHREN**



421

**DIAMANT & PKD WERKZEUGE**



467

**VERSCHLEISSTEILE**



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61



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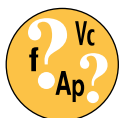
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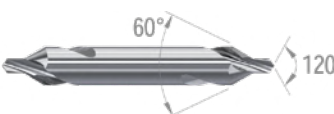






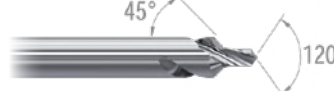
## GEOMETRIE UND INFORMATIONEN

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74

| <b>ZENTRIERBOHRER UND NC-ANBOHRER</b> |   | Z | Seite | SL  | VHM | TAIN | DICUT |  |  |
|---------------------------------------|---|---|-------|---|-----|------|-------|--|--|
|                                       |   |   |       |   | ☐   | ■    | ■     |  |  |
| <b>DIXI 1101</b><br>Ø0.80 - Ø4.00     |    | 2 | 12    |  | ✓   |      |       |  |  |
| <b>DIXI 1106</b><br>Ø1.00 - Ø20.00    |    | 2 | 13    |   | ✓   | ✓    |       |  |  |
| <b>DIXI 1106 L</b><br>Ø4.00 - Ø6.00   |    | 2 | 14    |   | ✓   |      |       |  |  |
| <b>DIXI 1107</b><br>Ø1.00 - Ø20.00    |    | 2 | 15    |   | ✓   |      |       |  |  |
| <b>DIXI 1108</b><br>Ø0.50 - Ø2.50     |    | 2 | 16    | 1-2×Ø   | ✓   | ✓    |       |  |  |
| <b>DIXI 1109</b><br>Ø0.50 - Ø2.50     |  | 2 | 17    | 1-2×Ø   | ✓   |      | ✓     |  |  |
| <b>DIXI 1110</b><br>Ø0.80 - Ø1.45     |  | 2 | 18    | 1-2×Ø   | ✓   | ✓    |       |  |  |

**KANONENBOHRER Z=1**

|                                   |   |   |    |       |   |  |  |  |  |
|-----------------------------------|---|---|----|-------|---|--|--|--|--|
| <b>DIXI 1111</b><br>Ø0.10 - Ø2.00 |  | 1 | 19 | 4-9×Ø | ✓ |  |  |  |  |
|-----------------------------------|---|---|----|-------|---|--|--|--|--|

**SPIRALBOHRER Z=2**

|                                     |   |   |    |   |   |  |   |  |  |
|-------------------------------------|---|---|----|---|---|--|---|--|--|
| <b>DIXI 1126</b><br>Ø1.00 - Ø14.00  |  | 2 | 20 | <br>7-12×Ø | ✓ |  | ✓ |  |  |
| <b>DIXI 1130</b><br>Ø0.30 - Ø14.00  |  | 2 | 22 | <br>2-16×Ø | ✓ |  | ✓ |  |  |
| <b>DIXI 1130 L</b><br>Ø0.30 - Ø8.00 |  | 2 | 24 | 4-16×Ø  | ✓ |  | ✓ |  |  |

| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |

|              |                    |                |                        |           |               |              |                           |                                  |             |                    |                |                          |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|

|   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ☉ | ○ | ○ | ○ | ☉ | ☉ | ○ | ☉ | ☉ | ☉ | ☉ | ○ | ○ |
| ☉ | ☉ | ○ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ○ | ☉ |   |
| ☉ | ☉ | ○ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ○ | ☉ |   |
| ☉ | ☉ | ○ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ○ | ☉ |   |
| ☉ | ☉ | ○ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ○ | ☉ |   |
| ☉ | ☉ | ○ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ○ | ☉ |   |
| ☉ | ☉ | ○ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ○ | ☉ |   |



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| ☉ | ○ | ○ | ○ | ☉ | ☉ | ○ | ○ | ○ | ○ | ○ | ○ |  |
| ☉ | ○ | ○ | ○ | ☉ | ☉ | ○ | ○ | ○ | ○ | ○ | ○ |  |
| ☉ | ○ | ○ | ○ | ☉ | ☉ | ○ | ○ | ○ | ○ | ○ | ○ |  |













○ gut      ☉ ausgezeichnet

# ÜBERSICHT BOHRER

✓ = Artikel ab Lager  
 \* nicht für eisenhaltige Werkstoffe

| SPIRALBOHRER Z=2                  |   | Z | Seite | SL       | VHM | TAIN | C-TOP | DICUT | DRYCUT* | DLC* |
|-----------------------------------|---|---|-------|----------|-----|------|-------|-------|---------|------|
| <b>DIXI 1132</b><br>Ø0.40 - Ø2.00 |  | 2 | 26    | 4 - 15×Ø | ✓   |      |       | ✓     |         |      |
| <b>DIXI 1133</b><br>Ø0.50 - Ø6.00 |  | 2 | 27    | 4 - 18×Ø | ✓   |      |       | ✓     |         |      |

## SPIRALBOHRER VERSTÄRKTER SCHAFT Z=2

|                                      |   |   |    |  |   |   |   |   |    |    |
|--------------------------------------|---|---|----|--|---|---|---|---|----|----|
| <b>DIXI 1131</b><br>Ø0.05 - Ø2.45    |    | 2 | 28 | <br>4 - 9×Ø   | ✓ |   |   | ✓ |    | ✓* |
| <b>DIXI 1131 L</b><br>Ø0.10 - Ø2.45  |    | 2 | 31 | <br>4 - 9×Ø   | ✓ |   |   | ✓ |    |    |
| <b>DIXI 1137-5D</b><br>Ø0.15 - Ø6.00 |  | 2 | 34 | 5×Ø  | ✓ |   | ✓ |   | ✓* |    |
| <b>DIXI 1137-8D</b><br>Ø0.15 - Ø6.00 |  | 2 | 37 | 8×Ø  | ✓ |   | ✓ |   | ✓* |    |
| <b>DIXI 1134</b><br>Ø0.20 - Ø2.49    |  | 2 | 40 | <br>6 - 9×Ø | ✓ |   |   | ✓ |    |    |
| <b>DIXI 1135</b><br>Ø0.20 - Ø2.49    |  | 2 | 42 | 3 - 8×Ø  | ✓ |   |   | ✓ |    |    |
| <b>DIXI 1136</b><br>Ø0.20 - Ø1.99    |  | 2 | 45 | 4 - 8×Ø  | ✓ |   |   | ✓ |    |    |
| <b>DIXI 1138</b><br>Ø0.05 - Ø2.80    |  | 2 | 48 | 4 - 9×Ø  | ✓ | ✓ |   |   |    |    |
| <b>DIXI 1139</b><br>Ø0.50 - Ø3.00    |  | 2 | 50 | 12×Ø   | ✓ | ✓ |   |   |    |    |



| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |




|              |                    |                |                        |           |               |              |                           |                                  |             |                    |                |                          |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|

|                       |                                  |                       |                                  |                       |                                  |                                  |                                  |                                  |                                  |                                  |                       |                                  |  |
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|                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                       |                                  |                                  |                                  |  |
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| <input type="radio"/>            | <input checked="" type="radio"/> | <input type="radio"/>            | <input checked="" type="radio"/> | <input type="radio"/>            | <input type="radio"/>            | <input checked="" type="radio"/> | <input checked="" type="radio"/> |                       | <input checked="" type="radio"/> | <input type="radio"/>            | <input checked="" type="radio"/> |  |

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**HOCHLEISTUNGS-SPIRALBOHRER Z=2**

|   | Z | Seite | SL   | VHM | TAIN | XIDUR |  |  |
|---|---|-------|--|-----|------|-------|--|--|
| <b>DIXI 1149</b><br>Ø1.00 - Ø14.00<br> | 2 | 53    | <br>3 - 4×Ø |     | ✓    |       |  |  |
| <b>DIXI 1147</b><br>Ø0.50 - Ø6.00<br>  | 2 | 55    | 6.5×Ø  |     | ✓    |       |  |  |


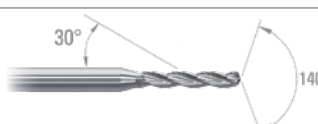
**HOCHLEISTUNGS-SPIRALBOHRER MIT INNENKÜHLUNG Z=2**

|  |   |    |  |  |   |  |  |  |
|--|---|----|--|--|---|--|--|--|
| <b>DIXI 1145-HH</b><br>Ø0.70 - Ø14.00<br> | 2 | 57 | <br>5 - 7×Ø |  | ✓ |  |  |  |
| <b>DIXI 1146-HH</b><br>Ø0.80 - Ø10.00<br> | 2 | 59 | 10×Ø   |  | ✓ |  |  |  |


**SPIRALBOHRER FÜR GEHÄRTETEN STAHL > 45 HRC**

|   |   |    |         |  |  |   |  |  |
|---|---|----|---------|--|--|---|--|--|
| <b>DIXI 1280</b><br>Ø0.25 - Ø12.00<br> | 2 | 61 | 3 - 7×Ø |  |  | ✓ |  |  |
|---|---|----|---------|--|--|---|--|--|

**SPIRALBOHRER Z=3**

|   |   |    |          |   |  |  |  |  |
|---|---|----|----------|---|--|--|--|--|
| <b>DIXI 1151</b><br>Ø1.00 - Ø14.00<br> | 3 | 63 | 3 - 8×Ø  | ✓ |  |  |  |  |
| <b>DIXI 1152</b><br>Ø0.15 - Ø2.90<br>  | 3 | 65 | 6 - 10×Ø | ✓ |  |  |  |  |

**SPIRALBOHRER FÜR FASERVERBUNDWERKSTOFFE / KEVLAR®**

|   |   |    |         |   |  |  |  |  |
|---|---|----|---------|---|--|--|--|--|
| <b>DIXI 1190</b><br>Ø2.50 - Ø12.00<br> | 2 | 67 | 3 - 7×Ø | ✓ |  |  |  |  |
|---|---|----|---------|---|--|--|--|--|

| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |

|              |                    |                |                        |           |               |              |                           |                                  |             |                    |                |                          |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|

|   |   |   |   |   |   |   |   |   |   |   |   |  |
|---|---|---|---|---|---|---|---|---|---|---|---|--|
| ○ | ○ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ○ | ○ | ○ | ◎ |  |
| ◎ | ◎ | ◎ | ○ | ○ | ○ | ○ |   |   |   | ◎ | ○ |  |

|   |   |   |   |   |   |   |   |  |   |   |   |  |
|---|---|---|---|---|---|---|---|--|---|---|---|--|
| ○ | ○ | ◎ | ◎ | ◎ | ○ | ○ | ○ |  | ○ | ○ | ◎ |  |
| ◎ | ◎ | ◎ | ○ | ○ |   |   |   |  |   | ◎ | ○ |  |


|  |  |  |  |  |  |  |  |  |  |   |  |   |
|--|--|--|--|--|--|--|--|--|--|---|--|---|
|  |  |  |  |  |  |  |  |  |  | ○ |  | ◎ |
|--|--|--|--|--|--|--|--|--|--|---|--|---|


|   |   |  |  |   |   |   |  |  |   |  |   |  |
|---|---|--|--|---|---|---|--|--|---|--|---|--|
| ○ | ○ |  |  | ◎ | ◎ | ◎ |  |  | ◎ |  | ◎ |  |
| ○ | ○ |  |  | ◎ | ◎ | ◎ |  |  | ◎ |  | ◎ |  |


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WERKZEUGE AUF ANFRAGE

| FLACHBOHRER   | Z | Setie | SL | VHM |             |  |  |  |
|---|---|-------|----|-----|-------------|--|--|--|
| <b>DIXI 1112 R+L</b><br>Ø0.08 - Ø5.99  | 2 | 68    |    |     | AUF ANFRAGE |  |  |  |

| KANONENBOHRER   | Z | Setie | SL | VHM |             |  |  |  |
|---|---|-------|----|-----|-------------|--|--|--|
| <b>DIXI 1114 R+L</b><br>Ø0.08 - Ø5.99  | 1 | 68    |    |     | AUF ANFRAGE |  |  |  |

| GERADE GENUTETE BOHRER  | Z | Setie | SL | VHM |             |  |  |  |
|---|---|-------|----|-----|-------------|--|--|--|
| <b>DIXI 1118 R+L</b><br>Ø0.08 - Ø5.99  | 2 | 68    |    |     | AUF ANFRAGE |  |  |  |

| STUFENBOHRER   | Z | Setie | SL | VHM |             |  |  |  |
|--|---|-------|----|-----|-------------|--|--|--|
| <b>DIXI 1501 R+L</b>  |   | 69    |    |     | AUF ANFRAGE |  |  |  |
| <b>DIXI 1502 R+L</b>  |   | 70    |    |     | AUF ANFRAGE |  |  |  |
| <b>DIXI 1503 R+L</b>  |   | 71    |    |     | AUF ANFRAGE |  |  |  |
| <b>DIXI 1504 R+L</b>  |   | 72    |    |     | AUF ANFRAGE |  |  |  |
| <b>DIXI 1512</b>      |   | 72    |    |     | AUF ANFRAGE |  |  |  |
| <b>DIXI 1514</b>      |   | 72    |    |     | AUF ANFRAGE |  |  |  |
| <b>DIXI 1518</b>      |   | 72    |    |     | AUF ANFRAGE |  |  |  |

| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |

|              |                    |                |                        |           |               |              |                           |                                  |             |                    |                |                          |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|

|                       |  |  |  |                       |                       |  |                                  |                       |                                  |  |  |  |
|-----------------------|--|--|--|-----------------------|-----------------------|--|----------------------------------|-----------------------|----------------------------------|--|--|--|
| <input type="radio"/> |  |  |  | <input type="radio"/> | <input type="radio"/> |  | <input checked="" type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |  |  |  |
|-----------------------|--|--|--|-----------------------|-----------------------|--|----------------------------------|-----------------------|----------------------------------|--|--|--|

|                                  |  |  |  |                       |                       |                       |                       |                       |                                  |                       |  |  |
|----------------------------------|--|--|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------------------|-----------------------|--|--|
| <input checked="" type="radio"/> |  |  |  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> |  |  |
|----------------------------------|--|--|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------------------|-----------------------|--|--|

|                       |  |  |  |                       |                                  |                                  |                       |                       |                                  |                       |  |  |
|-----------------------|--|--|--|-----------------------|----------------------------------|----------------------------------|-----------------------|-----------------------|----------------------------------|-----------------------|--|--|
| <input type="radio"/> |  |  |  | <input type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> |  |  |
|-----------------------|--|--|--|-----------------------|----------------------------------|----------------------------------|-----------------------|-----------------------|----------------------------------|-----------------------|--|--|

|                                  |                       |                       |                       |                       |                                  |                                  |                                  |                       |                                  |                       |                       |  |
|----------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------|----------------------------------|-----------------------|-----------------------|--|
| <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>            | <input type="radio"/>            | <input checked="" type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> |  |
| <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>            | <input type="radio"/>            | <input checked="" type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> |  |
| <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>            | <input type="radio"/>            | <input checked="" type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> |  |
| <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>            | <input type="radio"/>            | <input checked="" type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> |  |
| <input type="radio"/>            |                       |                       |                       | <input type="radio"/> | <input type="radio"/>            |                                  | <input checked="" type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |                       |                       |  |
| <input checked="" type="radio"/> |                       |                       |                       | <input type="radio"/> | <input type="radio"/>            | <input type="radio"/>            | <input checked="" type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |                       |                       |  |
| <input type="radio"/>            |                       |                       |                       | <input type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |                       |                       |  |

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P.74



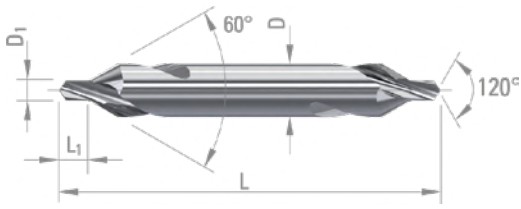
P.73



$D_1 \geq 3.15$



## ZENTRIERBOHRER



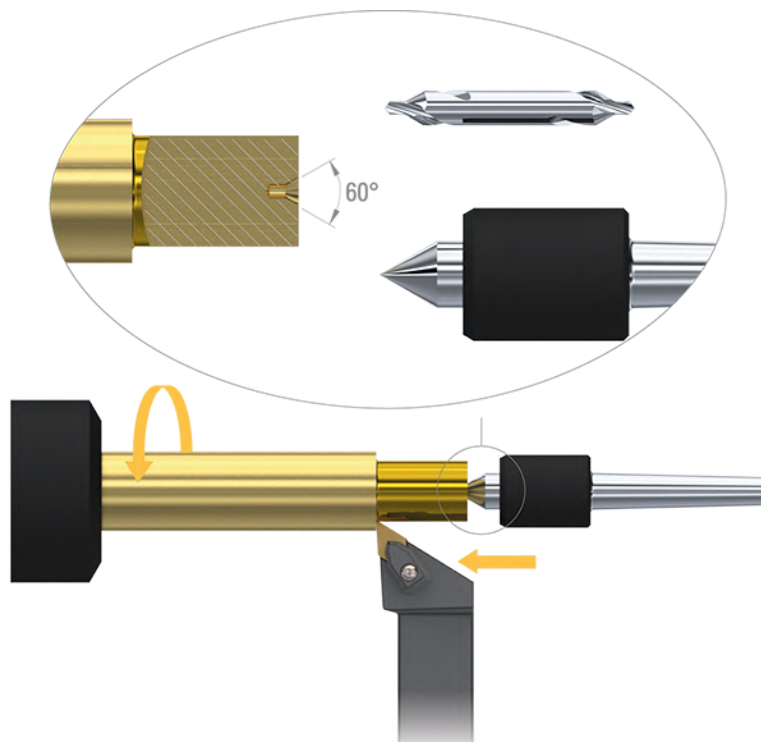
- Zentrierbohrer, hergestellt nach DIN 333A, Werkzeuge zur Herstellung von Zentrierbohrungen.

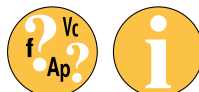
○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |          |      | K                |    |                    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|----------|------|------------------|----|--------------------|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      | Grauguss |      | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3     | 14.4 | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○        | ○    | ⊙                | ⊙  | ○                  | ○  | ○  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            | ⊙       | ⊙          | ⊙    | ○                       | ○  |       | ○                        | ○  |                  |    |                  |    |

| $D_1$   | $L_1$          | $D_{h5}$ | L             | VHM   |
|---|----------------|----------|---------------|-------|
| 0.80 $\begin{smallmatrix} +0.14 \\ 0 \end{smallmatrix}$ | 1.30 $\pm 0.1$ | 3.15     | 31.50 $\pm 2$ | 37253 |
| 1.00 $\begin{smallmatrix} +0.14 \\ 0 \end{smallmatrix}$ | 1.60 $\pm 0.2$ | 3.15     | 31.50 $\pm 2$ | 37254 |
| 1.25 $\begin{smallmatrix} +0.14 \\ 0 \end{smallmatrix}$ | 1.90 $\pm 0.2$ | 3.15     | 31.50 $\pm 2$ | 37255 |
| 1.60 $\begin{smallmatrix} +0.14 \\ 0 \end{smallmatrix}$ | 2.40 $\pm 0.2$ | 4.00     | 35.50 $\pm 2$ | 37256 |
| 2.00 $\begin{smallmatrix} +0.14 \\ 0 \end{smallmatrix}$ | 2.90 $\pm 0.2$ | 5.00     | 40.00 $\pm 2$ | 29156 |
| 2.50 $\begin{smallmatrix} +0.14 \\ 0 \end{smallmatrix}$ | 3.60 $\pm 0.2$ | 6.30     | 45.00 $\pm 2$ | 37257 |
| 3.15 $\begin{smallmatrix} +0.18 \\ 0 \end{smallmatrix}$ | 4.40 $\pm 0.3$ | 8.00     | 50.00 $\pm 2$ | 24756 |
| 4.00 $\begin{smallmatrix} +0.18 \\ 0 \end{smallmatrix}$ | 5.60 $\pm 0.4$ | 10.00    | 56.00 $\pm 3$ | 32950 |





NC-ANBOHRER



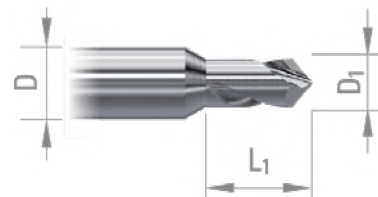
- NC-Anbohrer 90°, für allgemeine Bearbeitungen. Senkung mit 45° möglich. Kann nur an der Spitze verwendet werden.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

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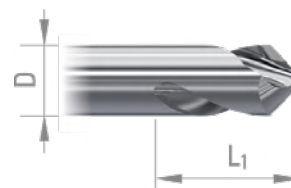
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |          |      | K                |    |                    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|----------|------|------------------|----|--------------------|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |      | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3     | 14.4 | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ⊙                                    | ⊙    | ⊙        | ⊙    | ⊙                | ⊙  | ⊙                  | ⊙  | ⊙  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      |                         | S  |       |                          |    |                  | H  |                  |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            | ⊙       | ⊙          | ⊙    | ○                       | ○  | ○     | ⊙                        | ⊙  |                  |    |                  |    |  |

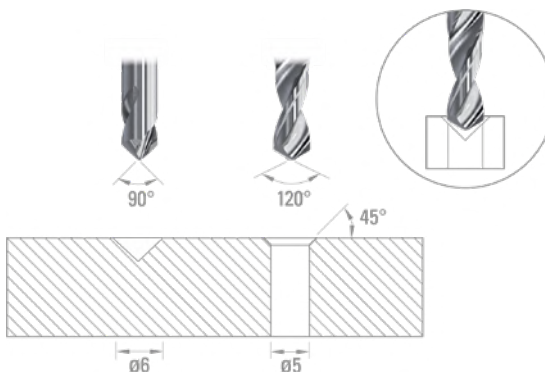
| D <sub>1h6</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | TiAlN  |
|------------------|----------------|-----------------|----|--------|--------|
| 1.00             | 3              | 3               | 38 | 956799 | 957230 |
| 1.50             | 5              | 3               | 38 | 956800 | 957231 |
| 2.00             | 5              | 3               | 38 | 956801 | 957232 |



| D <sub>h5</sub> | L <sub>1</sub> | L   | VHM    | TiAlN  |
|-----------------|----------------|-----|--------|--------|
| 1.00            | 3              | 32  | 953781 | 953780 |
| 1.50            | 5              | 32  | 953778 | 953779 |
| 2.00            | 5              | 32  | 47101  | 62892  |
| 3.00            | 9              | 38  | 43231  | 34090  |
| 4.00            | 10             | 50  | 36911  | 61280  |
| 5.00            | 13             | 50  | 47716  | 63736  |
| * 6.00          | 13             | 57  | 42788  | 63757  |
| * 8.00          | 27             | 63  | 42789  | 63758  |
| * 10.00         | 30             | 72  | 43233  | 61561  |
| * 12.00         | 35             | 83  | 43064  | 41463  |
| * 16.00         | 46             | 92  | 43234  | 63759  |
| * 20.00         | 52             | 104 | 43235  | 63760  |



\* Log. Hinterschliff





NC-ANBOHRER, LINKSSCHNEIDEND



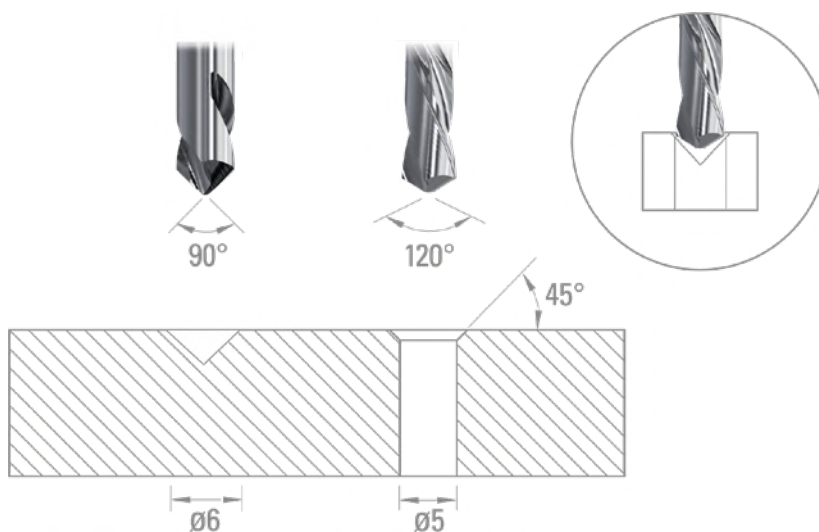
- NC-Anbohrer 90°, für allgemeine Bearbeitungen.
- Senkung mit 45° möglich. Kann nur an der Spitze verwendet werden.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

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| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○                | ○  | ○  | ⊙                                  | ⊙    | ⊙    | ⊙    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            | ⊙       | ⊙          | ⊙    | ○                       | ○  | ○     | ⊙                        | ⊙  |                  |    |                  |    |

| D <sub>h5</sub> | L <sub>1</sub> | L  | VHM   |
|-----------------|----------------|----|-------|
| 4               | 10             | 50 | 47714 |
| 5               | 13             | 50 | 47715 |
| 6               | 13             | 57 | 48813 |





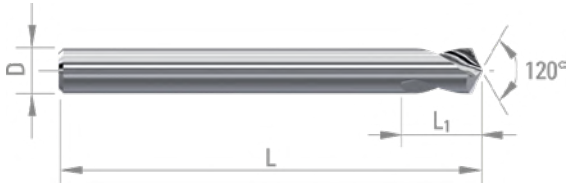


P.74



P.73

**NC-ANBOHRER**



- NC-Anbohrer 120°, für allgemeine Bearbeitungen.  
Kann nur an der Spitze verwendet werden.

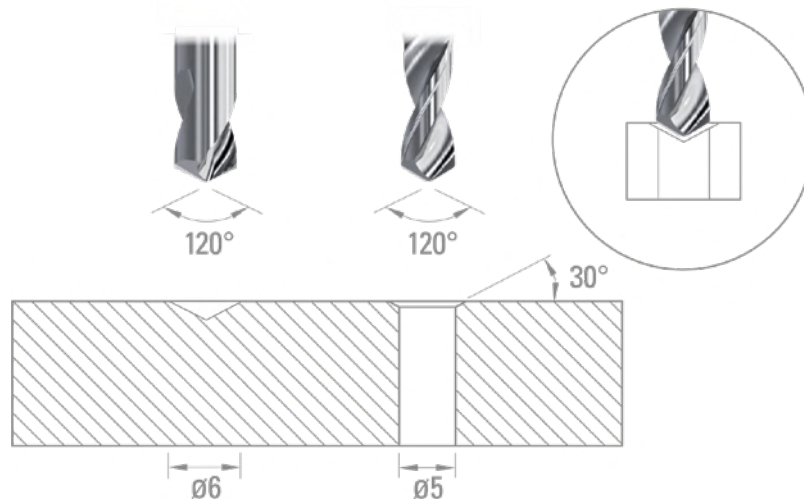
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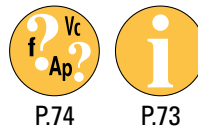
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○                | ○  | ○  | ⊙                                  | ⊙    | ⊙    | ⊙    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      |                         | S  |       |                          |    |                  | H  |                  |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            | ⊙       | ⊙          | ⊙    | ○                       | ○  | ○     | ⊙                        | ⊙  |                  |    |                  |    |  |

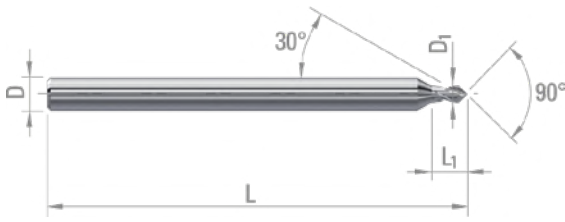
| D <sub>h5</sub> | L <sub>1</sub> | L   | VHM    |
|-----------------|----------------|-----|--------|
| 1               | 3              | 38  | 985118 |
| 2               | 5              | 38  | 985120 |
| 3               | 9              | 38  | 43236  |
| 4               | 10             | 50  | 36914  |
| * 6             | 13             | 57  | 43238  |
| * 8             | 27             | 63  | 43239  |
| * 10            | 30             | 72  | 43240  |
| * 12            | 35             | 83  | 43241  |
| * 16            | 46             | 92  | 43242  |
| * 20            | 52             | 104 | 43243  |

\* Log. Hinterschliff





ANBOHRER  
VERSTÄRKTER SCHAFT



- NC-Anbohrer 90°. Zur Herstellung von zylindrischen Pilotbohrungen.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

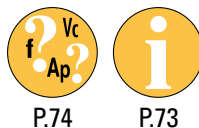
○ gut    ⊙ ausgezeichnet

| ISO          | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |          |      | K                |    |                    |    |    |    |
|--------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|----------|------|------------------|----|--------------------|----|----|----|
|              | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      | Grauguss |      | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |
| VDI 3323     | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3     | 14.4 | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ⊙                                  | ⊙    | ⊙        | ⊙    | ⊙                | ⊙  | ⊙                  | ⊙  | ⊙  | ⊙  |

| ISO          | N                       |    |                         |    |    |                   |                        |    |              |         |            |      |                         | S  |       |                          |    |                  | H  |                  |    |  |
|--------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
|              | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323     | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            | ⊙       | ⊙          | ⊙    | ○                       | ○  | ○     | ⊙                        | ⊙  |                  |    |                  |    |  |

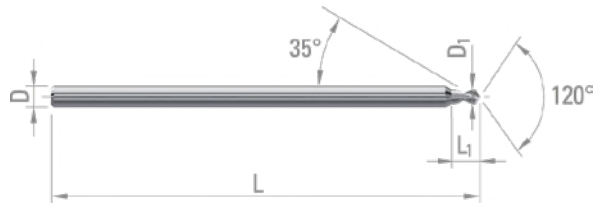
| D <sub>1h6</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | TiAlN  |
|------------------|----------------|-----------------|----|--------|--------|
| 0.50             | 1.00           | 3               | 38 | 983702 |        |
| 0.60             | 1.00           | 3               | 38 | 964801 |        |
| 0.65             | 1.00           | 3               | 38 | 964800 |        |
| 0.70             | 1.00           | 3               | 38 | 964799 |        |
| 0.75             | 1.00           | 3               | 38 | 964798 |        |
| 0.80             | 1.50           | 3               | 38 | 956678 | 956679 |
| 0.82             | 1.50           | 3               | 38 | 956681 | 956682 |
| 0.85             | 1.50           | 3               | 38 | 956684 | 956685 |
| 0.87             | 1.50           | 3               | 38 | 956687 | 956689 |
| 0.90             | 1.50           | 3               | 38 | 956691 | 956693 |
| 0.92             | 1.50           | 3               | 38 | 956695 | 956696 |
| 0.95             | 1.50           | 3               | 38 | 956697 | 956703 |
| 0.97             | 1.50           | 3               | 38 | 956704 | 956706 |
| 1.00             | 1.50           | 3               | 38 | 956708 | 956707 |
| 1.02             | 2.00           | 3               | 38 | 956709 | 956710 |
| 1.05             | 2.00           | 3               | 38 | 956711 | 956712 |
| 1.07             | 2.00           | 3               | 38 | 956713 | 956714 |
| 1.10             | 2.00           | 3               | 38 | 956715 | 956716 |
| 1.12             | 2.00           | 3               | 38 | 956717 | 956718 |
| 1.15             | 2.00           | 3               | 38 | 956719 | 956720 |
| 1.17             | 2.00           | 3               | 38 | 956721 | 956722 |
| 1.20             | 2.00           | 3               | 38 | 956723 | 956724 |
| 1.22             | 2.00           | 3               | 38 | 956725 | 956726 |
| 1.25             | 2.00           | 3               | 38 | 956727 | 956728 |
| 1.27             | 2.00           | 3               | 38 | 956729 | 956730 |
| 1.30             | 2.00           | 3               | 38 | 956731 | 956732 |
| 1.32             | 2.00           | 3               | 38 | 956733 | 956734 |
| 1.35             | 2.00           | 3               | 38 | 956735 | 956736 |
| 1.37             | 2.00           | 3               | 38 | 956737 | 956738 |
| 1.40             | 2.00           | 3               | 38 | 956739 | 956740 |

| D <sub>1h6</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | TiAlN  |
|------------------|----------------|-----------------|----|--------|--------|
| 1.42             | 2.00           | 3               | 38 | 956741 | 956742 |
| 1.45             | 2.00           | 3               | 38 | 956743 | 956744 |
| 1.47             | 2.00           | 3               | 38 | 956745 | 956746 |
| 1.50             | 2.00           | 3               | 38 | 956747 | 956748 |
| 1.52             | 3.00           | 3               | 38 | 956749 | 956750 |
| 1.55             | 3.00           | 3               | 38 | 956751 | 956752 |
| 1.57             | 3.00           | 3               | 38 | 956753 | 956754 |
| 1.60             | 3.00           | 3               | 38 | 956755 | 956756 |
| 1.62             | 3.00           | 3               | 38 | 956757 | 956758 |
| 1.65             | 3.00           | 3               | 38 | 956759 | 956760 |
| 1.67             | 3.00           | 3               | 38 | 956761 | 956762 |
| 1.70             | 3.00           | 3               | 38 | 956763 | 956764 |
| 1.72             | 3.00           | 3               | 38 | 956765 | 956766 |
| 1.75             | 3.00           | 3               | 38 | 956767 | 956768 |
| 1.77             | 3.00           | 3               | 38 | 956769 | 956770 |
| 1.80             | 3.00           | 3               | 38 | 956771 | 956772 |
| 1.82             | 3.00           | 3               | 38 | 956773 | 956774 |
| 1.85             | 3.00           | 3               | 38 | 956775 | 956776 |
| 1.87             | 3.00           | 3               | 38 | 956777 | 956778 |
| 1.90             | 3.00           | 3               | 38 | 956779 | 956780 |
| 1.92             | 3.00           | 3               | 38 | 956781 | 956782 |
| 1.95             | 3.00           | 3               | 38 | 956783 | 956784 |
| 1.97             | 3.00           | 3               | 38 | 956785 | 956786 |
| 2.00             | 3.00           | 3               | 38 | 956803 | 956804 |
| 2.10             | 3.00           | 3               | 38 | 956812 | 956813 |
| 2.20             | 3.00           | 3               | 38 | 956820 | 956821 |
| 2.30             | 3.00           | 3               | 38 | 956828 | 956830 |
| 2.40             | 3.00           | 3               | 38 | 956837 | 956838 |
| 2.50             | 3.00           | 3               | 38 | 956845 | 956846 |



ANBOHRER  
VERSTÄRKTER SCHAFT

- Anbohrer 120°, zur Herstellung von zylindrischen Pilotbohrungen.
- Die DICUT-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.



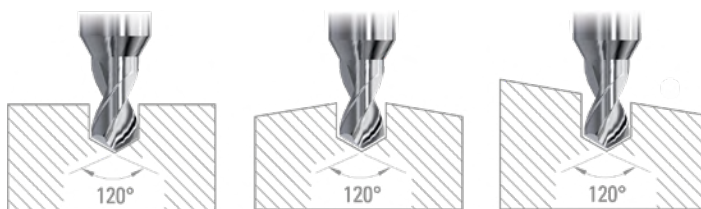
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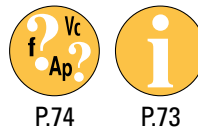
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |          |      | K                |    |                    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|----------|------|------------------|----|--------------------|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |      | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3     | 14.4 | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ⊙                                    | ⊙    | ⊙        | ⊙    | ⊙                | ⊙  | ⊙                  | ⊙  | ⊙  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            | ⊙       | ⊙          | ⊙    | ○                       | ○  | ○     | ⊙                        | ⊙  |    |                  |    |                  |  |  |

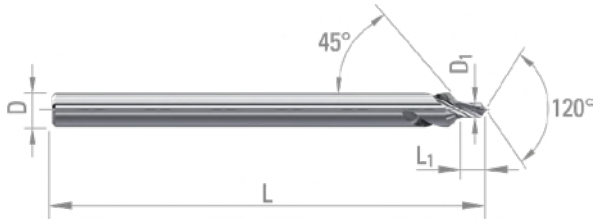
| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | DICUT  |
|------------------------|----------------|-----------------|----|--------|--------|
| 0.50                   | 1.00           | 1.50            | 30 | 62674  | 67354  |
| 0.55                   | 1.00           | 1.50            | 30 | 62675  | 67355  |
| 0.60                   | 1.20           | 1.50            | 30 | 62676  | 67356  |
| 0.65                   | 1.20           | 1.50            | 30 | 62677  | 67357  |
| 0.70                   | 1.50           | 1.50            | 30 | 62678  | 67358  |
| 0.75                   | 1.50           | 1.50            | 30 | 62679  | 67359  |
| 0.80                   | 2.00           | 1.50            | 30 | 52126  | 60989  |
| 0.85                   | 2.00           | 1.50            | 30 | 52127  | 67360  |
| 0.90                   | 2.00           | 1.50            | 30 | 52128  | 60990  |
| 0.95                   | 2.00           | 1.50            | 30 | 52129  | 67361  |
| 1.00                   | 2.00           | 1.50            | 30 | 52130  | 60991  |
| 1.05                   | 2.00           | 1.50            | 30 | 52131  | 67362  |
| 1.10                   | 2.00           | 1.50            | 30 | 52132  | 60992  |
| 1.15                   | 2.40           | 1.50            | 30 | 52133  | 62487  |
| 1.20                   | 2.40           | 1.50            | 30 | 52134  | 60993  |
| 1.25                   | 2.40           | 1.50            | 30 | 52135  | 67363  |
| 1.30                   | 2.40           | 1.50            | 30 | 52136  | 60994  |
| 1.35                   | 2.40           | 1.50            | 30 | 52137  | 67364  |
| 1.40                   | 2.40           | 1.50            | 30 | 52138  | 63485  |
| 1.45                   | 2.40           | 1.50            | 30 | 52139  | 67365  |
| 1.50                   | 3.00           | 2.00            | 32 | 981825 | 981839 |
| 1.55                   | 3.00           | 2.00            | 32 | 981826 | 981840 |
| 1.60                   | 3.00           | 2.00            | 32 | 981827 | 981841 |
| 1.65                   | 3.00           | 2.00            | 32 | 981828 | 981842 |
| 1.70                   | 3.00           | 2.00            | 32 | 981829 | 981843 |
| 1.75                   | 3.50           | 2.00            | 32 | 981830 | 981844 |

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | DICUT  |
|------------------------|----------------|-----------------|----|--------|--------|
| 1.80                   | 3.50           | 2.00            | 32 | 981831 | 981845 |
| 1.85                   | 3.50           | 2.00            | 32 | 981832 | 981847 |
| 1.90                   | 3.50           | 2.00            | 32 | 981833 | 981848 |
| 1.95                   | 3.50           | 2.00            | 32 | 981834 | 981849 |
| 2.00                   | 4.00           | 2.50            | 32 | 981317 | 981325 |
| 2.10                   | 4.00           | 2.50            | 32 | 981835 | 981850 |
| 2.20                   | 4.00           | 2.50            | 32 | 981836 | 981852 |
| 2.30                   | 4.00           | 2.50            | 32 | 981837 | 981853 |
| 2.40                   | 4.00           | 2.50            | 32 | 981838 | 981854 |
| 2.50                   | 4.00           | 2.50            | 32 | 981320 | 981327 |





BOHRSENKER



- Bohrsenker, für allgemeine Bearbeitungen.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗                 | ⊗ | ⊗ | ⊗ | ○              | ○  | ○                | ○  | ⊗                                    | ⊗    | ⊗    | ⊗    | ⊗        | ⊗  | ⊗                | ⊗  | ⊗                  | ⊗  |

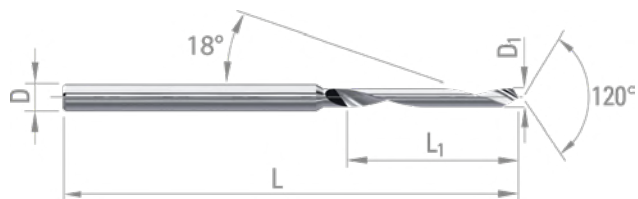
  

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ⊗                       | ⊗  | ⊗                       | ⊗  | ⊗  | ⊗                 | ⊗                      | ⊗  | ⊗            | ⊗       | ⊗          | ⊗    | ○                       | ○  | ○     | ⊗                        | ⊗  |    |                  |    |                  |  |

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM   | TiAlN |
|------------------------|----------------|-----------------|----|-------|-------|
| 0.80                   | 2.00           | 3               | 38 | 60268 | 64055 |
| 0.85                   | 2.00           | 3               | 38 | 60269 | 67239 |
| 0.90                   | 2.00           | 3               | 38 | 60270 | 64000 |
| 0.95                   | 2.00           | 3               | 38 | 60271 | 67240 |
| 1.00                   | 2.00           | 3               | 38 | 60272 | 64056 |
| 1.05                   | 2.00           | 3               | 38 | 60273 | 67241 |
| 1.10                   | 2.00           | 3               | 38 | 60274 | 63523 |
| 1.15                   | 2.40           | 3               | 38 | 60275 | 67242 |
| 1.20                   | 2.40           | 3               | 38 | 60276 | 64001 |
| 1.25                   | 2.40           | 3               | 38 | 60277 | 67243 |
| 1.30                   | 2.40           | 3               | 38 | 60278 | 67244 |
| 1.35                   | 2.40           | 3               | 38 | 60279 | 67245 |
| 1.40                   | 2.40           | 3               | 38 | 60280 | 64002 |
| 1.45                   | 2.40           | 3               | 38 | 60281 | 67246 |



KANONENBOHRER



- Kanonenbohrer. Werkzeuge, die entwickelt wurden, um hochpräzise Bohrungen mit hoher Oberflächengüte in gut zerspanbaren Werkstoffen herzustellen.
- $D1 \pm 1 \mu\text{m}$  auf Anfrage
- Andere Durchmesser bis  $\varnothing 5.99$  auf Anfrage

○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLIX / PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗ |                   |   |   |   |                |    |                  |    |                                      |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      |                         | S  |       |    |                          |    | H                |    |                  |  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|----|--------------------------|----|------------------|----|------------------|--|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       |    | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |  |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36 | 37                       | 38 | 39               | 40 | 41               |  |  |
| Empfehlungen           | ⊗                       | ⊗  | ○                       | ○  | ○  | ⊗                 | ⊗                      | ⊗  | ⊗            |         |            |      |                         |    |       |    |                          |    |                  |    |                  |  |  |

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM    |
|-----------------|-------|----------|----|--------|
| 0.10            | 0.70  | 1.00     | 30 | 955371 |
| 0.15            | 1.00  | 1.00     | 30 | 955374 |
| 0.20            | 1.00  | 1.00     | 30 | 955375 |
| 0.25            | 1.00  | 1.00     | 30 | 955377 |
| 0.30            | 1.50  | 1.00     | 30 | 955378 |
| 0.35            | 1.50  | 1.00     | 30 | 955379 |
| 0.40            | 2.00  | 1.00     | 30 | 955380 |
| 0.45            | 3.60  | 1.00     | 30 | 955381 |
| 0.50            | 4.00  | 1.00     | 30 | 955382 |
| 0.55            | 4.50  | 1.00     | 30 | 955383 |
| 0.60            | 4.50  | 1.00     | 30 | 955384 |
| 0.65            | 5.00  | 1.00     | 30 | 955385 |
| 0.70            | 5.60  | 1.00     | 30 | 955386 |
| 0.75            | 5.60  | 1.00     | 30 | 955387 |
| 0.80            | 6.30  | 1.50     | 30 | 955388 |
| 0.85            | 6.30  | 1.50     | 30 | 955389 |
| 0.90            | 7.10  | 1.50     | 30 | 955390 |

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM    |
|-----------------|-------|----------|----|--------|
| 0.95            | 7.10  | 1.50     | 30 | 955391 |
| 1.00            | 9.00  | 1.50     | 30 | 955392 |
| 1.05            | 9.00  | 1.50     | 30 | 955393 |
| 1.10            | 9.00  | 1.50     | 30 | 955394 |
| 1.15            | 9.00  | 1.50     | 30 | 955395 |
| 1.20            | 10.00 | 1.50     | 30 | 955396 |
| 1.30            | 10.00 | 1.50     | 30 | 965839 |
| 1.40            | 11.20 | 1.50     | 30 | 965840 |
| 1.45            | 11.20 | 1.50     | 30 | 965841 |
| 1.50            | 12.00 | 2.00     | 38 | 961881 |
| 1.60            | 12.00 | 2.00     | 38 | 965842 |
| 1.65            | 12.00 | 2.00     | 38 | 965843 |
| 1.70            | 12.00 | 2.00     | 38 | 961882 |
| 1.75            | 12.00 | 2.00     | 38 | 965844 |
| 1.80            | 12.00 | 2.00     | 38 | 961883 |
| 2.00            | 12.00 | 2.50     | 43 | 959038 |



P.76



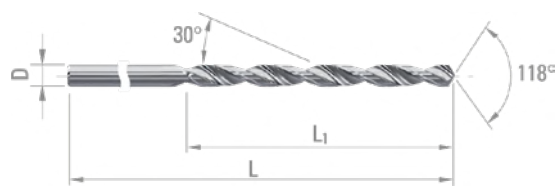
P.73



$D_1 \geq 3.1$



SPIRALBOHRER



- Spiralbohrer, zylindrisch, universeller Einsatz für große Bohrungstiefen ( $> 8 \times D_1$ ).
- Die DICUT-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                    | ○    | ○    | ○    | ⊙        | ⊙  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |  |
| Empfehlungen           | ⊙                       | ⊙  | ○                       | ○  | ○  | ⊙                 | ○                      | ○  | ○            | ⊙       | ○          | ○    | ○                       | ○  |       | ○                        | ○  |    |                  |    |                  |  |  |

| $D_{h5}$ | $L_1$ | L  | VHM   | DICUT |
|----------|-------|----|-------|-------|
| 1.00     | 12    | 34 | 40244 | 53697 |
| 1.10     | 14    | 36 | 40656 | 53698 |
| 1.20     | 16    | 38 | 40657 | 53699 |
| 1.30     | 16    | 38 | 40658 | 53700 |
| 1.40     | 18    | 40 | 40659 | 53701 |
| 1.50     | 18    | 40 | 40077 | 53702 |
| 1.60     | 20    | 43 | 40703 | 53703 |
| 1.70     | 20    | 43 | 38677 | 53704 |
| 1.80     | 22    | 46 | 41510 | 53705 |
| 1.90     | 22    | 46 | 41370 | 53706 |
| 2.00     | 24    | 49 | 41593 | 53707 |
| 2.10     | 24    | 49 | 40707 | 53708 |
| 2.20     | 27    | 53 | 40125 | 53709 |
| 2.30     | 27    | 53 | 43515 | 53710 |
| 2.40     | 30    | 57 | 45074 | 53711 |
| 2.50     | 30    | 57 | 40978 | 53712 |
| 2.60     | 30    | 57 | 40607 | 53713 |
| 2.70     | 33    | 61 | 41318 | 53714 |
| 2.80     | 33    | 61 | 41024 | 54284 |
| 2.90     | 33    | 61 | 40608 | 53715 |
| 3.00     | 33    | 61 | 40059 | 53716 |
| 3.10     | 36    | 65 | 40173 | 53717 |
| 3.20     | 36    | 65 | 41511 | 53718 |
| 3.30     | 36    | 65 | 40575 | 53736 |
| 3.40     | 39    | 70 | 41247 | 53737 |
| 3.50     | 39    | 70 | 41451 | 53738 |
| 3.60     | 39    | 70 | 40078 | 53739 |
| 3.70     | 39    | 70 | 40174 | 53740 |
| 3.80     | 43    | 75 | 40060 | 53741 |

| $D_{h5}$ | $L_1$ | L   | VHM   | DICUT |
|----------|-------|-----|-------|-------|
| 3.90     | 43    | 75  | 43676 | 53742 |
| 4.00     | 43    | 75  | 43497 | 53743 |
| 4.10     | 43    | 75  | 41218 | 53744 |
| 4.20     | 43    | 75  | 41295 | 53745 |
| 4.30     | 47    | 80  | 41452 | 53746 |
| 4.40     | 47    | 80  | 42866 | 53747 |
| 4.50     | 47    | 80  | 40263 | 53748 |
| 4.60     | 47    | 80  | 41991 | 53749 |
| 4.70     | 47    | 80  | 34710 | 53750 |
| 4.80     | 52    | 86  | 40126 | 53751 |
| 4.90     | 52    | 86  | 42661 | 53752 |
| 5.00     | 52    | 86  | 40061 | 53753 |
| 5.10     | 52    | 86  | 42022 | 53754 |
| 5.20     | 52    | 86  | 40062 | 53755 |
| 5.30     | 52    | 86  | 40063 | 53756 |
| 5.40     | 57    | 93  | 40064 | 53757 |
| 5.50     | 57    | 93  | 40065 | 53758 |
| 5.60     | 57    | 93  | 41992 | 53759 |
| 5.70     | 57    | 93  | 43357 | 53760 |
| 5.80     | 57    | 93  | 40864 | 53761 |
| 5.90     | 57    | 93  | 40258 | 53762 |
| 6.00     | 57    | 93  | 39996 | 53763 |
| 6.10     | 63    | 101 | 40704 | 54264 |
| 6.20     | 63    | 101 | 40066 | 54267 |
| 6.30     | 63    | 101 | 40067 | 54283 |
| 6.40     | 63    | 101 | 40068 | 54287 |
| 6.50     | 63    | 101 | 40069 | 54290 |
| 6.60     | 63    | 101 | 40070 | 54293 |
| 6.70     | 63    | 101 | 40071 | 54304 |



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 $D_1 \geq 3.1$ DIN  
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| $D_{h5}$ | $L_1$ | L   | VHM   | DICUT |
|----------|-------|-----|-------|-------|
| 6.80     | 69    | 109 | 40943 | 54306 |
| 6.90     | 69    | 109 | 41512 | 54309 |
| 7.00     | 69    | 109 | 40072 | 54312 |
| 7.50     | 69    | 109 | 40912 | 54315 |
| 7.70     | 75    | 117 | 53196 | 54318 |
| 7.80     | 75    | 117 | 45792 | 54321 |
| 8.00     | 75    | 117 | 40073 | 54324 |
| 8.50     | 75    | 117 | 40074 | 54811 |
| 9.00     | 81    | 125 | 40075 | 54778 |
| 9.50     | 81    | 125 | 41641 | 54781 |
| 10.00    | 87    | 133 | 40812 | 54784 |
| 10.20    | 87    | 133 | 40944 | 54787 |
| 10.50    | 87    | 133 | 34732 | 54790 |
| 11.00    | 94    | 142 | 40127 | 54793 |
| 11.50    | 94    | 142 | 40865 | 54795 |
| 12.00    | 101   | 151 | 41513 | 54798 |
| 12.50    | 101   | 151 | 41642 | 54801 |
| 13.00    | 101   | 151 | 40660 | 54804 |
| 13.50    | 108   | 160 | 40076 | 54807 |
| 14.00    | 108   | 160 | 40771 | 54810 |



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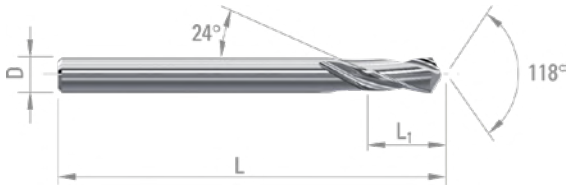
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$D_1 \geq 3.1$



SPIRALBOHRER



- Spiralbohrer, zylindrisch, universell einsetzbar für mittlere Bohrungstiefen (<math>5 \times D\_1</math>).
- Die DICUT-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLIX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                    | ○    | ○    | ○    | ⊙        | ⊙  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ○                       | ○  | ○  | ⊙                 | ○                      | ○  | ○            | ⊙       | ○          | ○    | ○                       | ○  |       | ⊙                        | ⊙  |                  |    |                  |    |

| $D_{h5}$ | $L_1$ | L  | VHM   | DICUT  |
|----------|-------|----|-------|--------|
| 0.30     | 5     | 30 | 24828 | 953165 |
| 0.35     | 5     | 30 | 37861 | 953167 |
| 0.40     | 6     | 30 | 244   | 953169 |
| 0.45     | 6     | 30 | 245   | 953171 |
| 0.50     | 6     | 30 | 246   | 54480  |
| 0.55     | 6     | 30 | 247   | 54481  |
| 0.60     | 6     | 30 | 248   | 54482  |
| 0.65     | 6     | 30 | 249   | 54483  |
| 0.70     | 6     | 30 | 250   | 54484  |
| 0.75     | 6     | 30 | 251   | 54485  |
| 0.80     | 7     | 30 | 252   | 54487  |
| 0.85     | 7     | 30 | 253   | 54486  |
| 0.90     | 7     | 30 | 254   | 54528  |
| 0.95     | 7     | 30 | 255   | 54488  |
| 1.00     | 7     | 30 | 256   | 54490  |
| 1.05     | 8     | 30 | 257   | 54491  |
| 1.10     | 8     | 30 | 258   | 54492  |
| 1.15     | 8     | 30 | 259   | 54493  |
| 1.20     | 8     | 30 | 260   | 54494  |
| 1.25     | 8     | 30 | 261   | 54495  |
| 1.30     | 8     | 30 | 262   | 54496  |
| 1.35     | 8     | 30 | 263   | 54497  |
| 1.40     | 8     | 30 | 264   | 54498  |
| 1.45     | 8     | 30 | 265   | 54499  |
| 1.50     | 8     | 30 | 266   | 54500  |
| 1.55     | 9     | 38 | 267   | 54501  |
| 1.60     | 9     | 38 | 268   | 54502  |
| 1.65     | 9     | 38 | 269   | 54503  |
| 1.70     | 9     | 38 | 270   | 54504  |

| $D_{h5}$ | $L_1$ | L  | VHM   | DICUT |
|----------|-------|----|-------|-------|
| 1.75     | 9     | 38 | 271   | 54505 |
| 1.80     | 9     | 38 | 272   | 54506 |
| 1.85     | 9     | 38 | 32277 | 54507 |
| 1.90     | 9     | 38 | 274   | 54509 |
| 1.95     | 9     | 38 | 275   | 54508 |
| 2.00     | 9     | 38 | 276   | 54510 |
| 2.05     | 9     | 38 | 39575 | 54511 |
| 2.10     | 9     | 38 | 39757 | 54512 |
| 2.15     | 10    | 40 | 33192 | 54513 |
| 2.20     | 10    | 40 | 39655 | 54514 |
| 2.25     | 10    | 40 | 4562  | 54516 |
| 2.30     | 10    | 40 | 43350 | 54529 |
| 2.35     | 10    | 40 | 1756  | 54530 |
| 2.40     | 11    | 43 | 42869 | 54531 |
| 2.45     | 11    | 43 | 4563  | 54532 |
| 2.50     | 11    | 43 | 43351 | 54533 |
| 2.55     | 11    | 43 | 41514 | 54534 |
| 2.60     | 11    | 43 | 41874 | 54535 |
| 2.65     | 11    | 43 | 4564  | 54536 |
| 2.70     | 12    | 46 | 42139 | 54539 |
| 2.75     | 12    | 46 | 4565  | 54537 |
| 2.80     | 12    | 46 | 42339 | 54538 |
| 2.85     | 12    | 46 | 42522 | 54540 |
| 2.90     | 12    | 46 | 41911 | 54541 |
| 2.95     | 12    | 46 | 41501 | 54542 |
| 3.00     | 12    | 46 | 41840 | 54543 |
| 3.05     | 14    | 49 | 4607  | 54544 |
| 3.10     | 14    | 49 | 41456 | 54545 |
| 3.15     | 14    | 49 | 1757  | 54546 |





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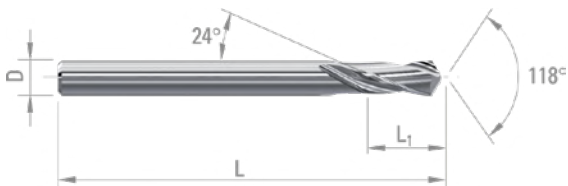
 $D_1 \geq 3.1$ 

| $D_{h5}$ | $L_1$ | L  | VHM   | DICUT |
|----------|-------|----|-------|-------|
| 3.20     | 14    | 49 | 42023 | 54547 |
| 3.25     | 14    | 49 | 3356  | 54548 |
| 3.30     | 14    | 49 | 290   | 54549 |
| 3.35     | 14    | 49 | 4567  | 54550 |
| 3.40     | 15    | 52 | 42200 | 54551 |
| 3.45     | 15    | 52 | 4020  | 54552 |
| 3.50     | 15    | 52 | 41534 | 54553 |
| 3.55     | 15    | 52 | 4568  | 54554 |
| 3.60     | 15    | 52 | 41535 | 54556 |
| 3.65     | 15    | 52 | 42523 | 54557 |
| 3.70     | 15    | 52 | 43037 | 54558 |
| 3.75     | 15    | 52 | 4570  | 54560 |
| 3.80     | 17    | 55 | 4610  | 54562 |
| 3.85     | 17    | 55 | 4571  | 54563 |
| 3.90     | 17    | 55 | 4142  | 54565 |
| 3.95     | 17    | 55 | 42870 | 54567 |
| 4.00     | 17    | 55 | 42093 | 54568 |
| 4.05     | 17    | 55 | 42871 | 54569 |
| 4.10     | 17    | 55 | 42652 | 54570 |
| 4.15     | 17    | 55 | 15177 | 54571 |
| 4.20     | 17    | 55 | 42340 | 54572 |
| 4.25     | 17    | 55 | 39938 | 54573 |
| 4.30     | 18    | 58 | 301   | 54574 |
| 4.35     | 18    | 58 | 39939 | 54575 |
| 4.40     | 18    | 58 | 29689 | 54576 |
| 4.45     | 18    | 58 | 4616  | 54577 |
| 4.50     | 18    | 58 | 303   | 54578 |
| 4.55     | 18    | 58 | 40790 | 54579 |
| 4.60     | 18    | 58 | 39013 | 54580 |
| 4.65     | 18    | 58 | 19790 | 54581 |
| 4.70     | 18    | 58 | 42170 | 54582 |
| 4.75     | 18    | 58 | 40791 | 54583 |
| 4.80     | 20    | 62 | 29756 | 54584 |
| 4.85     | 20    | 62 | 42524 | 54585 |
| 4.90     | 20    | 62 | 41914 | 54586 |
| 4.95     | 20    | 62 | 39997 | 54587 |
| 5.00     | 20    | 62 | 29758 | 54588 |
| 5.10     | 20    | 62 | 29759 | 54589 |
| 5.20     | 20    | 62 | 29760 | 54590 |
| 5.30     | 20    | 62 | 29761 | 54593 |
| 5.40     | 21    | 66 | 29693 | 54594 |
| 5.50     | 21    | 66 | 29694 | 54595 |
| 5.60     | 21    | 66 | 41594 | 54596 |

| $D_{h5}$ | $L_1$ | L   | VHM   | DICUT  |
|----------|-------|-----|-------|--------|
| 5.70     | 21    | 66  | 45724 | 54597  |
| 5.80     | 21    | 66  | 316   | 54599  |
| 5.90     | 21    | 66  | 28594 | 54600  |
| 6.00     | 21    | 66  | 42173 | 54601  |
| 6.10     | 23    | 70  | 29762 | 54602  |
| 6.20     | 23    | 70  | 41457 | 54618  |
| 6.30     | 23    | 70  | 29764 | 54619  |
| 6.40     | 23    | 70  | 42171 | 54620  |
| 6.50     | 23    | 70  | 42220 | 54621  |
| 6.60     | 23    | 70  | 41515 | 54622  |
| 6.70     | 23    | 70  | 41680 | 54623  |
| 6.80     | 25    | 74  | 326   | 54624  |
| 6.90     | 25    | 74  | 327   | 54625  |
| 7.00     | 25    | 74  | 328   | 54626  |
| 7.10     | 25    | 74  | 8646  | 54627  |
| 7.20     | 25    | 74  | 50671 | 54628  |
| 7.30     | 25    | 74  | 53054 | 54629  |
| 7.50     | 25    | 74  | 5389  | 54631  |
| 7.60     | 27    | 79  | 53056 | 54632  |
| 7.70     | 27    | 79  | 22351 | 54633  |
| 7.80     | 27    | 79  | 50331 | 54634  |
| 7.90     | 27    | 79  | 53057 | 54635  |
| 8.00     | 27    | 79  | 42821 | 54636  |
| 8.10     | 27    | 79  | 53058 | 54639  |
| 8.20     | 27    | 79  | 25291 | 54640  |
| 8.30     | 27    | 79  | 53479 | 54641  |
| 8.40     | 27    | 79  | 53059 | 54642  |
| 8.50     | 27    | 79  | 42653 | 54643  |
| 8.80     | 29    | 84  | 57852 | 59399  |
| 9.00     | 29    | 84  | 35325 | 54644  |
| 9.20     | 29    | 84  | 57851 | 59401  |
| 9.50     | 29    | 84  | 39660 | 54645  |
| 9.80     | 31    | 89  | 57853 | 963531 |
| 10.00    | 31    | 89  | 7958  | 54646  |
| 10.20    | 31    | 89  | 34340 | 54647  |
| 10.50    | 31    | 89  | 30130 | 54648  |
| 11.00    | 33    | 95  | 28591 | 54649  |
| 11.50    | 33    | 95  | 41092 | 54650  |
| 12.00    | 35    | 102 | 14939 | 54651  |
| 13.00    | 35    | 102 | 21462 | 54653  |
| 13.50    | 37    | 107 | 45725 | 54654  |
| 14.00    | 37    | 107 | 23729 | 54655  |



SPIRALBOHRER, LINKSSCHNEIDEND



- Spiralbohrer, zylindrisch, links gedreht, universell einsetzbar für mittlere Bohrungstiefen (<5×D1).
- Die DICUT-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                   |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|-------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLIX /PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                   | ○    | ○    | ○    | ⊗        | ⊗  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |    |                        |   |              | S       |            |      |                         |       |    | H                        |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|----|------------------------|---|--------------|---------|------------|------|-------------------------|-------|----|--------------------------|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung |    | Cu-Legierung Schwierig |   | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |       |    | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27 | 28                     | - | -            | 29      | 30         | 31   | 32                      | 33-35 | 36 | 37                       | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ⊗                       | ⊗  | ○                       | ○  | ○  | ⊗                 | ○  | ○                      | ○ | ○            | ⊗       | ○          | ○    | ○                       |       | ⊗  | ⊗                        |    |                  |    |                  |  |

| D <sub>h5</sub> | L <sub>1</sub> | L  | VHM   | DICUT  |
|-----------------|----------------|----|-------|--------|
| 0.30            | 5              | 30 | 37906 | 953748 |
| 0.35            | 5              | 30 | 37907 | 953752 |
| 0.40            | 6              | 30 | 330   | 953754 |
| 0.45            | 6              | 30 | 331   | 953758 |
| 0.50            | 6              | 30 | 332   | 54659  |
| 0.55            | 6              | 30 | 333   | 54660  |
| 0.60            | 6              | 30 | 334   | 54661  |
| 0.65            | 6              | 30 | 335   | 54662  |
| 0.70            | 6              | 30 | 336   | 54663  |
| 0.75            | 6              | 30 | 37908 | 54664  |
| 0.80            | 8              | 30 | 338   | 54665  |
| 0.85            | 8              | 30 | 339   | 54666  |
| 0.90            | 8              | 30 | 340   | 54667  |
| 0.95            | 8              | 30 | 341   | 54668  |
| 1.00            | 8              | 30 | 29560 | 54669  |
| 1.05            | 10             | 30 | 343   | 54670  |
| 1.10            | 10             | 30 | 344   | 54671  |
| 1.15            | 10             | 30 | 345   | 54672  |
| 1.20            | 10             | 30 | 346   | 54673  |
| 1.25            | 10             | 30 | 347   | 54674  |
| 1.30            | 10             | 30 | 348   | 54675  |
| 1.35            | 10             | 30 | 349   | 54676  |
| 1.40            | 10             | 30 | 350   | 54677  |
| 1.45            | 10             | 30 | 351   | 54678  |
| 1.50            | 10             | 30 | 352   | 54679  |
| 1.55            | 16             | 38 | 38634 | 54680  |
| 1.60            | 16             | 38 | 38826 | 54681  |
| 1.65            | 16             | 38 | 39127 | 54682  |
| 1.70            | 16             | 38 | 39126 | 54683  |

| D <sub>h5</sub> | L <sub>1</sub> | L  | VHM   | DICUT |
|-----------------|----------------|----|-------|-------|
| 1.75            | 16             | 38 | 38827 | 54684 |
| 1.80            | 16             | 38 | 395   | 54685 |
| 1.85            | 16             | 38 | 38921 | 54686 |
| 1.90            | 16             | 38 | 30637 | 54687 |
| 1.95            | 16             | 38 | 38997 | 54688 |
| 2.00            | 16             | 38 | 35181 | 54689 |
| 2.05            | 16             | 38 | 27526 | 54690 |
| 2.10            | 16             | 38 | 39657 | 54691 |
| 2.15            | 16             | 40 | 39041 | 54692 |
| 2.20            | 16             | 40 | 38965 | 54693 |
| 2.25            | 16             | 40 | 40245 | 54694 |
| 2.30            | 16             | 40 | 38769 | 54695 |
| 2.35            | 16             | 40 | 26575 | 54696 |
| 2.40            | 16             | 43 | 23429 | 54698 |
| 2.45            | 16             | 43 | 45720 | 54699 |
| 2.50            | 16             | 43 | 43245 | 54700 |
| 2.55            | 16             | 43 | 41034 | 54701 |
| 2.60            | 16             | 43 | 39043 | 54702 |
| 2.65            | 16             | 43 | 4026  | 54703 |
| 2.70            | 16             | 46 | 40247 | 54704 |
| 2.75            | 16             | 46 | 43036 | 54705 |
| 2.80            | 16             | 46 | 370   | 54706 |
| 2.85            | 16             | 46 | 40266 | 54707 |
| 2.90            | 16             | 46 | 40793 | 54708 |
| 2.95            | 16             | 46 | 40511 | 54709 |
| 3.00            | 16             | 46 | 42787 | 54710 |
| 3.05            | 18             | 49 | 40079 | 54711 |
| 3.10            | 18             | 49 | 40661 | 54712 |
| 3.15            | 18             | 49 | 40794 | 54713 |



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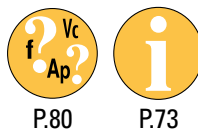


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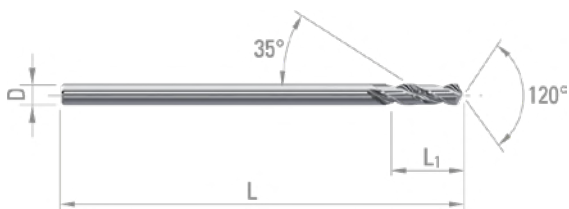
 $D_1 \geq 3.1$ 

## SPIRALBOHRER, LINKSSCHNEIDEND

| $D_{h5}$ | $L_1$ | L  | VHM   | DICUT |
|----------|-------|----|-------|-------|
| 3.20     | 18    | 49 | 40267 | 54714 |
| 3.25     | 18    | 49 | 40080 | 54715 |
| 3.30     | 18    | 49 | 375   | 54716 |
| 3.35     | 18    | 49 | 40296 | 54717 |
| 3.40     | 20    | 50 | 376   | 54718 |
| 3.45     | 20    | 50 | 37957 | 54719 |
| 3.50     | 20    | 50 | 377   | 54720 |
| 3.55     | 20    | 50 | 41596 | 54721 |
| 3.60     | 20    | 50 | 40662 | 54722 |
| 3.65     | 20    | 50 | 40797 | 54723 |
| 3.70     | 20    | 50 | 379   | 54724 |
| 3.75     | 20    | 50 | 38922 | 54725 |
| 3.80     | 22    | 50 | 40172 | 54726 |
| 3.85     | 22    | 50 | 37960 | 54727 |
| 3.90     | 22    | 50 | 38923 | 54728 |
| 3.95     | 22    | 50 |       | 54729 |
| 4.00     | 22    | 50 | 382   | 54730 |
| 4.05     | 22    | 50 | 40801 | 54731 |
| 4.10     | 22    | 50 | 383   | 54732 |
| 4.15     | 22    | 50 | 40576 | 54733 |
| 4.20     | 22    | 50 | 384   | 54734 |
| 4.25     | 22    | 50 | 39658 | 54735 |
| 4.30     | 24    | 50 | 385   | 54736 |
| 4.35     | 24    | 50 | 37966 | 54737 |
| 4.45     | 24    | 50 | 27518 | 54739 |
| 4.50     | 24    | 50 | 387   | 54740 |
| 4.55     | 24    | 50 | 37968 |       |
| 4.85     | 25    | 50 | 37971 | 54747 |
| 4.95     | 25    | 50 | 37972 | 54749 |
| 5.00     | 25    | 50 | 392   | 54750 |
| 5.20     | 25    | 50 | 4141  |       |
| 5.50     | 25    | 50 | 27042 | 54755 |
| 5.60     | 25    | 50 | 27041 | 54756 |
| 5.90     | 25    | 50 | 6489  | 54759 |
| 6.00     | 28    | 66 | 43390 | 54760 |
| 6.50     | 31    | 70 | 37994 | 54765 |
| 6.60     | 31    | 70 | 37996 | 54766 |
| 6.70     | 31    | 70 |       | 54767 |



SPIRALBOHRER



- Spiralbohrer, zylindrisch. Werkzeug entwickelt für langspanige Materialien.
- Die DICUT-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ⊙                | ⊙  | ⊙                                  | ⊙    | ⊙    | ⊙    | ⊙        | ⊙  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ⊙            | ⊙       | ○          | ○    | ○                       | ○  |       | ⊙                        | ⊙  |                  |    |                  |    |

| D <sub>h5</sub> | L <sub>1</sub> | L  | VHM   | DICUT  |
|-----------------|----------------|----|-------|--------|
| 0.40            | 6              | 30 | 197   | 953186 |
| 0.45            | 6              | 30 | 198   | 58925  |
| 0.50            | 6              | 30 | 199   | 53585  |
| 0.55            | 6              | 30 | 200   | 53586  |
| 0.60            | 6              | 30 | 201   | 53582  |
| 0.65            | 6              | 30 | 202   | 53588  |
| 0.70            | 6              | 30 | 203   | 53589  |
| 0.75            | 6              | 30 | 204   | 53587  |
| 0.80            | 7              | 30 | 205   | 53590  |
| 0.85            | 7              | 30 | 206   | 53591  |
| 0.90            | 7              | 30 | 207   | 53592  |
| 0.95            | 7              | 30 | 208   | 53593  |
| 1.00            | 7              | 30 | 40275 | 53583  |
| 1.05            | 8              | 30 | 210   | 53594  |
| 1.10            | 8              | 30 | 41502 | 53595  |
| 1.15            | 8              | 30 | 212   | 53596  |
| 1.20            | 8              | 30 | 41150 | 53597  |
| 1.25            | 8              | 30 | 41319 | 53598  |
| 1.30            | 8              | 30 | 215   | 53599  |
| 1.35            | 8              | 30 | 41320 | 53600  |
| 1.40            | 8              | 30 | 217   | 53584  |
| 1.45            | 8              | 30 | 218   | 53601  |
| 1.50            | 8              | 30 | 219   | 53602  |
| 1.55            | 9              | 38 | 220   | 53604  |
| 1.60            | 9              | 38 | 221   | 53605  |
| 1.65            | 9              | 38 | 5418  | 53606  |
| 1.70            | 9              | 38 | 222   | 53607  |
| 1.75            | 9              | 38 | 42537 | 53608  |

| D <sub>h5</sub> | L <sub>1</sub> | L  | VHM   | DICUT |
|-----------------|----------------|----|-------|-------|
| 1.80            | 9              | 38 | 223   | 53609 |
| 1.85            | 9              | 38 | 42538 | 53610 |
| 1.90            | 9              | 38 | 224   | 53611 |
| 1.95            | 9              | 38 | 42539 | 53612 |
| 2.00            | 9              | 38 | 225   | 53613 |



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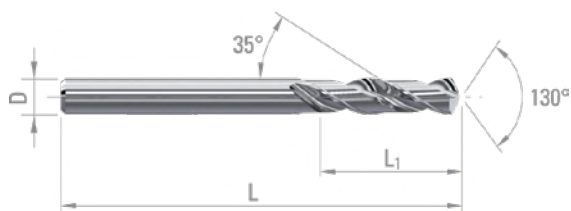


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$D_1 \geq 3.1$

SPIRALBOHRER



- Spiralbohrer, zylindrisch. Werkzeug entwickelt für das Bohren von weichen, langspanigen Werkstoffen.
- Die DICUT-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

○ gut    ⊗ ausgezeichnet

| ISO          | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |          |      | K                |    |                    |    |    |    |
|--------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|----------|------|------------------|----|--------------------|----|----|----|
|              | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |      | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |
| VDI 3323     | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3     | 14.4 | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○  | ⊗                | ⊗  | ⊗                                    | ⊗    | ⊗        | ⊗    | ⊗                | ⊗  | ○                  | ○  | ○  | ○  |

| ISO          | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          | H  |                  |    |                  |    |
|--------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
|              | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323     | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen | ⊗                       | ⊗  | ⊗                       | ⊗  | ⊗  | ⊗                 | ⊗                      | ⊗  | ⊗            | ⊗       | ○          | ○    | ○                       | ○  |       | ○                        | ○  |                  |    |                  |    |

| $D_{h5}$ | $L_1$ | L  | VHM  | DICUT |
|----------|-------|----|------|-------|
| 0.50     | 9     | 38 | 91   | 57557 |
| 0.55     | 9     | 38 | 92   | 57558 |
| 0.60     | 13    | 38 | 93   | 57559 |
| 0.65     | 13    | 38 | 94   | 57560 |
| 0.70     | 13    | 38 | 95   | 55471 |
| 0.75     | 13    | 38 | 96   | 55473 |
| 0.80     | 13    | 38 | 97   | 55475 |
| 0.85     | 13    | 38 | 98   | 55482 |
| 0.90     | 16    | 38 | 99   | 55599 |
| 0.95     | 16    | 38 | 100  | 55601 |
| 1.00     | 16    | 38 | 101  | 55603 |
| 1.05     | 16    | 38 | 102  | 55605 |
| 1.10     | 16    | 38 | 103  | 55607 |
| 1.15     | 16    | 38 | 104  | 55609 |
| 1.20     | 16    | 38 | 105  | 55611 |
| 1.25     | 16    | 38 | 106  | 55613 |
| 1.30     | 16    | 38 | 107  | 55615 |
| 1.35     | 16    | 38 | 108  | 55617 |
| 1.40     | 16    | 38 | 109  | 55619 |
| 1.45     | 16    | 38 | 110  | 55621 |
| 1.50     | 16    | 38 | 111  | 55623 |
| 1.55     | 16    | 38 | 2972 | 55625 |
| 1.60     | 16    | 38 | 112  | 55627 |
| 1.65     | 16    | 38 | 3360 | 55629 |
| 1.70     | 16    | 38 | 113  | 55631 |
| 1.75     | 16    | 38 | 3361 | 55633 |
| 1.80     | 16    | 38 | 114  | 55635 |
| 1.85     | 16    | 38 | 115  | 55637 |
| 1.90     | 16    | 38 | 116  | 55639 |
| 1.95     | 16    | 38 | 3362 | 55641 |

| $D_{h5}$ | $L_1$ | L  | VHM   | DICUT |
|----------|-------|----|-------|-------|
| 2.00     | 16    | 38 | 117   | 55643 |
| 2.10     | 16    | 38 | 118   | 55645 |
| 2.20     | 16    | 40 | 119   | 55647 |
| 2.30     | 16    | 40 | 120   | 55649 |
| 2.40     | 16    | 43 | 121   | 55651 |
| 2.50     | 16    | 43 | 122   | 55653 |
| 2.60     | 16    | 43 | 35575 | 55655 |
| 3.00     | 16    | 46 | 35726 | 55657 |
| 3.30     | 18    | 49 | 35665 | 55659 |
| 3.50     | 20    | 50 | 35727 | 55661 |
| 4.00     | 22    | 55 | 34062 | 55663 |
| 4.20     | 22    | 55 | 35728 | 55665 |
| 4.50     | 24    | 58 | 35729 | 55667 |
| 5.00     | 26    | 62 | 35730 | 55669 |
| 5.50     | 28    | 66 | 45735 | 55671 |
| 6.00     | 28    | 66 | 45736 | 55673 |



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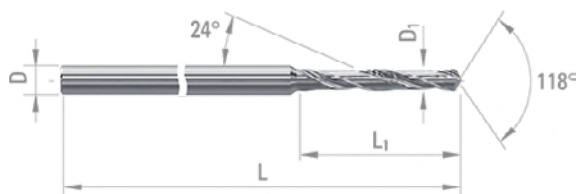


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DIN 1899

SPIRALBOHRER  
VERSTÄRKTER SCHAFT



- Spiralbohrer, verstärkter Schaft. Für allgemeine Bearbeitungen.
- Die DLC-Beschichtung verbessert die Standzeit in NE-Metallen bei der Trocken- oder Nassbearbeitung.
- Die DICUT-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLIX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ⊙        | ⊙  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ○                      | ○  | ⊙            | ⊙       | ○          | ○    | ○                       | ○  |       | ⊙                        | ⊙  |                  |    |                  |    |

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | DICUT  | DLC*   |
|------------------------|----------------|-----------------|----|--------|--------|--------|
| 0.05                   | 0.35           | 1.00            | 30 | 962703 |        |        |
| 0.06                   | 0.40           | 1.00            | 30 | 962702 |        |        |
| 0.07                   | 0.50           | 1.00            | 30 | 962701 |        |        |
| 0.08                   | 0.60           | 1.00            | 30 | 962700 |        |        |
| 0.09                   | 0.65           | 1.00            | 30 | 962699 |        |        |
| 0.10                   | 0.70           | 1.00            | 30 | 36792  |        |        |
| 0.11                   | 0.70           | 1.00            | 30 | 40829  |        |        |
| 0.12                   | 0.70           | 1.00            | 30 | 40627  |        |        |
| 0.13                   | 0.70           | 1.00            | 30 | 40628  |        |        |
| 0.14                   | 0.70           | 1.00            | 30 | 40629  |        |        |
| 0.15                   | 1.00           | 1.00            | 30 | 35600  |        |        |
| 0.16                   | 1.00           | 1.00            | 30 | 38658  |        |        |
| 0.17                   | 1.00           | 1.00            | 30 | 38659  |        |        |
| 0.18                   | 1.00           | 1.00            | 30 | 38660  |        |        |
| 0.19                   | 1.00           | 1.00            | 30 | 38661  |        |        |
| 0.20                   | 1.00           | 1.00            | 30 | 26824  | 952580 | 955953 |
| 0.21                   | 1.00           | 1.00            | 30 | 29609  | 952581 | 955954 |
| 0.22                   | 1.00           | 1.00            | 30 | 29610  | 952582 | 955955 |
| 0.23                   | 1.00           | 1.00            | 30 | 29611  | 950087 | 955956 |
| 0.23                   | 2.20           | 1.00            | 30 | 62513  | 952583 | 962712 |
| 0.24                   | 1.00           | 1.00            | 30 | 25957  | 952496 | 955957 |
| 0.24                   | 2.20           | 1.00            | 30 | 62514  | 952584 | 962713 |
| 0.25                   | 1.00           | 1.00            | 30 | 28712  | 950088 | 955958 |
| 0.25                   | 2.20           | 1.00            | 30 | 38282  | 952585 | 962714 |
| 0.26                   | 1.00           | 1.00            | 30 | 38665  | 952587 | 955959 |
| 0.27                   | 1.00           | 1.00            | 30 | 37358  | 952588 | 955960 |
| 0.28                   | 1.00           | 1.00            | 30 | 37258  | 952589 | 955961 |
| 0.29                   | 1.00           | 1.00            | 30 | 30568  | 952590 | 955962 |
| 0.30                   | 1.5            | 1.00            | 30 | 28713  | 952591 | 955963 |

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM   | DICUT  | DLC*   |
|------------------------|----------------|-----------------|----|-------|--------|--------|
| 0.31                   | 1.5            | 1.00            | 30 | 35421 | 952592 | 955964 |
| 0.32                   | 1.5            | 1.00            | 30 | 38662 | 952593 | 955965 |
| 0.32                   | 3.0            | 1.00            | 30 | 62515 | 952594 | 962715 |
| 0.33                   | 1.5            | 1.00            | 30 | 38663 | 952595 | 955966 |
| 0.33                   | 3.0            | 1.00            | 30 | 62516 | 952596 | 962716 |
| 0.34                   | 1.5            | 1.00            | 30 | 29570 | 952597 | 955967 |
| 0.34                   | 3.0            | 1.00            | 30 | 62517 | 952598 | 962717 |
| 0.35                   | 1.5            | 1.00            | 30 | 31747 | 952599 | 955968 |
| 0.36                   | 1.5            | 1.00            | 30 | 39018 | 952600 | 955970 |
| 0.37                   | 1.5            | 1.00            | 30 | 40633 | 952601 | 955971 |
| 0.38                   | 1.5            | 1.00            | 30 | 40634 | 952602 | 955972 |
| 0.39                   | 1.5            | 1.00            | 30 | 40635 | 952603 | 955973 |
| 0.40                   | 2.0            | 1.00            | 30 | 25992 | 63706  | 955974 |
| 0.41                   | 2.0            | 1.00            | 30 | 29571 | 952604 | 955975 |
| 0.42                   | 2.0            | 1.00            | 30 | 38419 | 952605 | 955976 |
| 0.43                   | 2.0            | 1.00            | 30 | 35804 | 950186 | 955977 |
| 0.44                   | 2.0            | 1.00            | 30 | 40636 | 952606 | 955978 |
| 0.45                   | 3.6            | 1.00            | 30 | 45726 | 59562  | 955979 |
| 0.46                   | 3.6            | 1.00            | 30 | 45727 | 952607 | 955980 |
| 0.47                   | 3.6            | 1.00            | 30 | 45728 | 952497 | 955981 |
| 0.48                   | 3.6            | 1.00            | 30 | 45729 | 952608 | 955982 |
| 0.49                   | 4.0            | 1.00            | 30 | 45730 | 952609 | 955983 |
| 0.50                   | 4.0            | 1.00            | 30 | 25994 | 55141  | 955984 |
| 0.51                   | 4.0            | 1.00            | 30 | 45731 | 55142  | 955985 |
| 0.52                   | 4.0            | 1.00            | 30 | 45732 | 55143  | 955986 |
| 0.53                   | 4.0            | 1.00            | 30 | 45733 | 55144  | 955987 |
| 0.54                   | 4.5            | 1.00            | 30 | 40640 | 55145  | 955988 |
| 0.55                   | 4.5            | 1.00            | 30 | 28375 | 55146  | 955989 |
| 0.56                   | 4.5            | 1.00            | 30 | 41925 | 55147  | 955990 |

\* nicht für eisenhaltige Werkstoffe



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## SPIRALBOHRER VERSTÄRKTER SCHAFT

| $D_{1.0/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM   | DICUT | DLC*   |
|------------------|-------|----------|----|-------|-------|--------|
| 0.57             | 4.50  | 1.00     | 30 | 40641 | 55148 | 955991 |
| 0.58             | 4.50  | 1.00     | 30 | 40642 | 55149 | 955993 |
| 0.59             | 4.50  | 1.00     | 30 | 40643 | 55150 | 955997 |
| 0.60             | 4.50  | 1.00     | 30 | 29643 | 55151 | 956048 |
| 0.61             | 5.00  | 1.00     | 30 | 37639 | 55152 | 956049 |
| 0.62             | 5.00  | 1.00     | 30 | 25270 | 55153 | 956050 |
| 0.63             | 5.00  | 1.00     | 30 | 40644 | 55154 | 956051 |
| 0.64             | 5.00  | 1.00     | 30 | 40645 | 55155 | 956052 |
| 0.65             | 5.00  | 1.00     | 30 | 41679 | 55156 | 956053 |
| 0.66             | 5.00  | 1.00     | 30 | 41886 | 55157 | 956054 |
| 0.67             | 5.00  | 1.00     | 30 | 42286 | 55158 | 956055 |
| 0.68             | 5.60  | 1.00     | 30 | 42287 | 55159 | 956056 |
| 0.69             | 5.60  | 1.00     | 30 | 41788 | 55160 | 956057 |
| 0.70             | 5.60  | 1.00     | 30 | 32099 | 55161 | 956058 |
| 0.71             | 5.60  | 1.00     | 30 | 42288 | 55162 | 956059 |
| 0.72             | 5.60  | 1.00     | 30 | 40983 | 55163 | 956060 |
| 0.73             | 5.60  | 1.00     | 30 | 35422 | 55164 | 956061 |
| 0.74             | 5.60  | 1.00     | 30 | 36102 | 55165 | 956062 |
| 0.75             | 5.60  | 1.00     | 30 | 35423 | 55166 | 956063 |
| 0.76             | 6.30  | 1.00     | 30 | 18579 | 55167 | 956064 |
| 0.77             | 6.30  | 1.00     | 30 | 42706 | 55168 | 956065 |
| 0.78             | 6.30  | 1.00     | 30 | 41887 | 55169 | 956066 |
| 0.79             | 6.30  | 1.00     | 30 | 36640 | 55170 | 956068 |
| 0.80             | 6.30  | 1.50     | 30 | 402   | 55171 | 956069 |
| 0.81             | 6.30  | 1.50     | 30 | 36144 | 55172 | 956070 |
| 0.82             | 6.30  | 1.50     | 30 | 34510 | 55173 | 956071 |
| 0.83             | 6.30  | 1.50     | 30 | 42290 | 55174 | 956072 |
| 0.84             | 6.30  | 1.50     | 30 | 27400 | 55175 | 956074 |
| 0.85             | 6.30  | 1.50     | 30 | 35551 | 55176 | 956075 |
| 0.86             | 7.10  | 1.50     | 30 | 29254 | 55177 | 956076 |
| 0.87             | 7.10  | 1.50     | 30 | 42291 | 55178 | 956077 |
| 0.88             | 7.10  | 1.50     | 30 | 19601 | 55179 | 956080 |
| 0.89             | 7.10  | 1.50     | 30 | 41789 | 55180 | 956081 |
| 0.90             | 7.10  | 1.50     | 30 | 32100 | 55181 | 956082 |
| 0.91             | 7.10  | 1.50     | 30 | 42292 | 55182 | 956083 |
| 0.92             | 7.10  | 1.50     | 30 | 36859 | 55183 | 956084 |
| 0.93             | 7.10  | 1.50     | 30 | 42293 | 55184 | 956085 |
| 0.94             | 7.10  | 1.50     | 30 | 42167 | 55185 | 956086 |
| 0.95             | 7.10  | 1.50     | 30 | 35183 | 55186 | 956087 |
| 0.96             | 8.00  | 1.50     | 30 | 37741 | 55188 | 956088 |
| 0.97             | 8.00  | 1.50     | 30 | 29255 | 55189 | 956089 |
| 0.98             | 8.00  | 1.50     | 30 | 42294 | 55190 | 956091 |

| $D_{1.0/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM   | DICUT | DLC*   |
|------------------|-------|----------|----|-------|-------|--------|
| 0.99             | 8.00  | 1.50     | 30 | 41790 | 55191 | 956092 |
| 1.00             | 9.00  | 1.50     | 30 | 406   | 55192 | 956093 |
| 1.01             | 9.00  | 1.50     | 30 | 34996 | 55193 | 956094 |
| 1.02             | 9.00  | 1.50     | 30 | 42876 | 55195 | 956095 |
| 1.03             | 9.00  | 1.50     | 30 | 34778 | 55196 | 956096 |
| 1.04             | 9.00  | 1.50     | 30 | 43984 | 55200 | 956097 |
| 1.05             | 9.00  | 1.50     | 30 | 4774  | 55201 | 956098 |
| 1.06             | 9.00  | 1.50     | 30 | 43985 | 55202 | 956099 |
| 1.07             | 9.00  | 1.50     | 30 | 42228 | 55203 | 956100 |
| 1.08             | 9.00  | 1.50     | 30 | 43198 | 55204 | 956101 |
| 1.09             | 9.00  | 1.50     | 30 | 28779 | 55205 | 956102 |
| 1.10             | 9.00  | 1.50     | 30 | 407   | 55206 | 956103 |
| 1.11             | 9.00  | 1.50     | 30 | 43986 | 55207 | 956104 |
| 1.12             | 9.00  | 1.50     | 30 | 43347 | 55208 | 956105 |
| 1.13             | 9.00  | 1.50     | 30 | 42853 | 55209 | 956106 |
| 1.14             | 9.00  | 1.50     | 30 | 43987 | 55210 | 956107 |
| 1.15             | 9.00  | 1.50     | 30 | 3530  | 55211 | 956108 |
| 1.16             | 9.00  | 1.50     | 30 | 22712 | 55212 | 956109 |
| 1.17             | 9.00  | 1.50     | 30 | 4775  | 55213 | 956110 |
| 1.18             | 9.00  | 1.50     | 30 | 42230 | 55214 | 956111 |
| 1.19             | 10.00 | 1.50     | 30 | 41791 | 55215 | 956112 |
| 1.20             | 10.00 | 1.50     | 30 | 408   | 55216 | 956113 |
| 1.21             | 10.00 | 1.50     | 30 | 42168 | 55217 | 956114 |
| 1.22             | 10.00 | 1.50     | 30 | 25751 | 55218 | 956115 |
| 1.23             | 10.00 | 1.50     | 30 | 23285 | 55219 | 956116 |
| 1.24             | 10.00 | 1.50     | 30 | 45524 | 55220 | 956118 |
| 1.25             | 10.00 | 1.50     | 30 | 3531  | 55221 | 956119 |
| 1.26             | 10.00 | 1.50     | 30 | 42005 | 55222 | 956120 |
| 1.27             | 10.00 | 1.50     | 30 | 3761  | 55223 | 956121 |
| 1.28             | 10.00 | 1.50     | 30 | 42169 | 55224 | 956122 |
| 1.29             | 10.00 | 1.50     | 30 | 37694 | 55225 | 956124 |
| 1.30             | 10.00 | 1.50     | 30 | 409   | 55226 | 956125 |
| 1.31             | 10.00 | 1.50     | 30 | 45525 | 55227 | 956128 |
| 1.32             | 10.00 | 1.50     | 30 | 29712 | 55228 | 956130 |
| 1.33             | 11.20 | 1.50     | 30 | 34695 | 55229 | 956131 |
| 1.34             | 11.20 | 1.50     | 30 | 45526 | 55230 | 956132 |
| 1.35             | 11.20 | 1.50     | 30 | 3532  | 55231 | 956133 |
| 1.36             | 11.20 | 1.50     | 30 | 45527 | 55232 | 956134 |
| 1.37             | 11.20 | 1.50     | 30 | 35556 | 55233 | 956135 |
| 1.38             | 11.20 | 1.50     | 30 | 45055 | 55234 | 956136 |
| 1.39             | 11.20 | 1.50     | 30 | 45297 | 55235 | 956137 |
| 1.40             | 11.20 | 1.50     | 30 | 410   | 55236 | 956138 |

\* nicht für eisenhaltige Werkstoffe



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DIN  
1899

## SPIRALBOHRER VERSTÄRKTER SCHAFT

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM   | DICUT | DLC*   |
|-----------------|-------|----------|----|-------|-------|--------|
| 1.41            | 11.20 | 1.50     | 30 | 33499 | 55237 | 956139 |
| 1.42            | 11.20 | 1.50     | 30 | 43348 | 55238 | 956140 |
| 1.43            | 11.20 | 1.50     | 30 | 45056 | 55239 | 956141 |
| 1.44            | 11.20 | 1.50     | 30 | 45528 | 55240 | 956142 |
| 1.45            | 11.20 | 1.50     | 30 | 36006 | 55241 | 956143 |
| 1.46            | 11.20 | 1.50     | 30 | 45529 | 55242 | 956144 |
| 1.47            | 11.20 | 1.50     | 30 | 45530 | 55243 | 956145 |
| 1.48            | 11.20 | 1.50     | 30 | 45057 | 55244 | 956146 |
| 1.49            | 11.20 | 1.50     | 30 | 35681 | 55245 | 956147 |
| 1.50            | 11.20 | 2.00     | 38 | 411   | 55246 | 956148 |
| 1.51            | 12.00 | 2.00     | 38 | 27735 | 55247 | 956149 |
| 1.52            | 12.00 | 2.00     | 38 | 27736 | 55248 | 956150 |
| 1.53            | 12.00 | 2.00     | 38 | 23286 | 55249 | 956151 |
| 1.54            | 12.00 | 2.00     | 38 | 45909 | 55250 | 956152 |
| 1.55            | 12.00 | 2.00     | 38 | 25686 | 55251 | 956153 |
| 1.56            | 12.00 | 2.00     | 38 | 58194 | 58196 | 956154 |
| 1.57            | 12.00 | 2.00     | 38 | 55541 | 58193 | 956155 |
| 1.58            | 12.00 | 2.00     | 38 | 39953 | 55252 | 956156 |
| 1.59            | 12.00 | 2.00     | 38 | 34993 | 55253 | 956157 |
| 1.60            | 12.00 | 2.00     | 38 | 412   | 55254 | 956158 |
| 1.61            | 12.00 | 2.00     | 38 | 40288 | 55255 | 956159 |
| 1.62            | 12.00 | 2.00     | 38 | 46968 | 55256 | 956160 |
| 1.63            | 12.00 | 2.00     | 38 | 45605 | 55257 | 956161 |
| 1.64            | 12.00 | 2.00     | 38 | 45910 | 55258 | 956162 |
| 1.65            | 12.00 | 2.00     | 38 | 32283 | 55259 | 956163 |
| 1.66            | 12.00 | 2.00     | 38 | 47198 | 55260 | 956164 |
| 1.67            | 12.00 | 2.00     | 38 | 50763 | 55261 | 956165 |
| 1.68            | 12.00 | 2.00     | 38 | 31684 | 55262 | 956166 |
| 1.69            | 12.00 | 2.00     | 38 | 45339 | 55263 | 956167 |
| 1.70            | 12.00 | 2.00     | 38 | 413   | 55264 | 956169 |
| 1.71            | 12.00 | 2.00     | 38 | 45911 | 55265 | 956175 |
| 1.72            | 12.00 | 2.00     | 38 | 27925 | 55266 | 956177 |
| 1.73            | 12.00 | 2.00     | 38 | 42609 | 55267 | 956178 |
| 1.74            | 12.00 | 2.00     | 38 | 45912 | 55268 | 956179 |
| 1.75            | 12.00 | 2.00     | 38 | 45734 | 55269 | 956180 |
| 1.76            | 12.00 | 2.00     | 38 | 45913 | 55270 | 956181 |
| 1.77            | 12.00 | 2.00     | 38 | 38757 | 61408 | 956182 |
| 1.78            | 12.00 | 2.00     | 38 | 46957 | 55271 | 956183 |
| 1.79            | 12.00 | 2.00     | 38 | 45340 | 55272 | 956185 |
| 1.80            | 12.00 | 2.00     | 38 | 31497 | 55273 | 956186 |
| 1.81            | 12.00 | 2.00     | 38 | 45914 | 55274 | 956187 |
| 1.82            | 12.00 | 2.00     | 38 | 46969 | 55275 | 956188 |

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM   | DICUT | DLC*   |
|-----------------|-------|----------|----|-------|-------|--------|
| 1.83            | 12.00 | 2.00     | 38 | 58717 | 61407 | 956189 |
| 1.84            | 12.00 | 2.00     | 38 | 46970 | 55276 | 956190 |
| 1.85            | 12.00 | 2.00     | 38 | 36793 | 55277 | 956191 |
| 1.86            | 12.00 | 2.00     | 38 | 50761 | 55278 | 956192 |
| 1.87            | 12.00 | 2.00     | 38 | 36487 | 55279 | 956195 |
| 1.88            | 12.00 | 2.00     | 38 | 45801 | 55280 | 956196 |
| 1.89            | 12.00 | 2.00     | 38 | 45341 | 55281 | 956197 |
| 1.90            | 12.00 | 2.00     | 38 | 415   | 55282 | 956198 |
| 1.91            | 12.00 | 2.00     | 38 | 45915 | 55283 | 956200 |
| 1.92            | 12.00 | 2.00     | 38 | 45916 | 55284 | 956201 |
| 1.93            | 12.00 | 2.00     | 38 | 44853 | 55285 | 956202 |
| 1.94            | 12.00 | 2.00     | 38 | 45917 | 55286 | 956203 |
| 1.95            | 12.00 | 2.00     | 38 | 32284 | 55287 | 956204 |
| 1.96            | 12.00 | 2.00     | 38 | 60692 | 61404 | 956205 |
| 1.97            | 12.00 | 2.00     | 38 | 50332 | 61401 | 956206 |
| 1.98            | 12.00 | 2.00     | 38 | 46959 | 55288 | 956207 |
| 1.99            | 12.00 | 2.00     | 38 | 45342 | 55289 | 956208 |
| 2.00            | 12.00 | 2.50     | 43 | 416   | 55290 | 956209 |
| 2.01            | 12.00 | 2.50     | 43 | 45498 | 55291 | 956210 |
| 2.02            | 12.00 | 2.50     | 43 | 48962 | 61399 | 956211 |
| 2.03            | 12.00 | 2.50     | 43 | 50685 | 55292 | 956212 |
| 2.04            | 12.00 | 2.50     | 43 | 60958 | 60962 | 956213 |
| 2.05            | 12.00 | 2.50     | 43 | 40813 | 55293 | 956214 |
| 2.20            | 12.00 | 2.50     | 43 | 418   | 55296 | 956217 |
| 2.25            | 12.00 | 2.50     | 43 | 40815 | 55297 | 956218 |
| 2.40            | 12.00 | 2.50     | 43 | 420   | 55300 | 956221 |
| 2.45            | 12.00 | 2.50     | 43 | 40816 | 55301 | 956222 |

\* nicht für eisenhaltige Werkstoffe





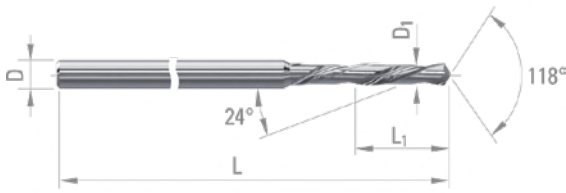
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SPIRALBOHRER, LINKSSCHNEIDEND  
VERSTÄRKTER SCHAFT



- Spiralbohrer, verstärkter Schaft, links gedraht. Für allgemeine Bearbeitungen.
- Die DICUT-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

○ gut    ⊙ ausgezeichnet

| ISO          | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |
|--------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
|              | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |    |
| VDI 3323     | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○                | ○  | ○  | ○    | ○                                    | ○    | ○        | ⊙  | ⊙                | ○  | ○                  | ○  | ○  |

| ISO          | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |  |
|--------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|--|
|              | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |  |
| VDI 3323     | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |  |
| Empfehlungen | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ○                      | ○  | ⊙            | ⊙       | ○          | ○    | ○                       | ○  |       |                          |    | ⊙  | ⊙                |    |                  |  |  |

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM   | DICUT  |
|------------------------|----------------|-----------------|----|-------|--------|
| 0.11                   | 0.70           | 1.00            | 30 | 36917 |        |
| 0.14                   | 0.70           | 1.00            | 30 | 36920 |        |
| 0.15                   | 1.00           | 1.00            | 30 | 36921 |        |
| 0.16                   | 1.00           | 1.00            | 30 | 36922 |        |
| 0.17                   | 1.00           | 1.00            | 30 | 38654 |        |
| 0.18                   | 1.00           | 1.00            | 30 | 36924 |        |
| 0.19                   | 1.00           | 1.00            | 30 | 36925 |        |
| 0.20                   | 1.00           | 1.00            | 30 | 36926 | 952652 |
| 0.21                   | 1.00           | 1.00            | 30 | 36927 | 952653 |
| 0.22                   | 1.00           | 1.00            | 30 | 36928 | 952654 |
| 0.23                   | 1.00           | 1.00            | 30 | 36929 | 952655 |
| 0.24                   | 1.00           | 1.00            | 30 | 36930 | 952656 |
| 0.25                   | 1.00           | 1.00            | 30 | 36931 | 952657 |
| 0.26                   | 1.00           | 1.00            | 30 | 36932 | 952658 |
| 0.27                   | 1.00           | 1.00            | 30 | 36933 | 952659 |
| 0.28                   | 1.00           | 1.00            | 30 | 36934 | 952660 |
| 0.29                   | 1.00           | 1.00            | 30 | 36935 | 952661 |
| 0.30                   | 1.50           | 1.00            | 30 | 36936 | 952662 |
| 0.31                   | 1.50           | 1.00            | 30 | 36937 | 952663 |
| 0.32                   | 1.50           | 1.00            | 30 | 36938 | 952664 |
| 0.33                   | 1.50           | 1.00            | 30 | 36939 | 952665 |
| 0.34                   | 1.50           | 1.00            | 30 | 36940 | 952666 |
| 0.35                   | 1.50           | 1.00            | 30 | 36941 | 952667 |
| 0.36                   | 1.50           | 1.00            | 30 | 36942 | 952669 |
| 0.37                   | 1.50           | 1.00            | 30 | 36943 | 952672 |
| 0.38                   | 1.50           | 1.00            | 30 | 36944 | 952673 |
| 0.39                   | 1.50           | 1.00            | 30 | 36945 | 952674 |

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM   | DICUT  |
|------------------------|----------------|-----------------|----|-------|--------|
| 0.40                   | 2.00           | 1.00            | 30 | 15026 | 952676 |
| 0.41                   | 2.00           | 1.00            | 30 | 35708 | 952677 |
| 0.42                   | 2.00           | 1.00            | 30 | 36946 | 952678 |
| 0.43                   | 2.00           | 1.00            | 30 | 36947 | 952679 |
| 0.44                   | 2.00           | 1.00            | 30 | 36948 | 952680 |
| 0.45                   | 3.60           | 1.00            | 30 | 38054 | 952681 |
| 0.46                   | 3.60           | 1.00            | 30 | 38057 | 952682 |
| 0.47                   | 3.60           | 1.00            | 30 | 38059 | 952683 |
| 0.48                   | 3.60           | 1.00            | 30 | 38062 | 952684 |
| 0.49                   | 4.00           | 1.00            | 30 | 38063 | 952685 |
| 0.50                   | 4.00           | 1.00            | 30 | 38065 | 55302  |
| 0.51                   | 4.00           | 1.00            | 30 | 38066 | 55303  |
| 0.52                   | 4.00           | 1.00            | 30 | 38068 | 55304  |
| 0.53                   | 4.00           | 1.00            | 30 | 38069 | 55305  |
| 0.54                   | 4.50           | 1.00            | 30 | 38245 | 55306  |
| 0.55                   | 4.50           | 1.00            | 30 | 38246 | 55307  |
| 0.56                   | 4.50           | 1.00            | 30 | 38190 | 55308  |
| 0.57                   | 4.50           | 1.00            | 30 | 38187 | 55309  |
| 0.58                   | 4.50           | 1.00            | 30 | 38103 | 55310  |
| 0.59                   | 4.50           | 1.00            | 30 | 38070 | 55311  |
| 0.60                   | 4.50           | 1.00            | 30 | 38188 | 55312  |
| 0.61                   | 5.00           | 1.00            | 30 | 38247 | 55313  |
| 0.62                   | 5.00           | 1.00            | 30 | 38364 | 55314  |
| 0.63                   | 5.00           | 1.00            | 30 | 38072 | 55315  |
| 0.64                   | 5.00           | 1.00            | 30 | 38073 | 55316  |
| 0.65                   | 5.00           | 1.00            | 30 | 38075 | 55317  |
| 0.66                   | 5.00           | 1.00            | 30 | 36966 | 55318  |
| 0.67                   | 5.00           | 1.00            | 30 | 36838 | 55319  |
| 0.68                   | 5.60           | 1.00            | 30 | 21766 | 55320  |
| 0.69                   | 5.60           | 1.00            | 30 | 4021  | 55321  |



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# SPIRALBOHRER, LINKSSCHNEIDEND VERSTÄRKTER SCHAFT

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM   | DICUT |
|-----------------|-------|----------|----|-------|-------|
| 0.70            | 5.60  | 1.00     | 30 | 450   | 55322 |
| 0.71            | 5.60  | 1.00     | 30 | 38078 | 55323 |
| 0.72            | 5.60  | 1.00     | 30 | 38182 | 55324 |
| 0.73            | 5.60  | 1.00     | 30 | 22294 | 55325 |
| 0.74            | 5.60  | 1.00     | 30 | 38080 | 55326 |
| 0.75            | 5.60  | 1.00     | 30 | 36975 | 55327 |
| 0.76            | 6.30  | 1.00     | 30 | 36976 | 55328 |
| 0.77            | 6.30  | 1.00     | 30 | 40866 | 55329 |
| 0.78            | 6.30  | 1.00     | 30 | 36978 | 55330 |
| 0.79            | 6.30  | 1.00     | 30 | 38082 | 55331 |
| 0.80            | 6.30  | 1.50     | 30 | 38317 | 55332 |
| 0.81            | 6.30  | 1.50     | 30 | 36981 | 55333 |
| 0.82            | 6.30  | 1.50     | 30 | 36982 | 55334 |
| 0.83            | 6.30  | 1.50     | 30 | 36983 | 55335 |
| 0.84            | 6.30  | 1.50     | 30 | 38292 | 55336 |
| 0.85            | 6.30  | 1.50     | 30 | 38293 | 55337 |
| 0.86            | 7.10  | 1.50     | 30 | 38294 | 55338 |
| 0.87            | 7.10  | 1.50     | 30 | 38251 | 55339 |
| 0.88            | 7.10  | 1.50     | 30 | 36988 | 55340 |
| 0.89            | 7.10  | 1.50     | 30 | 36989 | 55341 |
| 0.90            | 7.10  | 1.50     | 30 | 24182 | 55342 |
| 0.91            | 7.10  | 1.50     | 30 | 38295 | 55343 |
| 0.92            | 7.10  | 1.50     | 30 | 36360 | 55344 |
| 0.93            | 7.10  | 1.50     | 30 | 35871 | 55345 |
| 0.94            | 7.10  | 1.50     | 30 | 38086 | 55346 |
| 0.95            | 7.10  | 1.50     | 30 | 455   | 55347 |
| 0.96            | 8.00  | 1.50     | 30 | 38296 | 55348 |
| 0.97            | 8.00  | 1.50     | 30 | 36996 | 55349 |
| 0.98            | 8.00  | 1.50     | 30 | 36997 | 55350 |
| 0.99            | 8.00  | 1.50     | 30 | 36998 | 55351 |
| 1.00            | 9.00  | 1.50     | 30 | 36999 | 55352 |
| 1.01            | 9.00  | 1.50     | 30 | 37000 | 55353 |
| 1.02            | 9.00  | 1.50     | 30 | 37001 | 55354 |
| 1.03            | 9.00  | 1.50     | 30 | 37002 | 55355 |
| 1.04            | 9.00  | 1.50     | 30 | 37003 | 55356 |
| 1.05            | 9.00  | 1.50     | 30 | 37004 | 55357 |
| 1.06            | 9.00  | 1.50     | 30 | 37005 | 55358 |
| 1.07            | 9.00  | 1.50     | 30 | 37006 | 55359 |
| 1.08            | 9.00  | 1.50     | 30 | 37007 | 55360 |
| 1.09            | 9.00  | 1.50     | 30 | 37008 | 55361 |
| 1.10            | 9.00  | 1.50     | 30 | 457   | 55362 |

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM   | DICUT |
|-----------------|-------|----------|----|-------|-------|
| 1.11            | 9.00  | 1.50     | 30 | 37009 | 55363 |
| 1.12            | 9.00  | 1.50     | 30 | 37010 | 55364 |
| 1.13            | 9.00  | 1.50     | 30 | 14573 | 55365 |
| 1.14            | 9.00  | 1.50     | 30 | 37011 | 55366 |
| 1.15            | 9.00  | 1.50     | 30 | 19337 | 55367 |
| 1.16            | 9.00  | 1.50     | 30 | 37012 | 55368 |
| 1.17            | 9.00  | 1.50     | 30 | 37013 | 55369 |
| 1.18            | 9.00  | 1.50     | 30 | 37014 | 55370 |
| 1.19            | 10.00 | 1.50     | 30 | 37015 | 55371 |
| 1.20            | 10.00 | 1.50     | 30 | 37016 | 55372 |
| 1.21            | 10.00 | 1.50     | 30 | 26225 | 55373 |
| 1.22            | 10.00 | 1.50     | 30 | 37017 | 55374 |
| 1.23            | 10.00 | 1.50     | 30 | 45717 | 55375 |
| 1.24            | 10.00 | 1.50     | 30 | 37019 | 55376 |
| 1.25            | 10.00 | 1.50     | 30 | 26763 | 55377 |
| 1.26            | 10.00 | 1.50     | 30 | 27862 | 55378 |
| 1.27            | 10.00 | 1.50     | 30 | 6197  | 55379 |
| 1.28            | 10.00 | 1.50     | 30 | 25663 | 55380 |
| 1.29            | 10.00 | 1.50     | 30 | 27863 | 55381 |
| 1.30            | 10.00 | 1.50     | 30 | 459   | 55382 |
| 1.31            | 10.00 | 1.50     | 30 | 37020 | 55383 |
| 1.32            | 10.00 | 1.50     | 30 | 37021 | 55384 |
| 1.33            | 11.20 | 1.50     | 30 | 37022 | 55385 |
| 1.34            | 11.20 | 1.50     | 30 | 45718 | 55386 |
| 1.35            | 11.20 | 1.50     | 30 | 37024 | 55387 |
| 1.36            | 11.20 | 1.50     | 30 | 37025 | 55388 |
| 1.37            | 11.20 | 1.50     | 30 | 37026 | 55389 |
| 1.38            | 11.20 | 1.50     | 30 | 37027 | 55390 |
| 1.39            | 11.20 | 1.50     | 30 | 37028 | 55391 |
| 1.40            | 11.20 | 1.50     | 30 | 460   | 55392 |
| 1.41            | 11.20 | 1.50     | 30 | 26226 | 55393 |
| 1.42            | 11.20 | 1.50     | 30 | 37029 | 55394 |
| 1.43            | 11.20 | 1.50     | 30 | 37030 | 55395 |
| 1.44            | 11.20 | 1.50     | 30 | 37031 | 55396 |
| 1.45            | 11.20 | 1.50     | 30 | 26459 | 55397 |
| 1.46            | 11.20 | 1.50     | 30 | 37032 | 55398 |
| 1.47            | 11.20 | 1.50     | 30 | 37033 | 55399 |
| 1.48            | 11.20 | 1.50     | 30 | 37034 | 55400 |
| 1.49            | 11.20 | 1.50     | 30 | 37035 | 55401 |
| 1.50            | 11.20 | 2.00     | 38 | 461   | 55402 |
| 1.51            | 12.00 | 2.00     | 38 | 38089 | 55403 |



P.76



P.73



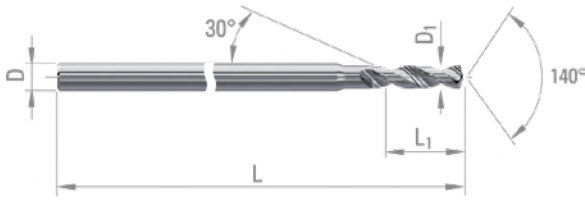
## SPIRALBOHRER, LINKSSCHNEIDEND VERSTÄRKTER SCHAFT

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM   | DICUT |
|-----------------|-------|----------|----|-------|-------|
| 1.52            | 12.00 | 2.00     | 38 | 38962 | 55404 |
| 1.53            | 12.00 | 2.00     | 38 | 38938 | 55405 |
| 1.54            | 12.00 | 2.00     | 38 | 45531 | 55406 |
| 1.55            | 12.00 | 2.00     | 38 | 38090 | 55407 |
| 1.56            | 12.00 | 2.00     | 38 | 45532 | 55408 |
| 1.57            | 12.00 | 2.00     | 38 | 45351 | 55409 |
| 1.58            | 12.00 | 2.00     | 38 | 38252 | 55410 |
| 1.59            | 12.00 | 2.00     | 38 | 45533 | 55411 |
| 1.60            | 12.00 | 2.00     | 38 | 37234 | 55412 |
| 1.61            | 12.00 | 2.00     | 38 | 40655 | 55413 |
| 1.62            | 12.00 | 2.00     | 38 | 29286 | 55414 |
| 1.63            | 12.00 | 2.00     | 38 | 40910 | 55415 |
| 1.64            | 12.00 | 2.00     | 38 | 41297 | 55416 |
| 1.65            | 12.00 | 2.00     | 38 | 37235 | 55417 |
| 1.66            | 12.00 | 2.00     | 38 | 45534 | 55418 |
| 1.67            | 12.00 | 2.00     | 38 | 44015 | 55419 |
| 1.68            | 12.00 | 2.00     | 38 | 38092 | 55420 |
| 1.69            | 12.00 | 2.00     | 38 | 45535 | 55421 |
| 1.70            | 12.00 | 2.00     | 38 | 463   | 55422 |
| 1.71            | 12.00 | 2.00     | 38 | 45536 | 55423 |
| 1.72            | 12.00 | 2.00     | 38 | 45075 | 55424 |
| 1.73            | 12.00 | 2.00     | 38 | 43415 | 55425 |
| 1.74            | 12.00 | 2.00     | 38 | 45537 | 55426 |
| 1.75            | 12.00 | 2.00     | 38 | 38093 | 55427 |
| 1.76            | 12.00 | 2.00     | 38 | 58052 | 58054 |
| 1.77            | 12.00 | 2.00     | 38 | 42174 | 55428 |
| 1.78            | 12.00 | 2.00     | 38 | 57881 | 57888 |
| 1.79            | 12.00 | 2.00     | 38 | 58197 | 58199 |
| 1.80            | 12.00 | 2.00     | 38 | 464   | 55429 |
| 1.81            | 12.00 | 2.00     | 38 | 58636 | 61392 |
| 1.82            | 12.00 | 2.00     | 38 | 26183 | 55430 |
| 1.83            | 12.00 | 2.00     | 38 | 61388 | 61390 |
| 1.84            | 12.00 | 2.00     | 38 | 50611 | 55431 |
| 1.85            | 12.00 | 2.00     | 38 | 38094 | 55432 |
| 1.86            | 12.00 | 2.00     | 38 | 61385 | 61387 |
| 1.87            | 12.00 | 2.00     | 38 | 42119 | 55433 |
| 1.88            | 12.00 | 2.00     | 38 | 61382 | 61384 |
| 1.89            | 12.00 | 2.00     | 38 | 50657 | 55434 |
| 1.90            | 12.00 | 2.00     | 38 | 41217 | 55435 |
| 1.91            | 12.00 | 2.00     | 38 | 61150 | 61367 |
| 1.92            | 12.00 | 2.00     | 38 | 48963 | 57890 |

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM   | DICUT |
|-----------------|-------|----------|----|-------|-------|
| 1.93            | 12.00 | 2.00     | 38 | 50158 | 58056 |
| 1.94            | 12.00 | 2.00     | 38 | 60780 | 60782 |
| 1.95            | 12.00 | 2.00     | 38 | 45719 | 55436 |
| 1.96            | 12.00 | 2.00     | 38 | 61368 | 61370 |
| 1.97            | 12.00 | 2.00     | 38 | 61372 | 61371 |
| 1.98            | 12.00 | 2.00     | 38 | 44254 | 57892 |
| 1.99            | 12.00 | 2.00     | 38 | 58741 | 60784 |
| 2.00            | 12.00 | 2.50     | 43 | 466   | 55437 |
| 2.01            | 12.00 | 2.50     | 43 | 38096 | 55438 |
| 2.02            | 12.00 | 2.50     | 43 | 47857 | 55439 |
| 2.03            | 12.00 | 2.50     | 43 | 61256 | 61375 |
| 2.04            | 12.00 | 2.50     | 43 | 61376 | 61378 |
| 2.05            | 12.00 | 2.50     | 43 | 61379 | 61381 |
| 2.10            | 12.00 | 2.50     | 43 | 467   | 55440 |
| 2.10            | 12.00 | 2.53     | 43 | 47858 | 55441 |
| 2.15            | 12.00 | 2.50     | 43 | 38097 | 55442 |
| 2.45            | 12.00 | 2.50     | 43 | 38098 | 55443 |



SPIRALBOHRER  
FÜR BLEIFREIES MESSING



- Spiralbohrer verstärkter Schaft, selbstzentrierend, Bohrtiefe 5×D<sub>1</sub>, Werkzeug zum Bohren von bleifreiem Messing und High Tech Materialien.
- Die dropless C-TOP-Beschichtung verbessert die Standzeit in schwer zerspanbaren Materialien.
- Die DRYCUT-Beschichtung verbessert die Standzeit in NE-Metallen.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                   |      |      |      | K        |    |                  |    |                    |    |   |   |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|-------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|---|---|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX /PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |   |   |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |   |   |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙              | ⊙                | ⊙  | ⊙  | ⊙                                   | ⊙    | ⊙    | ⊙    | ⊙        | ⊙  | ○                | ○  | ○                  | ○  | ○ | ○ |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            | ⊙       |            |      | ⊙                       | ⊙  | ○     | ⊙                        | ⊙  |                  |    |                  |    |

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | C-TOP  | DRYCUT* |
|------------------------|----------------|-----------------|----|--------|--------|---------|
| 0.15                   | 0.80           | 1.00            | 30 | 377730 | 416324 | 378235  |
| 0.16                   | 0.80           | 1.00            | 30 | 377731 | 416325 | 378236  |
| 0.17                   | 0.90           | 1.00            | 30 | 377732 | 416326 | 378237  |
| 0.18                   | 0.90           | 1.00            | 30 | 377733 | 416327 | 378238  |
| 0.19                   | 1.00           | 1.00            | 30 | 377734 | 416328 | 378239  |
| 0.20                   | 1.00           | 1.00            | 30 | 377735 | 416329 | 378240  |
| 0.21                   | 1.10           | 1.00            | 30 | 377736 | 416330 | 378241  |
| 0.22                   | 1.10           | 1.00            | 30 | 377737 | 416331 | 378242  |
| 0.23                   | 1.20           | 1.00            | 30 | 377738 | 416332 | 378243  |
| 0.24                   | 1.20           | 1.00            | 30 | 377739 | 416333 | 378244  |
| 0.25                   | 1.30           | 1.00            | 30 | 377740 | 416334 | 378245  |
| 0.26                   | 1.30           | 1.00            | 30 | 377741 | 416335 | 378246  |
| 0.27                   | 1.40           | 1.00            | 30 | 377742 | 416336 | 378247  |
| 0.28                   | 1.40           | 1.00            | 30 | 377743 | 416337 | 378248  |
| 0.29                   | 1.50           | 1.00            | 30 | 377744 | 416338 | 378249  |
| 0.30                   | 1.50           | 1.00            | 30 | 377745 | 416339 | 378250  |
| 0.31                   | 1.60           | 1.00            | 30 | 377746 | 416340 | 378251  |
| 0.32                   | 1.60           | 1.00            | 30 | 377747 | 416341 | 378252  |
| 0.33                   | 1.70           | 1.00            | 30 | 377748 | 416342 | 378253  |
| 0.34                   | 1.70           | 1.00            | 30 | 377749 | 416343 | 378254  |
| 0.35                   | 1.80           | 1.00            | 30 | 377750 | 416344 | 378255  |
| 0.36                   | 1.80           | 1.00            | 30 | 377751 | 416345 | 378256  |
| 0.37                   | 1.90           | 1.00            | 30 | 377752 | 416346 | 378257  |
| 0.38                   | 1.90           | 1.00            | 30 | 377753 | 416347 | 378258  |
| 0.39                   | 2.00           | 1.00            | 30 | 377754 | 416348 | 378259  |
| 0.40                   | 2.00           | 1.00            | 30 | 377755 | 416349 | 378260  |
| 0.41                   | 2.10           | 1.00            | 30 | 377756 | 416350 | 378261  |
| 0.42                   | 2.10           | 1.00            | 30 | 377757 | 416351 | 378262  |
| 0.43                   | 2.20           | 1.00            | 30 | 377758 | 416352 | 378263  |
| 0.44                   | 2.20           | 1.00            | 30 | 377759 | 416353 | 378264  |

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | C-TOP  | DRYCUT* |
|------------------------|----------------|-----------------|----|--------|--------|---------|
| 0.45                   | 2.30           | 1.00            | 30 | 377760 | 416354 | 378265  |
| 0.46                   | 2.30           | 1.00            | 30 | 377761 | 416355 | 378266  |
| 0.47                   | 2.40           | 1.00            | 30 | 377762 | 416356 | 378267  |
| 0.48                   | 2.40           | 1.00            | 30 | 377763 | 416357 | 378268  |
| 0.49                   | 2.50           | 1.00            | 30 | 377764 | 416358 | 378269  |
| 0.50                   | 2.50           | 1.00            | 30 | 377765 | 416359 | 378270  |
| 0.51                   | 2.60           | 1.00            | 30 | 377766 | 416360 | 378271  |
| 0.52                   | 2.60           | 1.00            | 30 | 377767 | 416361 | 378272  |
| 0.53                   | 2.70           | 1.00            | 30 | 377768 | 416362 | 378273  |
| 0.54                   | 2.70           | 1.00            | 30 | 377769 | 416363 | 378274  |
| 0.55                   | 2.80           | 1.00            | 30 | 377770 | 416364 | 378275  |
| 0.56                   | 2.80           | 1.00            | 30 | 377771 | 416365 | 378276  |
| 0.57                   | 2.90           | 1.00            | 30 | 377772 | 416366 | 378277  |
| 0.58                   | 2.90           | 1.00            | 30 | 377773 | 416367 | 378278  |
| 0.59                   | 3.00           | 1.00            | 30 | 377774 | 416368 | 378279  |
| 0.60                   | 3.00           | 1.00            | 30 | 377775 | 416369 | 378280  |
| 0.61                   | 3.10           | 1.00            | 30 | 377776 | 416370 | 378281  |
| 0.62                   | 3.10           | 1.00            | 30 | 377777 | 416371 | 378282  |
| 0.63                   | 3.20           | 1.00            | 30 | 377778 | 416372 | 378283  |
| 0.64                   | 3.20           | 1.00            | 30 | 377779 | 416373 | 378284  |
| 0.65                   | 3.30           | 1.00            | 30 | 377780 | 416374 | 378285  |
| 0.66                   | 3.30           | 1.00            | 30 | 377781 | 416375 | 378286  |
| 0.67                   | 3.40           | 1.00            | 30 | 377782 | 416376 | 378287  |
| 0.68                   | 3.40           | 1.00            | 30 | 377783 | 416377 | 378288  |
| 0.69                   | 3.50           | 1.00            | 30 | 377784 | 416378 | 378289  |
| 0.70                   | 3.50           | 1.00            | 30 | 377785 | 416379 | 378290  |
| 0.71                   | 3.60           | 1.00            | 30 | 377786 | 416380 | 378291  |
| 0.72                   | 3.60           | 1.00            | 30 | 377787 | 416381 | 378292  |
| 0.73                   | 3.70           | 1.00            | 30 | 377788 | 416382 | 378293  |
| 0.74                   | 3.70           | 1.00            | 30 | 377789 | 416383 | 378294  |

\* nicht für eisenhaltige Werkstoffe

## SPIRALBOHRER FÜR BLEIFREIES MESSING

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM    | C-TOP  | DRY-CUT* |
|-----------------|-------|----------|----|--------|--------|----------|
| 0.75            | 3.80  | 1.00     | 30 | 377790 | 416384 | 378295   |
| 0.76            | 3.80  | 1.00     | 30 | 377791 | 416385 | 378296   |
| 0.77            | 3.90  | 1.00     | 30 | 377792 | 416386 | 378297   |
| 0.78            | 3.90  | 1.00     | 30 | 377793 | 416387 | 378298   |
| 0.79            | 4.00  | 1.00     | 30 | 377794 | 416388 | 378299   |
| 0.80            | 4.00  | 1.50     | 30 | 377795 | 416389 | 378300   |
| 0.81            | 4.10  | 1.50     | 30 | 377796 | 416390 | 378301   |
| 0.82            | 4.10  | 1.50     | 30 | 377797 | 416391 | 378302   |
| 0.83            | 4.20  | 1.50     | 30 | 377798 | 416392 | 378303   |
| 0.84            | 4.20  | 1.50     | 30 | 377799 | 416393 | 378304   |
| 0.85            | 4.30  | 1.50     | 30 | 377800 | 416394 | 378305   |
| 0.86            | 4.30  | 1.50     | 30 | 377801 | 416395 | 378306   |
| 0.87            | 4.40  | 1.50     | 30 | 377802 | 416396 | 378307   |
| 0.88            | 4.40  | 1.50     | 30 | 377803 | 416397 | 378308   |
| 0.89            | 4.50  | 1.50     | 30 | 377804 | 416398 | 378309   |
| 0.90            | 4.50  | 1.50     | 30 | 377805 | 416399 | 378310   |
| 0.91            | 4.60  | 1.50     | 30 | 377806 | 416400 | 378311   |
| 0.92            | 4.60  | 1.50     | 30 | 377807 | 416401 | 378312   |
| 0.93            | 4.70  | 1.50     | 30 | 377808 | 416402 | 378313   |
| 0.94            | 4.70  | 1.50     | 30 | 377809 | 416403 | 378314   |
| 0.95            | 4.80  | 1.50     | 30 | 377810 | 416404 | 378315   |
| 0.96            | 4.80  | 1.50     | 30 | 377811 | 416405 | 378316   |
| 0.97            | 4.90  | 1.50     | 30 | 377812 | 416406 | 378317   |
| 0.98            | 4.90  | 1.50     | 30 | 377813 | 416407 | 378318   |
| 0.99            | 5.00  | 1.50     | 30 | 377814 | 416408 | 378319   |
| 1.00            | 5.00  | 1.50     | 30 | 377815 | 416409 | 378320   |
| 1.01            | 5.10  | 1.50     | 30 | 422878 | 423038 | 423198   |
| 1.02            | 5.10  | 1.50     | 30 | 422879 | 423039 | 423199   |
| 1.03            | 5.20  | 1.50     | 30 | 422880 | 423040 | 423200   |
| 1.04            | 5.20  | 1.50     | 30 | 422881 | 423041 | 423201   |
| 1.05            | 5.30  | 1.50     | 30 | 377816 | 416410 | 378321   |
| 1.06            | 5.30  | 1.50     | 30 | 422882 | 423042 | 423202   |
| 1.07            | 5.40  | 1.50     | 30 | 422883 | 423043 | 423203   |
| 1.08            | 5.40  | 1.50     | 30 | 422884 | 423044 | 423204   |
| 1.09            | 5.50  | 1.50     | 30 | 422885 | 423045 | 423205   |
| 1.10            | 5.50  | 1.50     | 30 | 377817 | 416411 | 378322   |
| 1.11            | 5.60  | 1.50     | 30 | 422886 | 423046 | 423206   |
| 1.12            | 5.60  | 1.50     | 30 | 422887 | 423047 | 423207   |
| 1.13            | 5.70  | 1.50     | 30 | 422888 | 423048 | 423208   |
| 1.14            | 5.70  | 1.50     | 30 | 422889 | 423049 | 423209   |
| 1.15            | 5.80  | 1.50     | 30 | 377818 | 416412 | 378323   |
| 1.16            | 5.80  | 1.50     | 30 | 422890 | 423050 | 423210   |
| 1.17            | 5.90  | 1.50     | 30 | 422891 | 423051 | 423211   |
| 1.18            | 5.90  | 1.50     | 30 | 422892 | 423052 | 423212   |

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM    | C-TOP  | DRY-CUT* |
|-----------------|-------|----------|----|--------|--------|----------|
| 1.19            | 6.00  | 1.50     | 30 | 422893 | 423053 | 423213   |
| 1.20            | 6.00  | 1.50     | 30 | 377819 | 416413 | 378324   |
| 1.21            | 6.10  | 1.50     | 30 | 422894 | 423054 | 423214   |
| 1.22            | 6.10  | 1.50     | 30 | 422895 | 423055 | 423215   |
| 1.23            | 6.20  | 1.50     | 30 | 422896 | 423056 | 423216   |
| 1.24            | 6.20  | 1.50     | 30 | 422897 | 423057 | 423217   |
| 1.25            | 6.30  | 1.50     | 30 | 377820 | 416414 | 378325   |
| 1.26            | 6.30  | 1.50     | 30 | 422898 | 423058 | 423218   |
| 1.27            | 6.40  | 1.50     | 30 | 422899 | 423059 | 423219   |
| 1.28            | 6.40  | 1.50     | 30 | 422900 | 423060 | 423220   |
| 1.29            | 6.50  | 1.50     | 30 | 422901 | 423061 | 423221   |
| 1.30            | 6.50  | 1.50     | 30 | 377821 | 416415 | 378326   |
| 1.31            | 6.60  | 1.50     | 30 | 422902 | 423062 | 423222   |
| 1.32            | 6.60  | 1.50     | 30 | 422903 | 423063 | 423223   |
| 1.33            | 6.70  | 1.50     | 30 | 422904 | 423064 | 423224   |
| 1.34            | 6.70  | 1.50     | 30 | 422905 | 423065 | 423225   |
| 1.35            | 6.80  | 1.50     | 30 | 377822 | 416416 | 378327   |
| 1.36            | 6.80  | 1.50     | 30 | 422906 | 423066 | 423226   |
| 1.37            | 6.90  | 1.50     | 30 | 422907 | 423067 | 423227   |
| 1.38            | 6.90  | 1.50     | 30 | 422908 | 423068 | 423228   |
| 1.39            | 7.00  | 1.50     | 30 | 422909 | 423069 | 423229   |
| 1.40            | 7.00  | 1.50     | 30 | 377823 | 416417 | 378328   |
| 1.41            | 7.10  | 1.50     | 30 | 422910 | 423070 | 423230   |
| 1.42            | 7.10  | 1.50     | 30 | 422911 | 423071 | 423231   |
| 1.43            | 7.20  | 1.50     | 30 | 422912 | 423072 | 423232   |
| 1.44            | 7.20  | 1.50     | 30 | 422913 | 423073 | 423233   |
| 1.45            | 7.30  | 1.50     | 30 | 377824 | 416418 | 378329   |
| 1.46            | 7.30  | 1.50     | 30 | 422914 | 423074 | 423234   |
| 1.47            | 7.40  | 1.50     | 30 | 422915 | 423075 | 423235   |
| 1.48            | 7.40  | 1.50     | 30 | 422916 | 423076 | 423236   |
| 1.49            | 7.50  | 1.50     | 30 | 422917 | 423077 | 423237   |
| 1.50            | 7.50  | 2.00     | 32 | 377825 | 416419 | 378330   |
| 1.51            | 7.60  | 2.00     | 32 | 422918 | 423078 | 423238   |
| 1.52            | 7.60  | 2.00     | 32 | 422919 | 423079 | 423239   |
| 1.53            | 7.70  | 2.00     | 32 | 422920 | 423080 | 423240   |
| 1.54            | 7.70  | 2.00     | 32 | 422921 | 423081 | 423241   |
| 1.55            | 7.80  | 2.00     | 32 | 377826 | 416420 | 378331   |
| 1.56            | 7.80  | 2.00     | 32 | 422922 | 423082 | 423242   |
| 1.57            | 7.90  | 2.00     | 32 | 422923 | 423083 | 423243   |
| 1.58            | 7.90  | 2.00     | 32 | 422924 | 423084 | 423244   |
| 1.59            | 8.00  | 2.00     | 32 | 422925 | 423085 | 423245   |
| 1.60            | 8.00  | 2.00     | 32 | 377827 | 416421 | 378332   |
| 1.61            | 8.10  | 2.00     | 32 | 422926 | 423086 | 423246   |

\* nicht für eisenhaltige Werkstoffe

SPIRALBOHRER  
FÜR BLEIFREIES MESSING

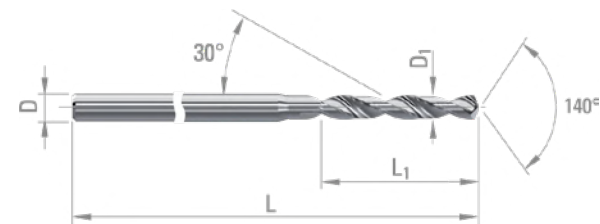


| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | C-TOP  | DRY CUT* |
|------------------------|----------------|-----------------|----|--------|--------|----------|
| 1.62                   | 8.10           | 2               | 32 | 422927 | 423087 | 423247   |
| 1.63                   | 8.20           | 2               | 32 | 422928 | 423088 | 423248   |
| 1.64                   | 8.20           | 2               | 32 | 422929 | 423089 | 423249   |
| 1.65                   | 8.30           | 2               | 32 | 377828 | 416422 | 378333   |
| 1.66                   | 8.30           | 2               | 32 | 422930 | 423090 | 423250   |
| 1.67                   | 8.40           | 2               | 32 | 422931 | 423091 | 423251   |
| 1.68                   | 8.40           | 2               | 32 | 422932 | 423092 | 423252   |
| 1.69                   | 8.50           | 2               | 32 | 422933 | 423093 | 423253   |
| 1.70                   | 8.50           | 2               | 32 | 377829 | 416423 | 378334   |
| 1.71                   | 8.60           | 2               | 32 | 422934 | 423094 | 423254   |
| 1.72                   | 8.60           | 2               | 32 | 422935 | 423095 | 423255   |
| 1.73                   | 8.70           | 2               | 32 | 422936 | 423096 | 423256   |
| 1.74                   | 8.70           | 2               | 32 | 422937 | 423097 | 423257   |
| 1.75                   | 8.80           | 2               | 32 | 377830 | 416424 | 378335   |
| 1.76                   | 8.80           | 2               | 32 | 422938 | 423098 | 423258   |
| 1.77                   | 8.90           | 2               | 32 | 422939 | 423099 | 423259   |
| 1.78                   | 8.90           | 2               | 32 | 422940 | 423100 | 423260   |
| 1.79                   | 9.00           | 2               | 32 | 422941 | 423101 | 423261   |
| 1.80                   | 9.00           | 2               | 32 | 377831 | 416425 | 378336   |
| 1.81                   | 9.10           | 2               | 32 | 422942 | 423102 | 423262   |
| 1.82                   | 9.10           | 2               | 32 | 422943 | 423103 | 423263   |
| 1.83                   | 9.20           | 2               | 32 | 422944 | 423104 | 423264   |
| 1.84                   | 9.20           | 2               | 32 | 422945 | 423105 | 423265   |
| 1.85                   | 9.30           | 2               | 32 | 377832 | 416426 | 378337   |
| 1.86                   | 9.30           | 2               | 32 | 422946 | 423106 | 423266   |
| 1.87                   | 9.40           | 2               | 32 | 422947 | 423107 | 423267   |
| 1.88                   | 9.40           | 2               | 32 | 422948 | 423108 | 423268   |
| 1.89                   | 9.50           | 2               | 32 | 422949 | 423109 | 423269   |
| 1.90                   | 9.50           | 2               | 32 | 377833 | 416427 | 378338   |
| 1.91                   | 9.60           | 2               | 32 | 422950 | 423110 | 423270   |
| 1.92                   | 9.60           | 2               | 32 | 422951 | 423111 | 423271   |
| 1.93                   | 9.70           | 2               | 32 | 422952 | 423112 | 423272   |
| 1.94                   | 9.70           | 2               | 32 | 422953 | 423113 | 423273   |
| 1.95                   | 9.80           | 2               | 32 | 377834 | 416428 | 378339   |
| 1.96                   | 9.80           | 2               | 32 | 422954 | 423114 | 423274   |
| 1.97                   | 9.90           | 2               | 32 | 422955 | 423115 | 423275   |
| 1.98                   | 9.90           | 2               | 32 | 422956 | 423116 | 423276   |
| 1.99                   | 10.00          | 2               | 32 | 422957 | 423117 | 423277   |
| 2.00                   | 10.00          | 3               | 38 | 377835 | 416429 | 378340   |
| 2.10                   | 10.50          | 3               | 38 | 377836 | 416430 | 378341   |
| 2.20                   | 11.00          | 3               | 38 | 377837 | 416431 | 378342   |
| 2.30                   | 11.50          | 3               | 38 | 377838 | 416432 | 378343   |
| 2.40                   | 12.00          | 3               | 38 | 377839 | 416433 | 378344   |
| 2.50                   | 12.50          | 3               | 38 | 377840 | 416434 | 378345   |
| 2.60                   | 13.00          | 3               | 38 | 377841 | 416435 | 378346   |

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | C-TOP  | DRY CUT* |
|------------------------|----------------|-----------------|----|--------|--------|----------|
| 2.70                   | 13.50          | 3               | 38 | 377842 | 416436 | 378347   |
| 2.80                   | 14.00          | 3               | 38 | 377843 | 416437 | 378348   |
| 2.90                   | 14.50          | 3               | 38 | 377844 | 416438 | 378349   |
| 3.00                   | 15.00          | 3               | 38 | 377845 | 416439 | 378350   |
| 3.10                   | 16.00          | 4               | 60 | 415972 | 416440 | 416148   |
| 3.20                   | 16.00          | 4               | 60 | 415973 | 416441 | 416149   |
| 3.30                   | 17.00          | 4               | 60 | 415974 | 416442 | 416150   |
| 3.40                   | 17.00          | 4               | 60 | 415975 | 416443 | 416151   |
| 3.50                   | 18.00          | 4               | 60 | 415976 | 416444 | 416152   |
| 3.60                   | 18.00          | 4               | 60 | 415977 | 416445 | 416153   |
| 3.70                   | 19.00          | 4               | 60 | 415978 | 416446 | 416154   |
| 3.80                   | 19.00          | 4               | 60 | 415979 | 416447 | 416155   |
| 3.90                   | 20.00          | 4               | 60 | 415980 | 416448 | 416156   |
| 4.00                   | 20.00          | 4               | 60 | 415981 | 416449 | 416157   |
| 4.10                   | 21.00          | 6               | 75 | 415982 | 416450 | 416158   |
| 4.20                   | 21.00          | 6               | 75 | 415983 | 416451 | 416159   |
| 4.30                   | 22.00          | 6               | 75 | 415984 | 416452 | 416160   |
| 4.40                   | 22.00          | 6               | 75 | 415985 | 416453 | 416161   |
| 4.50                   | 23.00          | 6               | 75 | 415986 | 416454 | 416162   |
| 4.60                   | 23.00          | 6               | 75 | 415987 | 416455 | 416163   |
| 4.70                   | 24.00          | 6               | 75 | 415988 | 416456 | 416164   |
| 4.80                   | 24.00          | 6               | 75 | 415989 | 416457 | 416165   |
| 4.90                   | 25.00          | 6               | 75 | 415990 | 416458 | 416166   |
| 5.00                   | 25.00          | 6               | 75 | 415991 | 416459 | 416167   |
| 5.10                   | 26.00          | 6               | 75 | 415992 | 416460 | 416168   |
| 5.20                   | 26.00          | 6               | 75 | 415993 | 416461 | 416169   |
| 5.30                   | 27.00          | 6               | 75 | 415994 | 416462 | 416170   |
| 5.40                   | 27.00          | 6               | 75 | 415995 | 416463 | 416171   |
| 5.50                   | 28.00          | 6               | 75 | 415996 | 416464 | 416172   |
| 5.60                   | 28.00          | 6               | 75 | 415997 | 416465 | 416173   |
| 5.70                   | 29.00          | 6               | 75 | 415998 | 416466 | 416174   |
| 5.80                   | 29.00          | 6               | 75 | 415999 | 416467 | 416175   |
| 5.90                   | 30.00          | 6               | 75 | 416000 | 416468 | 416176   |
| 6.00                   | 30.00          | 6               | 75 | 416001 | 416469 | 416177   |

\* nicht für eisenhaltige Werkstoffe

SPIRALBOHRER  
FÜR BLEIFREIES MESSING



- Spiralbohrer verstärkter Schaft, selbstzentrierend, Bohrtiefe  $8 \times D_1$ . Werkzeug zum Bohren von bleifreiem Messing und High Tech Materialien.
- Die dropless C-TOP-Beschichtung verbessert die Standzeit in schwer zerspanbaren Materialien.
- Die DRYCUT-Beschichtung verbessert die Standzeit in NE-Metallen.

○ gut    ⊗ ausgezeichnet

| ISO          | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |   |
|--------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|---|
|              | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLIX / PH) |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |    |   |
| VDI 3323     | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |   |
| Empfehlungen | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗              | ⊗                | ⊗  | ⊗  | ⊗    | ⊗                                    | ⊗    | ⊗        | ⊗  | ⊗                | ○  | ○                  | ○  | ○  | ○ |

| ISO          | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |  |  |
|--------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|--|
|              | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |  |
| VDI 3323     | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |  |
| Empfehlungen | ⊗                       | ⊗  | ⊗                       | ⊗  | ⊗  | ⊗                 | ⊗                      | ⊗  | ⊗            |         |            |      | ⊗                       | ⊗  | ○     | ⊗                        | ⊗  |                  |    |                  |    |  |  |

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM    | C-TOP  | DRYCUT* |
|-----------------|-------|----------|----|--------|--------|---------|
| 0.15            | 1.20  | 1.00     | 30 | 416002 | 416470 | 416178  |
| 0.16            | 1.30  | 1.00     | 30 | 416003 | 416471 | 416179  |
| 0.17            | 1.40  | 1.00     | 30 | 416004 | 416472 | 416180  |
| 0.18            | 1.50  | 1.00     | 30 | 416005 | 416473 | 416181  |
| 0.19            | 1.60  | 1.00     | 30 | 416006 | 416474 | 416182  |
| 0.20            | 1.60  | 1.00     | 30 | 416007 | 416475 | 416183  |
| 0.21            | 1.70  | 1.00     | 30 | 416008 | 416476 | 416184  |
| 0.22            | 1.80  | 1.00     | 30 | 416009 | 416477 | 416185  |
| 0.23            | 1.90  | 1.00     | 30 | 416010 | 416478 | 416186  |
| 0.24            | 2.00  | 1.00     | 30 | 416011 | 416479 | 416187  |
| 0.25            | 2.00  | 1.00     | 30 | 416012 | 416480 | 416188  |
| 0.26            | 2.10  | 1.00     | 30 | 416013 | 416481 | 416189  |
| 0.27            | 2.20  | 1.00     | 30 | 416014 | 416482 | 416190  |
| 0.28            | 2.30  | 1.00     | 30 | 416015 | 416483 | 416191  |
| 0.29            | 2.40  | 1.00     | 30 | 416016 | 416484 | 416192  |
| 0.30            | 2.40  | 1.00     | 30 | 416017 | 416485 | 416193  |
| 0.31            | 2.50  | 1.00     | 30 | 416018 | 416486 | 416194  |
| 0.32            | 2.60  | 1.00     | 30 | 416019 | 416487 | 416195  |
| 0.33            | 2.70  | 1.00     | 30 | 416020 | 416488 | 416196  |
| 0.34            | 2.80  | 1.00     | 30 | 416021 | 416489 | 416197  |
| 0.35            | 2.80  | 1.00     | 30 | 416022 | 416490 | 416198  |
| 0.36            | 2.90  | 1.00     | 30 | 416023 | 416491 | 416199  |
| 0.37            | 3.00  | 1.00     | 30 | 416024 | 416492 | 416200  |
| 0.38            | 3.10  | 1.00     | 30 | 416025 | 416493 | 416201  |
| 0.39            | 3.20  | 1.00     | 30 | 416026 | 416494 | 416202  |
| 0.40            | 3.20  | 1.00     | 30 | 416027 | 416495 | 416203  |
| 0.41            | 3.30  | 1.00     | 30 | 416028 | 416496 | 416204  |
| 0.42            | 3.40  | 1.00     | 30 | 416029 | 416497 | 416205  |
| 0.43            | 3.50  | 1.00     | 30 | 416030 | 416498 | 416206  |

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM    | C-TOP  | DRYCUT* |
|-----------------|-------|----------|----|--------|--------|---------|
| 0.44            | 3.60  | 1.00     | 30 | 416031 | 416499 | 416207  |
| 0.45            | 3.60  | 1.00     | 30 | 416032 | 416500 | 416208  |
| 0.46            | 3.70  | 1.00     | 30 | 416033 | 416501 | 416209  |
| 0.47            | 3.80  | 1.00     | 30 | 416034 | 416502 | 416210  |
| 0.48            | 3.90  | 1.00     | 30 | 416035 | 416503 | 416211  |
| 0.49            | 4.00  | 1.00     | 30 | 416036 | 416504 | 416212  |
| 0.50            | 4.00  | 1.00     | 30 | 416037 | 416505 | 416213  |
| 0.51            | 4.10  | 1.00     | 30 | 416038 | 416506 | 416214  |
| 0.52            | 4.20  | 1.00     | 30 | 416039 | 416507 | 416215  |
| 0.53            | 4.30  | 1.00     | 30 | 416040 | 416508 | 416216  |
| 0.54            | 4.40  | 1.00     | 30 | 416041 | 416509 | 416217  |
| 0.55            | 4.40  | 1.00     | 30 | 416042 | 416510 | 416218  |
| 0.56            | 4.50  | 1.00     | 30 | 416043 | 416511 | 416219  |
| 0.57            | 4.60  | 1.00     | 30 | 416044 | 416512 | 416220  |
| 0.58            | 4.70  | 1.00     | 30 | 416045 | 416513 | 416221  |
| 0.59            | 4.80  | 1.00     | 30 | 416046 | 416514 | 416222  |
| 0.60            | 4.80  | 1.00     | 30 | 416047 | 416515 | 416223  |
| 0.61            | 4.90  | 1.00     | 30 | 416048 | 416516 | 416224  |
| 0.62            | 5.00  | 1.00     | 30 | 416049 | 416517 | 416225  |
| 0.63            | 5.10  | 1.00     | 30 | 416050 | 416518 | 416226  |
| 0.64            | 5.20  | 1.00     | 30 | 416051 | 416519 | 416227  |
| 0.65            | 5.20  | 1.00     | 30 | 416052 | 416520 | 416228  |
| 0.66            | 5.30  | 1.00     | 30 | 416053 | 416521 | 416229  |
| 0.67            | 5.40  | 1.00     | 30 | 416054 | 416522 | 416230  |
| 0.68            | 5.50  | 1.00     | 30 | 416055 | 416523 | 416231  |
| 0.69            | 5.60  | 1.00     | 30 | 416056 | 416524 | 416232  |
| 0.70            | 5.60  | 1.00     | 30 | 416057 | 416525 | 416233  |
| 0.71            | 5.70  | 1.00     | 30 | 416058 | 416526 | 416234  |
| 0.72            | 5.80  | 1.00     | 30 | 416059 | 416527 | 416235  |

\* nicht für eisenhaltige Werkstoffe



## SPIRALBOHRER FÜR BLEIFREIES MESSING

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | C-TOP  | DRY CUT* |
|------------------------|----------------|-----------------|----|--------|--------|----------|
| 0.73                   | 5.90           | 1.00            | 30 | 416060 | 416528 | 416236   |
| 0.74                   | 6.00           | 1.00            | 30 | 416061 | 416529 | 416237   |
| 0.75                   | 6.00           | 1.00            | 30 | 416062 | 416530 | 416238   |
| 0.76                   | 6.10           | 1.00            | 30 | 416063 | 416531 | 416239   |
| 0.77                   | 6.20           | 1.00            | 30 | 416064 | 416532 | 416240   |
| 0.78                   | 6.30           | 1.00            | 30 | 416065 | 416533 | 416241   |
| 0.79                   | 6.40           | 1.00            | 30 | 416066 | 416534 | 416242   |
| 0.80                   | 6.40           | 1.50            | 30 | 416067 | 416535 | 416243   |
| 0.81                   | 6.50           | 1.50            | 30 | 416068 | 416536 | 416244   |
| 0.82                   | 6.60           | 1.50            | 30 | 416069 | 416537 | 416245   |
| 0.83                   | 6.70           | 1.50            | 30 | 416070 | 416538 | 416246   |
| 0.84                   | 6.80           | 1.50            | 30 | 416071 | 416539 | 416247   |
| 0.85                   | 6.80           | 1.50            | 30 | 416072 | 416540 | 416248   |
| 0.86                   | 6.90           | 1.50            | 30 | 416073 | 416541 | 416249   |
| 0.87                   | 7.00           | 1.50            | 30 | 416074 | 416542 | 416250   |
| 0.88                   | 7.10           | 1.50            | 30 | 416075 | 416543 | 416251   |
| 0.89                   | 7.20           | 1.50            | 30 | 416076 | 416544 | 416252   |
| 0.90                   | 7.20           | 1.50            | 30 | 416077 | 416545 | 416253   |
| 0.91                   | 7.30           | 1.50            | 30 | 416078 | 416546 | 416254   |
| 0.92                   | 7.40           | 1.50            | 30 | 416079 | 416547 | 416255   |
| 0.93                   | 7.50           | 1.50            | 30 | 416080 | 416548 | 416256   |
| 0.94                   | 7.60           | 1.50            | 30 | 416081 | 416549 | 416257   |
| 0.95                   | 7.60           | 1.50            | 30 | 416082 | 416550 | 416258   |
| 0.96                   | 7.70           | 1.50            | 30 | 416083 | 416551 | 416259   |
| 0.97                   | 7.80           | 1.50            | 30 | 416084 | 416552 | 416260   |
| 0.98                   | 7.90           | 1.50            | 30 | 416085 | 416553 | 416261   |
| 0.99                   | 8.00           | 1.50            | 30 | 416086 | 416554 | 416262   |
| 1.00                   | 8.00           | 1.50            | 30 | 416087 | 416555 | 416263   |
| 1.01                   | 8.10           | 1.50            | 38 | 422958 | 423118 | 423278   |
| 1.02                   | 8.20           | 1.50            | 38 | 422959 | 423119 | 423279   |
| 1.03                   | 8.30           | 1.50            | 38 | 422960 | 423120 | 423280   |
| 1.04                   | 8.40           | 1.50            | 38 | 422961 | 423121 | 423281   |
| 1.05                   | 8.40           | 1.50            | 38 | 416088 | 416556 | 416264   |
| 1.06                   | 8.50           | 1.50            | 38 | 422962 | 423122 | 423282   |
| 1.07                   | 8.60           | 1.50            | 38 | 422963 | 423123 | 423283   |
| 1.08                   | 8.70           | 1.50            | 38 | 422964 | 423124 | 423284   |
| 1.09                   | 8.80           | 1.50            | 38 | 422965 | 423125 | 423285   |
| 1.10                   | 8.80           | 1.50            | 38 | 416089 | 416557 | 416265   |
| 1.11                   | 8.90           | 1.50            | 38 | 422966 | 423126 | 423286   |
| 1.12                   | 9.00           | 1.50            | 38 | 422967 | 423127 | 423287   |
| 1.13                   | 9.10           | 1.50            | 38 | 422968 | 423128 | 423288   |
| 1.14                   | 9.20           | 1.50            | 38 | 422969 | 423129 | 423289   |
| 1.15                   | 9.20           | 1.50            | 38 | 416090 | 416558 | 416266   |
| 1.16                   | 9.30           | 1.50            | 38 | 422970 | 423130 | 423290   |

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | C-TOP  | DRY CUT* |
|------------------------|----------------|-----------------|----|--------|--------|----------|
| 1.17                   | 9.40           | 1.50            | 38 | 422971 | 423131 | 423291   |
| 1.18                   | 9.50           | 1.50            | 38 | 422972 | 423132 | 423292   |
| 1.19                   | 9.60           | 1.50            | 38 | 422973 | 423133 | 423293   |
| 1.20                   | 9.60           | 1.50            | 38 | 416091 | 416559 | 416267   |
| 1.21                   | 9.70           | 1.50            | 38 | 422974 | 423134 | 423294   |
| 1.22                   | 9.80           | 1.50            | 38 | 422975 | 423135 | 423295   |
| 1.23                   | 9.90           | 1.50            | 38 | 422976 | 423136 | 423296   |
| 1.24                   | 10.00          | 1.50            | 38 | 422977 | 423137 | 423297   |
| 1.25                   | 10.00          | 1.50            | 38 | 416092 | 416560 | 416268   |
| 1.26                   | 10.10          | 1.50            | 38 | 422978 | 423138 | 423298   |
| 1.27                   | 10.20          | 1.50            | 38 | 422979 | 423139 | 423299   |
| 1.28                   | 10.30          | 1.50            | 38 | 422980 | 423140 | 423300   |
| 1.29                   | 10.40          | 1.50            | 38 | 422981 | 423141 | 423301   |
| 1.30                   | 10.40          | 1.50            | 38 | 416093 | 416561 | 416269   |
| 1.31                   | 10.50          | 1.50            | 38 | 422982 | 423142 | 423302   |
| 1.32                   | 10.60          | 1.50            | 38 | 422983 | 423143 | 423303   |
| 1.33                   | 10.70          | 1.50            | 38 | 422984 | 423144 | 423304   |
| 1.34                   | 10.80          | 1.50            | 38 | 422985 | 423145 | 423305   |
| 1.35                   | 10.80          | 1.50            | 38 | 416094 | 416562 | 416270   |
| 1.36                   | 10.90          | 1.50            | 38 | 422986 | 423146 | 423306   |
| 1.37                   | 11.00          | 1.50            | 38 | 422987 | 423147 | 423307   |
| 1.38                   | 11.10          | 1.50            | 38 | 422988 | 423148 | 423308   |
| 1.39                   | 11.20          | 1.50            | 38 | 422989 | 423149 | 423309   |
| 1.40                   | 11.20          | 1.50            | 38 | 416095 | 416563 | 416271   |
| 1.41                   | 11.30          | 1.50            | 38 | 422990 | 423150 | 423310   |
| 1.42                   | 11.40          | 1.50            | 38 | 422991 | 423151 | 423311   |
| 1.43                   | 11.50          | 1.50            | 38 | 422992 | 423152 | 423312   |
| 1.44                   | 11.60          | 1.50            | 38 | 422993 | 423153 | 423313   |
| 1.45                   | 11.60          | 1.50            | 38 | 416096 | 416564 | 416272   |
| 1.46                   | 11.70          | 1.50            | 38 | 422994 | 423154 | 423314   |
| 1.47                   | 11.80          | 1.50            | 38 | 422995 | 423155 | 423315   |
| 1.48                   | 11.90          | 1.50            | 38 | 422996 | 423156 | 423316   |
| 1.49                   | 12.00          | 1.50            | 38 | 422997 | 423157 | 423317   |
| 1.50                   | 12.00          | 2.00            | 38 | 416097 | 416565 | 416273   |
| 1.51                   | 12.10          | 2.00            | 38 | 422998 | 423158 | 423318   |
| 1.52                   | 12.20          | 2.00            | 38 | 422999 | 423159 | 423319   |
| 1.53                   | 12.30          | 2.00            | 38 | 423000 | 423160 | 423320   |
| 1.54                   | 12.40          | 2.00            | 38 | 423001 | 423161 | 423321   |
| 1.55                   | 12.40          | 2.00            | 38 | 416098 | 416566 | 416274   |
| 1.56                   | 12.50          | 2.00            | 38 | 423002 | 423162 | 423322   |
| 1.57                   | 12.60          | 2.00            | 38 | 423003 | 423163 | 423323   |
| 1.58                   | 12.70          | 2.00            | 38 | 423004 | 423164 | 423324   |
| 1.59                   | 12.80          | 2.00            | 38 | 423005 | 423165 | 423325   |
| 1.60                   | 12.80          | 2.00            | 38 | 416099 | 416567 | 416275   |

\* nicht für eisenhaltige Werkstoffe





P.78



P.73

 $D_1 \geq 0.5$ SPIRALBOHRER  
FÜR BLEIFREIES MESSING

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM    | C-TOP  | DRY-CUT* |
|-----------------|-------|----------|----|--------|--------|----------|
| 1.61            | 12.9  | 2.0      | 38 | 423006 | 423166 | 423326   |
| 1.62            | 13.0  | 2.0      | 38 | 423007 | 423167 | 423327   |
| 1.63            | 13.1  | 2.0      | 38 | 423008 | 423168 | 423328   |
| 1.64            | 13.2  | 2.0      | 38 | 423009 | 423169 | 423329   |
| 1.65            | 13.2  | 2.0      | 38 | 416100 | 416568 | 416276   |
| 1.66            | 13.3  | 2.0      | 38 | 423010 | 423170 | 423330   |
| 1.67            | 13.4  | 2.0      | 38 | 423011 | 423171 | 423331   |
| 1.68            | 13.5  | 2.0      | 38 | 423012 | 423172 | 423332   |
| 1.69            | 13.6  | 2.0      | 38 | 423013 | 423173 | 423333   |
| 1.70            | 13.6  | 2.0      | 38 | 416101 | 416569 | 416277   |
| 1.71            | 13.7  | 2.0      | 38 | 423014 | 423174 | 423334   |
| 1.72            | 13.8  | 2.0      | 38 | 423015 | 423175 | 423335   |
| 1.73            | 13.9  | 2.0      | 38 | 423016 | 423176 | 423336   |
| 1.74            | 14.0  | 2.0      | 38 | 423017 | 423177 | 423337   |
| 1.75            | 14.0  | 2.0      | 38 | 416102 | 416570 | 416278   |
| 1.76            | 14.1  | 2.0      | 38 | 423018 | 423178 | 423338   |
| 1.77            | 14.2  | 2.0      | 38 | 423019 | 423179 | 423339   |
| 1.78            | 14.3  | 2.0      | 38 | 423020 | 423180 | 423340   |
| 1.79            | 14.4  | 2.0      | 38 | 423021 | 423181 | 423341   |
| 1.80            | 14.4  | 2.0      | 38 | 416103 | 416571 | 416279   |
| 1.81            | 14.5  | 2.0      | 38 | 423022 | 423182 | 423342   |
| 1.82            | 14.6  | 2.0      | 38 | 423023 | 423183 | 423343   |
| 1.83            | 14.7  | 2.0      | 38 | 423024 | 423184 | 423344   |
| 1.84            | 14.8  | 2.0      | 38 | 423025 | 423185 | 423345   |
| 1.85            | 14.8  | 2.0      | 38 | 416104 | 416572 | 416280   |
| 1.86            | 14.9  | 2.0      | 38 | 423026 | 423186 | 423346   |
| 1.87            | 15.0  | 2.0      | 38 | 423027 | 423187 | 423347   |
| 1.88            | 15.1  | 2.0      | 38 | 423028 | 423188 | 423348   |
| 1.89            | 15.2  | 2.0      | 38 | 423029 | 423189 | 423349   |
| 1.90            | 15.2  | 2.0      | 38 | 416105 | 416573 | 416281   |
| 1.91            | 15.3  | 2.0      | 38 | 423030 | 423190 | 423350   |
| 1.92            | 15.4  | 2.0      | 38 | 423031 | 423191 | 423351   |
| 1.93            | 15.5  | 2.0      | 38 | 423032 | 423192 | 423352   |
| 1.94            | 15.6  | 2.0      | 38 | 423033 | 423193 | 423353   |
| 1.95            | 15.6  | 2.0      | 38 | 416106 | 416574 | 416282   |
| 1.96            | 15.7  | 2.0      | 38 | 423034 | 423194 | 423354   |
| 1.97            | 15.8  | 2.0      | 38 | 423035 | 423195 | 423355   |
| 1.98            | 15.9  | 2.0      | 38 | 423036 | 423196 | 423356   |
| 1.99            | 16.0  | 2.0      | 38 | 423037 | 423197 | 423357   |
| 2.00            | 16.0  | 3.0      | 50 | 416107 | 416575 | 416283   |
| 2.10            | 16.8  | 3.0      | 50 | 416108 | 416576 | 416284   |
| 2.20            | 17.6  | 3.0      | 50 | 416109 | 416577 | 416285   |
| 2.30            | 18.4  | 3.0      | 50 | 416110 | 416578 | 416286   |
| 2.40            | 19.2  | 3.0      | 50 | 416111 | 416579 | 416287   |
| 2.50            | 20.0  | 3.0      | 50 | 416112 | 416580 | 416288   |

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L   | VHM    | C-TOP  | DRY-CUT* |
|-----------------|-------|----------|-----|--------|--------|----------|
| 2.60            | 20.8  | 3.0      | 50  | 416113 | 416581 | 416289   |
| 2.70            | 21.6  | 3.0      | 50  | 416114 | 416582 | 416290   |
| 2.80            | 22.4  | 3.0      | 50  | 416115 | 416583 | 416291   |
| 2.90            | 23.2  | 3.0      | 50  | 416116 | 416584 | 416292   |
| 3.00            | 24.0  | 3.0      | 50  | 416117 | 416585 | 416293   |
| 3.10            | 25.0  | 4.0      | 75  | 416118 | 416586 | 416294   |
| 3.20            | 26.0  | 4.0      | 75  | 416119 | 416587 | 416295   |
| 3.30            | 27.0  | 4.0      | 75  | 416120 | 416588 | 416296   |
| 3.40            | 28.0  | 4.0      | 75  | 416121 | 416589 | 416297   |
| 3.50            | 28.0  | 4.0      | 75  | 416122 | 416590 | 416298   |
| 3.60            | 29.0  | 4.0      | 75  | 416123 | 416591 | 416299   |
| 3.70            | 30.0  | 4.0      | 75  | 416124 | 416592 | 416300   |
| 3.80            | 31.0  | 4.0      | 75  | 416125 | 416593 | 416301   |
| 3.90            | 32.0  | 4.0      | 75  | 416126 | 416594 | 416302   |
| 4.00            | 32.0  | 4.0      | 75  | 416127 | 416595 | 416303   |
| 4.10            | 33.0  | 6.0      | 100 | 416128 | 416596 | 416304   |
| 4.20            | 34.0  | 6.0      | 100 | 416129 | 416597 | 416305   |
| 4.30            | 35.0  | 6.0      | 100 | 416130 | 416598 | 416306   |
| 4.40            | 36.0  | 6.0      | 100 | 416131 | 416599 | 416307   |
| 4.50            | 36.0  | 6.0      | 100 | 416132 | 416600 | 416308   |
| 4.60            | 37.0  | 6.0      | 100 | 416133 | 416601 | 416309   |
| 4.70            | 38.0  | 6.0      | 100 | 416134 | 416602 | 416310   |
| 4.80            | 39.0  | 6.0      | 100 | 416135 | 416603 | 416311   |
| 4.90            | 40.0  | 6.0      | 100 | 416136 | 416604 | 416312   |
| 5.00            | 40.0  | 6.0      | 100 | 416137 | 416605 | 416313   |
| 5.10            | 41.0  | 6.0      | 100 | 416138 | 416606 | 416314   |
| 5.20            | 42.0  | 6.0      | 100 | 416139 | 416607 | 416315   |
| 5.30            | 43.0  | 6.0      | 100 | 416140 | 416608 | 416316   |
| 5.40            | 44.0  | 6.0      | 100 | 416141 | 416609 | 416317   |
| 5.50            | 44.0  | 6.0      | 100 | 416142 | 416610 | 416318   |
| 5.60            | 45.0  | 6.0      | 100 | 416143 | 416611 | 416319   |
| 5.70            | 46.0  | 6.0      | 100 | 416144 | 416612 | 416320   |
| 5.80            | 47.0  | 6.0      | 100 | 416145 | 416613 | 416321   |
| 5.90            | 48.0  | 6.0      | 100 | 416146 | 416614 | 416322   |
| 6.00            | 48.0  | 6.0      | 100 | 416147 | 416615 | 416323   |

\* nicht für eisenhaltige Werkstoffe



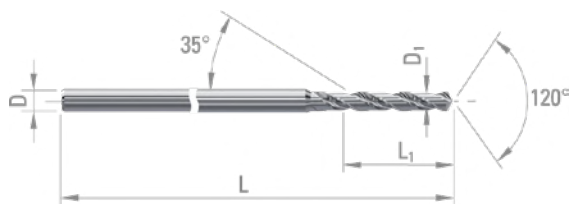
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P.73



SPIRALBOHRER  
VERSTÄRKTER SCHAFT



- Hochleistungswerkzeug entwickelt für das Bohren langspannender Materialien.
- Die DICUT-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                   |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|-------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX /PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ⊙                                   | ⊙    | ⊙    | ⊙    | ⊙        | ⊙  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen           | ○                       | ○  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ○            | ○       |            |      | ○                       | ○  |       |                          | ⊙  | ⊙                |    |                  |    |  |

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | DICUT  |
|------------------------|----------------|-----------------|----|--------|--------|
| 0.50                   | 4.00           | 1.00            | 30 | 21228  | 57565  |
| 0.55                   | 4.50           | 1.00            | 30 | 39029  | 57566  |
| 0.60                   | 4.50           | 1.00            | 30 | 176    | 57567  |
| 0.65                   | 5.00           | 1.00            | 30 | 39030  | 57568  |
| 0.70                   | 5.60           | 1.00            | 30 | 178    | 55679  |
| 0.75                   | 5.60           | 1.00            | 30 | 39031  | 55681  |
| 0.80                   | 6.30           | 1.50            | 30 | 180    | 55683  |
| 0.81                   | 6.30           | 1.50            | 30 | 957990 | 957991 |
| 0.82                   | 6.30           | 1.50            | 30 | 957040 | 957994 |
| 0.83                   | 6.30           | 1.50            | 30 | 45775  | 957802 |
| 0.84                   | 6.30           | 1.50            | 30 | 45776  | 957804 |
| 0.85                   | 6.30           | 1.50            | 30 | 181    | 55685  |
| 0.86                   | 7.10           | 1.50            | 30 | 957995 | 957996 |
| 0.87                   | 7.10           | 1.50            | 30 | 957998 | 957999 |
| 0.88                   | 7.10           | 1.50            | 30 | 958001 | 958002 |
| 0.89                   | 7.10           | 1.50            | 30 | 56626  | 957806 |
| 0.90                   | 7.10           | 1.50            | 30 | 182    | 55687  |
| 0.91                   | 7.10           | 1.50            | 30 | 958006 | 958007 |
| 0.92                   | 7.10           | 1.50            | 30 | 957949 | 958004 |
| 0.93                   | 7.10           | 1.50            | 30 | 957042 | 957808 |
| 0.94                   | 7.10           | 1.50            | 30 | 957043 | 957810 |
| 0.95                   | 7.10           | 1.50            | 30 | 39032  | 55689  |
| 0.96                   | 9.00           | 1.50            | 30 | 49329  | 957812 |
| 0.97                   | 9.00           | 1.50            | 30 | 957045 | 957829 |
| 0.98                   | 9.00           | 1.50            | 30 | 43498  | 957831 |
| 0.99                   | 9.00           | 1.50            | 30 | 61003  | 957834 |
| 1.00                   | 9.00           | 1.50            | 30 | 184    | 55691  |
| 1.01                   | 9.00           | 1.50            | 30 | 48709  | 957865 |
| 1.02                   | 9.00           | 1.50            | 30 | 58334  | 957867 |

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | DICUT  |
|------------------------|----------------|-----------------|----|--------|--------|
| 1.03                   | 9.00           | 1.50            | 30 | 958010 | 958011 |
| 1.04                   | 9.00           | 1.50            | 30 | 958013 | 958015 |
| 1.05                   | 9.00           | 1.50            | 30 | 39033  | 55757  |
| 1.06                   | 9.00           | 1.50            | 30 | 958017 | 958018 |
| 1.07                   | 9.00           | 1.50            | 30 | 58335  | 957879 |
| 1.08                   | 9.00           | 1.50            | 30 | 57722  | 957884 |
| 1.09                   | 9.00           | 1.50            | 30 | 958020 | 958021 |
| 1.10                   | 9.00           | 1.50            | 30 | 39034  | 55759  |
| 1.11                   | 9.00           | 1.50            | 30 | 45752  | 957887 |
| 1.12                   | 9.00           | 1.50            | 30 | 62921  | 954726 |
| 1.13                   | 9.00           | 1.50            | 30 | 957889 | 954727 |
| 1.14                   | 9.00           | 1.50            | 30 | 958023 | 958024 |
| 1.15                   | 9.00           | 1.50            | 30 | 39035  | 55761  |
| 1.16                   | 10.00          | 1.50            | 30 | 50299  | 957893 |
| 1.17                   | 10.00          | 1.50            | 30 | 52449  | 957895 |
| 1.18                   | 10.00          | 1.50            | 30 | 58333  | 957897 |
| 1.19                   | 10.00          | 1.50            | 30 | 958026 | 958027 |
| 1.20                   | 10.00          | 1.50            | 30 | 39036  | 55762  |
| 1.21                   | 10.00          | 1.50            | 30 | 50233  | 957899 |
| 1.22                   | 10.00          | 1.50            | 30 | 59610  | 957901 |
| 1.23                   | 10.00          | 1.50            | 30 | 46797  | 957902 |
| 1.24                   | 10.00          | 1.50            | 30 | 958029 | 958030 |
| 1.25                   | 10.00          | 1.50            | 30 | 37037  | 55764  |
| 1.26                   | 10.00          | 1.50            | 30 | 65858  | 50057  |
| 1.27                   | 10.00          | 1.50            | 30 | 50558  | 957912 |
| 1.28                   | 10.00          | 1.50            | 30 | 958032 | 958033 |
| 1.29                   | 10.00          | 1.50            | 30 | 958035 | 958037 |
| 1.30                   | 10.00          | 1.50            | 30 | 187    | 55766  |
| 1.31                   | 11.20          | 1.50            | 30 | 958199 | 958200 |



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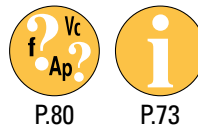


P.73

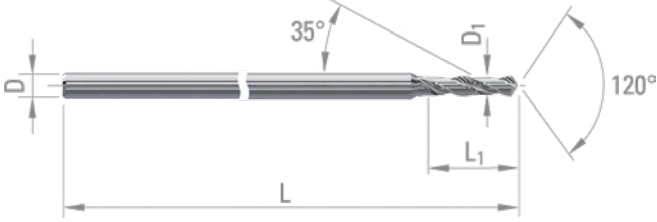


SPIRALBOHRER  
VERSTÄRKTER SCHAFT

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM    | DICUT  |
|-----------------|-------|----------|----|--------|--------|
| 1.32            | 11.20 | 1.50     | 30 | 50068  | 957914 |
| 1.33            | 11.20 | 1.50     | 30 | 44387  | 957916 |
| 1.34            | 11.20 | 1.50     | 30 | 53518  | 958203 |
| 1.35            | 11.20 | 1.50     | 30 | 39038  | 55768  |
| 1.36            | 11.20 | 1.50     | 30 | 58147  | 957921 |
| 1.37            | 11.20 | 1.50     | 30 | 958205 | 958206 |
| 1.38            | 11.20 | 1.50     | 30 | 958208 | 958209 |
| 1.39            | 11.20 | 1.50     | 30 | 958211 | 958212 |
| 1.40            | 11.20 | 1.50     | 30 | 188    | 55777  |
| 1.45            | 11.20 | 1.50     | 30 | 39039  | 55779  |
| 1.50            | 11.20 | 2.00     | 38 | 39040  | 55780  |
| 1.55            | 12.00 | 2.00     | 38 | 52209  | 55782  |
| 1.60            | 12.00 | 2.00     | 38 | 52210  | 55786  |
| 1.65            | 12.00 | 2.00     | 38 | 52211  | 54986  |
| 1.70            | 12.00 | 2.00     | 38 | 191    | 55789  |
| 1.75            | 12.00 | 2.00     | 38 | 52212  | 55791  |
| 1.80            | 12.00 | 2.00     | 38 | 49082  | 55793  |
| 1.85            | 12.00 | 2.00     | 38 | 52213  | 55795  |
| 1.90            | 12.00 | 2.00     | 38 | 193    | 55797  |
| 1.95            | 12.00 | 2.00     | 38 | 52214  | 55799  |



**SPIRALBOHRER  
VERSTÄRKTER SCHAFT**



- Spiralbohrer verstärkter Schaft. Hochleistungswerkzeug entwickelt für das Bohren langspannender Materialien.
- Die DICUT-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

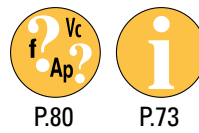
○ gut    ⊙ ausgezeichnet

| ISO          | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                   |      |      |      | K        |    |                  |    |                    |    |
|--------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|-------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
|              | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX /PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323     | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen | ○                 | ○ | ○ | ○ | ○ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ⊙                                   | ⊙    | ⊙    | ⊙    | ⊙        | ⊙  | ○                | ○  | ○                  | ○  |

| ISO          | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|--------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
|              | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323     | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen | ○                       | ○  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      |                         | ○  | ○     |                          | ⊙  | ⊙  |                  |    |                  |  |

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | DICUT  |
|------------------------|----------------|-----------------|----|--------|--------|
| 0.20                   | 1.50           | 1.50            | 30 | 950342 | 950234 |
| 0.21                   | 1.50           | 1.50            | 30 | 950235 | 950248 |
| 0.22                   | 1.50           | 1.50            | 30 | 950236 | 950249 |
| 0.23                   | 1.50           | 1.50            | 30 | 950240 | 950250 |
| 0.24                   | 1.50           | 1.50            | 30 | 950241 | 950251 |
| 0.25                   | 2.00           | 1.50            | 30 | 950253 | 950278 |
| 0.26                   | 2.00           | 1.50            | 30 | 950254 | 950279 |
| 0.27                   | 2.00           | 1.50            | 30 | 950255 | 950280 |
| 0.28                   | 2.00           | 1.50            | 30 | 950256 | 950281 |
| 0.29                   | 2.00           | 1.50            | 30 | 950084 | 950282 |
| 0.30                   | 2.00           | 1.50            | 30 | 950276 | 950283 |
| 0.31                   | 2.50           | 1.50            | 30 | 950284 | 950299 |
| 0.32                   | 2.50           | 1.50            | 30 | 950285 | 950301 |
| 0.33                   | 2.50           | 1.50            | 30 | 950286 | 950302 |
| 0.34                   | 2.50           | 1.50            | 30 | 950287 | 950303 |
| 0.35                   | 2.50           | 1.50            | 30 | 950288 | 950304 |
| 0.36                   | 2.50           | 1.50            | 30 | 950085 | 950305 |
| 0.37                   | 2.50           | 1.50            | 30 | 950289 | 950306 |
| 0.38                   | 2.50           | 1.50            | 30 | 950290 | 950307 |
| 0.39                   | 3.00           | 1.50            | 30 | 950308 | 950330 |
| 0.40                   | 3.00           | 1.50            | 30 | 950309 | 950331 |
| 0.41                   | 3.00           | 1.50            | 30 | 950310 | 950332 |
| 0.42                   | 3.00           | 1.50            | 30 | 950311 | 950333 |
| 0.43                   | 3.00           | 1.50            | 30 | 950312 | 950334 |
| 0.44                   | 3.00           | 1.50            | 30 | 950313 | 950335 |
| 0.45                   | 3.00           | 1.50            | 30 | 950314 | 950336 |
| 0.46                   | 3.00           | 1.50            | 30 | 950315 | 950337 |
| 0.47                   | 3.00           | 1.50            | 30 | 950316 | 950338 |
| 0.48                   | 3.00           | 1.50            | 30 | 950317 | 950339 |

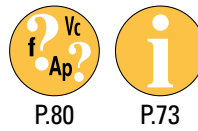
| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | DICUT  |
|------------------------|----------------|-----------------|----|--------|--------|
| 0.49                   | 3.00           | 1.50            | 30 | 950318 | 950340 |
| 0.50                   | 4.00           | 1.50            | 30 | 60922  | 61017  |
| 0.51                   | 4.00           | 1.50            | 30 | 60923  | 61018  |
| 0.52                   | 4.00           | 1.50            | 30 | 60924  | 61020  |
| 0.53                   | 4.00           | 1.50            | 30 | 60925  | 61021  |
| 0.54                   | 4.00           | 1.50            | 30 | 60926  | 61022  |
| 0.55                   | 4.00           | 1.50            | 30 | 60927  | 61023  |
| 0.56                   | 4.00           | 1.50            | 30 | 60928  | 61024  |
| 0.57                   | 4.00           | 1.50            | 30 | 60929  | 61025  |
| 0.58                   | 4.00           | 1.50            | 30 | 60930  | 61026  |
| 0.59                   | 4.00           | 1.50            | 30 | 60931  | 61027  |
| 0.60                   | 4.50           | 1.50            | 30 | 60932  | 61028  |
| 0.61                   | 4.50           | 1.50            | 30 | 60933  | 61029  |
| 0.62                   | 4.50           | 1.50            | 30 | 60934  | 61030  |
| 0.63                   | 4.50           | 1.50            | 30 | 60935  | 61031  |
| 0.64                   | 4.50           | 1.50            | 30 | 60936  | 61032  |
| 0.65                   | 4.50           | 1.50            | 30 | 60937  | 61033  |
| 0.66                   | 4.50           | 1.50            | 30 | 60938  | 61034  |
| 0.67                   | 4.50           | 1.50            | 30 | 60939  | 61035  |
| 0.68                   | 4.50           | 1.50            | 30 | 56623  | 61036  |
| 0.69                   | 4.50           | 1.50            | 30 | 60940  | 61037  |
| 0.70                   | 4.50           | 1.50            | 30 | 56364  | 57571  |
| 0.71                   | 4.50           | 1.50            | 30 | 56365  | 57573  |
| 0.72                   | 4.50           | 1.50            | 30 | 56366  | 57575  |
| 0.73                   | 4.50           | 1.50            | 30 | 56367  | 57577  |
| 0.74                   | 4.50           | 1.50            | 30 | 56368  | 57587  |
| 0.75                   | 4.50           | 1.50            | 30 | 56369  | 57589  |
| 0.76                   | 4.50           | 1.50            | 30 | 56370  | 57579  |
| 0.77                   | 4.50           | 1.50            | 30 | 56371  | 57581  |



## SPIRALBOHRER VERSTÄRKTER SCHAFT

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM   | DICUT |
|-----------------|-------|----------|----|-------|-------|
| 0.78            | 4.50  | 1.50     | 30 | 56372 | 57583 |
| 0.79            | 4.50  | 1.50     | 30 | 56373 | 57585 |
| 0.80            | 5.00  | 1.50     | 30 | 52140 | 55801 |
| 0.81            | 5.00  | 1.50     | 30 | 52141 | 55803 |
| 0.82            | 5.00  | 1.50     | 30 | 52142 | 55805 |
| 0.83            | 5.00  | 1.50     | 30 | 52143 | 55807 |
| 0.84            | 5.00  | 1.50     | 30 | 52144 | 55809 |
| 0.85            | 5.00  | 1.50     | 30 | 52145 | 55811 |
| 0.86            | 5.00  | 1.50     | 30 | 52146 | 55813 |
| 0.87            | 5.00  | 1.50     | 30 | 52147 | 55815 |
| 0.88            | 5.00  | 1.50     | 30 | 52148 | 55817 |
| 0.89            | 5.00  | 1.50     | 30 | 52149 | 55819 |
| 0.90            | 5.00  | 1.50     | 30 | 52150 | 55821 |
| 0.91            | 5.00  | 1.50     | 30 | 52151 | 55823 |
| 0.92            | 5.00  | 1.50     | 30 | 52152 | 55825 |
| 0.93            | 5.00  | 1.50     | 30 | 52153 | 55827 |
| 0.94            | 5.00  | 1.50     | 30 | 52154 | 55829 |
| 0.95            | 5.00  | 1.50     | 30 | 52155 | 55831 |
| 0.96            | 5.00  | 1.50     | 30 | 52156 | 55833 |
| 0.97            | 5.00  | 1.50     | 30 | 52157 | 55835 |
| 0.98            | 5.00  | 1.50     | 30 | 52158 | 55837 |
| 0.99            | 5.00  | 1.50     | 30 | 52159 | 55839 |
| 1.00            | 5.00  | 1.50     | 30 | 52160 | 55841 |
| 1.01            | 5.00  | 1.50     | 30 | 52161 | 55842 |
| 1.02            | 5.00  | 1.50     | 30 | 52162 | 55844 |
| 1.03            | 5.00  | 1.50     | 30 | 52163 | 55848 |
| 1.04            | 5.00  | 1.50     | 30 | 52164 | 55850 |
| 1.05            | 5.00  | 1.50     | 30 | 52165 | 55852 |
| 1.06            | 5.00  | 1.50     | 30 | 52166 | 55854 |
| 1.07            | 5.00  | 1.50     | 30 | 52167 | 55856 |
| 1.08            | 5.00  | 1.50     | 30 | 52168 | 55858 |
| 1.09            | 5.00  | 1.50     | 30 | 52169 | 55860 |
| 1.10            | 5.00  | 1.50     | 30 | 52170 | 55861 |
| 1.11            | 5.00  | 1.50     | 30 | 52171 | 55863 |
| 1.12            | 5.00  | 1.50     | 30 | 52172 | 55865 |
| 1.13            | 5.00  | 1.50     | 30 | 52173 | 55871 |
| 1.14            | 5.00  | 1.50     | 30 | 52174 | 55872 |
| 1.15            | 5.00  | 1.50     | 30 | 52175 | 55873 |
| 1.16            | 5.00  | 1.50     | 30 | 52176 | 55875 |
| 1.17            | 5.00  | 1.50     | 30 | 52177 | 55877 |
| 1.18            | 5.00  | 1.50     | 30 | 52178 | 55878 |
| 1.19            | 5.00  | 1.50     | 30 | 52179 | 55893 |
| 1.20            | 6.00  | 1.50     | 30 | 52180 | 55880 |

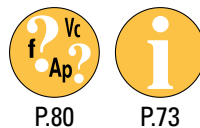
| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM   | DICUT |
|-----------------|-------|----------|----|-------|-------|
| 1.21            | 6.00  | 1.50     | 30 | 52181 | 55882 |
| 1.22            | 6.00  | 1.50     | 30 | 52182 | 55884 |
| 1.23            | 6.00  | 1.50     | 30 | 52183 | 55886 |
| 1.24            | 6.00  | 1.50     | 30 | 52184 | 55896 |
| 1.25            | 6.00  | 1.50     | 30 | 52185 | 55898 |
| 1.26            | 6.00  | 1.50     | 30 | 52186 | 55900 |
| 1.27            | 6.00  | 1.50     | 30 | 52187 | 55902 |
| 1.28            | 6.00  | 1.50     | 30 | 52188 | 55904 |
| 1.29            | 6.00  | 1.50     | 30 | 52189 | 55906 |
| 1.30            | 6.00  | 1.50     | 30 | 52190 | 55908 |
| 1.31            | 6.00  | 1.50     | 30 | 52191 | 55910 |
| 1.32            | 6.00  | 1.50     | 30 | 52192 | 55912 |
| 1.33            | 6.00  | 1.50     | 30 | 52193 | 55914 |
| 1.34            | 6.00  | 1.50     | 30 | 52194 | 55916 |
| 1.35            | 6.00  | 1.50     | 30 | 52195 | 55918 |
| 1.36            | 6.00  | 1.50     | 30 | 52196 | 55920 |
| 1.37            | 6.00  | 1.50     | 30 | 52197 | 55922 |
| 1.38            | 6.00  | 1.50     | 30 | 52198 | 55924 |
| 1.39            | 6.00  | 1.50     | 30 | 52199 | 55926 |
| 1.40            | 6.00  | 1.50     | 30 | 52200 | 55929 |
| 1.41            | 6.00  | 1.50     | 30 | 52201 | 55932 |
| 1.42            | 6.00  | 1.50     | 30 | 52202 | 55934 |
| 1.43            | 6.00  | 1.50     | 30 | 52203 | 55936 |
| 1.44            | 6.00  | 1.50     | 30 | 52204 | 55938 |
| 1.45            | 6.00  | 1.50     | 30 | 52205 | 55940 |
| 1.46            | 6.00  | 1.50     | 30 | 52206 | 55942 |
| 1.47            | 6.00  | 1.50     | 30 | 52207 | 55944 |
| 1.48            | 6.00  | 1.50     | 30 | 52208 | 55946 |
| 1.49            | 6.00  | 1.50     | 30 | 52216 | 55948 |
| 1.50            | 7.00  | 2.00     | 38 | 56431 | 57591 |
| 1.51            | 7.00  | 2.00     | 38 | 56374 | 57593 |
| 1.52            | 7.00  | 2.00     | 38 | 56375 | 57595 |
| 1.53            | 7.00  | 2.00     | 38 | 56376 | 57597 |
| 1.54            | 7.00  | 2.00     | 38 | 56377 | 57599 |
| 1.55            | 7.00  | 2.00     | 38 | 56378 | 57601 |
| 1.56            | 7.00  | 2.00     | 38 | 56379 | 57603 |
| 1.57            | 7.00  | 2.00     | 38 | 56380 | 57605 |
| 1.58            | 7.00  | 2.00     | 38 | 56381 | 57607 |
| 1.59            | 7.00  | 2.00     | 38 | 56382 | 57609 |
| 1.60            | 7.00  | 2.00     | 38 | 56383 | 57611 |
| 1.61            | 7.00  | 2.00     | 38 | 56384 | 57613 |
| 1.62            | 7.00  | 2.00     | 38 | 56385 | 57615 |
| 1.63            | 7.00  | 2.00     | 38 | 56386 | 57617 |
| 1.64            | 7.00  | 2.00     | 38 | 56387 | 57619 |
| 1.65            | 7.00  | 2.00     | 38 | 56388 | 57621 |
| 1.66            | 7.00  | 2.00     | 38 | 56389 | 57623 |
| 1.67            | 7.00  | 2.00     | 38 | 56390 | 57625 |
| 1.68            | 7.00  | 2.00     | 38 | 56391 | 57627 |



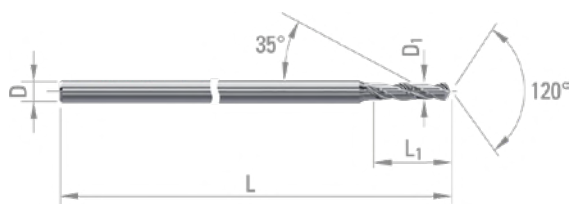
## SPIRALBOHRER VERSTÄRKTER SCHAFT

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | DICUT  |
|------------------------|----------------|-----------------|----|--------|--------|
| 1.69                   | 7.00           | 2.00            | 38 | 56392  | 57629  |
| 1.70                   | 7.00           | 2.00            | 38 | 56393  | 57631  |
| 1.71                   | 7.00           | 2.00            | 38 | 56394  | 57633  |
| 1.72                   | 7.00           | 2.00            | 38 | 56395  | 57635  |
| 1.73                   | 7.00           | 2.00            | 38 | 56396  | 57637  |
| 1.74                   | 7.00           | 2.00            | 38 | 56397  | 57639  |
| 1.75                   | 7.00           | 2.00            | 38 | 56398  | 57641  |
| 1.76                   | 8.00           | 2.00            | 38 | 56399  | 57643  |
| 1.77                   | 8.00           | 2.00            | 38 | 56400  | 57645  |
| 1.78                   | 8.00           | 2.00            | 38 | 56401  | 57647  |
| 1.79                   | 8.00           | 2.00            | 38 | 56402  | 57649  |
| 1.80                   | 8.00           | 2.00            | 38 | 56403  | 57651  |
| 1.81                   | 8.00           | 2.00            | 38 | 56404  | 57653  |
| 1.82                   | 8.00           | 2.00            | 38 | 56405  | 57655  |
| 1.83                   | 8.00           | 2.00            | 38 | 56406  | 57657  |
| 1.84                   | 8.00           | 2.00            | 38 | 56407  | 57659  |
| 1.85                   | 8.00           | 2.00            | 38 | 56408  | 57661  |
| 1.86                   | 8.00           | 2.00            | 38 | 56409  | 57663  |
| 1.87                   | 8.00           | 2.00            | 38 | 56410  | 57665  |
| 1.88                   | 8.00           | 2.00            | 38 | 56411  | 57667  |
| 1.89                   | 8.00           | 2.00            | 38 | 56412  | 57669  |
| 1.90                   | 8.00           | 2.00            | 38 | 56413  | 57671  |
| 1.91                   | 8.00           | 2.00            | 38 | 56414  | 57673  |
| 1.92                   | 8.00           | 2.00            | 38 | 56415  | 57675  |
| 1.93                   | 8.00           | 2.00            | 38 | 56416  | 57677  |
| 1.94                   | 8.00           | 2.00            | 38 | 56417  | 57679  |
| 1.95                   | 8.00           | 2.00            | 38 | 56418  | 57681  |
| 1.96                   | 8.00           | 2.00            | 38 | 56419  | 57683  |
| 1.97                   | 8.00           | 2.00            | 38 | 56420  | 57685  |
| 1.98                   | 8.00           | 2.00            | 38 | 56421  | 57687  |
| 1.99                   | 8.00           | 2.00            | 38 | 56422  | 57689  |
| 2.00                   | 9.00           | 2.50            | 43 | 951030 | 951165 |
| 2.01                   | 9.00           | 2.50            | 43 | 951034 | 951166 |
| 2.02                   | 9.00           | 2.50            | 43 | 951035 | 951167 |
| 2.03                   | 9.00           | 2.50            | 43 | 951036 | 951168 |
| 2.04                   | 9.00           | 2.50            | 43 | 951039 | 951169 |
| 2.05                   | 9.00           | 2.50            | 43 | 59122  | 951170 |
| 2.06                   | 9.00           | 2.50            | 43 | 951040 | 951171 |
| 2.07                   | 9.00           | 2.50            | 43 | 951041 | 951172 |
| 2.08                   | 9.00           | 2.50            | 43 | 951042 | 951173 |

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | DICUT  |
|------------------------|----------------|-----------------|----|--------|--------|
| 2.09                   | 9.00           | 2.50            | 43 | 951043 | 951214 |
| 2.10                   | 9.00           | 2.50            | 43 | 951058 | 951215 |
| 2.11                   | 9.00           | 2.50            | 43 | 951059 | 951216 |
| 2.12                   | 9.00           | 2.50            | 43 | 951060 | 951217 |
| 2.13                   | 9.00           | 2.50            | 43 | 951061 | 951218 |
| 2.14                   | 9.00           | 2.50            | 43 | 951062 | 951219 |
| 2.15                   | 9.00           | 2.50            | 43 | 951063 | 951220 |
| 2.16                   | 9.00           | 2.50            | 43 | 951064 | 951621 |
| 2.17                   | 9.00           | 2.50            | 43 | 951065 | 951622 |
| 2.18                   | 9.00           | 2.50            | 43 | 951066 | 951624 |
| 2.19                   | 9.00           | 2.50            | 43 | 951067 | 951625 |
| 2.20                   | 9.00           | 2.50            | 43 | 951068 | 951626 |
| 2.21                   | 9.00           | 2.50            | 43 | 951069 | 951627 |
| 2.22                   | 9.00           | 2.50            | 43 | 951070 | 951628 |
| 2.23                   | 9.00           | 2.50            | 43 | 951071 | 951629 |
| 2.24                   | 9.00           | 2.50            | 43 | 951072 | 951630 |
| 2.25                   | 9.00           | 2.50            | 43 | 951073 | 951631 |
| 2.26                   | 9.00           | 2.50            | 43 | 951074 | 951632 |
| 2.27                   | 9.00           | 2.50            | 43 | 951075 | 951633 |
| 2.28                   | 9.00           | 2.50            | 43 | 951076 | 951634 |
| 2.29                   | 9.00           | 2.50            | 43 | 951077 | 951636 |
| 2.30                   | 9.00           | 2.50            | 43 | 951078 | 951637 |
| 2.31                   | 9.00           | 2.50            | 43 | 951079 | 951638 |
| 2.32                   | 9.00           | 2.50            | 43 | 951080 | 951639 |
| 2.33                   | 9.00           | 2.50            | 43 | 951081 | 951640 |
| 2.34                   | 9.00           | 2.50            | 43 | 951082 | 951641 |
| 2.35                   | 9.00           | 2.50            | 43 | 951083 | 951642 |
| 2.36                   | 9.00           | 2.50            | 43 | 951084 | 951643 |
| 2.37                   | 9.00           | 2.50            | 43 | 951085 | 951644 |
| 2.38                   | 9.00           | 2.50            | 43 | 951086 | 951645 |
| 2.39                   | 9.00           | 2.50            | 43 | 951087 | 951646 |
| 2.40                   | 9.00           | 2.50            | 43 | 951089 | 951647 |
| 2.41                   | 9.00           | 2.50            | 43 | 951090 | 951648 |
| 2.42                   | 9.00           | 2.50            | 43 | 951091 | 951649 |
| 2.43                   | 9.00           | 2.50            | 43 | 951092 | 951650 |
| 2.44                   | 9.00           | 2.50            | 43 | 951093 | 951651 |
| 2.45                   | 9.00           | 2.50            | 43 | 951094 | 951652 |
| 2.46                   | 9.00           | 2.50            | 43 | 951095 | 951653 |
| 2.47                   | 9.00           | 2.50            | 43 | 951096 | 951654 |
| 2.48                   | 9.00           | 2.50            | 43 | 951097 | 951655 |
| 2.49                   | 9.00           | 2.50            | 43 | 951098 | 951656 |



**SPIRALBOHRER  
VERSTÄRKTER SCHAFT**



- Spiralbohrer verstärkter Schaft .Werkzeug, entwickelt für das Bohren langspannender Materialien.
- Die Durchmesser tolerance beträgt 0 / + 4µm.
- Die DICUT-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

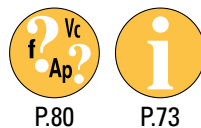
○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                   |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|-------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX /PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ⊙                                   | ⊙    | ⊙    | ⊙    | ⊙        | ⊙  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen           | ○                       | ○  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      |                         | ○  | ○     |                          | ⊙  | ⊙                |    |                  |    |  |

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | DICUT  |
|------------------------|----------------|-----------------|----|--------|--------|
| 0.20                   | 1.50           | 1.50            | 30 | 990662 | 990642 |
| 0.21                   | 1.50           | 1.50            | 30 | 990643 | 990676 |
| 0.22                   | 1.50           | 1.50            | 30 | 990644 | 990677 |
| 0.23                   | 1.50           | 1.50            | 30 | 990674 | 990678 |
| 0.24                   | 1.50           | 1.50            | 30 | 990675 | 990679 |
| 0.25                   | 2.00           | 1.50            | 30 | 990680 | 990659 |
| 0.26                   | 2.00           | 1.50            | 30 | 990681 | 990660 |
| 0.27                   | 2.00           | 1.50            | 30 | 990682 | 990663 |
| 0.28                   | 2.00           | 1.50            | 30 | 990683 | 990664 |
| 0.29                   | 2.00           | 1.50            | 30 | 990631 | 990665 |
| 0.30                   | 2.00           | 1.50            | 30 | 990658 | 990666 |
| 0.31                   | 2.50           | 1.50            | 30 | 990667 | 990645 |
| 0.32                   | 2.50           | 1.50            | 30 | 990668 | 990646 |
| 0.33                   | 2.50           | 1.50            | 30 | 990669 | 990647 |
| 0.34                   | 2.50           | 1.50            | 30 | 990670 | 990648 |
| 0.35                   | 2.50           | 1.50            | 30 | 990671 | 990649 |
| 0.36                   | 2.50           | 1.50            | 30 | 990632 | 990650 |
| 0.37                   | 2.50           | 1.50            | 30 | 990672 | 990651 |
| 0.38                   | 2.50           | 1.50            | 30 | 990673 | 990652 |
| 0.39                   | 3.00           | 1.50            | 30 | 990653 | 990633 |
| 0.40                   | 3.00           | 1.50            | 30 | 990654 | 990634 |
| 0.41                   | 3.00           | 1.50            | 30 | 990655 | 990635 |
| 0.42                   | 3.00           | 1.50            | 30 | 990656 | 990636 |
| 0.43                   | 3.00           | 1.50            | 30 | 990684 | 990637 |
| 0.44                   | 3.00           | 1.50            | 30 | 990685 | 990638 |
| 0.45                   | 3.00           | 1.50            | 30 | 990686 | 990639 |
| 0.46                   | 3.00           | 1.50            | 30 | 990687 | 990640 |
| 0.47                   | 3.00           | 1.50            | 30 | 990688 | 990641 |
| 0.48                   | 3.00           | 1.50            | 30 | 990689 | 990657 |

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | DICUT  |
|------------------------|----------------|-----------------|----|--------|--------|
| 0.49                   | 3.00           | 1.50            | 30 | 990690 | 990661 |
| 0.50                   | 4.00           | 1.50            | 30 | 990616 | 990605 |
| 0.51                   | 4.00           | 1.50            | 30 | 990617 | 990606 |
| 0.52                   | 4.00           | 1.50            | 30 | 990618 | 990607 |
| 0.53                   | 4.00           | 1.50            | 30 | 990619 | 990608 |
| 0.54                   | 4.00           | 1.50            | 30 | 990620 | 990609 |
| 0.55                   | 4.00           | 1.50            | 30 | 990621 | 990610 |
| 0.56                   | 4.00           | 1.50            | 30 | 990622 | 990630 |
| 0.57                   | 4.00           | 1.50            | 30 | 990623 | 990592 |
| 0.58                   | 4.00           | 1.50            | 30 | 990624 | 990593 |
| 0.59                   | 4.00           | 1.50            | 30 | 990625 | 990594 |
| 0.60                   | 4.50           | 1.50            | 30 | 990626 | 990595 |
| 0.61                   | 4.50           | 1.50            | 30 | 990627 | 990596 |
| 0.62                   | 4.50           | 1.50            | 30 | 990628 | 990597 |
| 0.63                   | 4.50           | 1.50            | 30 | 990629 | 990598 |
| 0.64                   | 4.50           | 1.50            | 30 | 990599 | 990604 |
| 0.65                   | 4.50           | 1.50            | 30 | 990600 | 990612 |
| 0.66                   | 4.50           | 1.50            | 30 | 990601 | 990613 |
| 0.67                   | 4.50           | 1.50            | 30 | 990602 | 990614 |
| 0.68                   | 4.50           | 1.50            | 30 | 990440 | 990615 |
| 0.69                   | 4.50           | 1.50            | 30 | 990603 | 990611 |
| 0.70                   | 4.50           | 1.50            | 30 | 990523 | 990576 |
| 0.71                   | 4.50           | 1.50            | 30 | 990524 | 990577 |
| 0.72                   | 4.50           | 1.50            | 30 | 990525 | 990578 |
| 0.73                   | 4.50           | 1.50            | 30 | 990526 | 990579 |
| 0.74                   | 4.50           | 1.50            | 30 | 990527 | 990581 |
| 0.75                   | 4.50           | 1.50            | 30 | 990528 | 990582 |
| 0.76                   | 4.50           | 1.50            | 30 | 990529 | 990588 |
| 0.77                   | 4.50           | 1.50            | 30 | 990530 | 990589 |



# SPIRALBOHRER VERSTÄRKTER SCHAFT

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | DICUT  |
|------------------------|----------------|-----------------|----|--------|--------|
| 0.78                   | 4.50           | 1.50            | 30 | 990531 | 990590 |
| 0.79                   | 4.50           | 1.50            | 30 | 990532 | 990591 |
| 0.80                   | 5.00           | 1.50            | 30 | 990426 | 990485 |
| 0.81                   | 5.00           | 1.50            | 30 | 990410 | 990550 |
| 0.82                   | 5.00           | 1.50            | 30 | 990411 | 990551 |
| 0.83                   | 5.00           | 1.50            | 30 | 990412 | 990552 |
| 0.84                   | 5.00           | 1.50            | 30 | 990413 | 990470 |
| 0.85                   | 5.00           | 1.50            | 30 | 990414 | 990471 |
| 0.86                   | 5.00           | 1.50            | 30 | 990415 | 990472 |
| 0.87                   | 5.00           | 1.50            | 30 | 990416 | 990473 |
| 0.88                   | 5.00           | 1.50            | 30 | 990417 | 990504 |
| 0.89                   | 5.00           | 1.50            | 30 | 990418 | 990505 |
| 0.90                   | 5.00           | 1.50            | 30 | 990419 | 990506 |
| 0.91                   | 5.00           | 1.50            | 30 | 990420 | 990507 |
| 0.92                   | 5.00           | 1.50            | 30 | 990421 | 990508 |
| 0.93                   | 5.00           | 1.50            | 30 | 990422 | 990509 |
| 0.94                   | 5.00           | 1.50            | 30 | 990423 | 990510 |
| 0.95                   | 5.00           | 1.50            | 30 | 990424 | 990511 |
| 0.96                   | 5.00           | 1.50            | 30 | 990425 | 990512 |
| 0.97                   | 5.00           | 1.50            | 30 | 990444 | 990474 |
| 0.98                   | 5.00           | 1.50            | 30 | 990445 | 990475 |
| 0.99                   | 5.00           | 1.50            | 30 | 990446 | 990476 |
| 1.00                   | 5.00           | 1.50            | 30 | 990447 | 990477 |
| 1.01                   | 5.00           | 1.50            | 30 | 990448 | 990478 |
| 1.02                   | 5.00           | 1.50            | 30 | 990339 | 990479 |
| 1.03                   | 5.00           | 1.50            | 30 | 990340 | 990480 |
| 1.04                   | 5.00           | 1.50            | 30 | 990341 | 990543 |
| 1.05                   | 5.00           | 1.50            | 30 | 990441 | 990544 |
| 1.06                   | 5.00           | 1.50            | 30 | 990442 | 990449 |
| 1.07                   | 5.00           | 1.50            | 30 | 990443 | 990488 |
| 1.08                   | 5.00           | 1.50            | 30 | 990427 | 990489 |
| 1.09                   | 5.00           | 1.50            | 30 | 990428 | 990490 |
| 1.10                   | 5.00           | 1.50            | 30 | 990429 | 990491 |
| 1.11                   | 5.00           | 1.50            | 30 | 990430 | 990492 |
| 1.12                   | 5.00           | 1.50            | 30 | 990431 | 990493 |
| 1.13                   | 5.00           | 1.50            | 30 | 990432 | 990494 |
| 1.14                   | 5.00           | 1.50            | 30 | 990433 | 990495 |
| 1.15                   | 5.00           | 1.50            | 30 | 990434 | 990496 |
| 1.16                   | 5.00           | 1.50            | 30 | 990435 | 990497 |
| 1.17                   | 5.00           | 1.50            | 30 | 990436 | 990498 |
| 1.18                   | 5.00           | 1.50            | 30 | 990437 | 990499 |
| 1.19                   | 5.00           | 1.50            | 30 | 990438 | 990466 |
| 1.20                   | 6.00           | 1.50            | 30 | 990439 | 990500 |
| 1.21                   | 6.00           | 1.50            | 30 | 990342 | 990371 |
| 1.22                   | 6.00           | 1.50            | 30 | 990343 | 990372 |
| 1.23                   | 6.00           | 1.50            | 30 | 990344 | 990373 |

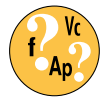
| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | DICUT  |
|------------------------|----------------|-----------------|----|--------|--------|
| 1.24                   | 6.00           | 1.50            | 30 | 990345 | 990517 |
| 1.25                   | 6.00           | 1.50            | 30 | 990346 | 990518 |
| 1.26                   | 6.00           | 1.50            | 30 | 990347 | 990368 |
| 1.27                   | 6.00           | 1.50            | 30 | 990348 | 990369 |
| 1.28                   | 6.00           | 1.50            | 30 | 990349 | 990370 |
| 1.29                   | 6.00           | 1.50            | 30 | 990350 | 990458 |
| 1.30                   | 6.00           | 1.50            | 30 | 990351 | 990459 |
| 1.31                   | 6.00           | 1.50            | 30 | 990352 | 990460 |
| 1.32                   | 6.00           | 1.50            | 30 | 990353 | 990461 |
| 1.33                   | 6.00           | 1.50            | 30 | 990354 | 990462 |
| 1.34                   | 6.00           | 1.50            | 30 | 990355 | 990463 |
| 1.35                   | 6.00           | 1.50            | 30 | 990356 | 990464 |
| 1.36                   | 6.00           | 1.50            | 30 | 990357 | 990465 |
| 1.37                   | 6.00           | 1.50            | 30 | 990358 | 990467 |
| 1.38                   | 6.00           | 1.50            | 30 | 990359 | 990468 |
| 1.39                   | 6.00           | 1.50            | 30 | 990360 | 990469 |
| 1.40                   | 6.00           | 1.50            | 30 | 990361 | 990393 |
| 1.41                   | 6.00           | 1.50            | 30 | 990362 | 990401 |
| 1.42                   | 6.00           | 1.50            | 30 | 990363 | 990402 |
| 1.43                   | 6.00           | 1.50            | 30 | 990364 | 990403 |
| 1.44                   | 6.00           | 1.50            | 30 | 990365 | 990404 |
| 1.45                   | 6.00           | 1.50            | 30 | 990366 | 990405 |
| 1.46                   | 6.00           | 1.50            | 30 | 990367 | 990406 |
| 1.47                   | 6.00           | 1.50            | 30 | 990331 | 990407 |
| 1.48                   | 6.00           | 1.50            | 30 | 990332 | 990408 |
| 1.49                   | 6.00           | 1.50            | 30 | 990333 | 990409 |
| 1.50                   | 7.00           | 2.00            | 38 | 990400 | 990583 |
| 1.51                   | 7.00           | 2.00            | 38 | 990533 | 990584 |
| 1.52                   | 7.00           | 2.00            | 38 | 990534 | 990560 |
| 1.53                   | 7.00           | 2.00            | 38 | 990535 | 990561 |
| 1.54                   | 7.00           | 2.00            | 38 | 990536 | 990481 |
| 1.55                   | 7.00           | 2.00            | 38 | 990537 | 990482 |
| 1.56                   | 7.00           | 2.00            | 38 | 990538 | 990483 |
| 1.57                   | 7.00           | 2.00            | 38 | 990539 | 990484 |
| 1.58                   | 7.00           | 2.00            | 38 | 990540 | 990501 |
| 1.59                   | 7.00           | 2.00            | 38 | 990541 | 990502 |
| 1.60                   | 7.00           | 2.00            | 38 | 990542 | 990503 |
| 1.61                   | 7.00           | 2.00            | 38 | 990545 | 990486 |
| 1.62                   | 7.00           | 2.00            | 38 | 990546 | 990487 |
| 1.63                   | 7.00           | 2.00            | 38 | 990547 | 990513 |
| 1.64                   | 7.00           | 2.00            | 38 | 990548 | 990514 |
| 1.65                   | 7.00           | 2.00            | 38 | 990549 | 990515 |
| 1.66                   | 7.00           | 2.00            | 38 | 990519 | 990516 |
| 1.67                   | 7.00           | 2.00            | 38 | 990520 | 990562 |
| 1.68                   | 7.00           | 2.00            | 38 | 990521 | 990563 |
| 1.69                   | 7.00           | 2.00            | 38 | 990522 | 990564 |





## SPIRALBOHRER VERSTÄRKTER SCHAFT

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM    | DICUT  |
|-----------------|-------|----------|----|--------|--------|
| 1.70            | 7.00  | 2.00     | 38 | 990374 | 990565 |
| 1.71            | 7.00  | 2.00     | 38 | 990375 | 990585 |
| 1.72            | 7.00  | 2.00     | 38 | 990376 | 990586 |
| 1.73            | 7.00  | 2.00     | 38 | 990377 | 990587 |
| 1.74            | 7.00  | 2.00     | 38 | 990378 | 990553 |
| 1.75            | 7.00  | 2.00     | 38 | 990394 | 990554 |
| 1.76            | 8.00  | 2.00     | 38 | 990395 | 990555 |
| 1.77            | 8.00  | 2.00     | 38 | 990396 | 990556 |
| 1.78            | 8.00  | 2.00     | 38 | 990397 | 990557 |
| 1.79            | 8.00  | 2.00     | 38 | 990398 | 990558 |
| 1.80            | 8.00  | 2.00     | 38 | 990399 | 990559 |
| 1.81            | 8.00  | 2.00     | 38 | 990379 | 990566 |
| 1.82            | 8.00  | 2.00     | 38 | 990380 | 990567 |
| 1.83            | 8.00  | 2.00     | 38 | 990381 | 990568 |
| 1.84            | 8.00  | 2.00     | 38 | 990334 | 990569 |
| 1.85            | 8.00  | 2.00     | 38 | 990335 | 990570 |
| 1.86            | 8.00  | 2.00     | 38 | 990336 | 990571 |
| 1.87            | 8.00  | 2.00     | 38 | 990337 | 990572 |
| 1.88            | 8.00  | 2.00     | 38 | 990338 | 990573 |
| 1.89            | 8.00  | 2.00     | 38 | 990382 | 990574 |
| 1.90            | 8.00  | 2.00     | 38 | 990383 | 990575 |
| 1.91            | 8.00  | 2.00     | 38 | 990384 | 990450 |
| 1.92            | 8.00  | 2.00     | 38 | 990385 | 990451 |
| 1.93            | 8.00  | 2.00     | 38 | 990386 | 990452 |
| 1.94            | 8.00  | 2.00     | 38 | 990387 | 990453 |
| 1.95            | 8.00  | 2.00     | 38 | 990388 | 990454 |
| 1.96            | 8.00  | 2.00     | 38 | 990389 | 990455 |
| 1.97            | 8.00  | 2.00     | 38 | 990390 | 990456 |
| 1.98            | 8.00  | 2.00     | 38 | 990391 | 990457 |
| 1.99            | 8.00  | 2.00     | 38 | 990392 | 990580 |



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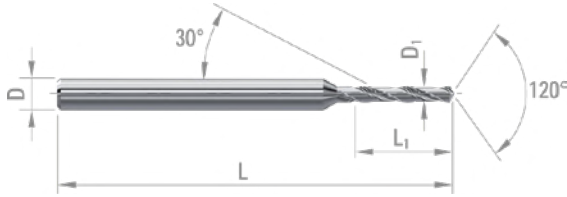


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D<sub>1</sub> > 0.8

SPIRALBOHRER  
VERSTÄRKTER SCHAFT



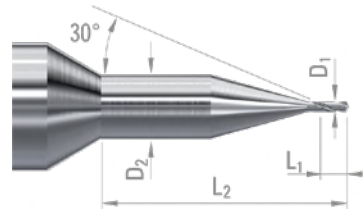
- Spiralbohrer verstärkter Schaft, selbstzentrierend. Für die allgemeine Bearbeitung.
- TiAIN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

○ gut    ⊙ ausgezeichnet

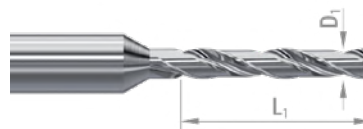
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○                | ○  | ○  | ⊙                                    | ⊙    | ⊙    | ⊙    | ⊙        | ⊙  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ○                       | ○  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      | ○                       | ○  |       | ⊙                        | ⊙  |    |                  |    |                  |  |

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>2</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | VHM    | TiAIN  |
|------------------------|----------------|----------------|----------------|-----------------|----|--------|--------|
| 0.05                   | 0.35           | 1.50           | 5.35           | 3               | 38 | 962810 |        |
| 0.06                   | 0.40           | 1.50           | 5.40           | 3               | 38 | 962809 |        |
| 0.07                   | 0.50           | 1.50           | 5.50           | 3               | 38 | 962808 |        |
| 0.08                   | 0.60           | 1.50           | 5.65           | 3               | 38 | 962807 |        |
| 0.09                   | 0.65           | 1.50           | 5.70           | 3               | 38 | 962806 |        |
| 0.10                   | 0.70           | 1.50           | 5.70           | 3               | 38 | 960016 | 960258 |
| 0.15                   | 1.00           | 1.50           | 6.00           | 3               | 38 | 960014 | 200513 |
| 0.20                   | 1.00           | 1.50           | 6.00           | 3               | 38 | 960013 | 200512 |
| 0.25                   | 1.00           | 1.50           | 6.00           | 3               | 38 | 960012 | 200511 |
| 0.30                   | 1.50           | 1.50           | 6.50           | 3               | 38 | 960011 | 200510 |
| 0.35                   | 1.50           | 1.50           | 6.50           | 3               | 38 | 960010 | 200509 |
| 0.40                   | 2.00           | 1.50           | 7.00           | 3               | 38 | 960009 | 200508 |
| 0.45                   | 3.60           | 1.50           | 8.60           | 3               | 38 | 960007 | 200507 |



| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | TiAIN  |
|------------------------|----------------|-----------------|----|--------|--------|
| 0.50                   | 4.00           | 3               | 38 | 200157 | 200439 |
| 0.53                   | 4.50           | 3               | 38 | 960034 | 200514 |
| 0.55                   | 4.50           | 3               | 38 | 200189 | 200471 |
| 0.60                   | 4.50           | 3               | 38 | 200148 | 200429 |
| 0.62                   | 5.00           | 3               | 38 | 960035 | 200515 |
| 0.65                   | 5.00           | 3               | 38 | 200190 | 200472 |
| 0.70                   | 5.60           | 3               | 38 | 200149 | 200431 |
| 0.71                   | 5.60           | 3               | 38 | 960036 | 200516 |
| 0.75                   | 5.60           | 3               | 38 | 200191 | 200473 |
| 0.80                   | 6.30           | 3               | 38 | 200150 | 200432 |
| 0.81                   | 6.30           | 3               | 38 | 200210 | 200492 |
| 0.82                   | 6.30           | 3               | 38 | 200185 | 200467 |
| 0.83                   | 6.30           | 3               | 38 | 200167 | 200449 |





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 $D_1 > 0.8$ 

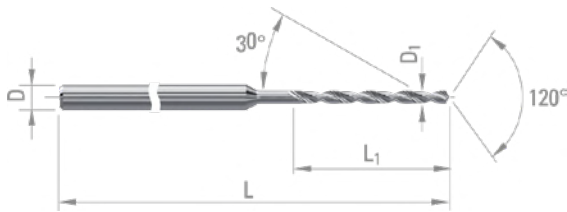
## SPIRALBOHRER VERSTÄRKTER SCHAFT

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM    | TiAIN  |
|-----------------|-------|----------|----|--------|--------|
| 0.84            | 6.30  | 3        | 38 | 200168 | 200450 |
| 0.85            | 6.30  | 3        | 38 | 200151 | 200433 |
| 0.86            | 7.10  | 3        | 38 | 200211 | 200493 |
| 0.87            | 7.10  | 3        | 38 | 200207 | 200489 |
| 0.88            | 7.10  | 3        | 38 | 200208 | 200490 |
| 0.89            | 7.10  | 3        | 38 | 200204 | 200486 |
| 0.90            | 7.10  | 3        | 38 | 200152 | 200434 |
| 0.91            | 7.10  | 3        | 38 | 200209 | 200491 |
| 0.92            | 7.10  | 3        | 38 | 200213 | 200495 |
| 0.93            | 7.10  | 3        | 38 | 200184 | 200466 |
| 0.94            | 7.10  | 3        | 38 | 200186 | 200468 |
| 0.95            | 7.10  | 3        | 38 | 200192 | 200474 |
| 0.96            | 9.00  | 3        | 38 | 200160 | 200442 |
| 0.97            | 9.00  | 3        | 38 | 200187 | 200469 |
| 0.98            | 9.00  | 3        | 38 | 200201 | 200483 |
| 0.99            | 9.00  | 3        | 38 | 200182 | 200464 |
| 1.00            | 9.00  | 3        | 38 | 959533 | 200430 |
| 1.01            | 9.00  | 3        | 38 | 200169 | 200451 |
| 1.02            | 9.00  | 3        | 38 | 200178 | 200460 |
| 1.03            | 9.00  | 3        | 38 | 200214 | 200496 |
| 1.04            | 9.00  | 3        | 38 | 200215 | 200497 |
| 1.05            | 9.00  | 3        | 38 | 200193 | 200475 |
| 1.06            | 9.00  | 3        | 38 | 200219 | 200501 |
| 1.07            | 9.00  | 3        | 38 | 200179 | 200461 |
| 1.08            | 9.00  | 3        | 38 | 200180 | 200462 |
| 1.09            | 9.00  | 3        | 38 | 200216 | 200498 |
| 1.10            | 9.00  | 3        | 38 | 200194 | 200476 |
| 1.11            | 9.00  | 3        | 38 | 200164 | 200446 |
| 1.12            | 9.00  | 3        | 38 | 200183 | 200465 |
| 1.13            | 9.00  | 3        | 38 | 200212 | 200494 |
| 1.14            | 9.00  | 3        | 38 | 200220 | 200502 |
| 1.15            | 9.00  | 3        | 38 | 200195 | 200477 |
| 1.16            | 10.00 | 3        | 38 | 200166 | 200448 |
| 1.17            | 10.00 | 3        | 38 | 200163 | 200445 |
| 1.18            | 10.00 | 3        | 38 | 200177 | 200459 |
| 1.19            | 10.00 | 3        | 38 | 200217 | 200499 |
| 1.20            | 10.00 | 3        | 38 | 200196 | 200478 |
| 1.21            | 10.00 | 3        | 38 | 200165 | 200447 |
| 1.22            | 10.00 | 3        | 38 | 200181 | 200463 |
| 1.23            | 10.00 | 3        | 38 | 200161 | 200443 |
| 1.24            | 10.00 | 3        | 38 | 200221 | 200503 |
| 1.25            | 10.00 | 3        | 38 | 200197 | 200479 |
| 1.26            | 10.00 | 3        | 38 | 200206 | 200488 |
| 1.27            | 10.00 | 3        | 38 | 200203 | 200485 |
| 1.28            | 10.00 | 3        | 38 | 200218 | 200500 |
| 1.29            | 10.00 | 3        | 38 | 200222 | 200504 |
| 1.30            | 10.00 | 3        | 38 | 200153 | 200435 |

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM    | TiAIN  |
|-----------------|-------|----------|----|--------|--------|
| 1.31            | 11.20 | 3        | 38 | 200188 | 200470 |
| 1.32            | 11.20 | 3        | 38 | 200176 | 200458 |
| 1.33            | 11.20 | 3        | 38 | 200162 | 200444 |
| 1.34            | 11.20 | 3        | 38 | 200202 | 200484 |
| 1.35            | 11.20 | 3        | 38 | 200198 | 200480 |
| 1.36            | 11.20 | 3        | 38 | 200205 | 200487 |
| 1.37            | 11.20 | 3        | 38 | 200158 | 200440 |
| 1.38            | 11.20 | 3        | 38 | 200223 | 200505 |
| 1.39            | 11.20 | 3        | 38 | 200224 | 200506 |
| 1.40            | 11.20 | 3        | 38 | 200154 | 200436 |
| 1.45            | 11.20 | 3        | 38 | 200199 | 200481 |
| 1.50            | 11.20 | 3        | 38 | 200200 | 200482 |
| 1.55            | 12.00 | 3        | 38 | 200170 | 200452 |
| 1.60            | 12.00 | 3        | 38 | 200171 | 200453 |
| 1.65            | 12.00 | 3        | 38 | 200172 | 200454 |
| 1.70            | 12.00 | 3        | 38 | 200155 | 200437 |
| 1.75            | 12.00 | 3        | 38 | 200173 | 200455 |
| 1.80            | 12.00 | 3        | 38 | 200159 | 200441 |
| 1.85            | 12.00 | 3        | 38 | 200174 | 200456 |
| 1.90            | 12.00 | 3        | 38 | 200156 | 200438 |
| 1.95            | 12.00 | 3        | 38 | 200175 | 200457 |
| 2.00            | 12.00 | 3        | 38 | 960037 | 200517 |
| 2.05            | 15.00 | 3        | 38 | 960038 | 200518 |
| 2.10            | 15.00 | 3        | 38 | 960039 | 200519 |
| 2.15            | 15.00 | 3        | 38 | 960040 | 200520 |
| 2.20            | 15.00 | 3        | 38 | 960041 | 200521 |
| 2.25            | 15.00 | 3        | 38 | 960042 | 200522 |
| 2.30            | 15.00 | 3        | 38 | 960043 | 200523 |
| 2.35            | 15.00 | 3        | 38 | 960044 | 200524 |
| 2.40            | 15.00 | 3        | 38 | 960045 | 200525 |
| 2.45            | 15.00 | 3        | 38 | 960046 | 200526 |
| 2.50            | 15.00 | 3        | 38 | 960047 | 200527 |
| 2.55            | 15.00 | 3        | 38 | 960048 | 200528 |
| 2.80            | 16.00 | 3        | 38 | 960049 | 200529 |



SPIRALBOHRER  
VERSTÄRKTER SCHAFT



- Spiralbohrer verstärkter Schaft, Bohrtiefe 12×D<sub>1</sub>. Für die allgemeine Bearbeitung.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

○ gut    ⊙ ausgezeichnet

| ISO          | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|--------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
|              | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323     | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen | ○                 | ○ | ○ | ○ | ○ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ⊙                                    | ⊙    | ⊙    | ⊙    | ⊙        | ⊙  | ○                | ○  | ○                  | ○  |

| ISO          | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |  |
|--------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
|              | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323     | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen | ○                       | ○  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      |                         | ○  | ○     |                          | ⊙  | ⊙                |    |                  |    |  |

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | TiAlN  |
|------------------------|----------------|-----------------|----|--------|--------|
| 0.50                   | 6.00           | 3               | 38 | 317729 | 317900 |
| 0.51                   | 6.10           | 3               | 38 | 317730 | 317901 |
| 0.52                   | 6.30           | 3               | 38 | 317731 | 317902 |
| 0.53                   | 6.40           | 3               | 38 | 317732 | 317903 |
| 0.54                   | 6.50           | 3               | 38 | 317733 | 317904 |
| 0.55                   | 6.60           | 3               | 38 | 317734 | 317905 |
| 0.56                   | 6.70           | 3               | 38 | 317735 | 317906 |
| 0.57                   | 6.90           | 3               | 38 | 317736 | 317907 |
| 0.58                   | 7.00           | 3               | 38 | 317737 | 317908 |
| 0.59                   | 7.10           | 3               | 38 | 317738 | 317909 |
| 0.60                   | 7.20           | 3               | 38 | 317739 | 317910 |
| 0.61                   | 7.30           | 3               | 38 | 317740 | 317911 |
| 0.62                   | 7.50           | 3               | 38 | 317741 | 317912 |
| 0.63                   | 7.60           | 3               | 38 | 317742 | 317913 |
| 0.64                   | 7.70           | 3               | 38 | 317743 | 317914 |
| 0.65                   | 7.80           | 3               | 38 | 317744 | 317915 |
| 0.66                   | 7.90           | 3               | 38 | 317745 | 317916 |
| 0.67                   | 8.10           | 3               | 38 | 317746 | 317917 |
| 0.68                   | 8.20           | 3               | 38 | 317747 | 317918 |
| 0.69                   | 8.30           | 3               | 38 | 317748 | 317919 |
| 0.70                   | 8.40           | 3               | 38 | 317749 | 317920 |
| 0.71                   | 8.50           | 3               | 38 | 317750 | 317921 |
| 0.72                   | 8.70           | 3               | 38 | 317751 | 317922 |
| 0.73                   | 8.80           | 3               | 38 | 317752 | 317923 |
| 0.74                   | 8.90           | 3               | 38 | 317753 | 317924 |
| 0.75                   | 9.00           | 3               | 38 | 317754 | 317925 |
| 0.76                   | 9.10           | 3               | 38 | 317755 | 317926 |
| 0.77                   | 9.30           | 3               | 38 | 317756 | 317927 |
| 0.78                   | 9.40           | 3               | 38 | 317757 | 317928 |

| D <sub>10/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | TiAlN  |
|------------------------|----------------|-----------------|----|--------|--------|
| 0.79                   | 9.50           | 3               | 38 | 317758 | 317929 |
| 0.80                   | 9.60           | 3               | 38 | 317759 | 317930 |
| 0.81                   | 9.70           | 3               | 38 | 317760 | 317931 |
| 0.82                   | 9.90           | 3               | 38 | 317761 | 317932 |
| 0.83                   | 10.00          | 3               | 38 | 317762 | 317933 |
| 0.84                   | 10.10          | 3               | 38 | 317763 | 317934 |
| 0.85                   | 10.20          | 3               | 38 | 317764 | 317935 |
| 0.86                   | 10.30          | 3               | 38 | 317765 | 317936 |
| 0.87                   | 10.50          | 3               | 38 | 317766 | 317937 |
| 0.88                   | 10.60          | 3               | 38 | 317767 | 317938 |
| 0.89                   | 10.70          | 3               | 38 | 317768 | 317939 |
| 0.90                   | 10.80          | 3               | 38 | 317769 | 317940 |
| 0.91                   | 10.90          | 3               | 38 | 317770 | 317941 |
| 0.92                   | 11.10          | 3               | 38 | 317771 | 317942 |
| 0.93                   | 11.20          | 3               | 38 | 317772 | 317943 |
| 0.94                   | 11.30          | 3               | 38 | 317773 | 317944 |
| 0.95                   | 11.40          | 3               | 38 | 317774 | 317945 |
| 0.96                   | 11.50          | 3               | 38 | 317775 | 317946 |
| 0.97                   | 11.70          | 3               | 38 | 317776 | 317947 |
| 0.98                   | 11.80          | 3               | 38 | 317777 | 317948 |
| 0.99                   | 11.90          | 3               | 38 | 317778 | 317949 |
| 1.00                   | 12.00          | 3               | 38 | 317779 | 317950 |
| 1.01                   | 12.10          | 3               | 38 | 317780 | 317951 |
| 1.02                   | 12.30          | 3               | 38 | 317781 | 317952 |
| 1.03                   | 12.40          | 3               | 38 | 317782 | 317953 |
| 1.04                   | 12.50          | 3               | 38 | 317783 | 317954 |
| 1.05                   | 12.60          | 3               | 38 | 317784 | 317955 |
| 1.06                   | 12.70          | 3               | 38 | 317785 | 317956 |
| 1.07                   | 12.90          | 3               | 38 | 317786 | 317957 |

SPIRALBOHRER  
VERSTÄRKTER SCHAFT

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM    | TiAIN  |
|-----------------|-------|----------|----|--------|--------|
| 1.08            | 13.00 | 3        | 38 | 317787 | 317958 |
| 1.09            | 13.10 | 3        | 38 | 317788 | 317959 |
| 1.10            | 13.20 | 3        | 38 | 317789 | 317960 |
| 1.11            | 13.30 | 3        | 38 | 317790 | 317961 |
| 1.12            | 13.50 | 3        | 38 | 317791 | 317962 |
| 1.13            | 13.60 | 3        | 38 | 317792 | 317963 |
| 1.14            | 13.70 | 3        | 38 | 317793 | 317964 |
| 1.15            | 13.80 | 3        | 38 | 317794 | 317965 |
| 1.16            | 13.90 | 3        | 38 | 317795 | 317966 |
| 1.17            | 14.10 | 3        | 38 | 317796 | 317967 |
| 1.18            | 14.20 | 3        | 38 | 317797 | 317968 |
| 1.19            | 14.30 | 3        | 38 | 317798 | 317969 |
| 1.20            | 14.40 | 3        | 38 | 317799 | 317970 |
| 1.21            | 14.50 | 3        | 38 | 317800 | 317971 |
| 1.22            | 14.70 | 3        | 38 | 317801 | 317972 |
| 1.23            | 14.80 | 3        | 38 | 317802 | 317973 |
| 1.24            | 14.90 | 3        | 38 | 317803 | 317974 |
| 1.25            | 15.00 | 3        | 38 | 317804 | 317975 |
| 1.26            | 15.10 | 3        | 50 | 317805 | 317976 |
| 1.27            | 15.30 | 3        | 50 | 317806 | 317977 |
| 1.28            | 15.40 | 3        | 50 | 317807 | 317978 |
| 1.29            | 15.50 | 3        | 50 | 317808 | 317979 |
| 1.30            | 15.60 | 3        | 50 | 317809 | 317980 |
| 1.31            | 15.70 | 3        | 50 | 317810 | 317981 |
| 1.32            | 15.90 | 3        | 50 | 317811 | 317982 |
| 1.33            | 16.00 | 3        | 50 | 317812 | 317983 |
| 1.34            | 16.10 | 3        | 50 | 317813 | 317984 |
| 1.35            | 16.20 | 3        | 50 | 317814 | 317985 |
| 1.36            | 16.30 | 3        | 50 | 317815 | 317986 |
| 1.37            | 16.50 | 3        | 50 | 317816 | 317987 |
| 1.38            | 16.60 | 3        | 50 | 317817 | 317988 |
| 1.39            | 16.70 | 3        | 50 | 317818 | 317989 |
| 1.40            | 16.80 | 3        | 50 | 317819 | 317990 |
| 1.41            | 16.90 | 3        | 50 | 317820 | 317991 |
| 1.42            | 17.10 | 3        | 50 | 317821 | 317992 |
| 1.43            | 17.20 | 3        | 50 | 317822 | 317993 |
| 1.44            | 17.30 | 3        | 50 | 317823 | 317994 |
| 1.45            | 17.40 | 3        | 50 | 317824 | 317995 |
| 1.46            | 17.50 | 3        | 50 | 317825 | 317996 |
| 1.47            | 17.70 | 3        | 50 | 317826 | 317997 |
| 1.48            | 17.80 | 3        | 50 | 317827 | 317998 |
| 1.49            | 17.90 | 3        | 50 | 317828 | 317999 |

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM    | TiAIN  |
|-----------------|-------|----------|----|--------|--------|
| 1.50            | 18.00 | 3        | 50 | 317829 | 318000 |
| 1.51            | 18.10 | 3        | 50 | 317830 | 318001 |
| 1.52            | 18.30 | 3        | 50 | 317831 | 318002 |
| 1.53            | 18.40 | 3        | 50 | 317832 | 318003 |
| 1.54            | 18.50 | 3        | 50 | 317833 | 318004 |
| 1.55            | 18.60 | 3        | 50 | 317834 | 318005 |
| 1.56            | 18.70 | 3        | 50 | 317835 | 318006 |
| 1.57            | 18.90 | 3        | 50 | 317836 | 318007 |
| 1.58            | 19.00 | 3        | 50 | 317837 | 318008 |
| 1.59            | 19.10 | 3        | 50 | 317838 | 318009 |
| 1.60            | 19.20 | 3        | 50 | 317839 | 318010 |
| 1.61            | 19.30 | 3        | 50 | 317840 | 318011 |
| 1.62            | 19.40 | 3        | 50 | 317841 | 318012 |
| 1.63            | 19.60 | 3        | 50 | 317842 | 318013 |
| 1.64            | 19.70 | 3        | 50 | 317843 | 318014 |
| 1.65            | 19.80 | 3        | 50 | 317844 | 318015 |
| 1.66            | 19.90 | 3        | 50 | 317845 | 318016 |
| 1.67            | 20.10 | 3        | 50 | 317846 | 318017 |
| 1.68            | 20.20 | 3        | 50 | 317847 | 318018 |
| 1.69            | 20.30 | 3        | 50 | 317848 | 318019 |
| 1.70            | 20.40 | 3        | 50 | 317849 | 318020 |
| 1.71            | 20.50 | 3        | 50 | 317850 | 318021 |
| 1.72            | 20.70 | 3        | 50 | 317851 | 318022 |
| 1.73            | 20.80 | 3        | 50 | 317852 | 318023 |
| 1.74            | 20.90 | 3        | 50 | 317853 | 318024 |
| 1.75            | 21.00 | 3        | 50 | 317854 | 318025 |
| 1.76            | 21.10 | 3        | 50 | 317855 | 318026 |
| 1.77            | 21.30 | 3        | 50 | 317856 | 318027 |
| 1.78            | 21.40 | 3        | 50 | 317857 | 318028 |
| 1.79            | 21.50 | 3        | 50 | 317858 | 318029 |
| 1.80            | 21.60 | 3        | 50 | 317859 | 318030 |
| 1.81            | 21.70 | 3        | 50 | 317860 | 318031 |
| 1.82            | 21.90 | 3        | 50 | 317861 | 318032 |
| 1.83            | 22.00 | 3        | 50 | 317862 | 318033 |
| 1.84            | 22.10 | 3        | 50 | 317863 | 318034 |
| 1.85            | 22.20 | 3        | 50 | 317864 | 318035 |
| 1.86            | 22.30 | 3        | 50 | 317865 | 318036 |
| 1.87            | 22.50 | 3        | 50 | 317866 | 318037 |
| 1.88            | 22.60 | 3        | 50 | 317867 | 318038 |
| 1.89            | 22.70 | 3        | 50 | 317868 | 318039 |
| 1.90            | 22.80 | 3        | 50 | 317869 | 318040 |
| 1.91            | 22.90 | 3        | 50 | 317870 | 318041 |
| 1.92            | 23.10 | 3        | 50 | 317871 | 318042 |
| 1.93            | 23.20 | 3        | 50 | 317872 | 318043 |
| 1.94            | 23.30 | 3        | 50 | 317873 | 318044 |
| 1.95            | 23.40 | 3        | 50 | 317874 | 318045 |



## SPIRALBOHRER VERSTÄRKTER SCHAFT

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM    | TiAIN  |
|-----------------|-------|----------|----|--------|--------|
| 1.96            | 23.50 | 3        | 50 | 317875 | 318046 |
| 1.97            | 23.70 | 3        | 50 | 317876 | 318047 |
| 1.98            | 23.80 | 3        | 50 | 317877 | 318048 |
| 1.99            | 23.90 | 3        | 50 | 317878 | 318049 |
| 2.00            | 24.00 | 3        | 61 | 317879 | 318050 |
| 2.05            | 24.60 | 3        | 61 | 317880 | 318051 |
| 2.10            | 25.20 | 3        | 61 | 317881 | 318052 |
| 2.15            | 25.80 | 3        | 61 | 317882 | 318053 |
| 2.20            | 26.40 | 3        | 61 | 317883 | 318054 |
| 2.25            | 27.00 | 3        | 61 | 317884 | 318055 |
| 2.30            | 27.60 | 3        | 61 | 317885 | 318056 |
| 2.35            | 28.20 | 3        | 61 | 317886 | 318057 |
| 2.40            | 28.80 | 3        | 61 | 317887 | 318058 |
| 2.45            | 29.40 | 3        | 61 | 317888 | 318059 |
| 2.50            | 30.00 | 3        | 61 | 317889 | 318060 |
| 2.55            | 30.60 | 3        | 61 | 317890 | 318061 |
| 2.60            | 31.20 | 3        | 61 | 317891 | 318062 |
| 2.65            | 31.80 | 3        | 61 | 317892 | 318063 |
| 2.70            | 32.40 | 3        | 61 | 317893 | 318064 |
| 2.75            | 33.00 | 3        | 61 | 317894 | 318065 |
| 2.80            | 33.60 | 3        | 61 | 317895 | 318066 |
| 2.85            | 34.20 | 3        | 61 | 317896 | 318067 |
| 2.90            | 34.80 | 3        | 61 | 317897 | 318068 |
| 2.95            | 35.40 | 3        | 61 | 317898 | 318069 |
| 3.00            | 36.00 | 3        | 61 | 317899 | 318070 |



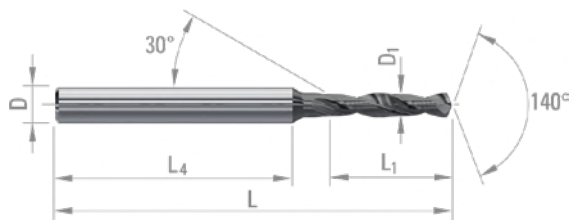
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HOCHLEISTUNGS-SPIRALBOHRER  
VERSTÄRKTER SCHAFT



- Spiralbohrer verstärkter Schaft, selbstzentrierend. Hochleistungswerkzeuge entwickelt für das Bohren langspanender Materialien.
- TiAIN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

○ gut    ⊙ ausgezeichnet

| ISO          | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                   |      |      |      | K        |    |                  |    |                    |    |
|--------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|-------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
|              | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX /PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323     | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                   | ○    | ○    | ○    | ○        | ○  | ○                | ○  | ○                  | ○  |

| ISO          | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |
|--------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|
|              | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |
| VDI 3323     | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |
| Empfehlungen | ○                       | ○  | ○                       | ○  | ○  | ○                 | ○                      | ○  | ○            | ○       |            |      | ○                       | ○  | ○     | ○                        | ○  |    |                  |    |                  |

| D <sub>1 h6</sub> | L <sub>1</sub> | L <sub>4</sub> | D <sub>h5</sub> | L  | TiAIN  |
|-------------------|----------------|----------------|-----------------|----|--------|
| 1.00              | 5              | 26             | 3               | 38 | 976857 |
| 1.10              | 5              | 26             | 3               | 38 | 976858 |
| 1.20              | 5              | 26             | 3               | 38 | 976859 |
| 1.30              | 5              | 26             | 3               | 38 | 976860 |
| 1.40              | 5              | 26             | 3               | 38 | 976861 |
| 1.50              | 7              | 25             | 3               | 38 | 976862 |
| 1.60              | 7              | 25             | 3               | 38 | 976863 |
| 1.70              | 7              | 25             | 3               | 38 | 976864 |
| 1.80              | 7              | 25             | 3               | 38 | 976865 |
| 1.90              | 7              | 25             | 3               | 38 | 976866 |
| 2.00              | 9              | 35             | 3               | 50 | 43300  |
| 2.10              | 9              | 35             | 3               | 50 | 43301  |
| 2.20              | 9              | 35             | 3               | 50 | 43302  |
| 2.30              | 9              | 35             | 3               | 50 | 43303  |
| 2.40              | 9              | 35             | 3               | 50 | 43304  |
| 2.50              | 9              | 36             | 3               | 50 | 43305  |
| 2.60              | 11             | 31             | 4               | 50 | 43306  |
| 2.70              | 11             | 31             | 4               | 50 | 43307  |
| 2.80              | 11             | 31             | 4               | 50 | 41777  |
| 2.90              | 11             | 31             | 4               | 50 | 43308  |
| 3.00              | 14             | 39             | 6               | 62 | 43309  |
| 3.10              | 14             | 39             | 6               | 62 | 43310  |
| 3.175             | 14             | 39             | 6               | 62 | 64419  |
| 3.20              | 14             | 39             | 6               | 62 | 43311  |
| 3.30              | 14             | 39             | 6               | 62 | 43312  |
| 3.40              | 14             | 39             | 6               | 62 | 43313  |
| 3.50              | 14             | 39             | 6               | 62 | 43314  |
| 3.60              | 14             | 39             | 6               | 62 | 43315  |
| 3.70              | 14             | 40             | 6               | 62 | 43316  |

| D <sub>1 h6</sub> | L <sub>1</sub> | L <sub>4</sub> | D <sub>h5</sub> | L  | TiAIN  |
|-------------------|----------------|----------------|-----------------|----|--------|
| 3.80              | 17             | 40             | 6               | 66 | 43317  |
| 3.90              | 17             | 40             | 6               | 66 | 43318  |
| 4.00              | 17             | 40             | 6               | 66 | 43319  |
| 4.10              | 17             | 40             | 6               | 66 | 43320  |
| 4.20              | 17             | 40             | 6               | 66 | 43321  |
| 4.30              | 17             | 40             | 6               | 66 | 43322  |
| 4.40              | 17             | 40             | 6               | 66 | 43323  |
| 4.50              | 17             | 40             | 6               | 66 | 43324  |
| 4.60              | 17             | 40             | 6               | 66 | 43325  |
| 4.70              | 17             | 40             | 6               | 66 | 43326  |
| 4.762             | 20             | 37             | 6               | 66 | 43673  |
| 4.80              | 20             | 37             | 6               | 66 | 43327  |
| 4.90              | 20             | 38             | 6               | 66 | 43328  |
| 5.00              | 20             | 38             | 6               | 66 | 43329  |
| 5.10              | 20             | 38             | 6               | 66 | 966749 |
| 5.20              | 20             | 38             | 6               | 66 | 43330  |
| 5.30              | 20             | 38             | 6               | 66 | 43331  |
| 5.40              | 20             | 38             | 6               | 66 | 966750 |
| 5.50              | 20             | 38             | 6               | 66 | 43332  |
| 5.60              | 22             | 37             | 6               | 66 | 960752 |
| 5.70              | 22             | 37             | 6               | 66 | 966751 |
| 5.80              | 22             | 37             | 6               | 66 | 43333  |
| 5.90              | 22             | 37             | 6               | 66 | 966752 |
| 6.00              | 22             | 37             | 6               | 66 | 43334  |
| 6.20              | 24             | 43             | 8               | 79 | 43447  |
| 6.30              | 24             | 43             | 8               | 79 | 43538  |
| 6.35              | 24             | 43             | 8               | 79 | 44585  |
| 6.40              | 24             | 43             | 8               | 79 | 63641  |
| 6.50              | 24             | 43             | 8               | 79 | 39394  |



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## HOCHLEISTUNGS-SPIRALBOHRER VERSTÄRKTER SCHAFT

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM | TiAlN  |
|-----------------|-------|----------|----|-----|--------|
| 6.60            | 24    | 43       | 8  | 79  | 43539  |
| 6.70            | 24    | 43       | 8  | 79  | 966756 |
| 6.80            | 24    | 44       | 8  | 79  | 43540  |
| 6.90            | 24    | 44       | 8  | 79  | 966757 |
| 7.00            | 24    | 43       | 8  | 79  | 43541  |
| 7.20            | 29    | 38       | 8  | 79  | 56826  |
| 7.50            | 29    | 38       | 8  | 79  | 43542  |
| 7.80            | 29    | 38       | 8  | 79  | 43543  |
| 8.00            | 29    | -        | 8  | 79  | 43544  |
| 8.20            | 35    | 40       | 10 | 89  | 43448  |
| 8.40            | 35    | 40       | 10 | 89  | 55450  |
| 8.50            | 35    | 40       | 10 | 89  | 42654  |
| 8.70            | 35    | 41       | 10 | 89  | 54604  |
| 8.80            | 35    | 41       | 10 | 89  | 56828  |
| 9.00            | 35    | 41       | 10 | 89  | 43545  |
| 9.20            | 35    | 41       | 10 | 89  | 55451  |
| 9.50            | 35    | 41       | 10 | 89  | 43546  |
| 9.80            | 35    | 41       | 10 | 89  | 43547  |
| 10.00           | 35    | -        | 10 | 89  | 43548  |
| 10.10           | 40    | 47       | 12 | 102 | 978563 |
| 10.20           | 40    | 47       | 12 | 102 | 43549  |
| 10.50           | 40    | 47       | 12 | 102 | 43550  |
| 10.80           | 40    | 48       | 12 | 102 | 59472  |
| 11.00           | 40    | 48       | 12 | 102 | 43551  |
| 11.50           | 41    | 47       | 12 | 102 | 43552  |
| 12.00           | 42    | -        | 12 | 102 | 43553  |
| 13.00           | 46    | 47       | 14 | 107 | 43554  |
| 14.00           | 49    | -        | 14 | 107 | 43556  |



# DIXI 1147 TiAlN

Z = 2  
L<sub>1</sub> = 6,5 × D<sub>1</sub>



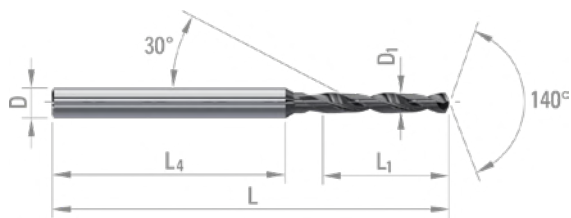
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## HOCHLEISTUNGS-SPIRALBOHRER VERSTÄRKTER SCHAFT



- Spiralbohrer verstärkter Schaft, selbstzentrierend, Bohrtiefe 6,5xD<sub>1</sub>. Hochleistungswerkzeug entwickelt für das Bohren von kurzspanenden Materialien.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

○ gut    ⊙ ausgezeichnet

| ISO          | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|--------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
|              | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323     | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙              | ⊙  | ○                | ○  | ○                                    | ○    | ○    | ○    | ○        | ○  | ○                | ○  | ○                  | ○  |

| ISO          | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|--------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
|              | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323     | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen | ○                       | ○  | ○                       | ○  | ○  |                   |                        |    |              |         |            |      | ⊙                       | ⊙  | ⊙     | ○                        | ○  |                  |    |                  |    |

| D <sub>1 h6</sub> | L <sub>1</sub> | L <sub>4</sub> | D <sub>h5</sub> | L  | TiAlN  |
|-------------------|----------------|----------------|-----------------|----|--------|
| 0.50              | 3.30           | 29             | 3               | 38 | 960468 |
| 0.55              | 3.60           | 29             | 3               | 38 | 960469 |
| 0.60              | 3.90           | 29             | 3               | 38 | 960470 |
| 0.65              | 4.20           | 33             | 3               | 43 | 960471 |
| 0.70              | 4.60           | 33             | 3               | 43 | 960472 |
| 0.75              | 4.90           | 33             | 3               | 43 | 960473 |
| 0.80              | 5.20           | 32             | 3               | 43 | 960474 |
| 0.85              | 5.50           | 32             | 3               | 43 | 960475 |
| 0.90              | 5.90           | 32             | 3               | 43 | 960476 |
| 0.95              | 6.20           | 32             | 3               | 43 | 960477 |
| 1.00              | 6.50           | 31             | 3               | 43 | 960478 |
| 1.10              | 7.20           | 31             | 3               | 43 | 960479 |
| 1.20              | 7.80           | 37             | 3               | 50 | 960480 |
| 1.30              | 8.50           | 37             | 3               | 50 | 960481 |
| 1.40              | 9.10           | 36             | 3               | 50 | 960482 |
| 1.50              | 9.80           | 35             | 3               | 50 | 960483 |
| 1.60              | 10.40          | 35             | 3               | 50 | 960484 |
| 1.70              | 11.10          | 34             | 3               | 50 | 960485 |
| 1.80              | 11.70          | 34             | 3               | 50 | 960486 |
| 1.90              | 12.40          | 33             | 3               | 50 | 960487 |
| 2.00              | 13.00          | 43             | 4               | 62 | 960137 |
| 2.10              | 13.70          | 42             | 4               | 62 | 960138 |
| 2.20              | 14.30          | 42             | 4               | 62 | 960139 |
| 2.30              | 15.00          | 41             | 4               | 62 | 960140 |
| 2.40              | 15.60          | 41             | 4               | 62 | 960141 |
| 2.50              | 16.30          | 40             | 4               | 62 | 960142 |
| 2.60              | 16.90          | 39             | 4               | 62 | 960143 |
| 2.70              | 17.60          | 39             | 4               | 62 | 960144 |
| 2.80              | 18.20          | 38             | 4               | 62 | 960145 |

| D <sub>1 h6</sub> | L <sub>1</sub> | L <sub>4</sub> | D <sub>h5</sub> | L  | TiAlN  |
|-------------------|----------------|----------------|-----------------|----|--------|
| 2.90              | 18.90          | 38             | 4               | 62 | 960146 |
| 3.00              | 19.50          | 37             | 4               | 62 | 960147 |
| 3.10              | 20.20          | 53             | 6               | 79 | 960148 |
| 3.20              | 20.80          | 52             | 6               | 79 | 960149 |
| 3.30              | 21.50          | 51             | 6               | 79 | 960150 |
| 3.40              | 22.10          | 51             | 6               | 79 | 960151 |
| 3.50              | 22.80          | 50             | 6               | 79 | 960152 |
| 3.60              | 23.40          | 50             | 6               | 79 | 966741 |
| 3.75              | 24.40          | 49             | 6               | 79 | 960153 |
| 3.80              | 24.70          | 48             | 6               | 79 | 960154 |
| 3.90              | 25.40          | 47             | 6               | 79 | 961304 |
| 4.00              | 26.00          | 47             | 6               | 79 | 960155 |
| 4.10              | 26.70          | 46             | 6               | 79 | 960156 |
| 4.20              | 27.30          | 45             | 6               | 79 | 960157 |
| 4.30              | 28.00          | 45             | 6               | 79 | 960158 |
| 4.40              | 28.60          | 44             | 6               | 79 | 959769 |
| 4.50              | 29.30          | 43             | 6               | 79 | 960159 |
| 4.60              | 29.90          | 43             | 6               | 79 | 960160 |
| 4.70              | 30.60          | 42             | 6               | 79 | 960161 |
| 4.80              | 31.20          | 42             | 6               | 79 | 960162 |
| 4.90              | 31.90          | 41             | 6               | 79 | 960163 |
| 5.00              | 32.50          | 50             | 6               | 89 | 959770 |
| 5.10              | 33.20          | 49             | 6               | 89 | 960167 |
| 5.20              | 33.80          | 49             | 6               | 89 | 960169 |
| 5.30              | 34.50          | 48             | 6               | 89 | 960170 |
| 5.40              | 35.10          | 48             | 6               | 89 | 966742 |
| 5.50              | 35.80          | 47             | 6               | 89 | 960171 |
| 5.60              | 36.40          | 46             | 6               | 89 | 960172 |
| 5.70              | 37.10          | 46             | 6               | 89 | 966743 |



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HOCHLEISTUNGS-SPIRALBOHRER  
 VERSTÄRKTER SCHAFT

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM | TiAIN  |
|-----------------|-------|----------|----|-----|--------|
| 5.80            | 37.70 | 45       | 6  | 89  | 960173 |
| 5.90            | 38.40 | 44       | 6  | 89  | 966744 |
| 6.00            | 39.00 | -        | 6  | 89  | 960174 |
| 6.10            | 39.70 | 54       | 8  | 102 | 960175 |
| 6.20            | 40.30 | 53       | 8  | 102 | 960176 |
| 6.30            | 41.00 | 53       | 8  | 102 | 960177 |
| 6.35            | 41.30 | 53       | 8  | 102 | 960178 |
| 6.40            | 41.60 | 52       | 8  | 102 | 966745 |
| 6.50            | 42.30 | 51       | 8  | 102 | 960179 |
| 6.60            | 42.90 | 51       | 8  | 102 | 960180 |
| 6.70            | 43.60 | 50       | 8  | 102 | 966747 |
| 6.80            | 44.20 | 50       | 8  | 102 | 960181 |
| 6.90            | 44.90 | 49       | 8  | 102 | 966748 |
| 7.00            | 45.50 | 48       | 8  | 102 | 960182 |
| 7.20            | 46.80 | 47       | 8  | 102 | 960183 |
| 7.50            | 48.80 | 45       | 8  | 102 | 960184 |
| 7.80            | 50.70 | 43       | 8  | 102 | 960185 |
| 8.00            | 52.00 | -        | 8  | 102 | 960186 |
| 8.20            | 53.30 | 54       | 10 | 118 | 960187 |
| 8.40            | 54.00 | 54       | 10 | 118 | 960188 |
| 8.50            | 55.30 | 52       | 10 | 118 | 960189 |
| 8.80            | 57.20 | 51       | 10 | 118 | 960190 |
| 9.00            | 58.50 | 49       | 10 | 118 | 960191 |
| 9.50            | 61.80 | 46       | 10 | 118 | 960192 |
| 9.80            | 63.70 | 44       | 10 | 118 | 960193 |
| 10.00           | 65.00 | -        | 10 | 118 | 960194 |

# DIXI 1145-HH TiAIN

Z = 2



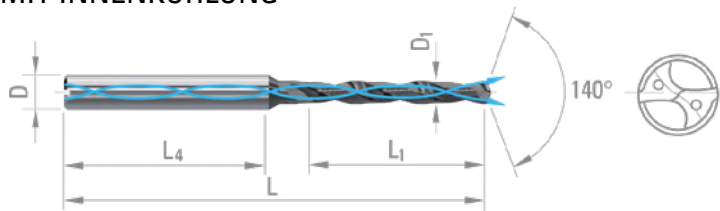
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## HOCHLEISTUNGS-SPIRALBOHRER VERSTÄRKTER SCHAFT MIT INNENKÜHLUNG



- Spiralbohrer mit Innenkühlung verstärkter Schaft, selbstzentrierend. Hochleistungswerkzeug entwickelt für das Bohren langspannender Materialien.

- TiAIN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

○ gut    ⊙ ausgezeichnet

| ISO          | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|--------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
|              | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323     | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                    | ○    | ○    | ○    | ○        | ○  | ○                | ○  | ○                  | ○  |

| ISO          | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|--------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
|              | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323     | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen | ○                       | ○  | ○                       | ○  | ○  | ○                 | ○                      | ○  | ○            | ○       |            |      | ○                       | ○  | ○     | ○                        | ○  |                  |    |                  |    |

| D <sub>1h6</sub> | L <sub>1</sub> | L <sub>4</sub> | D <sub>h5</sub> | L  | TiAIN  |
|------------------|----------------|----------------|-----------------|----|--------|
| 0.80             | 5              | 26             | 3               | 38 | 954321 |
| 1.40             | 7              | 25             | 3               | 38 | 956694 |
| 1.50             | 11             | 20             | 3               | 38 | 956692 |
| 1.60             | 11             | 20             | 3               | 38 | 956690 |
| 1.70             | 11             | 20             | 3               | 38 | 956688 |
| 1.80             | 11             | 20             | 3               | 38 | 956686 |
| 1.90             | 11             | 20             | 3               | 38 | 956683 |
| 2.00             | 15             | 18             | 3               | 38 | 954320 |
| 2.10             | 15             | 18             | 3               | 38 | 956325 |
| 2.20             | 15             | 18             | 3               | 38 | 956326 |
| 2.30             | 15             | 26             | 4               | 50 | 956327 |
| 2.40             | 15             | 27             | 4               | 50 | 956328 |
| 2.50             | 18             | 24             | 4               | 50 | 956329 |
| 2.60             | 18             | 24             | 4               | 50 | 956330 |
| 2.70             | 18             | 24             | 4               | 50 | 956331 |
| 2.80             | 18             | 24             | 4               | 50 | 956332 |
| 2.90             | 23             | 35             | 6               | 66 | 956333 |
| 3.00             | 23             | 35             | 6               | 66 | 65470  |
| 3.10             | 23             | 35             | 6               | 66 | 953836 |
| 3.20             | 23             | 35             | 6               | 66 | 953835 |
| 3.30             | 23             | 35             | 6               | 66 | 65471  |
| 3.40             | 23             | 35             | 6               | 66 | 953837 |
| 3.50             | 23             | 35             | 6               | 66 | 65472  |
| 3.60             | 29             | 35             | 6               | 74 | 966718 |
| 3.70             | 29             | 35             | 6               | 74 | 966719 |
| 3.75             | 29             | 36             | 6               | 74 | 65473  |
| 3.80             | 29             | 36             | 6               | 74 | 953838 |
| 3.90             | 29             | 36             | 6               | 74 | 966720 |
| 4.00             | 29             | 36             | 6               | 74 | 45540  |

| D <sub>1h6</sub> | L <sub>1</sub> | L <sub>4</sub> | D <sub>h5</sub> | L  | TiAIN  |
|------------------|----------------|----------------|-----------------|----|--------|
| 4.10             | 29             | 36             | 6               | 74 | 953839 |
| 4.20             | 29             | 36             | 6               | 74 | 56829  |
| 4.30             | 29             | 36             | 6               | 74 | 62995  |
| 4.40             | 29             | 36             | 6               | 74 | 956579 |
| 4.50             | 35             | 38             | 6               | 82 | 953840 |
| 4.60             | 35             | 38             | 6               | 82 | 966721 |
| 4.70             | 35             | 38             | 6               | 82 | 966722 |
| 4.80             | 35             | 38             | 6               | 82 | 45541  |
| 4.90             | 35             | 38             | 6               | 82 | 966826 |
| 5.00             | 35             | 39             | 6               | 82 | 43272  |
| 5.10             | 35             | 39             | 6               | 82 | 953841 |
| 5.20             | 35             | 39             | 6               | 82 | 56830  |
| 5.30             | 35             | 39             | 6               | 82 | 59465  |
| 5.40             | 35             | 39             | 6               | 82 | 953842 |
| 5.50             | 35             | 39             | 6               | 82 | 45542  |
| 5.60             | 35             | 39             | 6               | 82 | 954509 |
| 5.70             | 35             | 39             | 6               | 82 | 966723 |
| 5.80             | 35             | 39             | 6               | 82 | 59466  |
| 5.90             | 35             | 39             | 6               | 82 | 966724 |
| 6.00             | 35             | -              | 6               | 82 | 38821  |
| 6.10             | 43             | 36             | 8               | 91 | 953843 |
| 6.20             | 43             | 36             | 8               | 91 | 56831  |
| 6.30             | 43             | 36             | 8               | 91 | 43279  |
| 6.35             | 43             | 36             | 8               | 91 | 59467  |
| 6.40             | 43             | 36             | 8               | 91 | 953844 |
| 6.50             | 43             | 36             | 8               | 91 | 39758  |
| 6.60             | 43             | 36             | 8               | 91 | 59468  |
| 6.70             | 43             | 36             | 8               | 91 | 956886 |
| 6.80             | 43             | 36             | 8               | 91 | 45614  |



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HOCHLEISTUNGS-SPIRALBOHRER  
VERSTÄRKTER SCHAFT  
MIT INNENKÜHLUNG

| D <sub>1 h6</sub> | L <sub>1</sub> | L <sub>4</sub> | D <sub>h5</sub> | L   | TiAlN  |
|-------------------|----------------|----------------|-----------------|-----|--------|
| 6.90              | 43             | 36             | 8               | 91  | 966725 |
| 7.00              | 43             | 36             | 8               | 91  | 43283  |
| 7.20              | 43             | 36             | 8               | 91  | 56833  |
| 7.30              | 43             | 36             | 8               | 91  | 954510 |
| 7.40              | 43             | 36             | 8               | 91  | 59384  |
| 7.50              | 43             | 36             | 8               | 91  | 43284  |
| 7.60              | 43             | 36             | 8               | 91  | 954511 |
| 7.80              | 43             | 36             | 8               | 91  | 43285  |
| 8.00              | 43             | -              | 8               | 91  | 39530  |
| 8.10              | 49             | 40             | 10              | 103 | 954512 |
| 8.20              | 49             | 40             | 10              | 103 | 56834  |
| 8.30              | 49             | 40             | 10              | 103 | 954513 |
| 8.40              | 49             | 40             | 10              | 103 | 59469  |
| 8.50              | 49             | 40             | 10              | 103 | 52633  |
| 8.60              | 49             | 40             | 10              | 103 | 954514 |
| 8.80              | 49             | 40             | 10              | 103 | 45615  |
| 9.00              | 49             | 41             | 10              | 103 | 43288  |
| 9.20              | 49             | 41             | 10              | 103 | 953849 |
| 9.40              | 49             | 41             | 10              | 103 | 954515 |
| 9.50              | 49             | 41             | 10              | 103 | 63430  |
| 9.60              | 49             | 41             | 10              | 103 | 954516 |
| 9.70              | 49             | 41             | 10              | 103 | 953846 |
| 9.80              | 49             | 41             | 10              | 103 | 44777  |
| 10.00             | 49             | -              | 10              | 103 | 40751  |
| 10.10             | 56             | 47             | 12              | 118 | 954326 |
| 10.20             | 56             | 47             | 12              | 118 | 56837  |
| 10.30             | 56             | 47             | 12              | 118 | 954518 |
| 10.50             | 56             | 47             | 12              | 118 | 44152  |
| 10.60             | 56             | 47             | 12              | 118 | 954517 |
| 10.80             | 56             | 47             | 12              | 118 | 45616  |
| 11.00             | 56             | 48             | 12              | 118 | 43294  |
| 11.30             | 58             | 46             | 12              | 118 | 954519 |
| 11.50             | 58             | 46             | 12              | 118 | 45207  |
| 12.00             | 60             | -              | 12              | 118 | 40752  |
| 13.00             | 65             | 45             | 14              | 124 | 44339  |
| 14.00             | 70             | -              | 14              | 124 | 45649  |

# DIXI 1146-HH TiAlN

Z = 2  
L<sub>1</sub> = 10 × D<sub>1</sub>



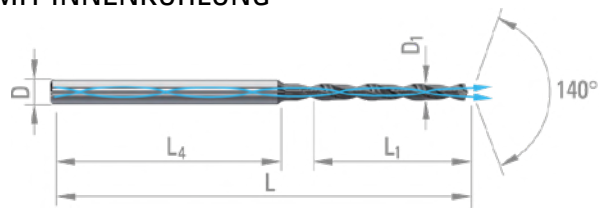
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## HOCHLEISTUNGS-SPIRALBOHRER VERSTÄRKTER SCHAFT MIT INNENKÜHLUNG



- Spiralbohrer mit Innenkühlung verstärkter Schaft, selbstzentrierend, Bohrtiefe 10xD<sub>1</sub>. Hochleistungswerkzeug entwickelt für das Bohren von kurzspanenden Materialien.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

○ gut    ⊙ ausgezeichnet

| ISO          | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|--------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
|              | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323     | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙              | ⊙  | ○                | ○  | ○                                  | ○    | ○    | ○    | ○        | ○  | ○                | ○  | ○                  | ○  |

| ISO          | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |
|--------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|
|              | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |
| VDI 3323     | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |
| Empfehlungen | ○                       | ○  | ○                       | ○  | ○  |                   |                        |    |              |         |            |      | ⊙                       | ⊙  | ⊙     | ○                        | ○  |    |                  |    |                  |

| D <sub>1h6</sub> | L <sub>1</sub> | L <sub>4</sub> | D <sub>h5</sub> | L  | TiAlN  |
|------------------|----------------|----------------|-----------------|----|--------|
| 0.80             | 8.00           | 37             | 3               | 50 | 960206 |
| 0.85             | 8.50           | 37             | 3               | 50 | 960208 |
| 0.90             | 9.00           | 36             | 3               | 50 | 960209 |
| 0.95             | 9.50           | 36             | 3               | 50 | 960210 |
| 1.00             | 10.00          | 35             | 3               | 50 | 960211 |
| 1.10             | 11.00          | 34             | 3               | 50 | 960212 |
| 1.20             | 12.00          | 33             | 3               | 50 | 960214 |
| 1.30             | 13.00          | 33             | 3               | 50 | 960215 |
| 1.40             | 14.00          | 32             | 3               | 50 | 960216 |
| 1.50             | 15.00          | 43             | 3               | 62 | 960217 |
| 1.60             | 16.00          | 42             | 3               | 62 | 960218 |
| 1.70             | 17.00          | 41             | 3               | 62 | 960219 |
| 1.80             | 18.00          | 40             | 3               | 62 | 960220 |
| 1.90             | 19.00          | 39             | 3               | 62 | 960221 |
| 2.00             | 20.00          | 38             | 3               | 62 | 960222 |
| 2.10             | 21.00          | 37             | 3               | 62 | 960223 |
| 2.20             | 22.00          | 36             | 3               | 62 | 960224 |
| 2.30             | 23.00          | 51             | 4               | 79 | 960225 |
| 2.40             | 24.00          | 50             | 4               | 79 | 960226 |
| 2.50             | 25.00          | 49             | 4               | 79 | 960227 |
| 2.60             | 26.00          | 48             | 4               | 79 | 960228 |
| 2.70             | 27.00          | 47             | 4               | 79 | 960229 |
| 2.80             | 28.00          | 46             | 4               | 79 | 960230 |
| 2.90             | 29.00          | 44             | 6               | 79 | 960231 |
| 3.00             | 30.00          | 43             | 6               | 79 | 960232 |
| 3.10             | 31.00          | 52             | 6               | 89 | 966726 |
| 3.20             | 32.00          | 51             | 6               | 89 | 966727 |
| 3.30             | 33.00          | 50             | 6               | 89 | 960243 |
| 3.40             | 34.00          | 49             | 6               | 89 | 966728 |

| D <sub>1h6</sub> | L <sub>1</sub> | L <sub>4</sub> | D <sub>h5</sub> | L   | TiAlN  |
|------------------|----------------|----------------|-----------------|-----|--------|
| 3.50             | 35.00          | 48             | 6               | 89  | 960244 |
| 3.60             | 36.00          | 47             | 6               | 89  | 966729 |
| 3.75             | 37.50          | 46             | 6               | 89  | 960245 |
| 3.90             | 39.00          | 44             | 6               | 89  | 966730 |
| 4.00             | 40.00          | 56             | 6               | 102 | 960246 |
| 4.10             | 41.00          | 55             | 6               | 102 | 966731 |
| 4.20             | 42.00          | 54             | 6               | 102 | 960247 |
| 4.30             | 43.00          | 53             | 6               | 102 | 960248 |
| 4.40             | 44.00          | 52             | 6               | 102 | 966732 |
| 4.50             | 45.00          | 51             | 6               | 102 | 960249 |
| 4.60             | 46.00          | 50             | 6               | 102 | 966733 |
| 4.70             | 47.00          | 49             | 6               | 102 | 966734 |
| 4.80             | 48.00          | 48             | 6               | 102 | 960250 |
| 4.90             | 49.00          | 47             | 6               | 102 | 966735 |
| 5.00             | 50.00          | 46             | 6               | 102 | 960251 |
| 5.10             | 51.00          | 45             | 6               | 102 | 966736 |
| 5.20             | 52.00          | 44             | 6               | 102 | 960252 |
| 5.30             | 53.00          | 43             | 6               | 102 | 960253 |
| 5.40             | 54.00          | 42             | 6               | 102 | 966737 |
| 5.50             | 55.00          | 41             | 6               | 102 | 960254 |
| 5.60             | 56.00          | 56             | 6               | 118 | 966738 |
| 5.70             | 57.00          | 55             | 6               | 118 | 966739 |
| 5.80             | 58.00          | 54             | 6               | 118 | 960255 |
| 5.90             | 59.00          | 53             | 6               | 118 | 963660 |
| 6.00             | 60.00          | -              | 6               | 118 | 960256 |
| 6.10             | 61.00          | 49             | 8               | 118 | 966740 |
| 6.20             | 62.00          | 48             | 8               | 118 | 960257 |
| 6.30             | 63.00          | 47             | 8               | 118 | 960426 |
| 6.35             | 63.50          | 47             | 8               | 118 | 960427 |

**DIXI 1146-HH TiAIN**

Z = 2  
 $L_1 = 10 \times D_1$



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**HOCHLEISTUNGS-SPIRALBOHRER  
 VERSTÄRKTER SCHAFT  
 MIT INNENKÜHLUNG**

| $D_{1h6}$ | $L_1$  | $L_4$ | $D_{h5}$ | L   | TiAIN  |
|-----------|--------|-------|----------|-----|--------|
| 6.50      | 65.00  | 45    | 8        | 118 | 960428 |
| 6.60      | 66.00  | 59    | 8        | 133 | 960429 |
| 6.80      | 68.00  | 56    | 8        | 133 | 960430 |
| 6.90      | 69.00  | 56    | 8        | 133 | 963661 |
| 7.00      | 70.00  | 55    | 8        | 133 | 960431 |
| 7.20      | 72.00  | 53    | 8        | 133 | 960432 |
| 7.50      | 75.00  | 50    | 8        | 133 | 960433 |
| 7.80      | 78.00  | 47    | 8        | 133 | 960434 |
| 8.00      | 80.00  | -     | 8        | 133 | 960435 |
| 8.20      | 82.00  | 59    | 10       | 151 | 960436 |
| 8.40      | 84.00  | 57    | 10       | 151 | 960437 |
| 8.50      | 85.00  | 56    | 10       | 151 | 960438 |
| 8.80      | 88.00  | 53    | 10       | 151 | 960439 |
| 9.00      | 90.00  | 60    | 10       | 160 | 960440 |
| 9.20      | 92.00  | 58    | 10       | 160 | 960441 |
| 9.40      | 94.00  | 56    | 10       | 160 | 960442 |
| 9.525     | 95.30  | 55    | 10       | 160 | 960443 |
| 9.80      | 98.00  | 52    | 10       | 160 | 960444 |
| 10.00     | 100.00 | -     | 10       | 160 | 960445 |



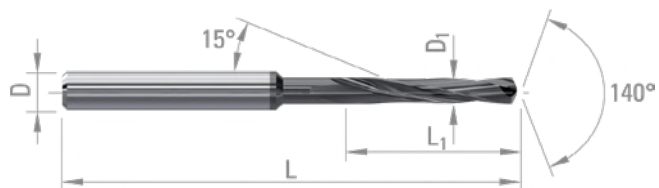
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## SPIRALBOHRER FÜR GEHÄRTETEN STAHL VERSTÄRKTER SCHAFT



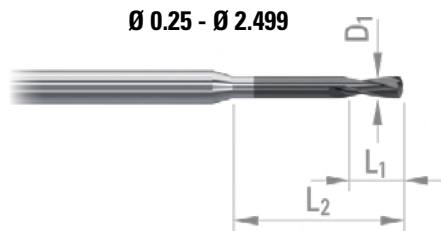
- Spiralbohrer, verstärkter Schaft. Werkzeug für die Bearbeitung gehärteter Stähle.
- Die XIDUR-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen bis 65 HRC.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                      |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         |            |      | ○                       | ○  | ⊙     |                          |    | ⊙  | ⊙                | ⊙  | ⊙                |  |

Ø 0.25 - Ø 2.499



Ø 2.50 - Ø 12.00



| $D_{10/-0.004}$ | $L_1$ | $L_2$ | $D_{h5}$ | L  | XIDUR  |
|-----------------|-------|-------|----------|----|--------|
| 0.25            | 0.75  | 2.00  | 3        | 38 | 957466 |
| 0.30            | 0.90  | 2.50  | 3        | 38 | 956658 |
| 0.40            | 1.20  | 3.20  | 3        | 38 | 956659 |
| 0.50            | 1.50  | 4.00  | 3        | 38 | 956660 |
| 0.60            | 1.80  | 4.80  | 3        | 38 | 956661 |
| 0.70            | 2.10  | 5.60  | 3        | 38 | 956662 |
| 0.80            | 2.40  | 6.50  | 3        | 38 | 956663 |
| 0.90            | 2.70  | 7.50  | 3        | 38 | 956664 |
| 1.00            | 3.00  | 8.00  | 3        | 38 | 956665 |
| 1.10            | 3.30  | 8.00  | 3        | 50 | 957524 |
| 1.20            | 3.60  | 10.00 | 3        | 50 | 956666 |
| 1.30            | 3.90  | 12.00 | 3        | 50 | 957525 |
| 1.40            | 4.20  | 12.00 | 3        | 50 | 957467 |
| 1.50            | 4.50  | 12.00 | 3        | 50 | 956667 |
| 1.60            | 4.80  | 15.00 | 3        | 50 | 957526 |
| 1.70            | 5.10  | 15.00 | 3        | 50 | 957527 |
| 1.80            | 5.40  | 15.00 | 3        | 50 | 956668 |
| 1.90            | 5.80  | 15.00 | 3        | 50 | 957528 |
| 2.00            | 6.00  | 15.00 | 3        | 50 | 956669 |

| $D_{10/-0.004}$ | $L_1$ | $L_2$ | $D_{h5}$ | L  | XIDUR |
|-----------------|-------|-------|----------|----|-------|
| 2.50            | 15    | 3     | 62       | 62 | 62529 |
| 2.60            | 15    | 3     | 62       | 62 | 62843 |
| 2.70            | 15    | 3     | 62       | 62 | 62844 |
| 2.80            | 15    | 3     | 62       | 62 | 62845 |
| 2.90            | 15    | 3     | 62       | 62 | 62846 |
| 3.00            | 20    | 4     | 66       | 66 | 62530 |
| 3.175           | 20    | 4     | 66       | 66 | 62848 |
| 3.30            | 20    | 4     | 66       | 66 | 62849 |
| 3.40            | 20    | 4     | 66       | 66 | 62850 |
| 3.50            | 20    | 4     | 66       | 66 | 62531 |
| 3.57            | 20    | 4     | 66       | 66 | 62851 |
| 3.70            | 20    | 4     | 66       | 66 | 62852 |
| 3.80            | 20    | 4     | 66       | 66 | 62853 |
| 3.90            | 20    | 4     | 66       | 66 | 62854 |
| 4.00            | 30    | 6     | 66       | 66 | 62532 |
| 4.10            | 30    | 6     | 66       | 66 | 62855 |
| 4.20            | 30    | 6     | 66       | 66 | 62533 |
| 4.30            | 30    | 6     | 66       | 66 | 62857 |
| 4.365           | 30    | 6     | 66       | 66 | 62858 |



## SPIRALBOHRER FÜR GEHÄRTETEN STAHL VERSTÄRKTER SCHAFT

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L   | XIDUR |
|-----------------|-------|----------|-----|-------|
| 4.50            | 30    | 6        | 66  | 62859 |
| 4.60            | 30    | 6        | 66  | 62860 |
| 4.70            | 30    | 6        | 66  | 62861 |
| 4.762           | 30    | 6        | 66  | 62862 |
| 4.90            | 30    | 6        | 66  | 62863 |
| 5.00            | 30    | 6        | 66  | 62534 |
| 5.10            | 30    | 6        | 66  | 62414 |
| 5.16            | 30    | 6        | 66  | 62864 |
| 5.50            | 30    | 6        | 66  | 62867 |
| 5.80            | 30    | 6        | 66  | 62870 |
| 6.00            | 40    | 8        | 79  | 62872 |
| 6.35            | 40    | 8        | 79  | 62874 |
| 6.50            | 40    | 8        | 79  | 62877 |
| 6.80            | 40    | 8        | 79  | 62535 |
| 7.00            | 40    | 8        | 79  | 62878 |
| 7.50            | 40    | 8        | 79  | 62880 |
| 7.80            | 40    | 8        | 79  | 62881 |
| 8.00            | 50    | 10       | 89  | 62882 |
| 8.33            | 50    | 10       | 89  | 62883 |
| 8.50            | 50    | 10       | 89  | 62536 |
| 8.73            | 50    | 10       | 89  | 62884 |
| 9.00            | 50    | 10       | 89  | 62885 |
| 9.525           | 50    | 10       | 89  | 62886 |
| 9.80            | 50    | 10       | 89  | 62887 |
| 10.00           | 60    | 12       | 102 | 62888 |
| 10.20           | 60    | 12       | 102 | 62889 |
| 10.50           | 60    | 12       | 102 | 62890 |
| 10.80           | 60    | 12       | 102 | 62891 |
| 11.00           | 60    | 12       | 102 | 62895 |
| 11.50           | 60    | 12       | 102 | 62896 |
| 12.00           | 60    | 12       | 102 | 62897 |

### $D_1 < 5 \text{ mm}$

Schnittbedingungen :  $V_c = 10 - 30 \text{ m/min}$

$$f = 0.005 \times D_1$$

$$\text{Entspanzyklus} = 0.25 \times D_1$$

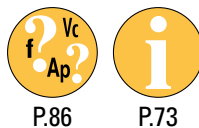
### $D_1 \geq 5 \text{ mm}$

Schnittbedingungen :  $V_c = 10 - 30 \text{ m/min}$

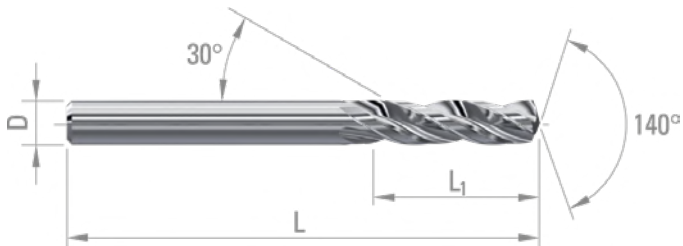
$$f = 0.008 \times D_1$$

$$\text{Entspanzyklus} = 0.25 \times D_1$$





SPIRALBOHRER MIT 3 SCHNEIDEN



- Spiralbohrer, zylindrischer Schaft entwickelt zur Herstellung präziser Bohrungen mit sehr guter Rundheit und Geradheit.
- Geeignet für Titan-Legierungen.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                   |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|-------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX /PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ |                |    |                  |    |                                     |      |      |      | ⊙        | ⊙  |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  |                   |                        |    | ⊙            |         |            |      |                         |    |       | ⊙                        | ⊙  |                  |    |                  |    |

| D <sub>h5</sub> | L <sub>1</sub> | L  | VHM    |
|-----------------|----------------|----|--------|
| 1.00            | 8              | 30 | 31446  |
| 1.05            | 8              | 30 | 47890  |
| 1.10            | 10             | 30 | 31573  |
| 1.15            | 10             | 30 | 37288  |
| 1.20            | 10             | 30 | 31574  |
| 1.25            | 10             | 30 | 34553  |
| 1.30            | 10             | 30 | 31575  |
| 1.35            | 10             | 30 | 37506  |
| 1.40            | 10             | 30 | 31576  |
| 1.45            | 10             | 30 | 47039  |
| 1.50            | 10             | 30 | 31560  |
| 1.55            | 12             | 38 | 47891  |
| 1.60            | 12             | 38 | 31577  |
| 1.63            | 12             | 38 | 41603  |
| 1.64            | 12             | 38 | 58867  |
| 1.65            | 12             | 38 | 38467  |
| 1.70            | 12             | 38 | 31578  |
| 1.75            | 12             | 38 | 43738  |
| 1.80            | 12             | 38 | 31579  |
| 1.85            | 12             | 38 | 47899  |
| 1.90            | 12             | 38 | 31294  |
| 1.95            | 12             | 38 | 47040  |
| 2.00            | 12             | 38 | 31580  |
| 2.04            | 12             | 38 | 954146 |
| 2.10            | 12             | 38 | 31581  |
| 2.20            | 13             | 40 | 41993  |
| 2.30            | 13             | 40 | 31583  |
| 2.40            | 14             | 43 | 39320  |
| 2.50            | 14             | 43 | 41454  |

| D <sub>h5</sub> | L <sub>1</sub> | L  | VHM   |
|-----------------|----------------|----|-------|
| 2.60            | 14             | 43 | 42140 |
| 2.70            | 16             | 46 | 31295 |
| 2.80            | 16             | 46 | 31296 |
| 2.90            | 16             | 46 | 31586 |
| 3.00            | 16             | 46 | 29106 |
| 3.10            | 18             | 49 | 31197 |
| 3.20            | 18             | 49 | 31728 |
| 3.30            | 18             | 49 | 29107 |
| 3.40            | 20             | 52 | 33271 |
| 3.50            | 20             | 52 | 29108 |
| 3.60            | 20             | 52 | 31297 |
| 3.70            | 20             | 52 | 32311 |
| 3.80            | 22             | 55 | 29109 |
| 3.90            | 22             | 55 | 42942 |
| 4.00            | 22             | 55 | 42305 |
| 4.10            | 22             | 55 | 42939 |
| 4.20            | 22             | 55 | 29111 |
| 4.30            | 24             | 58 | 32871 |
| 4.40            | 24             | 58 | 33427 |
| 4.50            | 24             | 58 | 29112 |
| 4.60            | 24             | 58 | 32862 |
| 4.70            | 24             | 58 | 32312 |
| 4.80            | 26             | 62 | 29113 |
| 4.90            | 26             | 62 | 31590 |
| 5.00            | 26             | 62 | 29114 |
| 5.10            | 26             | 62 | 41455 |
| 5.20            | 26             | 62 | 32639 |
| 5.30            | 26             | 62 | 31717 |
| 5.40            | 28             | 66 | 34791 |



## SPIRALBOHRER MIT 3 SCHNEIDEN

| $D_{h5}$ | $L_1$ | L   | VHM   |
|----------|-------|-----|-------|
| 5.50     | 28    | 66  | 29115 |
| 5.60     | 28    | 66  | 41597 |
| 5.70     | 28    | 66  | 32313 |
| 5.80     | 28    | 66  | 43809 |
| 5.90     | 28    | 66  | 45905 |
| 6.00     | 28    | 66  | 41120 |
| 6.10     | 31    | 70  | 41620 |
| 6.20     | 31    | 70  | 32640 |
| 6.30     | 31    | 70  | 34792 |
| 6.40     | 31    | 70  | 33105 |
| 6.50     | 31    | 70  | 29118 |
| 6.60     | 31    | 70  | 34754 |
| 6.70     | 31    | 70  | 31506 |
| 6.80     | 34    | 74  | 29119 |
| 6.90     | 34    | 74  | 32860 |
| 7.00     | 34    | 74  | 29120 |
| 7.50     | 34    | 74  | 29121 |
| 7.80     | 37    | 79  | 29122 |
| 8.00     | 37    | 79  | 43769 |
| 8.20     | 37    | 79  | 32237 |
| 8.50     | 37    | 79  | 41927 |
| 8.80     | 40    | 84  | 29125 |
| 9.00     | 40    | 84  | 29126 |
| 9.50     | 40    | 84  | 29127 |
| 9.80     | 43    | 89  | 29128 |
| 10.00    | 43    | 89  | 29129 |
| 10.20    | 43    | 89  | 29130 |
| 10.50    | 43    | 89  | 29131 |
| 11.00    | 47    | 95  | 29132 |
| 11.50    | 47    | 95  | 29133 |
| 12.00    | 51    | 102 | 29134 |
| 12.50    | 51    | 102 | 32641 |
| 13.00    | 51    | 102 | 29135 |
| 13.50    | 54    | 107 | 32642 |
| 14.00    | 54    | 107 | 29136 |

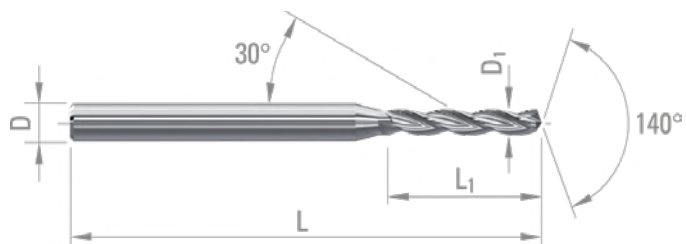


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SPIRALBOHRER MIT 3 SCHNEIDEN  
VERSTÄRKTER SCHAFT



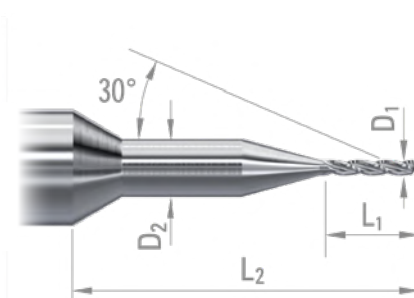
- Spiralbohrer, verstärkter Schaft entwickelt zur Herstellung präziser Bohrungen mit sehr guter Rundheit und Geradheit.
- Geeignet für Titan-Legierungen.

○ gut    ⊙ ausgezeichnet

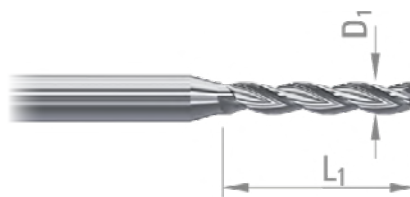
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |                                    |    | M    |      |          |      | K                |    |                    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|------------------------------------|----|------|------|----------|------|------------------|----|--------------------|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl | Aust. Rostfreier Stahl (DUPLIX/PH) |    |      |      | Grauguss |      | Kugelgraphitguss |    | Gusseisen, formbar |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12                                 | 13 | 14.1 | 14.2 | 14.3     | 14.4 | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ |                |                  |                                    |    |      |      |          |      | ⊙                | ⊙  |                    |    |    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  |                   |                        |    | ⊙            |         |            |      |                         |    |       |                          |    | ⊙                | ⊙  |                  |    |  |  |

| D <sub>1 0/-0.004</sub> | L <sub>1</sub> | D <sub>2</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | VHM    |
|-------------------------|----------------|----------------|----------------|-----------------|----|--------|
| 0.15                    | 1.50           | 1.50           | 6.80           | 3               | 38 | 962817 |
| 0.20                    | 1.50           | 1.50           | 6.80           | 3               | 38 | 962818 |
| 0.25                    | 2.00           | 1.50           | 7.35           | 3               | 38 | 962819 |
| 0.30                    | 2.00           | 1.50           | 7.35           | 3               | 38 | 962820 |
| 0.35                    | 2.00           | 1.50           | 7.35           | 3               | 38 | 962821 |
| 0.40                    | 2.00           | 1.50           | 7.35           | 3               | 38 | 962822 |
| 0.45                    | 3.60           | 1.50           | 7.35           | 3               | 38 | 962850 |



| D <sub>1 0/-0.004</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    |
|-------------------------|----------------|-----------------|----|--------|
| 0.50                    | 4.00           | 3               | 38 | 962851 |
| 0.53                    | 4.50           | 3               | 38 | 962852 |
| 0.55                    | 4.50           | 3               | 38 | 962853 |
| 0.60                    | 4.50           | 3               | 38 | 962854 |
| 0.62                    | 5.00           | 3               | 38 | 962855 |
| 0.65                    | 5.00           | 3               | 38 | 962856 |
| 0.70                    | 5.60           | 3               | 38 | 962857 |
| 0.71                    | 5.60           | 3               | 38 | 962858 |
| 0.75                    | 5.60           | 3               | 38 | 962859 |
| 0.80                    | 6.30           | 3               | 38 | 962860 |
| 0.81                    | 6.30           | 3               | 38 | 962861 |
| 0.82                    | 6.30           | 3               | 38 | 962862 |
| 0.83                    | 6.30           | 3               | 38 | 962863 |
| 0.84                    | 6.30           | 3               | 38 | 962864 |
| 0.85                    | 6.30           | 3               | 38 | 962865 |
| 0.86                    | 7.10           | 3               | 38 | 962866 |
| 0.87                    | 7.10           | 3               | 38 | 962867 |
| 0.88                    | 7.10           | 3               | 38 | 962868 |





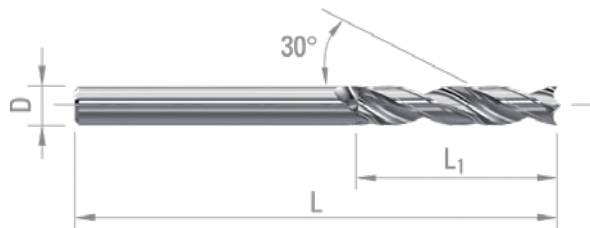
## SPIRALBOHRER MIT 3 SCHNEIDEN VERSTÄRKTER SCHAFT

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM    |
|-----------------|-------|----------|----|--------|
| 0.89            | 7.10  | 3        | 38 | 962869 |
| 0.90            | 7.10  | 3        | 38 | 962870 |
| 0.91            | 7.10  | 3        | 38 | 962871 |
| 0.92            | 7.10  | 3        | 38 | 962872 |
| 0.93            | 7.10  | 3        | 38 | 962873 |
| 0.94            | 7.10  | 3        | 38 | 962874 |
| 0.95            | 7.10  | 3        | 38 | 962875 |
| 0.96            | 9.00  | 3        | 38 | 962876 |
| 0.97            | 9.00  | 3        | 38 | 962877 |
| 0.98            | 9.00  | 3        | 38 | 962878 |
| 0.99            | 9.00  | 3        | 38 | 962879 |
| 1.00            | 9.00  | 3        | 38 | 962880 |
| 1.01            | 9.00  | 3        | 38 | 962881 |
| 1.02            | 9.00  | 3        | 38 | 962882 |
| 1.03            | 9.00  | 3        | 38 | 962883 |
| 1.04            | 9.00  | 3        | 38 | 962884 |
| 1.05            | 9.00  | 3        | 38 | 962885 |
| 1.06            | 9.00  | 3        | 38 | 962886 |
| 1.07            | 9.00  | 3        | 38 | 962887 |
| 1.08            | 9.00  | 3        | 38 | 962888 |
| 1.09            | 9.00  | 3        | 38 | 962889 |
| 1.10            | 9.00  | 3        | 38 | 962890 |
| 1.11            | 9.00  | 3        | 38 | 962901 |
| 1.12            | 9.00  | 3        | 38 | 962902 |
| 1.13            | 9.00  | 3        | 38 | 962903 |
| 1.14            | 9.00  | 3        | 38 | 962904 |
| 1.15            | 9.00  | 3        | 38 | 962905 |
| 1.16            | 10.00 | 3        | 38 | 962906 |
| 1.17            | 10.00 | 3        | 38 | 962907 |
| 1.18            | 10.00 | 3        | 38 | 962908 |
| 1.19            | 10.00 | 3        | 38 | 962909 |
| 1.20            | 10.00 | 3        | 38 | 962910 |
| 1.21            | 10.00 | 3        | 38 | 962911 |
| 1.22            | 10.00 | 3        | 38 | 962912 |
| 1.23            | 10.00 | 3        | 38 | 962913 |
| 1.24            | 10.00 | 3        | 38 | 962914 |
| 1.25            | 10.00 | 3        | 38 | 962915 |
| 1.26            | 10.00 | 3        | 38 | 962916 |
| 1.27            | 10.00 | 3        | 38 | 962917 |
| 1.28            | 10.00 | 3        | 38 | 962918 |
| 1.29            | 10.00 | 3        | 38 | 962919 |
| 1.30            | 10.00 | 3        | 38 | 962920 |
| 1.31            | 11.20 | 3        | 38 | 962921 |
| 1.32            | 11.20 | 3        | 38 | 962922 |
| 1.33            | 11.20 | 3        | 38 | 962923 |
| 1.34            | 11.20 | 3        | 38 | 962925 |
| 1.35            | 11.20 | 3        | 38 | 962926 |

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  | VHM    |
|-----------------|-------|----------|----|--------|
| 1.36            | 11.20 | 3        | 38 | 962927 |
| 1.37            | 11.20 | 3        | 38 | 962928 |
| 1.38            | 11.20 | 3        | 38 | 962930 |
| 1.39            | 11.20 | 3        | 38 | 962931 |
| 1.40            | 11.20 | 3        | 38 | 962932 |
| 1.45            | 11.20 | 3        | 38 | 962933 |
| 1.50            | 11.20 | 3        | 38 | 962934 |
| 1.55            | 12.00 | 3        | 38 | 962935 |
| 1.60            | 12.00 | 3        | 38 | 962936 |
| 1.65            | 12.00 | 3        | 38 | 962937 |
| 1.67            | 12.00 | 3        | 38 | 962959 |
| 1.70            | 12.00 | 3        | 38 | 962938 |
| 1.75            | 12.00 | 3        | 38 | 962940 |
| 1.80            | 12.00 | 3        | 38 | 962941 |
| 1.85            | 12.00 | 3        | 38 | 962942 |
| 1.90            | 12.00 | 3        | 38 | 962943 |
| 1.95            | 12.00 | 3        | 38 | 962944 |
| 2.00            | 12.00 | 3        | 38 | 962945 |
| 2.03            | 15.00 | 3        | 38 | 969260 |
| 2.04            | 15.00 | 3        | 38 | 969261 |
| 2.05            | 15.00 | 3        | 38 | 963109 |
| 2.10            | 15.00 | 3        | 38 | 963111 |
| 2.15            | 15.00 | 3        | 38 | 963115 |
| 2.20            | 15.00 | 3        | 38 | 963116 |
| 2.25            | 15.00 | 3        | 38 | 963117 |
| 2.30            | 15.00 | 3        | 38 | 963118 |
| 2.35            | 15.00 | 3        | 38 | 963119 |
| 2.40            | 15.00 | 3        | 38 | 963120 |
| 2.45            | 15.00 | 3        | 38 | 963121 |
| 2.50            | 15.00 | 3        | 38 | 963122 |
| 2.55            | 15.00 | 3        | 38 | 963123 |
| 2.60            | 15.00 | 3        | 38 | 963124 |
| 2.70            | 16.00 | 3        | 38 | 963125 |
| 2.80            | 16.00 | 3        | 38 | 963126 |
| 2.90            | 16.00 | 3        | 38 | 963127 |



**SPIRALBOHRER  
FÜR FASER-VERBUNDWERKSTOFFE / KEVLAR®**



- Werkzeuge entwickelt für das Bohren von Verbundwerkstoffen / Kevlar und Kunststoff.
- Reduziert Delamination.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                   |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|-------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX /PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                     |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         |            |      |                         |    |       |                          |    |                  |    |                  |    |

**Ø 2.50 - Ø 5.556**



| D <sub>h5</sub> | inches | L <sub>1</sub> | L  | VHM   |
|-----------------|--------|----------------|----|-------|
| 2.50            |        | 18             | 50 | 29322 |
| 3.00            |        | 18             | 50 | 26766 |
| 3.175           | 1/8"   | 18             | 50 | 27059 |
| 3.20            |        | 18             | 50 | 27948 |
| 3.30            |        | 18             | 50 | 28660 |
| 3.50            |        | 20             | 50 | 27949 |
| 3.80            |        | 20             | 50 | 26283 |
| 4.00            |        | 22             | 50 | 26767 |
| 4.10            |        | 22             | 50 | 29224 |
| 4.20            |        | 25             | 55 | 27951 |
| 4.50            |        | 25             | 58 | 27731 |
| 4.80            |        | 25             | 62 | 29324 |
| 5.00            |        | 25             | 62 | 29299 |
| 5.20            |        | 25             | 62 | 29072 |
| 5.50            |        | 25             | 66 | 27952 |
| 5.556           | 7/32"  | 25             | 60 | 26588 |

**Ø 5.60 - Ø 12.00**



| D <sub>h5</sub> | inches | L <sub>1</sub> | L   | VHM   |
|-----------------|--------|----------------|-----|-------|
| 5.60            |        | 30             | 66  | 29215 |
| 6.00            |        | 30             | 66  | 43244 |
| 6.35            | 1/4"   | 30             | 70  | 27199 |
| 6.50            |        | 30             | 70  | 28661 |
| 8.00            |        | 35             | 75  | 26663 |
| 9.525           | 3/8"   | 35             | 75  | 27959 |
| 10.00           |        | 35             | 75  | 27684 |
| 11.00           |        | 50             | 100 | 29493 |
| 12.00           |        | 50             | 100 | 26723 |

Schnittbedingungen : Vc = 100 - 150 m/min  
f = 0.05 - 0.15 mm/U

## DIXI 1112 R+L

Z = 2

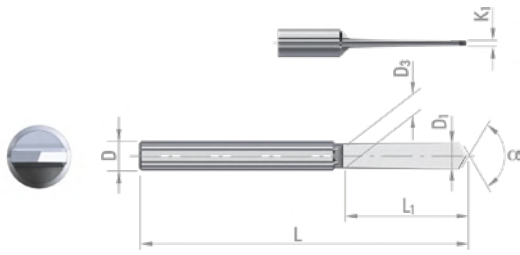


P.74

### WERKZEUGE AUF ANFRAGE

#### FLACHBOHRER

Ø 0.08 - 5.99



Richtwerte der Abmessungen für die Bohrer  
**DIXI 1112, 1114 et 1118.**

| $D_{10/-0.004}$ | $L_1$ | $D_{h5}$ | L  |
|-----------------|-------|----------|----|
| 0.08 - 0.14     | 0.70  | 1.00     | 30 |
| 0.15 - 0.29     | 1.00  | 1.00     | 30 |
| 0.30 - 0.39     | 1.50  | 1.00     | 30 |
| 0.40 - 0.44     | 2.00  | 1.00     | 30 |
| 0.45 - 0.48     | 3.60  | 1.00     | 30 |
| 0.49 - 0.53     | 4.00  | 1.00     | 30 |
| 0.54 - 0.60     | 4.50  | 1.00     | 30 |
| 0.61 - 0.67     | 5.00  | 1.00     | 30 |
| 0.68 - 0.75     | 5.60  | 1.00     | 30 |
| 0.76 - 0.79     | 6.30  | 1.00     | 30 |
| 0.80 - 0.85     | 6.30  | 1.50     | 30 |
| 0.86 - 0.95     | 7.10  | 1.50     | 30 |
| 0.96 - 0.99     | 8.00  | 1.50     | 30 |
| 1.00 - 1.18     | 9.00  | 1.50     | 30 |
| 1.19 - 1.32     | 10.00 | 1.50     | 30 |
| 1.33 - 1.49     | 11.20 | 1.50     | 30 |
| 1.50 - 1.99     | 12.00 | 2.00     | 38 |
| 2.00 - 2.49     | 12.00 | 2.50     | 43 |
| 2.50 - 2.99     | 15.00 | 3.00     | 46 |
| 3.00 - 3.49     | 18.00 | 3.50     | 50 |
| 3.50 - 3.99     | 18.00 | 4.00     | 50 |
| 4.00 - 4.49     | 20.00 | 4.50     | 50 |
| 4.50 - 4.99     | 22.00 | 5.00     | 50 |
| 5.00 - 5.49     | 25.00 | 5.50     | 50 |
| 5.50 - 5.99     | 25.00 | 6.00     | 50 |

## DIXI 1114 R+L

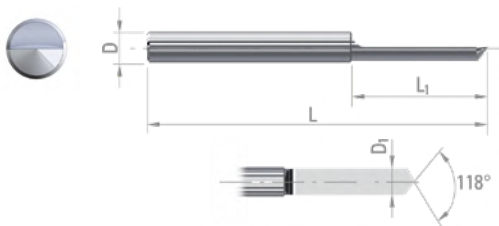
Z = 1

### WERKZEUGE AUF ANFRAGE

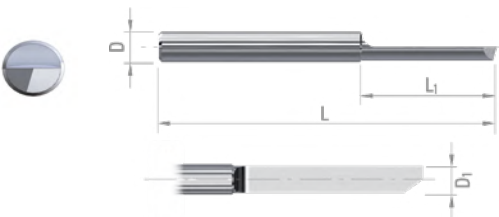
#### KANONENBOHRER AUSFÜHRUNG A ODER B

Ø 0.08 - 5.99

Ref A



Ref B



## DIXI 1118 R+L

Z = 2

### WERKZEUGE AUF ANFRAGE

#### GERADE GENUTETER BOHRER

Ø 0.08 - 5.99





DIXI 1501



DIXI 1514 (Z = 1)

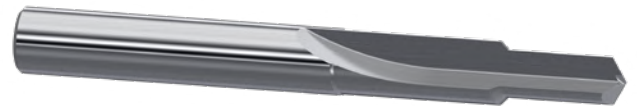


Drallwinkel abhängig vom zu bearbeitenden Werkstoff.

DIXI 1512 (Z = 2)



DIXI 1518 (Z = 2)



Wenn nicht anders angegeben, werden die DIXI Standardtoleranzen angenommen.

R  L

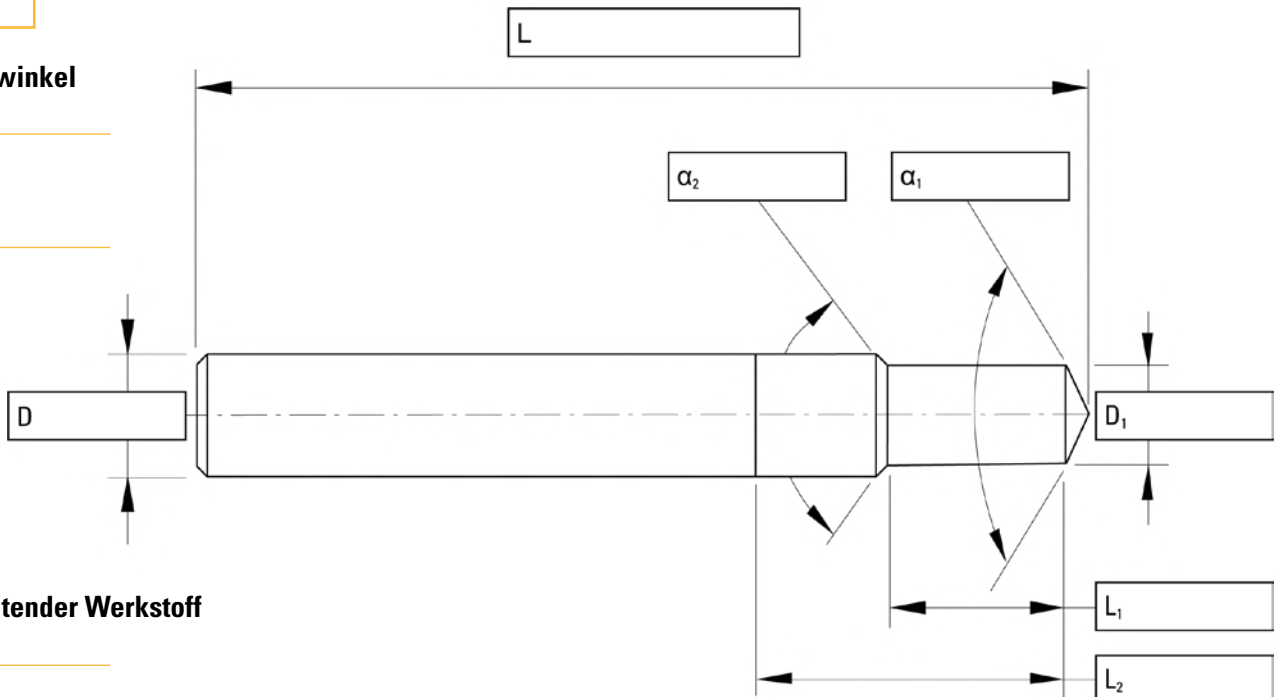
Z =

Steigungswinkel

Menge

Zu bearbeitender Werkstoff

Bemerkungen



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WWW.DIXIPOLYTOOL.COM



DIXI 1502



Drallwinkel abhängig vom zu bearbeitenden Werkstoff.

DIXI 1514 (Z = 1)



DIXI 1512 (Z = 2)



DIXI 1518 (Z = 2)



Wenn nicht anders angegeben, werden die DIXI Standardtoleranzen angenommen.

R  L

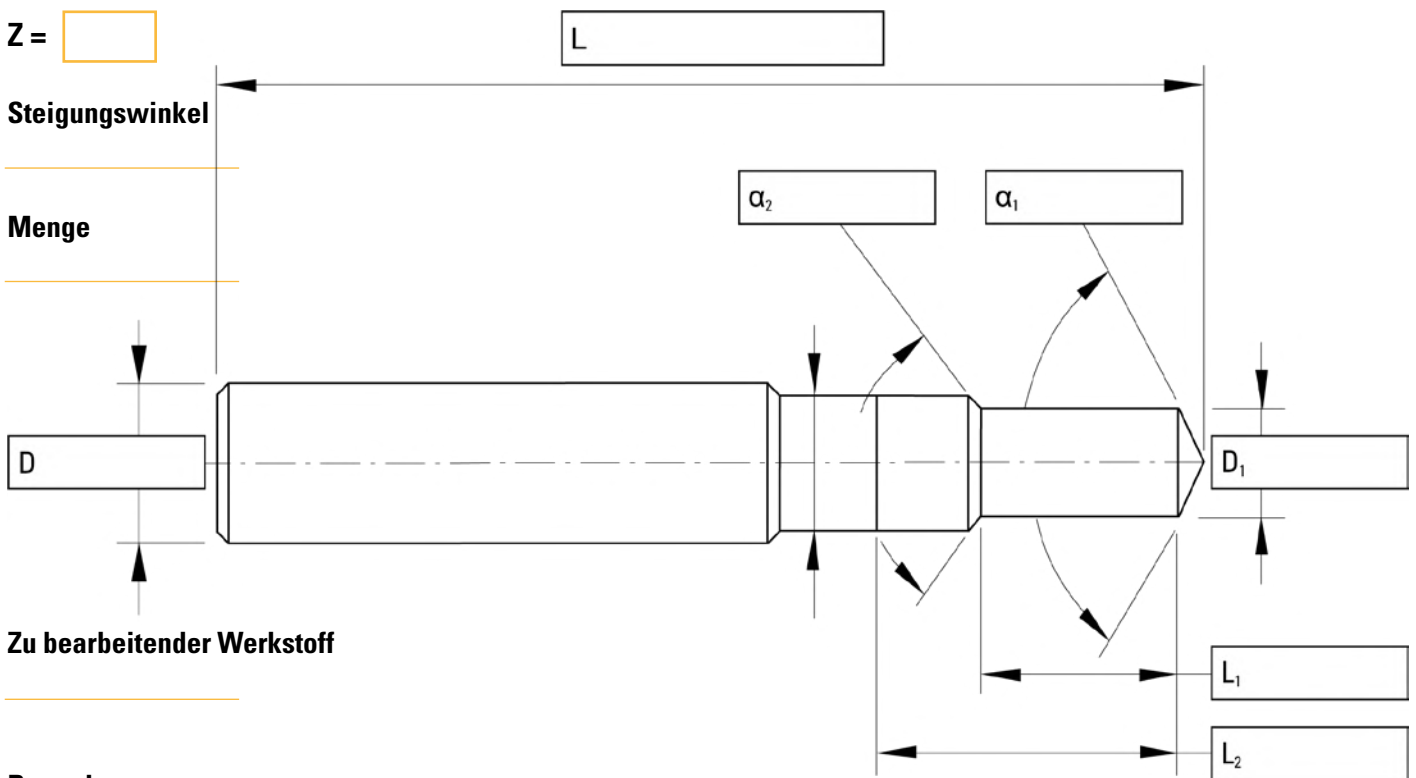
Z =

Steigungswinkel

Menge

Zu bearbeitender Werkstoff

Bemerkungen



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DIXI 1503



DIXI 1514 (Z = 1)



Drallwinkel abhängig vom zu bearbeitenden Werkstoff.

DIXI 1512 (Z = 2)



DIXI 1518 (Z = 2)



Wenn nicht anders angegeben, werden die DIXI Standardtoleranzen angenommen.

R  L

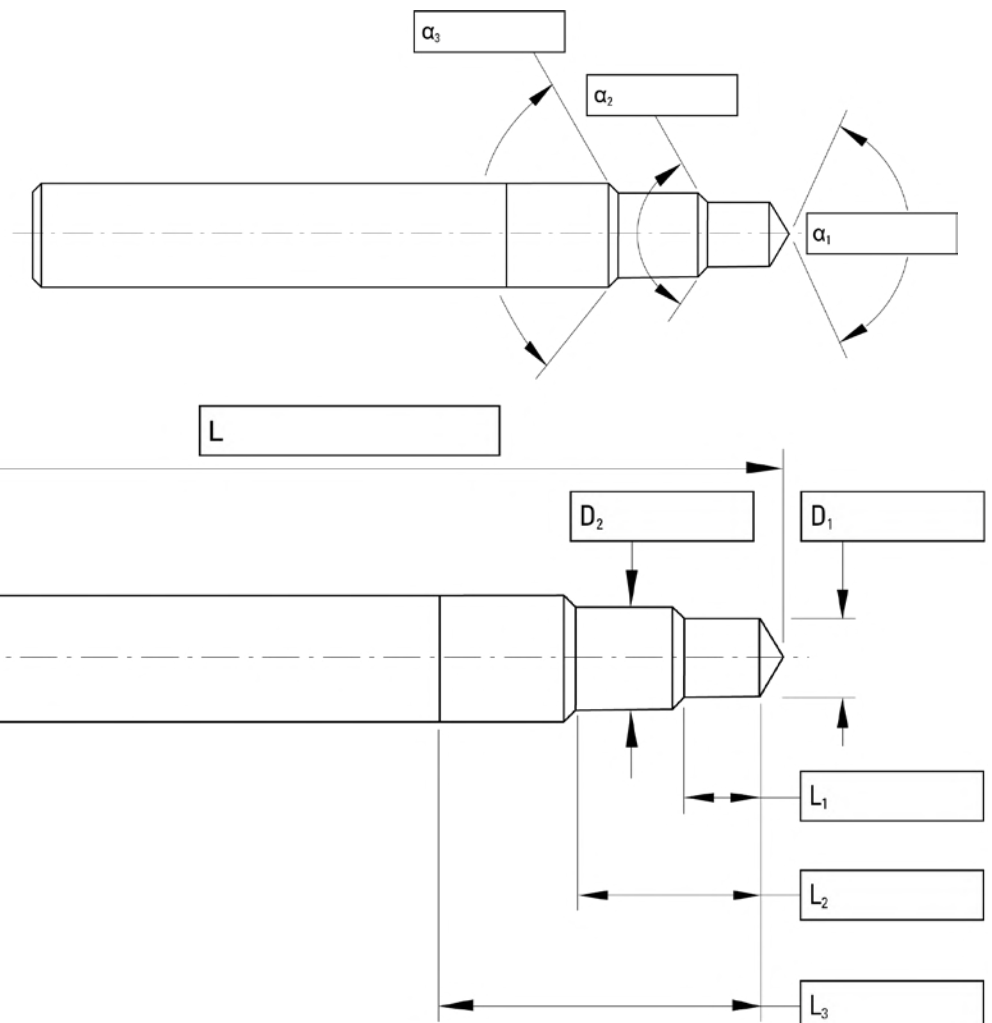
Z =

Steigungswinkel

Menge

Zu bearbeitender Werkstoff

Bemerkungen



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DIXI 1504



DIXI 1514 (Z = 1)



Drallwinkel abhängig vom zu bearbeitenden Werkstoff.

DIXI 1512 (Z = 2)



DIXI 1518 (Z = 2)



Wenn nicht anders angegeben, werden die DIXI Standardtoleranzen angenommen.

R  L

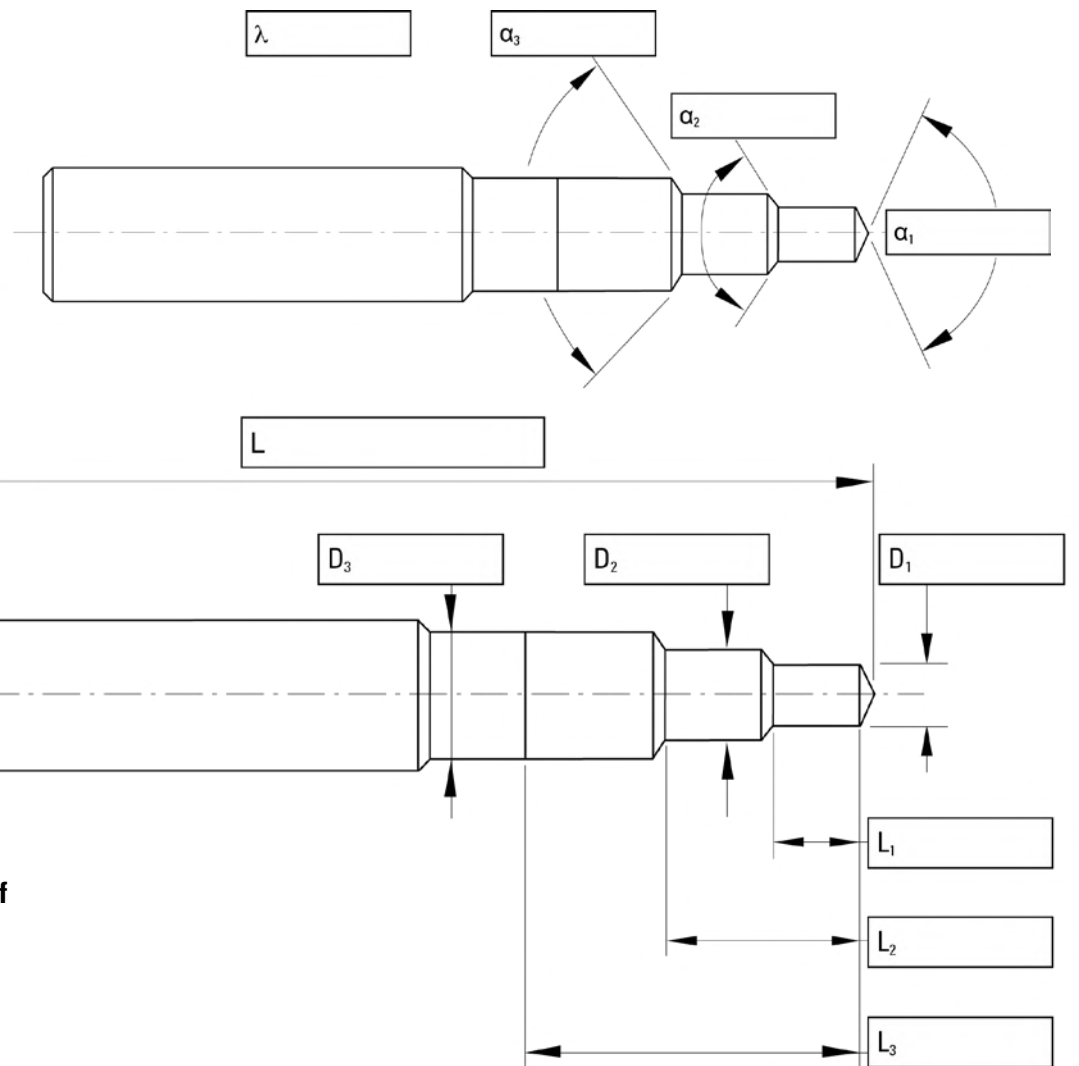
Z =

Steigungswinkel

Menge

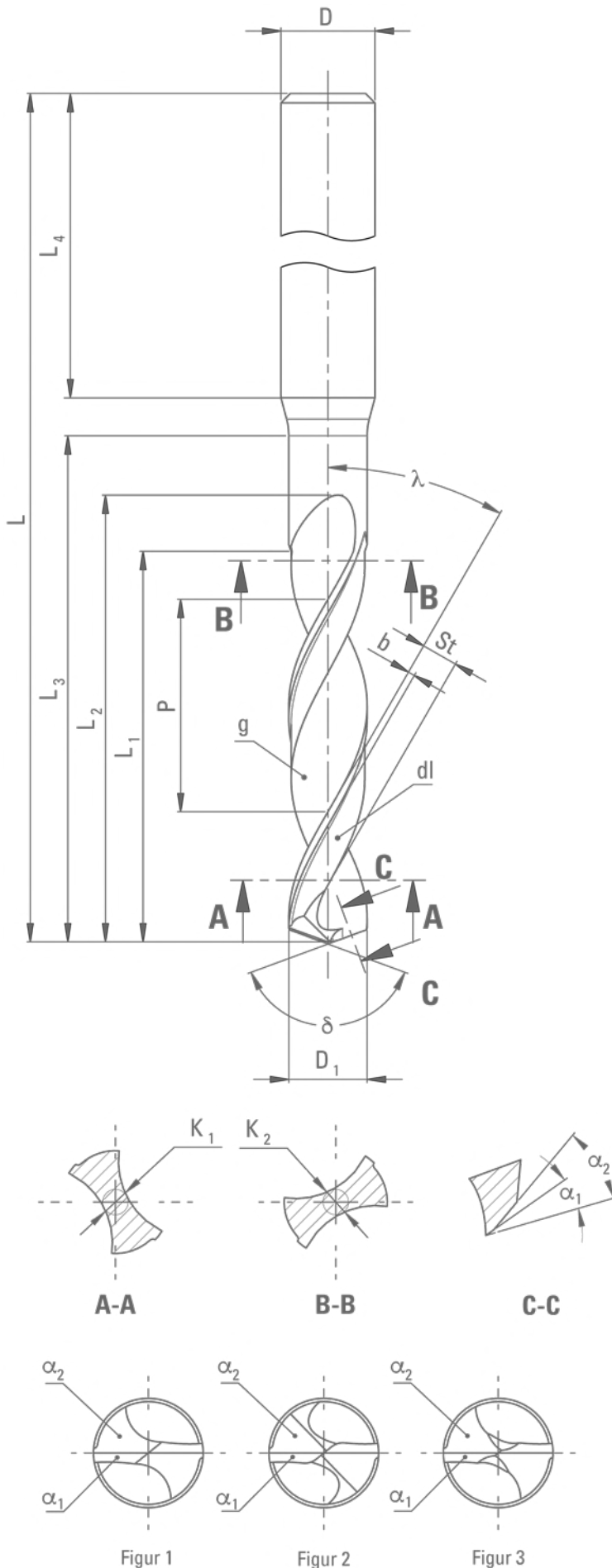
Zu bearbeitender Werkstoff

Bemerkungen



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Figur 1 : Bohrer ohne Ausspitzung

Figur 2 & 3 : Bohrer mit Ausspitzung

| Symbol     | Beschreibung                  |
|------------|-------------------------------|
| $D_1$      | Bohrerdurchmesser             |
| $D$        | Schaftdurchmesser             |
| $L$        | Gesamtlänge des Werkzeuges    |
| $L_1$      | Schneidenlänge                |
| $L_2$      | Spannutlänge                  |
| $L_3$      | Nutzlänge                     |
| $L_4$      | Spannlänge (Schaftlänge)      |
| $P$        | Steigung                      |
| $\delta$   | Spitzenwinkel                 |
| $\lambda$  | Spanwinkel (Steigungswinkel)  |
| $\alpha_1$ | Freiwinkel 1                  |
| $\alpha_2$ | Freiwinkel 2                  |
| $K_1$      | Kerndurchmesser (Schnitt A-A) |
| $K_2$      | Kerndurchmesser (Schnitt B-B) |
| $b$        | Fasenbreite                   |
| $St$       | Stegbreite                    |
| $g$        | Spannut                       |
| $dl$       | Rücken                        |

## DIXI 1101 - 1106 - 1107 - 1108 - 1109 - 1110

|   |   | VDI<br>3323 |         | VHM<br>Vc [m/min] | TiAlN<br>Vc [m/min] | DICUT<br>Vc [m/min] |
|---|---|-------------|---------|-------------------|---------------------|---------------------|
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5       |         | 50 - 80           | 60 - 90             | 60 - 90             |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9       |         | 40 - 70           | 50 - 80             | 50 - 80             |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13     |         | 30 - 50           | 40 - 60             | 40 - 60             |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1 - 14.2 |         | 20 - 40           | 30 - 50             | 30 - 50             |
| K | Grauguss < 250 HB   | 15 - 16     |         | 30 - 50           | 40 - 60             | 40 - 60             |
|   | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20     |         | 30 - 50           | 40 - 60             | 40 - 60             |
| N | Alu-Knetlegierung < 12% Si  | 21 - 22     |         | 90 - 120          | 100 - 130           |                     |
|   | Alu-Gusslegierung >12% Si   | 23 - 25     |         | 80 - 100          | 90 - 120            |                     |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26          |         | 70 - 110          | 90 - 130            |                     |
|   | Kunststoff, Holz  | 29 - 30     |         | 30 - 60           | 50 - 80             |                     |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35     |         | 20 - 50           | 20 - 50             |                     |
|   | Titan, Titanlegierung   | 36 - 37     | 40 - 70 |                   |                     |                     |

## DIXI 1111 - 1112 - 1114 - 1118

|   |  | VDI<br>3323 |  | VHM<br>Vc [m/min] | Entspanzyklus<br>Q1 |
|---|--|-------------|--|-------------------|---------------------|
| P | Unlegierter Stahl, Automaten Stahl         | 1 - 5       |  | 40 - 70           | <6×ØD1              |
| N | Alu-Knetlegierung < 12% Si                 | 21 - 22     |  | 80 - 100          | <6×ØD1              |
|   | Alu-Gusslegierung >12% Si                  | 23 - 25     |  | 40 - 70           | <8×ØD1              |
| N | Kupferlegierung gute Zerspanbarkeit mit Pb | 26          |  | 80 - 130          | <8×ØD1              |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27 - 28     |  | 70 - 110          | <4×ØD1              |
|   | Gold, Silber                               | -           |  | 50 - 80           | <6×ØD1              |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]}$$

Vorschub pro Umdrehung  $f$  [mm]

| $\varnothing D_1$<br>0.50 - 1.00 | $\varnothing D_1$<br>1.00 - 1.50 | $\varnothing D_1$<br>1.50 - 2.00 | $\varnothing D_1$<br>2.00 - 3.00 | $\varnothing D_1$<br>3.00 - 5.00 | $\varnothing D_1$<br>5.00 - 7.00 | $\varnothing D_1$<br>7.00 - 10.00 | $\varnothing D_1$<br>10.00 - 14.00 | $\varnothing D_1$<br>14.00 - 16.00 | $\varnothing D_1$<br>16.00 - 20.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|------------------------------------|------------------------------------|
| 0.009 - 0.020                    | 0.016 - 0.030                    | 0.024 - 0.04                     | 0.03 - 0.05                      | 0.05 - 0.10                      | 0.08 - 0.14                      | 0.11 - 0.20                       | 0.16 - 0.28                        | 0.22 - 0.32                        | 0.26 - 0.40                        |
| 0.007 - 0.015                    | 0.013 - 0.023                    | 0.020 - 0.03                     | 0.03 - 0.04                      | 0.04 - 0.08                      | 0.07 - 0.11                      | 0.09 - 0.15                       | 0.13 - 0.21                        | 0.18 - 0.24                        | 0.21 - 0.30                        |
| 0.006 - 0.015                    | 0.011 - 0.023                    | 0.017 - 0.03                     | 0.02 - 0.04                      | 0.03 - 0.08                      | 0.06 - 0.11                      | 0.08 - 0.15                       | 0.11 - 0.21                        | 0.15 - 0.24                        | 0.18 - 0.30                        |
| 0.006 - 0.015                    | 0.011 - 0.023                    | 0.017 - 0.03                     | 0.02 - 0.04                      | 0.03 - 0.08                      | 0.06 - 0.11                      | 0.08 - 0.15                       | 0.11 - 0.21                        | 0.15 - 0.24                        | 0.18 - 0.30                        |
| 0.006 - 0.015                    | 0.011 - 0.023                    | 0.017 - 0.03                     | 0.02 - 0.04                      | 0.03 - 0.08                      | 0.06 - 0.11                      | 0.08 - 0.15                       | 0.11 - 0.21                        | 0.15 - 0.24                        | 0.18 - 0.30                        |
| 0.007 - 0.015                    | 0.013 - 0.023                    | 0.020 - 0.03                     | 0.03 - 0.04                      | 0.04 - 0.08                      | 0.07 - 0.11                      | 0.09 - 0.15                       | 0.13 - 0.21                        | 0.18 - 0.24                        | 0.21 - 0.30                        |
| 0.011 - 0.030                    | 0.020 - 0.045                    | 0.030 - 0.06                     | 0.04 - 0.08                      | 0.06 - 0.15                      | 0.10 - 0.21                      | 0.14 - 0.30                       | 0.20 - 0.42                        | 0.28 - 0.48                        | 0.32 - 0.60                        |
| 0.011 - 0.030                    | 0.020 - 0.045                    | 0.030 - 0.06                     | 0.04 - 0.08                      | 0.06 - 0.15                      | 0.10 - 0.21                      | 0.14 - 0.30                       | 0.20 - 0.42                        | 0.28 - 0.48                        | 0.32 - 0.60                        |
| 0.011 - 0.030                    | 0.020 - 0.045                    | 0.030 - 0.06                     | 0.04 - 0.08                      | 0.06 - 0.15                      | 0.10 - 0.21                      | 0.14 - 0.30                       | 0.20 - 0.42                        | 0.28 - 0.48                        | 0.32 - 0.60                        |
| 0.013 - 0.045                    | 0.027 - 0.068                    | 0.041 - 0.09                     | 0.05 - 0.11                      | 0.08 - 0.23                      | 0.14 - 0.32                      | 0.19 - 0.45                       | 0.27 - 0.63                        | 0.38 - 0.72                        | 0.43 - 0.90                        |
| 0.006 - 0.015                    | 0.011 - 0.023                    | 0.017 - 0.03                     | 0.02 - 0.04                      | 0.03 - 0.08                      | 0.06 - 0.11                      | 0.08 - 0.15                       | 0.11 - 0.21                        | 0.15 - 0.24                        | 0.18 - 0.30                        |
| 0.009 - 0.020                    | 0.016 - 0.030                    | 0.024 - 0.04                     | 0.03 - 0.05                      | 0.05 - 0.10                      | 0.08 - 0.14                      | 0.11 - 0.20                       | 0.16 - 0.28                        | 0.22 - 0.32                        | 0.26 - 0.40                        |

Vorschub pro Umdrehung  $f$  [mm]

| $\varnothing D_1$<br>0.08 - 0.30 | $\varnothing D_1$<br>0.30 - 0.70 | $\varnothing D_1$<br>0.70 - 1.00 | $\varnothing D_1$<br>1.00 - 1.50 | $\varnothing D_1$<br>1.50 - 3.00 | $\varnothing D_1$<br>3.00 - 6.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| 0.0005 - 0.003                   | 0.002 - 0.006                    | 0.004 - 0.010                    | 0.006 - 0.014                    | 0.008 - 0.026                    | 0.014 - 0.048                    |
| 0.0008 - 0.004                   | 0.002 - 0.010                    | 0.006 - 0.014                    | 0.010 - 0.022                    | 0.012 - 0.040                    | 0.022 - 0.072                    |
| 0.0006 - 0.004                   | 0.002 - 0.008                    | 0.006 - 0.012                    | 0.008 - 0.018                    | 0.010 - 0.034                    | 0.018 - 0.060                    |
| 0.0006 - 0.004                   | 0.002 - 0.008                    | 0.006 - 0.012                    | 0.008 - 0.018                    | 0.010 - 0.034                    | 0.018 - 0.060                    |
| 0.0005 - 0.003                   | 0.002 - 0.006                    | 0.004 - 0.010                    | 0.006 - 0.014                    | 0.008 - 0.026                    | 0.014 - 0.048                    |
| 0.0005 - 0.003                   | 0.002 - 0.006                    | 0.004 - 0.010                    | 0.006 - 0.014                    | 0.008 - 0.026                    | 0.014 - 0.048                    |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

## DIXI 1126 - 1130

|   |   |                   | Entspanzyklus     |                     |          |          |
|---|---|-------------------|-------------------|---------------------|----------|----------|
|   |   |                   | VHM<br>Vc [m/min] | DICUT<br>Vc [m/min] | Q1       |          |
| P | Unlegierter Stahl, Automaten Stahl  | VDI 3323<br>1 - 5 |                   | 40 - 60             | 50 - 70  | <1.5×ØD1 |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9             |                   |                     | 30 - 40  | <0.8×ØD1 |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13           |                   |                     | 25 - 40  | <0.5×ØD1 |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1 - 14.2       |                   |                     | 45 - 60  | <0.3×ØD1 |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                            | 14.3 - 14.4       |                   |                     | 30 - 50  | <0.3×ØD1 |
| K | Grauguss < 250 HB   | 15 - 16           |                   | 50 - 80             | 60 - 90  | <2×ØD1   |
|   | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20           |                   |                     | 30 - 50  | <1×ØD1   |
| N | Alu-Knetlegierung < 12% Si  | 21 - 22           |                   | 80 - 130            |          | <1×ØD1   |
|   | Alu-Gusslegierung >12% Si   | 23 - 25           |                   | 70 - 110            |          | <1×ØD1   |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26                |                   | 80 - 100            |          | <3×ØD1   |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28           | 40 - 70           |                     | <1×ØD1   |          |
|   | Kunststoff, Holz  | 29 - 30           | 30 - 60           |                     | <2×ØD1   |          |
|   | Gold, Silber  | -                 | 50 - 80           |                     | <0.5×ØD1 |          |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35           |                   | 20 - 40             | <0.3×ØD1 |          |
|   | Titan, Titanlegierung   | 36 - 37           | 30 - 50           |                     | <0.1×ØD1 |          |

## DIXI 1131

|   |   |                   | Entspanzyklus     |                     |                   |           |           |
|---|---|-------------------|-------------------|---------------------|-------------------|-----------|-----------|
|   |   |                   | VHM<br>Vc [m/min] | DICUT<br>Vc [m/min] | DLC<br>Vc [m/min] | Q1        |           |
| P | Unlegierter Stahl, Automaten Stahl  | VDI 3323<br>1 - 5 |                   | 40 - 60             | 40 - 70           |           | <2×ØD1    |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9             |                   |                     | 30 - 40           |           | <1×ØD1    |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13           |                   |                     | 25 - 40           |           | <0.5×ØD1  |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1 - 14.2       |                   |                     | 45 - 60           |           | <0.35×ØD1 |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                            | 14.3 - 14.4       |                   |                     | 30 - 50           |           | <0.35×ØD1 |
| K | Grauguss < 250 HB   | 15 - 16           |                   | 50 - 80             | 60 - 90           |           | <3×ØD1    |
|   | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20           |                   |                     | 40 - 60           |           | <1×ØD1    |
| N | Alu-Knetlegierung < 12% Si  | 21 - 22           |                   | 80 - 130            |                   | 100 - 150 | <1×ØD1    |
|   | Alu-Gusslegierung >12% Si   | 23 - 25           |                   | 70 - 110            |                   | 90 - 130  | <1×ØD1    |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26                |                   | 80 - 100            |                   | 90 - 110  | <4×ØD1    |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28           | 40 - 70           |                     | 50 - 80           | <2×ØD1    |           |
|   | Kunststoff, Holz  | 29 - 30           | 30 - 60           |                     | 50 - 80           | <2×ØD1    |           |
|   | Gold, Silber  | -                 | 50 - 80           |                     | 70 - 100          | <0.5×ØD1  |           |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35           |                   | 20 - 40             |                   | <0.15×ØD1 |           |
|   | Titan, Titanlegierung   | 36 - 37           | 30 - 50           |                     |                   | <0.35×ØD1 |           |

$$n \text{ [U/min]} = \frac{Vc \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$Vf \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]}$$

Vorschub pro Umdrehung **f [mm]**

| $\varnothing D_1$<br>0.30 - 1.00 | $\varnothing D_1$<br>1.00 - 2.00 | $\varnothing D_1$<br>2.00 - 4.00 | $\varnothing D_1$<br>4.00 - 6.00 | $\varnothing D_1$<br>6.00 - 10.00 | $\varnothing D_1$<br>10.00 - 12.00 | $\varnothing D_1$<br>12.00 - 14.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|------------------------------------|
| 0.0024 - 0.012                   | 0.008 - 0.024                    | 0.016 - 0.050                    | 0.030 - 0.070                    | 0.040 - 0.110                     | 0.060 - 0.120                      | 0.060 - 0.140                      |
| 0.0022 - 0.011                   | 0.008 - 0.022                    | 0.014 - 0.045                    | 0.030 - 0.060                    | 0.040 - 0.100                     | 0.050 - 0.110                      | 0.050 - 0.130                      |
| 0.0019 - 0.010                   | 0.006 - 0.020                    | 0.012 - 0.040                    | 0.030 - 0.060                    | 0.030 - 0.090                     | 0.050 - 0.100                      | 0.050 - 0.110                      |
| 0.0020 - 0.010                   | 0.006 - 0.020                    | 0.014 - 0.040                    | 0.030 - 0.060                    | 0.040 - 0.090                     | 0.050 - 0.100                      | 0.050 - 0.120                      |
| 0.0018 - 0.009                   | 0.006 - 0.018                    | 0.012 - 0.035                    | 0.020 - 0.050                    | 0.030 - 0.080                     | 0.050 - 0.090                      | 0.050 - 0.110                      |
| 0.0029 - 0.014                   | 0.010 - 0.028                    | 0.020 - 0.060                    | 0.040 - 0.090                    | 0.050 - 0.130                     | 0.070 - 0.140                      | 0.070 - 0.170                      |
| 0.0024 - 0.012                   | 0.008 - 0.024                    | 0.016 - 0.050                    | 0.030 - 0.070                    | 0.040 - 0.110                     | 0.060 - 0.120                      | 0.060 - 0.140                      |
| 0.0036 - 0.018                   | 0.012 - 0.036                    | 0.024 - 0.070                    | 0.050 - 0.120                    | 0.060 - 0.170                     | 0.090 - 0.180                      | 0.090 - 0.210                      |
| 0.0036 - 0.018                   | 0.012 - 0.036                    | 0.024 - 0.070                    | 0.050 - 0.120                    | 0.060 - 0.170                     | 0.090 - 0.180                      | 0.090 - 0.210                      |
| 0.0041 - 0.020                   | 0.014 - 0.040                    | 0.028 - 0.080                    | 0.050 - 0.120                    | 0.070 - 0.190                     | 0.100 - 0.200                      | 0.100 - 0.240                      |
| 0.0029 - 0.014                   | 0.010 - 0.028                    | 0.020 - 0.060                    | 0.040 - 0.090                    | 0.050 - 0.130                     | 0.070 - 0.140                      | 0.070 - 0.170                      |
| 0.0031 - 0.016                   | 0.010 - 0.028                    | 0.020 - 0.060                    | 0.040 - 0.090                    | 0.050 - 0.130                     | 0.080 - 0.160                      | 0.080 - 0.180                      |
| 0.0024 - 0.012                   | 0.008 - 0.024                    | 0.016 - 0.050                    | 0.030 - 0.070                    | 0.040 - 0.110                     | 0.060 - 0.120                      | 0.060 - 0.140                      |
| 0.0012 - 0.006                   | 0.004 - 0.012                    | 0.008 - 0.025                    | 0.020 - 0.040                    | 0.020 - 0.060                     | 0.030 - 0.060                      | 0.030 - 0.070                      |
| 0.0024 - 0.012                   | 0.008 - 0.024                    | 0.016 - 0.050                    | 0.030 - 0.070                    | 0.040 - 0.110                     | 0.060 - 0.120                      | 0.060 - 0.140                      |

Vorschub pro Umdrehung **f [mm]**

| $\varnothing D_1$<br>0.05 - 0.15 | $\varnothing D_1$<br>0.15 - 0.30 | $\varnothing D_1$<br>0.30 - 0.60 | $\varnothing D_1$<br>0.60 - 1.00 | $\varnothing D_1$<br>1.00 - 2.00 | $\varnothing D_1$<br>2.00 - 2.45 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| 0.0004 - 0.0018                  | 0.0012 - 0.0036                  | 0.002 - 0.007                    | 0.005 - 0.012                    | 0.008 - 0.024                    | 0.016 - 0.029                    |
| 0.0004 - 0.0016                  | 0.0011 - 0.0032                  | 0.002 - 0.006                    | 0.004 - 0.011                    | 0.007 - 0.022                    | 0.014 - 0.026                    |
| 0.0003 - 0.0014                  | 0.0010 - 0.0029                  | 0.002 - 0.006                    | 0.004 - 0.010                    | 0.006 - 0.019                    | 0.013 - 0.024                    |
| 0.0003 - 0.0014                  | 0.0010 - 0.0029                  | 0.002 - 0.006                    | 0.004 - 0.010                    | 0.006 - 0.019                    | 0.013 - 0.024                    |
| 0.0003 - 0.0013                  | 0.0008 - 0.0025                  | 0.002 - 0.005                    | 0.003 - 0.008                    | 0.006 - 0.017                    | 0.011 - 0.021                    |
| 0.0005 - 0.0022                  | 0.0014 - 0.0043                  | 0.003 - 0.009                    | 0.006 - 0.014                    | 0.010 - 0.029                    | 0.019 - 0.035                    |
| 0.0004 - 0.0018                  | 0.0012 - 0.0036                  | 0.002 - 0.007                    | 0.005 - 0.012                    | 0.008 - 0.024                    | 0.016 - 0.029                    |
| 0.0007 - 0.0031                  | 0.0020 - 0.0061                  | 0.004 - 0.012                    | 0.008 - 0.020                    | 0.014 - 0.041                    | 0.027 - 0.050                    |
| 0.0005 - 0.0023                  | 0.0016 - 0.0047                  | 0.003 - 0.009                    | 0.006 - 0.014                    | 0.010 - 0.031                    | 0.021 - 0.038                    |
| 0.0008 - 0.0036                  | 0.0024 - 0.0072                  | 0.005 - 0.014                    | 0.010 - 0.024                    | 0.016 - 0.048                    | 0.032 - 0.059                    |
| 0.0005 - 0.0022                  | 0.0014 - 0.0043                  | 0.003 - 0.009                    | 0.006 - 0.014                    | 0.010 - 0.029                    | 0.019 - 0.035                    |
| 0.0006 - 0.0027                  | 0.0018 - 0.0054                  | 0.004 - 0.011                    | 0.007 - 0.018                    | 0.012 - 0.036                    | 0.024 - 0.044                    |
| 0.0004 - 0.0018                  | 0.0012 - 0.0036                  | 0.002 - 0.007                    | 0.005 - 0.012                    | 0.008 - 0.024                    | 0.016 - 0.029                    |
| 0.0002 - 0.0009                  | 0.0006 - 0.0018                  | 0.001 - 0.004                    | 0.002 - 0.006                    | 0.004 - 0.012                    | 0.008 - 0.015                    |
| 0.0004 - 0.0018                  | 0.0012 - 0.0036                  | 0.002 - 0.007                    | 0.005 - 0.012                    | 0.008 - 0.024                    | 0.016 - 0.029                    |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

## DIXI 1137-5D - 8D

|          |   |                   | Entspanzyklus     |                     |                       |          |          |          |        |
|----------|---|-------------------|-------------------|---------------------|-----------------------|----------|----------|----------|--------|
|          |   |                   | VHM<br>Vc [m/min] | C-TOP<br>Vc [m/min] | DRY-CUT<br>Vc [m/min] | Q1       |          |          |        |
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | VDI 3323<br>1 - 5 |                   | <b>n</b><br>[U/min] |                       | <3×ØD1   |          |          |        |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9             |                   |                     |                       | 45 - 100 | <1.5×ØD1 |          |        |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13           |                   |                     |                       | 45 - 90  | <1.5×ØD1 |          |        |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1 - 14.2       |                   |                     |                       | 35 - 60  | <0.3×ØD1 |          |        |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                            | 14.3 - 14.4       |                   |                     |                       | 30 - 55  | <0.5×ØD1 |          |        |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16           |                   |                     |                       | 80 - 150 | 90 - 160 | <2×ØD1   |        |
|          | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20           |                   |                     |                       | 40 - 80  | 50 - 100 | <1×ØD1   |        |
| <b>N</b> | Alu-Knetlegierung < 12% Si  | 21 - 22           |                   |                     |                       | 80 - 150 |          | 90 - 200 | <3×ØD1 |
|          | Alu-Gusslegierung >12% Si   | 23 - 25           |                   |                     |                       | 50 - 90  |          | 80 - 150 | <3×ØD1 |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26                |                   |                     |                       | 60 - 150 |          | 65 - 180 | <4×ØD1 |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28           | 50 - 120          |                     | 55 - 130              | <3×ØD1   |          |          |        |
|          | Gold, Silber  | -                 | 60 - 120          |                     | 70 - 150              | <3×ØD1   |          |          |        |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31 - 35           |                   |                     | 20 - 40               | <0.5×ØD1 |          |          |        |
|          | Titan, Titanlegierung   | 36 - 37           | 30 - 60           |                     | 35 - 70               | <0.3×ØD1 |          |          |        |

## DIXI 1512 - 1514 - 1518

|          |  |                   | Entspanzyklus     |                     |  |          |        |
|----------|--|-------------------|-------------------|---------------------|--|----------|--------|
|          |  |                   | VHM<br>Vc [m/min] | Q1                  |  |          |        |
| <b>P</b> | Unlegierter Stahl, Automaten Stahl         | VDI 3323<br>1 - 5 |                   | <b>n</b><br>[U/min] |  | 50 - 80  | <6×ØD1 |
| <b>K</b> | Grauguss < 250 HB                          | 15 - 16           |                   |                     |  | 50 - 80  | <6×ØD1 |
|          | Duktiles Gusseisen, Temperguss > 250 HB    | 17 - 20           |                   |                     |  | 40 - 70  | <3×ØD1 |
| <b>N</b> | Alu-Knetlegierung < 12% Si                 | 21 - 22           |                   |                     |  | 80 - 130 | <5×ØD1 |
|          | Alu-Gusslegierung >12% Si                  | 23 - 25           |                   |                     |  | 70 - 110 | <5×ØD1 |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb | 26                |                   |                     |  | 80 - 100 | <6×ØD1 |
|          | Kupferlegierung schwere Zerspanbarkeit     | 27 - 28           |                   |                     |  | 40 - 70  | <3×ØD1 |
|          | Gold, Silber                               | -                 |                   |                     |  | 50 - 80  | <2×ØD1 |



$$n \text{ [U/min]} = \frac{Vc \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$Vf \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]}$$

Vorschub pro Umdrehung **f [mm]**

| $\varnothing D_1$<br>0.15 - 0.40 | $\varnothing D_1$<br>0.40 - 0.70 | $\varnothing D_1$<br>0.70 - 1.00 | $\varnothing D_1$<br>1.00 - 1.50 | $\varnothing D_1$<br>1.50 - 2.00 | $\varnothing D_1$<br>2.00 - 3.00 | $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>4.00 - 6.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| 0.0026 - 0.0100                  | 0.007 - 0.017                    | 0.012 - 0.025                    | 0.017 - 0.037                    | 0.026 - 0.050                    | 0.034 - 0.074                    | 0.050 - 0.096                    | 0.060 - 0.135                    |
| 0.0024 - 0.0090                  | 0.006 - 0.016                    | 0.011 - 0.023                    | 0.016 - 0.035                    | 0.024 - 0.046                    | 0.032 - 0.070                    | 0.046 - 0.090                    | 0.056 - 0.125                    |
| 0.0021 - 0.0080                  | 0.006 - 0.014                    | 0.010 - 0.020                    | 0.014 - 0.030                    | 0.021 - 0.040                    | 0.028 - 0.060                    | 0.040 - 0.076                    | 0.048 - 0.110                    |
| 0.0016 - 0.0060                  | 0.004 - 0.010                    | 0.007 - 0.015                    | 0.010 - 0.022                    | 0.016 - 0.030                    | 0.020 - 0.044                    | 0.030 - 0.058                    | 0.036 - 0.080                    |
| 0.0014 - 0.0055                  | 0.004 - 0.009                    | 0.006 - 0.013                    | 0.009 - 0.020                    | 0.014 - 0.026                    | 0.018 - 0.040                    | 0.026 - 0.052                    | 0.032 - 0.070                    |
| 0.0035 - 0.0130                  | 0.009 - 0.023                    | 0.016 - 0.033                    | 0.023 - 0.050                    | 0.035 - 0.066                    | 0.046 - 0.100                    | 0.066 - 0.128                    | 0.080 - 0.180                    |
| 0.0017 - 0.0065                  | 0.005 - 0.012                    | 0.008 - 0.017                    | 0.012 - 0.025                    | 0.017 - 0.033                    | 0.024 - 0.050                    | 0.034 - 0.064                    | 0.040 - 0.090                    |
| 0.0035 - 0.0130                  | 0.009 - 0.023                    | 0.016 - 0.033                    | 0.023 - 0.050                    | 0.035 - 0.066                    | 0.046 - 0.100                    | 0.066 - 0.128                    | 0.080 - 0.180                    |
| 0.0030 - 0.0115                  | 0.008 - 0.020                    | 0.014 - 0.029                    | 0.020 - 0.043                    | 0.030 - 0.058                    | 0.040 - 0.086                    | 0.058 - 0.112                    | 0.070 - 0.160                    |
| 0.0043 - 0.0165                  | 0.012 - 0.029                    | 0.020 - 0.041                    | 0.029 - 0.062                    | 0.043 - 0.083                    | 0.058 - 0.124                    | 0.082 - 0.160                    | 0.100 - 0.225                    |
| 0.0033 - 0.0125                  | 0.009 - 0.022                    | 0.015 - 0.031                    | 0.022 - 0.047                    | 0.033 - 0.063                    | 0.044 - 0.094                    | 0.062 - 0.122                    | 0.076 - 0.170                    |
| 0.0030 - 0.0115                  | 0.008 - 0.020                    | 0.014 - 0.029                    | 0.020 - 0.043                    | 0.030 - 0.058                    | 0.040 - 0.086                    | 0.058 - 0.112                    | 0.070 - 0.160                    |
| 0.0009 - 0.0035                  | 0.002 - 0.006                    | 0.004 - 0.008                    | 0.006 - 0.012                    | 0.009 - 0.017                    | 0.012 - 0.024                    | 0.016 - 0.032                    | 0.020 - 0.045                    |
| 0.0017 - 0.0065                  | 0.005 - 0.012                    | 0.008 - 0.017                    | 0.012 - 0.025                    | 0.017 - 0.033                    | 0.024 - 0.050                    | 0.034 - 0.064                    | 0.040 - 0.090                    |

Vorschub pro Umdrehung **f [mm]**

| $\varnothing D_1$<br>0.40 - 1.00 | $\varnothing D_1$<br>1.00 - 2.00 | $\varnothing D_1$<br>2.00 - 4.00 | $\varnothing D_1$<br>4.00 - 6.00 | $\varnothing D_1$<br>6.00 - 10.00 | $\varnothing D_1$<br>10.00 - 12.00 | $\varnothing D_1$<br>12.00 - 14.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|------------------------------------|
| 0.0005 - 0.003                   | 0.002 - 0.006                    | 0.004 - 0.010                    | 0.006 - 0.014                    | 0.008 - 0.026                     | 0.110 - 0.220                      | 0.014 - 0.048                      |
| 0.0058 - 0.022                   | 0.014 - 0.044                    | 0.028 - 0.085                    | 0.060 - 0.130                    | 0.080 - 0.200                     | 0.110 - 0.220                      | 0.110 - 0.250                      |
| 0.0048 - 0.018                   | 0.012 - 0.036                    | 0.024 - 0.070                    | 0.050 - 0.110                    | 0.060 - 0.170                     | 0.090 - 0.180                      | 0.090 - 0.210                      |
| 0.0096 - 0.036                   | 0.024 - 0.072                    | 0.048 - 0.145                    | 0.100 - 0.220                    | 0.130 - 0.330                     | 0.180 - 0.360                      | 0.180 - 0.420                      |
| 0.0064 - 0.024                   | 0.016 - 0.048                    | 0.032 - 0.095                    | 0.060 - 0.140                    | 0.080 - 0.220                     | 0.120 - 0.240                      | 0.120 - 0.280                      |
| 0.0080 - 0.030                   | 0.020 - 0.060                    | 0.040 - 0.120                    | 0.080 - 0.180                    | 0.110 - 0.280                     | 0.150 - 0.300                      | 0.150 - 0.350                      |
| 0.0064 - 0.024                   | 0.016 - 0.048                    | 0.032 - 0.095                    | 0.060 - 0.140                    | 0.080 - 0.220                     | 0.120 - 0.240                      | 0.120 - 0.280                      |
| 0.0064 - 0.024                   | 0.016 - 0.048                    | 0.032 - 0.095                    | 0.060 - 0.140                    | 0.080 - 0.220                     | 0.120 - 0.240                      | 0.120 - 0.280                      |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation. Wenn es sich bei der Schmierung um Emulsion oder Minimalmengenschmierung handelt, sollten Sie bei Nichteisenmetallen die DRYCUT-Beschichtung bevorzugen.

# DIXI 1132 - 1134 - 1135 1136 - 1138 - 1139

|   |   |             | Entspanzyklus |                   |                     |                     |           |        |
|---|---|-------------|---------------|-------------------|---------------------|---------------------|-----------|--------|
|   |   |             | VDI<br>3323   | VHM<br>Vc [m/min] | DICUT<br>Vc [m/min] | TiAlN<br>Vc [m/min] | Q1        |        |
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5       |               | 40 - 60           | 40 - 70             | 40 - 70             | <2×ØD1    |        |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9       |               |                   | 30 - 40             | 30 - 40             | <1×ØD1    |        |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13     |               |                   | 25 - 40             | 25 - 40             | <0.6×ØD1  |        |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1 - 14.2 |               |                   | 45 - 60             | 45 - 60             | <0.4×ØD1  |        |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                            | 14.3 - 14.4 |               |                   | 30 - 50             | 30 - 50             | <0.4×ØD1  |        |
| K | Grauguss < 250 HB   | 15 - 16     |               |                   | 50 - 80             | 60 - 90             | 60 - 90   | <3×ØD1 |
|   | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20     |               |                   | 40 - 60             | 40 - 60             | 40 - 60   | <1×ØD1 |
| N | Alu-Knetlegierung < 12% Si  | 21 - 22     |               |                   | 80 - 130            |                     |           | <1×ØD1 |
|   | Alu-Gusslegierung >12% Si   | 23 - 25     |               |                   | 70 - 110            |                     |           | <1×ØD1 |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26          |               |                   | 80 - 100            |                     |           | <4×ØD1 |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28     |               | 40 - 70           |                     |                     | <1×ØD1    |        |
|   | Kunststoff, Holz  | 29 - 30     |               | 30 - 60           |                     |                     | <2×ØD1    |        |
|   | Gold, Silber  | -           |               | 50 - 80           |                     |                     | <0.5×ØD1  |        |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35     |               | 20 - 40           | 20 - 40             | 20 - 40             | <0.15×ØD1 |        |
|   | Titan, Titanlegierung   | 36 - 37     |               | 30 - 50           |                     |                     | <0.35×ØD1 |        |

# DIXI 1133

|   |   |                       | Entspanzyklus |                   |                     |          |          |
|---|---|-----------------------|---------------|-------------------|---------------------|----------|----------|
|   |   |                       | VDI<br>3323   | VHM<br>Vc [m/min] | DICUT<br>Vc [m/min] | Q1       |          |
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5                 |               | 40 - 60           | 70 - 100            | <1.5×ØD1 |          |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9                 |               |                   | 50 - 70             | <0.8×ØD1 |          |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13               |               |                   | 40 - 60             | <0.5×ØD1 |          |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1 - 14.2           |               |                   | 45 - 60             | <0.3×ØD1 |          |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                            | 14.3 - 14.4           |               |                   | 30 - 50             | <0.3×ØD1 |          |
| K | Grauguss < 250 HB   | 15 - 16               |               |                   | 50 - 80             | 60 - 90  | <2×ØD1   |
|   | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20               |               |                   | 30 - 50             | 30 - 50  | <1×ØD1   |
| N | Alu-Knetlegierung < 12% Si  | 21 - 22               |               |                   | 80 - 130            |          | <2×ØD1   |
|   | Alu-Gusslegierung >12% Si   | 23 - 25               |               |                   | 70 - 110            |          | <3×ØD1   |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26                    |               |                   | 80 - 100            |          | <4×ØD1   |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28               |               | 40 - 70           |                     | <2×ØD1   |          |
|   | Gold, Silber  | -                     |               | 50 - 80           |                     | <0.5×ØD1 |          |
|   | S   | Titan, Titanlegierung | 36 - 37       |                   | 30 - 50             |          | <0.3×ØD1 |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]}$$

Vorschub pro Umdrehung **f [mm]**

| $\varnothing D_1$<br>0.05 - 0.15 | $\varnothing D_1$<br>0.15 - 0.30 | $\varnothing D_1$<br>0.30 - 0.60 | $\varnothing D_1$<br>0.60 - 1.00 | $\varnothing D_1$<br>1.00 - 2.00 | $\varnothing D_1$<br>2.00 - 2.50 | $\varnothing D_1$<br>2.50 - 3.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| 0.0004 - 0.0020                  | 0.0013 - 0.0048                  | 0.003 - 0.010                    | 0.006 - 0.016                    | 0.010 - 0.033                    | 0.019 - 0.041                    | 0.024 - 0.049                    |
| 0.0003 - 0.0018                  | 0.0012 - 0.0044                  | 0.003 - 0.009                    | 0.005 - 0.015                    | 0.009 - 0.030                    | 0.018 - 0.037                    | 0.022 - 0.045                    |
| 0.0003 - 0.0017                  | 0.0011 - 0.0040                  | 0.002 - 0.008                    | 0.005 - 0.014                    | 0.008 - 0.027                    | 0.016 - 0.034                    | 0.020 - 0.041                    |
| 0.0003 - 0.0017                  | 0.0011 - 0.0040                  | 0.003 - 0.009                    | 0.005 - 0.014                    | 0.008 - 0.029                    | 0.017 - 0.036                    | 0.021 - 0.043                    |
| 0.0003 - 0.0016                  | 0.0010 - 0.0038                  | 0.002 - 0.008                    | 0.005 - 0.013                    | 0.008 - 0.026                    | 0.015 - 0.032                    | 0.019 - 0.039                    |
| 0.0004 - 0.0023                  | 0.0015 - 0.0056                  | 0.003 - 0.011                    | 0.007 - 0.019                    | 0.011 - 0.038                    | 0.022 - 0.048                    | 0.028 - 0.057                    |
| 0.0004 - 0.0020                  | 0.0013 - 0.0048                  | 0.003 - 0.010                    | 0.006 - 0.016                    | 0.010 - 0.033                    | 0.019 - 0.041                    | 0.024 - 0.049                    |
| 0.0005 - 0.0028                  | 0.0018 - 0.0068                  | 0.004 - 0.014                    | 0.008 - 0.023                    | 0.014 - 0.046                    | 0.027 - 0.058                    | 0.034 - 0.069                    |
| 0.0005 - 0.0025                  | 0.0016 - 0.0060                  | 0.004 - 0.012                    | 0.007 - 0.020                    | 0.012 - 0.041                    | 0.024 - 0.051                    | 0.030 - 0.061                    |
| 0.0005 - 0.0028                  | 0.0018 - 0.0068                  | 0.004 - 0.014                    | 0.008 - 0.023                    | 0.014 - 0.046                    | 0.027 - 0.058                    | 0.034 - 0.069                    |
| 0.0004 - 0.0023                  | 0.0015 - 0.0056                  | 0.003 - 0.011                    | 0.007 - 0.019                    | 0.011 - 0.038                    | 0.022 - 0.048                    | 0.028 - 0.057                    |
| 0.0005 - 0.0028                  | 0.0018 - 0.0068                  | 0.004 - 0.014                    | 0.080 - 0.023                    | 0.014 - 0.046                    | 0.027 - 0.058                    | 0.034 - 0.069                    |
| 0.0004 - 0.0020                  | 0.0013 - 0.0048                  | 0.003 - 0.010                    | 0.006 - 0.016                    | 0.010 - 0.033                    | 0.019 - 0.041                    | 0.024 - 0.049                    |
| 0.0002 - 0.0012                  | 0.0007 - 0.0028                  | 0.002 - 0.006                    | 0.003 - 0.010                    | 0.006 - 0.019                    | 0.011 - 0.024                    | 0.014 - 0.029                    |
| 0.0004 - 0.0020                  | 0.0013 - 0.0048                  | 0.003 - 0.010                    | 0.006 - 0.016                    | 0.010 - 0.033                    | 0.019 - 0.041                    | 0.024 - 0.049                    |

Vorschub pro Umdrehung **f [mm]**

| $\varnothing D_1$<br>0.50 - 0.70 | $\varnothing D_1$<br>0.70 - 1.00 | $\varnothing D_1$<br>1.00 - 1.50 | $\varnothing D_1$<br>1.50 - 2.00 | $\varnothing D_1$<br>2.00 - 3.00 | $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>4.00 - 6.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| 0.0035 - 0.009                   | 0.004 - 0.014                    | 0.008 - 0.020                    | 0.010 - 0.026                    | 0.014 - 0.040                    | 0.018 - 0.048                    | 0.020 - 0.066                    |
| 0.0032 - 0.008                   | 0.004 - 0.012                    | 0.006 - 0.018                    | 0.010 - 0.024                    | 0.012 - 0.036                    | 0.016 - 0.044                    | 0.018 - 0.060                    |
| 0.0028 - 0.007                   | 0.004 - 0.010                    | 0.006 - 0.016                    | 0.008 - 0.020                    | 0.012 - 0.032                    | 0.014 - 0.038                    | 0.016 - 0.052                    |
| 0.0030 - 0.008                   | 0.004 - 0.012                    | 0.006 - 0.016                    | 0.008 - 0.022                    | 0.012 - 0.034                    | 0.016 - 0.040                    | 0.018 - 0.056                    |
| 0.0026 - 0.007                   | 0.004 - 0.010                    | 0.006 - 0.014                    | 0.008 - 0.020                    | 0.010 - 0.030                    | 0.014 - 0.036                    | 0.016 - 0.050                    |
| 0.0042 - 0.011                   | 0.006 - 0.016                    | 0.008 - 0.024                    | 0.012 - 0.032                    | 0.016 - 0.046                    | 0.022 - 0.058                    | 0.024 - 0.080                    |
| 0.0035 - 0.009                   | 0.004 - 0.014                    | 0.008 - 0.020                    | 0.010 - 0.026                    | 0.014 - 0.040                    | 0.018 - 0.048                    | 0.020 - 0.066                    |
| 0.0060 - 0.015                   | 0.008 - 0.022                    | 0.012 - 0.034                    | 0.018 - 0.044                    | 0.024 - 0.066                    | 0.030 - 0.082                    | 0.034 - 0.112                    |
| 0.0046 - 0.012                   | 0.006 - 0.016                    | 0.010 - 0.026                    | 0.014 - 0.034                    | 0.018 - 0.050                    | 0.024 - 0.062                    | 0.028 - 0.086                    |
| 0.0060 - 0.0015                  | 0.008 - 0.020                    | 0.012 - 0.034                    | 0.018 - 0.044                    | 0.024 - 0.066                    | 0.030 - 0.082                    | 0.034 - 0.112                    |
| 0.0042 - 0.011                   | 0.006 - 0.016                    | 0.008 - 0.024                    | 0.012 - 0.032                    | 0.016 - 0.046                    | 0.022 - 0.058                    | 0.024 - 0.080                    |
| 0.0035 - 0.009                   | 0.004 - 0.014                    | 0.008 - 0.020                    | 0.010 - 0.026                    | 0.014 - 0.040                    | 0.018 - 0.048                    | 0.020 - 0.066                    |
| 0.0035 - 0.009                   | 0.004 - 0.014                    | 0.008 - 0.020                    | 0.010 - 0.026                    | 0.014 - 0.040                    | 0.018 - 0.048                    | 0.020 - 0.066                    |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

## DIXI 1147

|   |   |             | Entspanzyklus       |          |
|---|---|-------------|---------------------|----------|
|   |   |             | TiAlN<br>Vc [m/min] | Q1       |
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5       | 70 - 100            | <4×ØD1   |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9       | 60 - 90             | <4×ØD1   |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13     | 40 - 70             | <2×ØD1   |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1 - 14.2 | 30 - 50             | <0.5×ØD1 |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                            | 14.3 - 14.4 | 20 - 40             | <0.6×ØD1 |
| K | Grauguss < 250 HB   | 15 - 16     | 90 - 130            | <4×ØD1   |
|   | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20     | 70 - 100            | <2×ØD1   |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35     | 15 - 30             | <3×ØD1   |
|   | Titan, Titanlegierung   | 36 - 37     | 30 - 60             | <0.5×ØD1 |

## DIXI 1149

|   |   |             | Entspanzyklus       |           |
|---|---|-------------|---------------------|-----------|
|   |   |             | TiAlN<br>Vc [m/min] | Q1        |
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5       | 70 - 100            | <3×ØD1    |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9       | 60 - 90             | <1.5×ØD1  |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13     | 40 - 70             | <2×ØD1    |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1 - 14.2 | 40 - 60             | <0.75×ØD1 |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                            | 14.3 - 14.4 | 30 - 50             | <0.75×ØD1 |
| K | Grauguss < 250 HB   | 15 - 16     | 70 - 100            | <4×ØD1    |
|   | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20     | 30 - 50             | <2×ØD1    |
| N | Alu-Knetlegierung < 12% Si  | 21 - 22     | 130 - 180           | <3×ØD1    |
|   | Alu-Gusslegierung > 12% Si  | 23 - 25     | 100 - 150           | <3×ØD1    |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26          | 80 - 130            | <3×ØD1    |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28     | 60 - 80             | <1.5×ØD1  |
|   | Gold, Silber  | -           | 70 - 90             | <0.5×ØD1  |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35     | 15 - 30             | <1×ØD1    |
|   | Titan, Titanlegierung   | 36 - 37     | 30 - 60             | <0.5×ØD1  |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]}$$

Vorschub pro Umdrehung **f [mm]**



| $\varnothing D_1$<br>0.50 - 1.00 | $\varnothing D_1$<br>1.00 - 1.50 | $\varnothing D_1$<br>1.50 - 2.00 | $\varnothing D_1$<br>2.00 - 3.00 | $\varnothing D_1$<br>3.00 - 5.00 | $\varnothing D_1$<br>5.00 - 7.00 | $\varnothing D_1$<br>7.00 - 10.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|
| 0.030 - 0.082                    | 0.062 - 0.124                    | 0.080 - 0.145                    | 0.090 - 0.190                    | 0.110 - 0.260                    | 0.150 - 0.290                    | 0.160 - 0.310                     |
| 0.028 - 0.074                    | 0.054 - 0.110                    | 0.072 - 0.130                    | 0.080 - 0.170                    | 0.100 - 0.230                    | 0.140 - 0.260                    | 0.140 - 0.280                     |
| 0.028 - 0.074                    | 0.054 - 0.110                    | 0.072 - 0.130                    | 0.080 - 0.170                    | 0.100 - 0.230                    | 0.140 - 0.260                    | 0.140 - 0.280                     |
| 0.012 - 0.030                    | 0.022 - 0.044                    | 0.030 - 0.050                    | 0.030 - 0.070                    | 0.040 - 0.090                    | 0.060 - 0.100                    | 0.060 - 0.110                     |
| 0.010 - 0.026                    | 0.020 - 0.040                    | 0.026 - 0.045                    | 0.030 - 0.060                    | 0.040 - 0.080                    | 0.050 - 0.090                    | 0.050 - 0.100                     |
| 0.034 - 0.092                    | 0.068 - 0.138                    | 0.090 - 0.160                    | 0.100 - 0.210                    | 0.130 - 0.290                    | 0.170 - 0.320                    | 0.180 - 0.350                     |
| 0.026 - 0.070                    | 0.052 - 0.104                    | 0.066 - 0.120                    | 0.080 - 0.160                    | 0.100 - 0.220                    | 0.130 - 0.240                    | 0.130 - 0.260                     |
| 0.008 - 0.024                    | 0.018 - 0.034                    | 0.022 - 0.040                    | 0.030 - 0.050                    | 0.030 - 0.070                    | 0.040 - 0.080                    | 0.040 - 0.090                     |
| 0.012 - 0.032                    | 0.024 - 0.048                    | 0.032 - 0.055                    | 0.040 - 0.070                    | 0.040 - 0.100                    | 0.060 - 0.110                    | 0.060 - 0.120                     |

Vorschub pro Umdrehung **f [mm]**



| $\varnothing D_1$<br>1.00 - 2.00 | $\varnothing D_1$<br>2.00 - 3.00 | $\varnothing D_1$<br>3.00 - 4.50 | $\varnothing D_1$<br>4.50 - 6.00 | $\varnothing D_1$<br>6.00 - 10.00 | $\varnothing D_1$<br>10.00 - 12.00 | $\varnothing D_1$<br>12.00 - 14.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|------------------------------------|
| 0.012 - 0.024                    | 0.024 - 0.036                    | 0.036 - 0.055                    | 0.050 - 0.070                    | 0.060 - 0.100                     | 0.100 - 0.120                      | 0.120 - 0.150                      |
| 0.013 - 0.026                    | 0.026 - 0.038                    | 0.038 - 0.055                    | 0.060 - 0.080                    | 0.070 - 0.110                     | 0.110 - 0.130                      | 0.130 - 0.150                      |
| 0.012 - 0.024                    | 0.024 - 0.036                    | 0.036 - 0.055                    | 0.050 - 0.070                    | 0.060 - 0.100                     | 0.100 - 0.120                      | 0.120 - 0.150                      |
| 0.011 - 0.021                    | 0.021 - 0.032                    | 0.032 - 0.045                    | 0.050 - 0.060                    | 0.050 - 0.090                     | 0.090 - 0.110                      | 0.110 - 0.130                      |
| 0.010 - 0.020                    | 0.020 - 0.029                    | 0.030 - 0.045                    | 0.040 - 0.060                    | 0.050 - 0.080                     | 0.080 - 0.100                      | 0.100 - 0.120                      |
| 0.023 - 0.045                    | 0.045 - 0.068                    | 0.068 - 0.100                    | 0.100 - 0.140                    | 0.120 - 0.200                     | 0.200 - 0.230                      | 0.230 - 0.270                      |
| 0.020 - 0.039                    | 0.039 - 0.059                    | 0.058 - 0.090                    | 0.090 - 0.120                    | 0.100 - 0.170                     | 0.170 - 0.200                      | 0.200 - 0.240                      |
| 0.020 - 0.039                    | 0.039 - 0.059                    | 0.058 - 0.090                    | 0.090 - 0.120                    | 0.100 - 0.170                     | 0.170 - 0.200                      | 0.200 - 0.240                      |
| 0.015 - 0.030                    | 0.030 - 0.045                    | 0.046 - 0.070                    | 0.070 - 0.090                    | 0.080 - 0.130                     | 0.130 - 0.160                      | 0.160 - 0.180                      |
| 0.020 - 0.039                    | 0.039 - 0.059                    | 0.058 - 0.090                    | 0.090 - 0.120                    | 0.100 - 0.170                     | 0.170 - 0.200                      | 0.200 - 0.240                      |
| 0.015 - 0.030                    | 0.030 - 0.045                    | 0.046 - 0.070                    | 0.070 - 0.090                    | 0.080 - 0.130                     | 0.130 - 0.160                      | 0.160 - 0.180                      |
| 0.014 - 0.027                    | 0.027 - 0.0405                   | 0.040 - 0.060                    | 0.060 - 0.080                    | 0.070 - 0.120                     | 0.120 - 0.140                      | 0.140 - 0.160                      |
| 0.011 - 0.023                    | 0.023 - 0.034                    | 0.034 - 0.050                    | 0.050 - 0.070                    | 0.060 - 0.100                     | 0.100 - 0.120                      | 0.120 - 0.140                      |
| 0.015 - 0.030                    | 0.030 - 0.045                    | 0.046 - 0.070                    | 0.070 - 0.090                    | 0.080 - 0.130                     | 0.130 - 0.160                      | 0.160 - 0.180                      |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

## DIXI 1145

|   |  |             | VDI 3323   |  | TiAlN Vc [m/min] | Entspanzyklus Q1 |
|---|--|-------------|--|--|------------------|------------------|
| P | Unlegierter Stahl, Automaten Stahl   | 1 - 5       |  |  | 90 - 130         |                  |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>  | 6 - 9       |  | 80 - 115   |                  |                  |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> , ferritischer / martensitischer Edelstahl | 10 - 13     |  | 50 - 90  |                  |                  |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                | 14.1 - 14.2 |  | 50 - 80  | < 3×ØD1          |                  |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                         | 14.3 - 14.4 |  | 40 - 65  | < 3×ØD1          |                  |
| K | Grauguss < 250 HB  | 15 - 16     |  | 90 - 130   |                  |                  |
|   | Duktiles Gusseisen, Temperguss > 250 HB  | 17 - 20     |  | 40 - 65  |                  |                  |
| N | Alu-Knetlegierung < 12% Si   | 21 - 22     |  | 170 - 235  |                  |                  |
|   | Alu-Gusslegierung >12% Si  | 23 - 25     |  | 130 - 195  |                  |                  |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb   | 26          |  | 90 - 115   |                  |                  |
|   | Kupferlegierung schwere Zerspanbarkeit   | 27 - 28     |  | 80 - 105   |                  |                  |
|   | Gold, Silber   | -           |  | 105 - 130  |                  |                  |
| S | Spezielle Nickel-Kobalt-Legierung  | 31 - 35     |  | 20 - 40  |                  |                  |
|   | Titan, Titanlegierung  | 36 - 37     |  | 40 - 80  | < 3×ØD1          |                  |

## DIXI 1146

|   |  |             | VDI 3323   |  | TiAlN Vc [m/min] | Entspanzyklus Q1 |
|---|--|-------------|--|--|------------------|------------------|
| P | Unlegierter Stahl, Automaten Stahl   | 1 - 5       |  |  | 90 - 130         |                  |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>  | 6 - 9       |  | 80 - 115   |                  |                  |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> , ferritischer / martensitischer Edelstahl | 10 - 13     |  | 50 - 90  |                  |                  |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                | 14.1 - 14.2 |  | 40 - 65  | < 3×ØD1          |                  |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                         | 14.3 - 14.4 |  | 25 - 50  | < 3×ØD1          |                  |
| K | Grauguss < 250 HB  | 15 - 16     |  | 115 - 170  |                  |                  |
|   | Duktiles Gusseisen, Temperguss > 250 HB  | 17 - 20     |  | 105 - 145  |                  |                  |
| S | Spezielle Nickel-Kobalt-Legierung  | 31 - 35     |  | 20 - 40  |                  |                  |
|   | Titan, Titanlegierung  | 36 - 37     |  | 40 - 80  | < 3×ØD1          |                  |

$$n \text{ [U/min]} = \frac{Vc \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$Vf \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]}$$

Vorschub pro Umdrehung **f [mm]**

| $\varnothing D_1$<br>0.80 - 1.10 | $\varnothing D_1$<br>1.10 - 2.50 | $\varnothing D_1$<br>2.50 - 4.00 | $\varnothing D_1$<br>4.00 - 6.00 | $\varnothing D_1$<br>6.00 - 10.00 | $\varnothing D_1$<br>10.00 - 12.00 | $\varnothing D_1$<br>12.00 - 14.00 |  |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|------------------------------------|--|
| 0.013 - 0.024                    | 0.020 - 0.055                    | 0.046 - 0.090                    | 0.070 - 0.130                    | 0.110 - 0.220                     | 0.160 - 0.240                      | 0.170 - 0.250                      |  |
| 0.011 - 0.022                    | 0.018 - 0.050                    | 0.040 - 0.080                    | 0.060 - 0.120                    | 0.100 - 0.200                     | 0.140 - 0.220                      | 0.150 - 0.230                      |  |
| 0.010 - 0.019                    | 0.016 - 0.044                    | 0.036 - 0.070                    | 0.060 - 0.110                    | 0.090 - 0.180                     | 0.130 - 0.190                      | 0.130 - 0.200                      |  |
| 0.011 - 0.021                    | 0.017 - 0.047                    | 0.038 - 0.075                    | 0.060 - 0.110                    | 0.090 - 0.190                     | 0.140 - 0.200                      | 0.140 - 0.210                      |  |
| 0.009 - 0.018                    | 0.015 - 0.041                    | 0.034 - 0.065                    | 0.050 - 0.100                    | 0.080 - 0.170                     | 0.120 - 0.180                      | 0.130 - 0.190                      |  |
| 0.015 - 0.029                    | 0.024 - 0.066                    | 0.054 - 0.105                    | 0.090 - 0.160                    | 0.130 - 0.260                     | 0.190 - 0.290                      | 0.200 - 0.170                      |  |
| 0.013 - 0.024                    | 0.020 - 0.055                    | 0.046 - 0.090                    | 0.070 - 0.130                    | 0.110 - 0.220                     | 0.160 - 0.240                      | 0.170 - 0.250                      |  |
| 0.019 - 0.036                    | 0.030 - 0.083                    | 0.068 - 0.130                    | 0.110 - 0.200                    | 0.160 - 0.330                     | 0.240 - 0.360                      | 0.250 - 0.380                      |  |
| 0.016 - 0.031                    | 0.026 - 0.072                    | 0.058 - 0.115                    | 0.090 - 0.170                    | 0.140 - 0.290                     | 0.210 - 0.310                      | 0.220 - 0.330                      |  |
| 0.019 - 0.036                    | 0.030 - 0.083                    | 0.068 - 0.130                    | 0.110 - 0.200                    | 0.160 - 0.330                     | 0.240 - 0.360                      | 0.250 - 0.380                      |  |
| 0.015 - 0.029                    | 0.024 - 0.066                    | 0.054 - 0.105                    | 0.090 - 0.160                    | 0.130 - 0.260                     | 0.190 - 0.290                      | 0.200 - 0.300                      |  |
| 0.013 - 0.024                    | 0.020 - 0.055                    | 0.046 - 0.090                    | 0.070 - 0.130                    | 0.110 - 0.220                     | 0.160 - 0.240                      | 0.170 - 0.250                      |  |
| 0.006 - 0.012                    | 0.010 - 0.028                    | 0.022 - 0.045                    | 0.040 - 0.070                    | 0.050 - 0.110                     | 0.080 - 0.120                      | 0.080 - 0.130                      |  |
| 0.013 - 0.024                    | 0.020 - 0.055                    | 0.046 - 0.090                    | 0.070 - 0.130                    | 0.110 - 0.220                     | 0.160 - 0.240                      | 0.170 - 0.250                      |  |

Vorschub pro Umdrehung **f [mm]**

| $\varnothing D_1$<br>0.80 - 1.00 | $\varnothing D_1$<br>1.00 - 1.50 | $\varnothing D_1$<br>1.50 - 2.00 | $\varnothing D_1$<br>2.00 - 3.00 | $\varnothing D_1$<br>2.00 - 3.00 | $\varnothing D_1$<br>3.00 - 5.00 | $\varnothing D_1$<br>5.00 - 7.00 | $\varnothing D_1$<br>7.00 - 10.00 |  |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|--|
| 0.049 - 0.083                    | 0.061 - 0.124                    | 0.080 - 0.145                    | 0.010 - 0.026                    | 0.092 - 0.185                    | 0.110 - 0.260                    | 0.150 - 0.290                    | 0.160 - 0.310                     |  |
| 0.044 - 0.074                    | 0.054 - 0.110                    | 0.071 - 0.129                    | 0.010 - 0.024                    | 0.082 - 0.165                    | 0.100 - 0.230                    | 0.140 - 0.260                    | 0.140 - 0.280                     |  |
| 0.044 - 0.074                    | 0.054 - 0.110                    | 0.071 - 0.129                    | 0.008 - 0.020                    | 0.082 - 0.165                    | 0.100 - 0.230                    | 0.140 - 0.260                    | 0.140 - 0.280                     |  |
| 0.018 - 0.030                    | 0.022 - 0.045                    | 0.029 - 0.052                    | 0.008 - 0.022                    | 0.034 - 0.065                    | 0.040 - 0.090                    | 0.060 - 0.100                    | 0.060 - 0.110                     |  |
| 0.016 - 0.027                    | 0.020 - 0.040                    | 0.026 - 0.047                    | 0.008 - 0.020                    | 0.030 - 0.060                    | 0.040 - 0.080                    | 0.050 - 0.090                    | 0.050 - 0.100                     |  |
| 0.054 - 0.092                    | 0.068 - 0.138                    | 0.089 - 0.161                    | 0.012 - 0.032                    | 0.102 - 0.205                    | 0.130 - 0.290                    | 0.170 - 0.320                    | 0.180 - 0.350                     |  |
| 0.041 - 0.069                    | 0.051 - 0.104                    | 0.067 - 0.121                    | 0.010 - 0.026                    | 0.076 - 0.155                    | 0.100 - 0.220                    | 0.130 - 0.240                    | 0.130 - 0.260                     |  |
| 0.014 - 0.023                    | 0.017 - 0.035                    | 0.022 - 0.040                    | 0.010 - 0.026                    | 0.026 - 0.050                    | 0.030 - 0.070                    | 0.040 - 0.080                    | 0.040 - 0.090                     |  |
| 0.022 - 0.037                    | 0.027 - 0.055                    | 0.036 - 0.064                    | 0.010 - 0.026                    | 0.040 - 0.085                    | 0.050 - 0.120                    | 0.070 - 0.130                    | 0.070 - 0.140                     |  |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

## DIXI 1151 - 1152

|          |  | VDI<br>3323 |  |                     | VHM<br>Vc [m/min] | Q1        |
|----------|--|-------------|--|---------------------|-------------------|-----------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl               | 1 - 5       |  | <b>n</b><br>[U/min] | 90 - 130          | <1×ØD1    |
|          | Niedrig legierter Stahl < 800 N/ mm <sup>2</sup> | 6 - 9       |  |                     | 80 - 115          | <1×ØD1    |
| <b>K</b> | Grauguss < 250 HB                                | 15 - 16     |  |                     | 90 - 130          | <4×ØD1    |
|          | Duktiles Gusseisen, Temperguss > 250 HB          | 17 - 20     |  |                     | 40 - 65           | <1×ØD1    |
| <b>N</b> | Alu-Gusslegierung >12% Si                        | 23 - 25     |  |                     | 130 - 195         | <4×ØD1    |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb       | 26          |  |                     | 90 - 115          | <4×ØD1    |
|          | Gold, Silber                                     | -           |  |                     | 105 - 130         | <1×ØD1    |
| <b>S</b> | Titan, Titanlegierung                            | 36 - 37     |  |                     | 40 - 80           | <0.75×ØD1 |

## DIXI 1501 - 1502 - 1503 - 1504

|          |   | VDI<br>3323 |  |                     | VHM<br>Vc [m/min] | TiAlN<br>Vc [m/min] | Q1        |        |
|----------|---|-------------|--|---------------------|-------------------|---------------------|-----------|--------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5       |  | <b>n</b><br>[U/min] | 40 - 60           | 40 - 70             | <2×ØD1    |        |
|          | Niedrig legierter Stahl < 800 N/ mm <sup>2</sup>  | 6 - 9       |  |                     |                   | 40 - 60             | <1×ØD1    |        |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13     |  |                     |                   | 30 - 60             | <0.5×ØD1  |        |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.3 - 14.4 |  |                     |                   | 40 - 60             | <0.35×ØD1 |        |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                            | 14.3 - 14.4 |  |                     |                   | 35 - 55             | <0.35×ØD1 |        |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16     |  |                     |                   | 60 - 100            | 60 - 100  | <3×ØD1 |
|          | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20     |  |                     |                   | 40 - 70             | 40 - 70   | <1×ØD1 |
| <b>N</b> | Alu-Knetlegierung < 12% Si  | 21 - 22     |  |                     |                   | 80 - 130            |           | <1×ØD1 |
|          | Alu-Gusslegierung >12% Si   | 23 - 25     |  |                     |                   | 70 - 110            |           | <1×ØD1 |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26          |  |                     |                   | 80 - 100            |           | <4×ØD1 |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28     |  | 40 - 70             |                   | <2×ØD1              |           |        |
|          | Kunststoff, Holz  | 29 - 30     |  | 100 - 150           |                   | <2× ØD1             |           |        |
| <b>S</b> | Gold, Silber  | -           |  | 50 - 80             |                   | <0.5×ØD1            |           |        |
|          | Spezielle Nickel-Kobalt-Legierung   | 31 - 35     |  |                     | 20 - 40           | <0.15×ØD1           |           |        |
|          | Titan, Titanlegierung   | 36 - 37     |  | 30 - 50             |                   | <0.35×ØD1           |           |        |



$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]}$$

Vorschub pro Umdrehung  $f$  [mm]

| $\varnothing D_1$<br>0.15 - 0.50 | $\varnothing D_1$<br>0.50 - 1.00 | $\varnothing D_1$<br>1.00 - 1.50 | $\varnothing D_1$<br>1.50 - 3.00 | $\varnothing D_1$<br>3.00 - 6.00 | $\varnothing D_1$<br>6.00 - 10.00 | $\varnothing D_1$<br>10.00 - 14.00 |  |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|--|
| 0.0014 - 0.008                   | 0.005 - 0.016                    | 0.010 - 0.022                    | 0.014 - 0.045                    | 0.020 - 0.080                    | 0.040 - 0.120                     | 0.050 - 0.140                      |  |
| 0.0012 - 0.007                   | 0.004 - 0.014                    | 0.008 - 0.020                    | 0.012 - 0.040                    | 0.020 - 0.070                    | 0.030 - 0.110                     | 0.050 - 0.130                      |  |
| 0.0016 - 0.009                   | 0.005 - 0.018                    | 0.010 - 0.028                    | 0.016 - 0.055                    | 0.025 - 0.095                    | 0.040 - 0.140                     | 0.060 - 0.170                      |  |
| 0.0014 - 0.008                   | 0.005 - 0.016                    | 0.010 - 0.022                    | 0.014 - 0.045                    | 0.020 - 0.080                    | 0.040 - 0.120                     | 0.050 - 0.140                      |  |
| 0.0018 - 0.010                   | 0.006 - 0.020                    | 0.012 - 0.030                    | 0.018 - 0.060                    | 0.025 - 0.100                    | 0.050 - 0.160                     | 0.070 - 0.180                      |  |
| 0.0020 - 0.011                   | 0.007 - 0.022                    | 0.014 - 0.034                    | 0.020 - 0.070                    | 0.030 - 0.115                    | 0.050 - 0.180                     | 0.080 - 0.210                      |  |
| 0.0014 - 0.008                   | 0.005 - 0.016                    | 0.010 - 0.022                    | 0.014 - 0.045                    | 0.020 - 0.080                    | 0.040 - 0.120                     | 0.050 - 0.140                      |  |
| 0.0014 - 0.008                   | 0.005 - 0.016                    | 0.010 - 0.022                    | 0.014 - 0.045                    | 0.020 - 0.080                    | 0.040 - 0.120                     | 0.050 - 0.140                      |  |

Vorschub pro Umdrehung  $f$  [mm]

| $\varnothing D_1$<br>0.05 - 0.30 | $\varnothing D_1$<br>0.30 - 0.60 | $\varnothing D_1$<br>0.60 - 1.00 | $\varnothing D_1$<br>1.00 - 2.00 | $\varnothing D_1$<br>2.00 - 3.00 | $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>4.00 - 6.00 | $\varnothing D_1$<br>6.00 - 12.00 | $\varnothing D_1$<br>12.00 - 20.00 |  |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|--|
| 0.0004 - 0.0036                  | 0.002 - 0.007                    | 0.005 - 0.012                    | 0.008 - 0.024                    | 0.016 - 0.036                    | 0.024 - 0.048                    | 0.032 - 0.070                    | 0.040 - 0.080                     | 0.070 - 0.120                      |  |
| 0.0004 - 0.0032                  | 0.002 - 0.006                    | 0.004 - 0.011                    | 0.007 - 0.022                    | 0.014 - 0.032                    | 0.022 - 0.043                    | 0.028 - 0.065                    | 0.040 - 0.080                     | 0.060 - 0.110                      |  |
| 0.0003 - 0.0029                  | 0.002 - 0.006                    | 0.004 - 0.010                    | 0.006 - 0.019                    | 0.013 - 0.029                    | 0.019 - 0.038                    | 0.026 - 0.060                    | 0.030 - 0.070                     | 0.060 - 0.100                      |  |
| 0.0003 - 0.0029                  | 0.002 - 0.006                    | 0.004 - 0.010                    | 0.006 - 0.019                    | 0.013 - 0.029                    | 0.019 - 0.038                    | 0.026 - 0.060                    | 0.030 - 0.070                     | 0.060 - 0.100                      |  |
| 0.0003 - 0.0025                  | 0.002 - 0.005                    | 0.003 - 0.008                    | 0.006 - 0.017                    | 0.011 - 0.025                    | 0.017 - 0.034                    | 0.022 - 0.050                    | 0.030 - 0.060                     | 0.050 - 0.080                      |  |
| 0.0005 - 0.0043                  | 0.003 - 0.009                    | 0.006 - 0.014                    | 0.010 - 0.029                    | 0.019 - 0.043                    | 0.029 - 0.058                    | 0.038 - 0.085                    | 0.050 - 0.100                     | 0.090 - 0.140                      |  |
| 0.0004 - 0.0036                  | 0.002 - 0.007                    | 0.005 - 0.012                    | 0.008 - 0.024                    | 0.016 - 0.036                    | 0.024 - 0.048                    | 0.032 - 0.070                    | 0.040 - 0.080                     | 0.070 - 0.120                      |  |
| 0.0006 - 0.0054                  | 0.004 - 0.011                    | 0.007 - 0.018                    | 0.012 - 0.036                    | 0.024 - 0.054                    | 0.036 - 0.072                    | 0.048 - 0.110                    | 0.060 - 0.130                     | 0.110 - 0.180                      |  |
| 0.0005 - 0.0047                  | 0.003 - 0.009                    | 0.006 - 0.016                    | 0.010 - 0.031                    | 0.021 - 0.047                    | 0.031 - 0.062                    | 0.042 - 0.095                    | 0.050 - 0.110                     | 0.090 - 0.160                      |  |
| 0.0006 - 0.0054                  | 0.004 - 0.011                    | 0.007 - 0.018                    | 0.012 - 0.036                    | 0.024 - 0.054                    | 0.036 - 0.072                    | 0.048 - 0.110                    | 0.060 - 0.130                     | 0.110 - 0.180                      |  |
| 0.0005 - 0.0043                  | 0.003 - 0.009                    | 0.006 - 0.014                    | 0.010 - 0.029                    | 0.019 - 0.043                    | 0.029 - 0.058                    | 0.038 - 0.085                    | 0.050 - 0.100                     | 0.090 - 0.140                      |  |
| 0.0006 - 0.0054                  | 0.004 - 0.011                    | 0.007 - 0.018                    | 0.012 - 0.036                    | 0.024 - 0.054                    | 0.036 - 0.072                    | 0.048 - 0.100                    | 0.060 - 0.130                     | 0.110 - 0.180                      |  |
| 0.0004 - 0.0036                  | 0.002 - 0.007                    | 0.005 - 0.012                    | 0.008 - 0.024                    | 0.016 - 0.036                    | 0.024 - 0.048                    | 0.032 - 0.070                    | 0.040 - 0.080                     | 0.070 - 0.120                      |  |
| 0.0002 - 0.0018                  | 0.001 - 0.004                    | 0.002 - 0.006                    | 0.004 - 0.012                    | 0.008 - 0.018                    | 0.012 - 0.024                    | 0.016 - 0.035                    | 0.020 - 0.040                     | 0.040 - 0.060                      |  |
| 0.0004 - 0.0036                  | 0.002 - 0.007                    | 0.005 - 0.012                    | 0.008 - 0.024                    | 0.016 - 0.036                    | 0.024 - 0.048                    | 0.032 - 0.070                    | 0.040 - 0.080                     | 0.070 - 0.120                      |  |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.





## ÜBERSICHT FRÄSER

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## GERADE GENUTET FRÄSER

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## SCHAFTFRÄSER Z = 1

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## SCHAFTFRÄSER Z = 2

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## SCHAFTFRÄSER Z = 3

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## SCHAFTFRÄSER Z = 4

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## MULTIZAHN-FRÄSER

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# ÜBERSICHT FRÄSER

✓ = Artikel ab Lager  
 \* nicht für eisenhaltige Werkstoffe

| GERADE GENUTET FRÄSER             |  | Z | Seite | Schruppen<br>Schichten                   |  | VHM<br><input type="checkbox"/>     | DLC*<br><input checked="" type="checkbox"/> |
|-----------------------------------|--|---|-------|--|--|-------------------------------------|---|
| <b>DIXI 7060</b><br>Ø0.50 - Ø6.00 |  | 1 | 106   | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | <input checked="" type="checkbox"/> |   |
| <b>DIXI 7063</b><br>Ø0.40 - Ø4.00 |  | 1 | 107   | Schruppen<br>●●●●○<br>Schichten<br>●●●●● |  | <input checked="" type="checkbox"/> |   |
| <b>DIXI 7232</b><br>Ø2.00 - Ø8.00 |  | 2 | 108   | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | <input checked="" type="checkbox"/> |   |
| <b>DIXI 7233</b><br>Ø0.50 - Ø6.00 |  | 3 | 109   | Schruppen<br>●●●●○<br>Schichten<br>●●●●● |  | <input checked="" type="checkbox"/> |   |

# SCHAFTFRÄSER Z=1

|                                    |  |   |     |  |  |                                     |                                       |
|------------------------------------|--|---|-----|--|--|-------------------------------------|---------------------------------------|
| <b>DIXI 7561</b><br>Ø2.00 - Ø12.00 |  | 1 | 110 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> * |
| <b>DIXI 7305</b><br>Ø1.00 - Ø12.00 |  | 1 | 111 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | <input checked="" type="checkbox"/> |                                       |
| <b>DIXI 7315</b><br>Ø2.00 - Ø12.00 |  | 1 | 112 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | <input checked="" type="checkbox"/> |                                       |
| <b>DIXI 7306</b><br>Ø1.00 - Ø12.00 |  | 1 | 113 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | <input checked="" type="checkbox"/> |                                       |
| <b>DIXI 7307</b><br>Ø1.00 - Ø12.00 |  | 1 | 114 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> * |
| <b>DIXI 7308</b><br>Ø6.00 - Ø8.00  |  | 1 | 115 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | <input checked="" type="checkbox"/> |                                       |

| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |

| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
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|   |  |  |  |  | ○ |   | ⊙ | ○ | ⊙ |  |   |  |
| ○ |  |  |  |  | ○ |   | ⊙ | ○ | ⊙ |  | ○ |  |
|   |  |  |  |  | ○ | ⊙ | ⊙ | ○ | ⊙ |  |   |  |
| ○ |  |  |  |  | ○ |   | ⊙ | ○ | ⊙ |  | ○ |  |

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|  |  |  |  |  | ⊙ | ○ | ○ |   | ○ |  |  |  |
|  |  |  |  |  |   |   |   | ⊙ |   |  |  |  |
|  |  |  |  |  |   |   |   | ⊙ |   |  |  |  |
|  |  |  |  |  |   |   |   | ⊙ |   |  |  |  |
|  |  |  |  |  | ⊙ | ○ |   | ○ |   |  |  |  |
|  |  |  |  |  | ⊙ | ○ |   |   |   |  |  |  |

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| SCHAFTFRÄSER Z=2                      |  | Z | Seite | Schruppen<br>Schichten  |  |  |  |    |
|---------------------------------------|--|---|-------|---|--|--|--|----|
| <b>DIXI 7242</b><br>Ø0.10 - Ø20.00    |  | 2 | 116   | Schruppen<br>●●●●○<br>Schichten<br>●●●●○<br>D <sub>1</sub> >6<br>DIN 6527 |  |  |  |    |
| <b>DIXI 7342</b><br>Ø0.10 - Ø12.00    |  | 2 | 118   | Schruppen<br>●●●●○<br>Schichten<br>●●●●○                                  |  |  |  |    |
| <b>DIXI 7202</b><br>Ø1.50 - Ø12.00    |  | 2 | 119   | Schruppen<br>●●●●○<br>Schichten<br>●●●●○                                  |  |  |  | ✓* |
| <b>DIXI 7222</b><br>Ø3.00 - Ø20.00    |  | 2 | 120   | Schruppen<br>●●●●○<br>Schichten<br>●●●●○                                  |  |  |  | ✓* |
| <b>DIXI 7240</b><br>Ø0.04 - Ø5.50     |  | 2 | 121   | Schruppen<br>●●●●○<br>Schichten<br>●●●●○                                  |  |  |  |    |
| <b>DIXI 7240-3D</b><br>Ø0.15 - Ø3.00  |  | 2 | 122   | Schruppen<br>●●●●○<br>Schichten<br>●●●●○                                  |  |  |  |    |
| <b>DIXI 7240-5D</b><br>Ø0.30 - Ø3.00  |  | 2 | 122   | Schruppen<br>●●●●○<br>Schichten<br>●●●●○                                  |  |  |  |    |
| <b>DIXI 7240-8D</b><br>Ø0.40 - Ø3.00  |  | 2 | 122   | Schruppen<br>●●●●○<br>Schichten<br>●●●●○                                  |  |  |  |    |
| <b>DIXI 7240-10D</b><br>Ø0.50 - Ø3.00 |  | 2 | 122   | Schruppen<br>●●●●○<br>Schichten<br>●●●●○                                  |  |  |  |    |
| <b>DIXI 7240-12D</b><br>Ø0.50 - Ø1.70 |  | 2 | 122   | Schruppen<br>●●●●○<br>Schichten<br>●●●●○                                  |  |  |  |    |
| <b>DIXI 7240-15D</b><br>Ø0.50 - Ø1.35 |  | 2 | 122   | Schruppen<br>●●●●○<br>Schichten<br>●●●●○                                  |  |  |  |    |
| <b>DIXI 7582</b><br>Ø1.00 - Ø20.00    |  | 2 | 126   | Schruppen<br>●●●●○<br>Schichten<br>●●●●○<br>D <sub>1</sub> ≥2.8           |  |  |  |    |
| <b>DIXI 7572</b><br>Ø3.00 - Ø12.00    |  | 2 | 127   | Schruppen<br>●●●●○<br>Schichten<br>●●●●○                                  |  |  |  | ✓* |

| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |

| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
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|---|---|---|---|---|---|---|---|---|---|---|---|--|
| ☉ | ○ | ○ | ○ | ☉ | ○ | ○ | ☉ | ○ | ☉ | ○ | ○ |  |
| ☉ | ☉ | ☉ | ☉ | ○ | ○ | ○ | ☉ |   | ☉ | ☉ | ☉ |  |
| ☉ | ○ | ○ | ○ | ☉ | ○ | ○ | ☉ | ○ | ☉ |   | ○ |  |
| ☉ | ○ | ○ | ○ | ☉ | ○ | ○ | ☉ | ☉ |   |   | ○ |  |
| ☉ | ○ | ○ | ○ | ☉ | ○ | ○ | ☉ | ○ | ☉ | ○ | ○ |  |
| ☉ | ○ | ○ | ○ | ☉ | ○ | ○ | ☉ | ○ | ☉ | ○ | ○ |  |
| ☉ | ○ | ○ | ○ | ☉ | ○ | ○ | ☉ | ○ | ☉ | ○ | ○ |  |
| ☉ | ○ | ○ | ○ | ☉ | ○ | ○ | ☉ | ○ | ☉ | ○ | ○ |  |
| ☉ | ○ | ○ | ○ | ☉ | ○ | ○ | ☉ | ○ | ☉ | ○ | ○ |  |
| ☉ | ○ | ○ | ○ | ☉ | ○ | ○ | ☉ | ○ | ☉ | ○ | ○ |  |
| ○ |   |   |   |   | ☉ | ☉ | ○ | ○ | ☉ |   |   |  |
|   |   |   |   |   | ☉ | ☉ | ○ | ○ | ☉ |   |   |  |

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\* nicht für eisenhaltige Werkstoffe

| SCHAFTFRÄSER Z=3                      |  | Z | Seite | Schruppen<br>Schichten                            |  |  |  |  |  |  |  |    |
|---------------------------------------|--|---|-------|---|--|--|--|--|--|--|--|----|
| <b>DIXI 7243</b><br>Ø0.35 - Ø20.00    |  | 3 | 128   | Schruppen<br>●●●●●<br>Schichten<br>●●●●●<br>●●●●● |  |  |  |  |  |  |  |    |
| <b>DIXI 7343</b><br>Ø0.30 - Ø16.00    |  | 3 | 129   | Schruppen<br>●●●●●<br>Schichten<br>●●●●●          |  |  |  |  |  |  |  |    |
| <b>DIXI 7343-5D</b><br>Ø0.30 - Ø12.00 |  | 3 | 130   | Schruppen<br>●●●●●<br>Schichten<br>●●●●●          |  |  |  |  |  |  |  |    |
| <b>DIXI 7203</b><br>Ø2.00 - Ø20.00    |  | 3 | 131   | Schruppen<br>●●●●●<br>Schichten<br>●●●●●          |  |  |  |  |  |  |  |    |
| <b>DIXI 7223</b><br>Ø3.00 - Ø12.00    |  | 3 | 132   | Schruppen<br>●●●●●<br>Schichten<br>●●●●●          |  |  |  |  |  |  |  | ✓* |
| <b>DIXI 7333</b><br>Ø0.30 - Ø10.00    |  | 3 | 133   | Schruppen<br>●●●●●<br>Schichten<br>●●●●●          |  |  |  |  |  |  |  |    |
| <b>DIXI 7333-3D</b><br>Ø0.30 - Ø4.00  |  | 3 | 134   | Schruppen<br>●●●●●<br>Schichten<br>●●●●●          |  |  |  |  |  |  |  |    |
| <b>DIXI 7333-5D</b><br>Ø0.30 - Ø3.00  |  | 3 | 134   | Schruppen<br>●●●●●<br>Schichten<br>●●●●●          |  |  |  |  |  |  |  |    |
| <b>DIXI 7333-8D</b><br>Ø0.30 - Ø3.00  |  | 3 | 134   | Schruppen<br>●●●●●<br>Schichten<br>●●●●●          |  |  |  |  |  |  |  |    |
| <b>DIXI 7543</b><br>Ø1.00 - Ø12.00    |  | 3 | 136   | Schruppen<br>●●●●●<br>Schichten<br>●●●●●          |  |  |  |  |  |  |  |    |
| <b>DIXI 7583</b><br>Ø0.30 - Ø6.00     |  | 3 | 137   | Schruppen<br>●●●●●<br>Schichten<br>●●●●●          |  |  |  |  |  |  |  | ✓* |
| <b>DIXI 7253</b><br>Ø3.00 - Ø16.00    |  | 3 | 138   | Schruppen<br>●●●●●<br>Schichten<br>●●●●●          |  |  |  |  |  |  |  |    |
| <b>DIXI 7563</b><br>Ø4.00 - Ø20.00    |  | 3 | 139   | Schruppen<br>●●●●●<br>Schichten<br>●●●●●          |  |  |  |  |  |  |  |    |



| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |

| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|

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| ☉ | ○ | ○ | ○ | ☉ | ○ | ○ | ☉ | ○ | ○ | ○ | ○ |  |
| ☉ | ☉ | ☉ | ☉ | ○ | ○ | ○ | ☉ |   | ☉ | ☉ | ☉ |  |
| ☉ | ☉ | ☉ | ☉ | ○ | ○ | ○ | ☉ |   | ☉ | ☉ | ☉ |  |
| ☉ | ○ | ○ | ○ | ☉ | ○ | ○ | ☉ | ○ | ○ |   | ○ |  |
| ○ | ○ | ○ | ○ | ☉ | ○ | ○ | ☉ | ○ | ○ |   | ○ |  |
| ☉ | ☉ | ☉ | ☉ | ○ | ○ | ○ | ☉ |   | ☉ | ○ | ☉ |  |
| ☉ | ☉ | ☉ | ☉ | ○ | ○ | ○ | ☉ |   | ☉ | ○ | ☉ |  |
| ☉ | ☉ | ☉ | ☉ | ○ | ○ | ○ | ☉ |   | ☉ | ○ | ☉ |  |
| ☉ | ○ | ○ | ☉ |   |   |   |   |   |   |   | ☉ |  |
| ○ | ○ | ○ | ○ | ○ | ☉ | ☉ | ☉ | ○ | ☉ |   | ○ |  |
| ☉ | ☉ | ☉ | ☉ | ☉ |   |   |   |   |   | ☉ | ☉ |  |
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\* nicht für eisenhaltige Werkstoffe

| SCHAFTFRÄSER Z=3                      |  | Z | Seite | Schruppen<br>Schichten                   |  | VHM<br><input type="checkbox"/> | TAIN<br><input checked="" type="checkbox"/> | CUTINOX<br><input checked="" type="checkbox"/> | DIXAL<br><input checked="" type="checkbox"/> | DIAMANT*<br><input type="checkbox"/> |
|---------------------------------------|--|---|-------|--|--|---------------------------------|---|--|--|--------------------------------------|
| <b>DIXI 7563-FC</b><br>Ø6.00 - Ø20.00 |  | 3 | 139   | Schruppen<br>●●●●○<br>Schichten<br>●●●●● |  |                                 |   |  | ✓  |                                      |
| <b>DIXI 7273</b><br>Ø3.00 - Ø16.00    |  | 3 | 140   | Schruppen<br>●●●●○<br>Schichten<br>●●●●● |  | ✓                               | ✓   |  |  |                                      |
| <b>DIXI 7323</b><br>Ø3.00 - Ø12.00    |  | 3 | 141   | Schruppen<br>●●●●●<br>Schichten<br>●●●●○ |  | ✓                               |   |  |  |                                      |
| <b>DIXI 7593</b><br>Ø6.00 - Ø20.00    |  | 3 | 142   | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | ✓                               |   |  |  |                                      |

# SCHAFTFRÄSER Z=4

|                                       |  |   |     |  |  |   |   |   |  |    |
|---------------------------------------|--|---|-----|--|--|---|---|---|--|----|
| <b>DIXI 7244</b><br>Ø0.40 - Ø20.00    |  | 4 | 143 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | ✓ | ✓ |   |  | ✓* |
| <b>DIXI 7204</b><br>Ø2.00 - Ø6.00     |  | 4 | 144 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | ✓ | ✓ |   |  |    |
| <b>DIXI 7224</b><br>Ø3.00 - Ø20.00    |  | 4 | 145 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | ✓ | ✓ |   |  | ✓* |
| <b>DIXI 7264</b><br>Ø1.50 - Ø20.00    |  | 4 | 146 | Schruppen<br>●●●●○<br>Schichten<br>●●●●● |  |   |   | ✓ |  |    |
| <b>DIXI 7264-3D</b><br>Ø6.00 - Ø20.00 |  | 4 | 146 | Schruppen<br>●●●●○<br>Schichten<br>●●●●● |  |   |   | ✓ |  |    |
| <b>DIXI 7254</b><br>Ø3.00 - Ø12.00    |  | 4 | 147 | Schruppen<br>●●●●●<br>Schichten<br>●●●●○ |  |   |   | ✓ |  |    |

| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |

|              |                    |                |                        |           |               |              |                           |                                  |             |                    |                |                          |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|

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|---|---|---|---|---|---|---|---|---|---|--|---|--|
|   |   |   |   |   | ☉ | ☉ | ☉ |   | ☉ |  |   |  |
| ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ |  | ☉ |  |
|   |   |   |   |   |   |   |   | ☉ |   |  |   |  |
|   |   |   |   |   | ☉ | ☉ |   |   |   |  |   |  |

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|---|---|---|---|---|---|---|---|---|---|---|---|--|
| ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ |   | ☉ |  |
| ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ |   | ☉ |  |
| ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ |   | ☉ |  |
| ☉ | ☉ | ☉ | ☉ | ☉ |   |   |   |   |   | ☉ | ☉ |  |
| ☉ | ☉ | ☉ | ☉ | ☉ |   |   |   |   |   | ☉ | ☉ |  |
| ☉ | ☉ | ☉ | ☉ | ☉ |   |   |   |   |   | ☉ | ☉ |  |

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| MULTIZAHN-FRÄSER                    |  | Z    | Seite | Schruppen<br>Schichten                   |  |  |  |   |  |  |    |
|-------------------------------------|--|------|-------|--|--|--|--|---|--|--|----|
| <b>DIXI 7560</b><br>Ø3.35 - Ø20.00  |  | 3-8  | 148   | Schruppen<br>●●●●●<br>Schichten<br>●●●●● |  |  |  |   |  |  | ✓* |
| <b>DIXI 7520</b><br>Ø0.40 - Ø16.00  |  | 3-10 | 149   | Schruppen<br>●●●●●<br>Schichten<br>●●●●● |  |  |  | ✓ |  |  |    |
| <b>DIXI 7800</b><br>Ø12.00 - Ø35.00 |  | 4-6  | 150   | Schruppen<br>●●●●●<br>Schichten<br>●●●●● |  |  |  |   |  |  |    |

| SCHRUPPFÄSER                          |  | Z   | Seite | Schruppen<br>Schichten                   |  |  |   |  |   |   |  |
|---------------------------------------|--|-----|-------|--|--|--|---|--|---|---|--|
| <b>DIXI 7210</b><br>Ø3.00 - Ø12.00    |  | 3   | 151   | Schruppen<br>●●●●●<br>Schichten<br>○○○○○ |  |  |   |  | ✓ |   |  |
| <b>DIXI 7213</b><br>Ø4.00 - Ø20.00    |  | 3   | 152   | Schruppen<br>●●●●●<br>Schichten<br>○○○○○ |  |  |   |  |   |   |  |
| <b>DIXI 7214</b><br>Ø6.00 - Ø20.00    |  | 4   | 153   | Schruppen<br>●●●●●<br>Schichten<br>○○○○○ |  |  |   |  |   |   |  |
| <b>DIXI 7215</b><br>Ø6.00 - Ø16.00    |  | 3   | 154   | Schruppen<br>●●●●●<br>Schichten<br>○○○○○ |  |  |   |  |   | ✓ |  |
| <b>DIXI 7215-FC</b><br>Ø6.00 - Ø16.00 |  | 3   | 154   | Schruppen<br>●●●●●<br>Schichten<br>○○○○○ |  |  |   |  |   | ✓ |  |
| <b>DIXI 7217</b><br>Ø6.00 - Ø12.00    |  | 4   | 155   | Schruppen<br>●●●●●<br>Schichten<br>○○○○○ |  |  |   |  |   |   |  |
| <b>DIXI 7220</b><br>Ø3.00 - Ø16.00    |  | 3-4 | 156   | Schruppen<br>●●●●●<br>Schichten<br>●●○○○ |  |  | ✓ |  |   |   |  |
| <b>DIXI 7220-3D</b><br>Ø3.00 - Ø8.00  |  | 3-4 | 156   | Schruppen<br>●●●●●<br>Schichten<br>●●○○○ |  |  | ✓ |  |   |   |  |

| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |

| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
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|---|---|---|---|---|--|--|---|---|---|---|---|---|
| ☉ | ☉ | ○ | ○ | ☉ |  |  | ☉ |   | ☉ | ○ | ○ |   |
|   |   | ○ |   |   |  |  |   |   |   | ○ |   | ☉ |
|   |   |   |   |   |  |  |   | ☉ |   |   |   |   |

|   |   |   |   |   |   |   |   |   |   |   |   |  |
|---|---|---|---|---|---|---|---|---|---|---|---|--|
| ☉ | ☉ | ○ | ☉ | ○ | ☉ | ○ | ☉ |   | ☉ | ○ | ○ |  |
| ☉ | ○ | ○ | ○ | ☉ | ○ | ○ | ○ |   | ○ |   | ○ |  |
| ☉ | ○ | ○ | ○ | ☉ | ○ | ○ | ○ |   | ○ |   | ○ |  |
|   |   |   |   |   | ☉ | ☉ | ☉ |   | ☉ |   |   |  |
|   |   |   |   |   | ☉ | ☉ | ☉ |   | ☉ |   |   |  |
|   |   |   |   |   |   |   |   | ☉ |   |   |   |  |
| ☉ | ☉ | ☉ | ☉ | ○ |   |   | ○ |   | ☉ | ☉ | ☉ |  |
| ☉ | ☉ | ☉ | ☉ | ○ |   |   | ○ |   | ☉ | ☉ | ☉ |  |

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| FRÄSER TECHNOLOGIE COOL+®                   |  | Z | Seite | Schruppen<br>Schichten                   |  |  |   |  |  |  |
|---|--|---|-------|--|--|--|---|--|--|--|
| <b>DIXI 7442 COOL+</b><br>Ø0.30 - Ø5.00     |  | 2 | 157   | Schruppen<br>●●●●●<br>Schichten<br>●●●●● |  |  | ✓ |  |  |  |
| <b>DIXI 7443 COOL+</b><br>Ø0.30 - Ø10.00    |  | 3 | 158   | Schruppen<br>●●●●●<br>Schichten<br>●●●●● |  |  | ✓ |  |  |  |
| <b>DIXI 7443-5D COOL+</b><br>Ø0.30 - Ø10.00 |  | 3 | 159   | Schruppen<br>●●●●●<br>Schichten<br>●●●●● |  |  | ✓ |  |  |  |
| <b>DIXI 7453 COOL+</b><br>Ø0.40 - Ø10.00    |  | 3 | 160   | Schruppen<br>●●●●●<br>Schichten<br>●●●●● |  |  | ✓ |  |  |  |

HPC-FRÄSER

|                                    |  |   |     |  |  |  |  |  |  |   |
|------------------------------------|--|---|-----|--|--|--|--|--|--|---|
| <b>DIXI 7702</b><br>Ø0.50 - Ø12.00 |  | 2 | 161 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  |  |  |  |  | ✓ |
|------------------------------------|--|---|-----|--|--|--|--|--|--|---|

TORISCHE FRÄSER

|                                      |  |     |     |  |  |   |   |   |   |   |
|--------------------------------------|--|-----|-----|--|--|---|---|---|---|---|
| <b>DIXI 7250-3D</b><br>Ø0.40 - Ø3.00 |  | 2   | 162 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | ✓ | ✓ |   |   |   |
| <b>DIXI 7353</b><br>Ø0.40 - Ø12.00   |  | 3   | 164 | Schruppen<br>●●●●●<br>Schichten<br>●●●●○ |  | ✓ |   | ✓ |   |   |
| <b>DIXI 7070</b><br>Ø3.00 - Ø12.00   |  | 4-6 | 165 | Schruppen<br>●●●●○<br>Schichten<br>●●●●● |  |   |   |   |   | ✓ |
| <b>DIXI 7265</b><br>Ø2.00 - Ø12.00   |  | 4   | 166 | Schruppen<br>●●●●○<br>Schichten<br>●●●●● |  |   |   |   |   | ✓ |
| <b>DIXI 7554</b><br>Ø2.00 - Ø12.00   |  | 4   | 167 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | ✓ | ✓ |   |   |   |
| <b>DIXI 7552</b><br>Ø3.00 - Ø16.00   |  | 2   | 168 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | ✓ |   |   | ✓ |   |

| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |

| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|

|   |   |   |   |   |  |  |   |  |   |   |   |  |
|---|---|---|---|---|--|--|---|--|---|---|---|--|
| ⊙ | ⊙ | ⊙ | ⊙ | ○ |  |  | ⊙ |  | ⊙ | ⊙ | ⊙ |  |
| ⊙ | ⊙ | ⊙ | ⊙ | ○ |  |  | ⊙ |  | ⊙ | ⊙ | ⊙ |  |
| ⊙ | ⊙ | ⊙ | ⊙ | ○ |  |  | ⊙ |  | ⊙ | ⊙ | ⊙ |  |
| ⊙ | ⊙ | ⊙ | ⊙ | ○ |  |  | ⊙ |  | ⊙ | ⊙ | ⊙ |  |

|   |   |   |   |   |   |   |   |  |   |   |   |   |
|---|---|---|---|---|---|---|---|--|---|---|---|---|
| ⊙ | ⊙ | ⊙ | ⊙ | ⊙ | ○ | ○ | ⊙ |  | ○ | ⊙ | ⊙ | ⊙ |
|---|---|---|---|---|---|---|---|--|---|---|---|---|

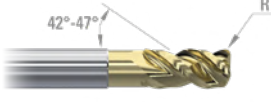
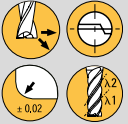
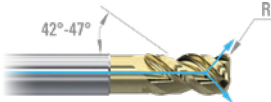
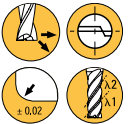
|   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ⊙ | ○ | ○ | ⊙ | ○ | ○ |   | ○ |   |
| ⊙ | ⊙ | ⊙ | ⊙ | ○ |   |   | ⊙ |   | ⊙ | ⊙ | ⊙ |   |
|   |   | ○ |   |   |   |   |   |   |   | ○ | ⊙ | ⊙ |
| ⊙ | ⊙ | ⊙ | ⊙ | ⊙ |   |   |   |   |   | ⊙ | ⊙ |   |
| ⊙ | ○ | ○ | ○ | ⊙ | ○ | ○ | ○ | ○ | ○ |   | ⊙ |   |
|   |   |   |   |   | ⊙ | ⊙ | ⊙ |   | ○ |   | ⊙ |   |

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# ÜBERSICHT FRÄSER

✓ = Artikel ab Lager

\* nicht für eisenhaltige Werkstoffe

| TORISCHE FRÄSER                       |   | Z | Seite | Schruppen<br>Schichten                   |  | VHM | TiAIN | C-TOP | DICUT | DIXAL | DIAMANT* |
|---------------------------------------|---|---|-------|--|--|-----|-------|-------|-------|-------|----------|
| <b>DIXI 7565</b><br>Ø4.00 - Ø20.00    |  | 3 | 169   | Schruppen<br>●●●●○<br>Schichten<br>●●●●● |  |     |       |       |       | ✓     |          |
| <b>DIXI 7565-FC</b><br>Ø6.00 - Ø20.00 |  | 3 | 169   | Schruppen<br>●●●●○<br>Schichten<br>●●●●● |  |     |       |       |       | ✓     |          |

# STIRNRADIUSFRÄSER

|  |   |   |     |  |  |   |   |  |   |  |    |
|--|---|---|-----|--|--|---|---|--|---|--|----|
| <b>DIXI 7032</b><br>Ø0.06 - Ø16.00     |    | 2 | 170 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |    | ✓ | ✓ |  | ✓ |  | ✓* |
| <b>DIXI 7042</b><br>Ø2.00 - Ø20.00     |    | 2 | 172 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |   | ✓ | ✓ |  |   |  | ✓* |
| <b>DIXI 7046</b><br>Ø0.20 - Ø12.00     |  | 2 | 173 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | ✓ | ✓ |  | ✓ |  | ✓* |
| <b>DIXI 7045</b><br>Ø0.20 - Ø12.00     |  | 2 | 174 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | ✓ | ✓ |  | ✓ |  | ✓* |
| <b>DIXI 7047-8D</b><br>Ø0.20 - Ø12.00  |  | 2 | 174 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | ✓ | ✓ |  | ✓ |  | ✓* |
| <b>DIXI 7047-10D</b><br>Ø0.20 - Ø12.00 |  | 2 | 174 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | ✓ | ✓ |  | ✓ |  | ✓* |
| <b>DIXI 7047-12D</b><br>Ø0.20 - Ø5.00  |  | 2 | 174 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | ✓ | ✓ |  | ✓ |  | ✓* |
| <b>DIXI 7047-15D</b><br>Ø0.20 - Ø4.00  |  | 2 | 174 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | ✓ | ✓ |  | ✓ |  | ✓* |
| <b>DIXI 7047-18D</b><br>Ø0.20 - Ø3.00  |  | 2 | 174 | Schruppen<br>●●●●○<br>Schichten<br>●●●●○ |  | ✓ | ✓ |  | ✓ |  | ✓* |



| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |

|              |                    |                |                        |           |               |              |                           |                                  |             |                    |                |                          |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|

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|--|--|--|--|--|---|---|---|--|---|--|--|--|
|  |  |  |  |  | ☉ | ☉ | ○ |  | ○ |  |  |  |
|  |  |  |  |  | ☉ | ☉ | ○ |  | ○ |  |  |  |

|   |   |   |   |   |   |   |   |   |   |   |   |  |
|---|---|---|---|---|---|---|---|---|---|---|---|--|
| ☉ | ○ | ○ | ○ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ○ | ☉ |  |
| ☉ | ○ | ○ | ○ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ○ | ☉ |  |
| ☉ | ○ | ○ | ○ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ○ | ☉ |  |
| ☉ | ○ | ○ | ○ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ○ | ☉ |  |
| ☉ | ○ | ○ | ○ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ○ | ☉ |  |
| ☉ | ○ | ○ | ○ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ○ | ☉ |  |
| ☉ | ○ | ○ | ○ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ○ | ☉ |  |
| ☉ | ○ | ○ | ○ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ○ | ☉ |  |
| ☉ | ○ | ○ | ○ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ○ | ☉ |  |

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# ÜBERSICHT FRÄSER

✓ = Artikel ab Lager  
 \* nicht für eisenhaltige Werkstoffe

| STIRNRADIUSFRÄSER                     |  | Z | Seite | Schruppen<br>Schichten                   |  |   |   |  |
|---------------------------------------|--|---|-------|--|--|---|---|--|
| <b>DIXI 7532</b><br>Ø0.20 - Ø10.00    |  | 2 | 176   | Schruppen<br>●●●●●<br>Schichten<br>●●●●● |  |   | ✓ |  |
| <b>DIXI 7532-3D</b><br>Ø0.20 - Ø10.00 |  | 2 | 177   | Schruppen<br>●●●●●<br>Schichten<br>●●●●● |  |   | ✓ |  |
| <b>DIXI 7532-5D</b><br>Ø0.20 - Ø10.00 |  | 2 | 177   | Schruppen<br>●●●●●<br>Schichten<br>●●●●● |  |   | ✓ |  |
| <b>DIXI 7532-8D</b><br>Ø0.20 - Ø4.00  |  | 2 | 177   | Schruppen<br>●●●●●<br>Schichten<br>●●●●● |  |   | ✓ |  |
| <b>DIXI 7532-10D</b><br>Ø0.40 - Ø3.00 |  | 2 | 177   | Schruppen<br>●●●●●<br>Schichten<br>●●●●● |  |   | ✓ |  |
| <b>DIXI 7532-12D</b><br>Ø0.50 - Ø2.00 |  | 2 | 177   | Schruppen<br>●●●●●<br>Schichten<br>●●●●● |  |   | ✓ |  |
| <b>DIXI 7532-15D</b><br>Ø0.60 - Ø2.00 |  | 2 | 177   | Schruppen<br>●●●●●<br>Schichten<br>●●●●● |  |   | ✓ |  |
| <b>DIXI 7542</b><br>Ø1.00 - Ø12.00    |  | 2 | 178   | Schruppen<br>●●●●●<br>Schichten<br>●●●●● |  |   | ✓ |  |
| <b>DIXI 7033</b><br>Ø1.00 - Ø10.00    |  | 3 | 179   | Schruppen<br>●●●●●<br>Schichten<br>●●●●● |  | ✓ | ✓ |  |

## FRÄSER FÜR VERBUNDWERKSTOFFE / KEVLAR®

|                                    |  |   |     |  |  |   |  |    |
|------------------------------------|--|---|-----|--|--|---|--|----|
| <b>DIXI 7102</b><br>Ø6.00 - Ø12.00 |  | 2 | 180 | Schruppen<br>●●●●●<br>Schichten<br>●●●●● |  | ✓ |  | ✓* |
| <b>DIXI 7112</b><br>Ø5.00 - Ø12.70 |  | 2 | 181 | Schruppen<br>●●●●●<br>Schichten<br>●●●●● |  | ✓ |  |    |

| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |

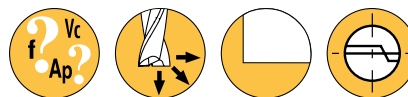
|              |                    |                |                        |           |               |              |                           |                                  |             |                    |                |                          |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|

|   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|   |   | ○ |   |   |   |   |   |   |   |   | ○ | ◎ |
|   |   | ○ |   |   |   |   |   |   |   |   | ○ | ◎ |
|   |   | ○ |   |   |   |   |   |   |   |   | ○ | ◎ |
|   |   | ○ |   |   |   |   |   |   |   |   | ○ | ◎ |
|   |   | ○ |   |   |   |   |   |   |   |   | ○ | ◎ |
|   |   | ○ |   |   |   |   |   |   |   |   | ○ | ◎ |
|   |   | ○ |   |   |   |   |   |   |   |   | ○ | ◎ |
|   |   | ○ |   |   |   |   |   |   |   |   | ○ | ◎ |
|   |   | ○ |   |   |   |   |   |   |   |   | ○ | ◎ |
|   |   | ○ |   |   |   |   |   |   |   |   | ○ | ◎ |
| ◎ | ○ | ○ | ○ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ◎ |

Kevlar®

|  |  |  |  |  |  |  |  |   |   |  |  |  |
|--|--|--|--|--|--|--|--|---|---|--|--|--|
|  |  |  |  |  |  |  |  | ◎ |   |  |  |  |
|  |  |  |  |  |  |  |  |   | ○ |  |  |  |

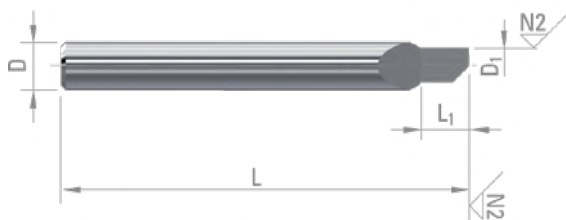
○ gut      ◎ ausgezeichnet



LANGLOCHFRÄSER, GERADE GENUTET

- Schaftfräser, gerade genutet, polierte Spanfläche und Hinterschnitt sowie gerade Stirnschneide. Entwickelt für die Grat und verformungsfreie Bearbeitung von gut zerspanbaren Werkstoffen.
- Eine typische Anwendung ist die Schlichtbearbeitung von Uhrenkomponenten.

Schuppen ●●●○○ Schichten ●●●●○○○ ○ gut ⊙ ausgezeichnet



| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                    |      |      |      |          |    |                  |    |                    |    |

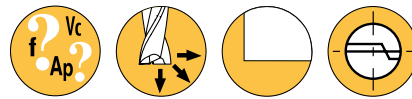
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ⊙            | ⊙       | ○          | ○    |                         |    |       | ○                        | ○  |                  |    |                  |    |

| D <sub>1 ± 0.01</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    |
|-----------------------|----------------|-----------------|----|--------|
| 0.50                  | 1.00           | 4               | 35 | 965456 |
| 0.60                  | 1.20           | 4               | 35 | 965457 |
| 0.70                  | 1.50           | 4               | 35 | 965458 |
| 0.80                  | 1.50           | 4               | 35 | 960645 |
| 0.90                  | 1.50           | 4               | 35 | 960646 |
| 1.00                  | 1.50           | 4               | 35 | 960647 |
| 1.00 >                | 2.50           | 4               | 35 | 964328 |
| 1.10                  | 2.00           | 4               | 35 | 960648 |
| 1.20                  | 2.00           | 4               | 35 | 960649 |
| 1.30                  | 2.00           | 4               | 35 | 960650 |
| 1.40                  | 2.00           | 4               | 35 | 960651 |
| 1.50                  | 2.00           | 4               | 35 | 960652 |
| 1.60                  | 2.00           | 4               | 35 | 960653 |
| 1.70                  | 2.50           | 4               | 35 | 960654 |
| 1.80                  | 2.50           | 4               | 35 | 960655 |
| 1.90                  | 2.50           | 4               | 35 | 960656 |
| 2.00                  | 2.50           | 4               | 35 | 960657 |
| 2.50                  | 3.00           | 4               | 35 | 960658 |
| 3.00                  | 3.50           | 4               | 42 | 960659 |
| 3.50                  | 4.00           | 4               | 42 | 960660 |
| 4.00                  | 5.00           | 4               | 42 | 960661 |
| 4.50                  | 6.00           | 6               | 50 | 960662 |
| 5.00                  | 7.00           | 6               | 50 | 960663 |
| 6.00                  | 7.00           | 8               | 50 | 960664 |



DIXI 7063

Z = 1



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3/4 EINZAHNFRÄSER

- Schafffräser, gerade genutet, polierte Spanfläche und Hinterschnitt und gerader Stirnschneide. Verstärkte Geometrie für bessere Stabilität und höhere Rundlaufgenauigkeit. Entwickelt für die Grat und verformungsfreie Bearbeitung von gut zerspanbaren Werkstoffen.
- Eine typische Anwendung ist die Schlichtbearbeitung von Uhrenkomponenten.

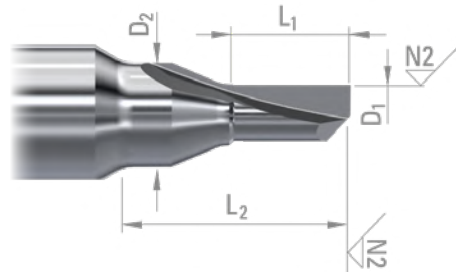
Schuppen ●●●●○ Schlichten ●●●●●○ gut ⊙ ausgezeichnet



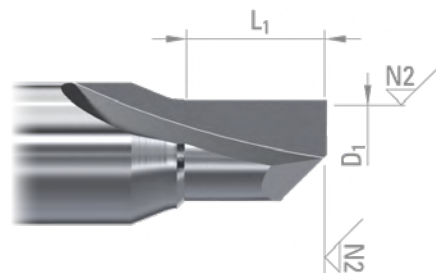
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ |                   |   |   |   |                |                  |    |    |      |                                      |      |          |    |                  |    |                    |    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |  |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ⊙            | ⊙       | ○          | ○    |                         |    |       |                          |    | ○                | ○  |                  |    |  |  |

| $D_{1 \pm 0.01}$ | $L_1$ | $D_2$ | $L_2$ | $D_{h5}$ | L  | VHM    |
|------------------|-------|-------|-------|----------|----|--------|
| 0.40             | 0.80  | 1.50  | 4.60  | 4        | 35 | 987593 |
| 0.50             | 1.00  | 1.50  | 4.60  | 4        | 35 | 983250 |
| 0.60             | 1.20  | 1.50  | 4.60  | 4        | 35 | 987594 |
| 0.70             | 1.50  | 1.50  | 4.60  | 4        | 35 | 987595 |
| 0.80             | 1.50  | 1.50  | 4.60  | 4        | 35 | 987596 |
| 0.90             | 1.50  | 2.00  | 5.10  | 4        | 35 | 987581 |
| 1.00             | 1.50  | 2.00  | 5.10  | 4        | 35 | 983251 |
| 1.00 >           | 2.50  | 2.00  | 5.10  | 4        | 35 | 987582 |
| 1.10             | 2.50  | 2.00  | 6.00  | 4        | 35 | 987597 |
| 1.20             | 2.50  | 2.00  | 6.00  | 4        | 35 | 987598 |
| 1.30             | 2.50  | 3.00  | 6.00  | 4        | 35 | 987599 |
| 1.40             | 2.50  | 3.00  | 6.00  | 4        | 35 | 987583 |
| 1.50             | 2.50  | 3.00  | 6.00  | 4        | 35 | 983252 |
| 1.50 >           | 3.50  | 3.00  | 6.50  | 4        | 35 | 987600 |
| 1.60             | 3.50  | 3.00  | 6.50  | 4        | 35 | 987585 |
| 1.70             | 3.50  | 3.00  | 6.50  | 4        | 35 | 987586 |



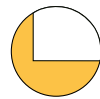
| $D_{1 \pm 0.01}$ | $L_1$ | $D_{h5}$ | L  | VHM    |
|------------------|-------|----------|----|--------|
| 1.80             | 3.50  | 4        | 35 | 987601 |
| 1.90             | 3.50  | 4        | 35 | 987602 |
| 2.00             | 4.00  | 4        | 35 | 983253 |
| 2.20             | 4.00  | 4        | 35 | 987603 |
| 2.50             | 4.00  | 4        | 35 | 987604 |
| 2.80             | 4.00  | 4        | 35 | 987605 |
| 3.00             | 4.00  | 4        | 35 | 983254 |
| 4.00             | 5.00  | 4        | 35 | 987584 |





**DIXI 7232**

**Z = 2**



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**LANGLOCHFRÄSER, GERADE GENUTET**



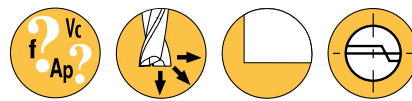
- Schaftfräser, gerade genutet, Werkzeuge, für die Bearbeitung von dünnen, schwingungsanfälligen Werkstücken mit geringer Härte entwickelt.

Schuppen ●●●●○ Schichten ●●●●○ gut ○ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                    |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ○                       | ○  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ○          | ○    |                         |    |       |                          |    |    |                  |    |                  |  |

| $D_{1e8}$ | $L_1$ | $D_{h5}$ | L  | VHM   |
|-----------|-------|----------|----|-------|
| 2         | 6     | 2        | 38 | 42540 |
| 3         | 7     | 3        | 38 | 42541 |
| 4         | 8     | 4        | 50 | 42542 |
| 6         | 10    | 6        | 57 | 42543 |
| 8         | 16    | 8        | 63 | 42544 |



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LANGLOCHFRÄSER, GERADE GENUTET



- Schafffräser, gerade Zähne, polierte Schnittfläche und Hinterschneidungen.
- Werkzeuge für die grat- und verformungsfreie Bearbeitung von gut zerspanbaren Werkstoffen. Eine typische Anwendung, die Endbearbeitung von Uhrenkomponenten.

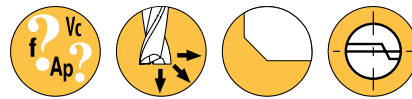
Schuppen ●●●●○ Schichten ●●●●●○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |  |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|--|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |    |  |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |  |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ |                   |   |   |   |                |                  |    |    |      |                                      |      |          |    |                  |    |                    |    |    |  |

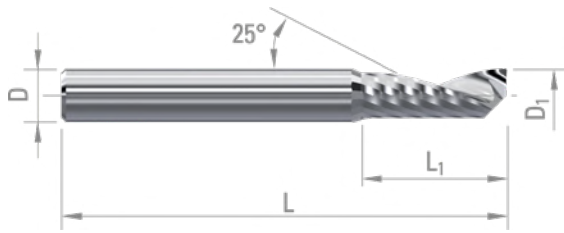
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen           | ○                       | ○  |                         |    |    | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ○          | ○    |                         |    |       | ○                        | ○  |                  |    |                  |    |  |

D<sub>1</sub>      L<sub>1</sub>      D<sub>h5</sub>      L      VHM  
 Ø < 2.00 - 0/-0.01  
 Ø ≥ 2.00 - 0/-0.02  
 D1 = D - e8

|      |      |   |    |        |
|------|------|---|----|--------|
| 0.50 | 1.50 | 3 | 38 | 378215 |
| 0.60 | 1.80 | 3 | 38 | 378216 |
| 0.70 | 2.10 | 3 | 38 | 378217 |
| 0.80 | 2.40 | 3 | 38 | 378218 |
| 0.90 | 2.70 | 3 | 38 | 378219 |
| 1.00 | 3.00 | 3 | 38 | 378220 |
| 1.10 | 3.00 | 3 | 38 | 378221 |
| 1.20 | 3.00 | 3 | 38 | 378222 |
| 1.30 | 3.00 | 3 | 38 | 378223 |
| 1.40 | 3.00 | 3 | 38 | 378224 |
| 1.50 | 4.00 | 3 | 38 | 378225 |
| 1.60 | 4.00 | 3 | 38 | 378226 |
| 1.70 | 4.00 | 3 | 38 | 378227 |
| 1.80 | 4.00 | 3 | 38 | 378228 |
| 1.90 | 4.00 | 3 | 38 | 378229 |
| 2.00 | 5.00 | 3 | 38 | 378230 |
| 3.00 | 6.00 | 4 | 38 | 378231 |
| 4.00 | 6.00 | 4 | 38 | 378232 |
| 5.00 | 8.00 | 6 | 51 | 378233 |
| 6.00 | 8.00 | 6 | 51 | 378234 |



**EINZAHNFRÄSER FÜR ALUMINIUM**



- Fräser, entwickelt für die Bearbeitung von Aluminiumprofilen und dünnen Platten.
- Die DLC-Beschichtung verbessert die Standzeit in NE-Metallen bei der Trocken- und Nassbearbeitung.

Schuppen ●●●●○ Schichten ●●●●○ gut ○ ausgezeichnet

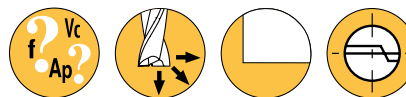
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLIX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                    |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ○                 | ○                      | ○  | ○            |         |            |      |                         |    |       |                          |    |    |                  |    |                  |  |

| D <sub>1 e8</sub> |            | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM   | DLC *  |
|-------------------|------------|----------------|-----------------|----|-------|--------|
| 2                 | 0.10 × 45° | 4              | 3               | 38 | 46560 | 971284 |
| 3                 | 0.15 × 45° | 6              | 3               | 38 | 46561 | 971285 |
| 4                 | 0.15 × 45° | 12             | 4               | 50 | 46562 | 971286 |
| 5                 | 0.15 × 45° | 14             | 5               | 50 | 46563 | 960345 |
| 6                 | 0.20 × 45° | 16             | 6               | 50 | 46564 | 967038 |
| 8                 | 0.20 × 45° | 20             | 8               | 60 | 46565 | 992675 |
| 10                | 0.20 × 45° | 22             | 10              | 70 | 46566 | 996345 |
| 12                | 0.20 × 45° | 25             | 12              | 70 | 46567 | 965525 |

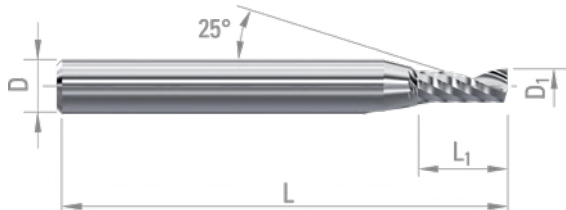
\* nicht für eisenhaltige Werkstoffe





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EINZAHNFRÄSER FÜR KUNSTSTOFF  
RECHTSSPIRALISIERT



- Schafffräser, mit rechtem Drallwinkel, polierte Spann- und Freiflächen.
- Einzahnfräser mit sehr scharfen Schneidkanten und hohem Spanfluss, empfohlen für bestes Oberflächenfinish in Kunststoff, Holz und HPL.

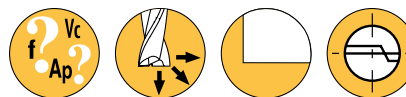
Schuppen ●●●●○ Schichten ●●●●○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |                  |    |    |      |                                      |      |          |    |                  |    |                    |    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         | ⊙          | ⊙    |                         |    |       |                          |    |                  |    |                  |    |

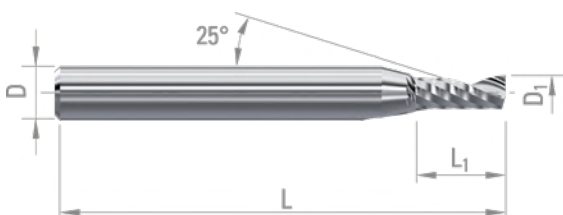
| D <sub>1e8</sub> | D <sub>h5</sub> | L <sub>1</sub> | L  | VHM    |
|------------------|-----------------|----------------|----|--------|
| 1.00             | 3.00            | 4              | 30 | 372568 |
|                  |                 | 4              | 38 | 372569 |
| 1.50             | 3.00            | 6              | 30 | 372570 |
|                  |                 | 6              | 38 | 372571 |
| 1.50             | 3.00            | 8              | 60 | 372572 |
| 2.00             | 2.00            | 8              | 30 | 372573 |
| 2.00             | 3.00            | 8              | 30 | 372574 |
|                  |                 | 8              | 38 | 372575 |
|                  |                 | 8              | 60 | 372576 |
| 2.00             | 4.00            | 8              | 60 | 372577 |
| 2.00             | 6.00            | 8              | 50 | 372578 |
| 2.50             | 2.50            | 8              | 38 | 372579 |
| 2.50             | 3.00            | 8              | 30 | 372580 |
|                  |                 | 8              | 38 | 372581 |
|                  |                 | 8              | 60 | 372582 |
| 3.00             | 3.00            | 8              | 60 | 372583 |
|                  |                 | 10             | 30 | 372584 |
|                  |                 | 10             | 38 | 372585 |
|                  |                 | 15             | 50 | 372586 |
| 3.00             | 4.00            | 8              | 60 | 372587 |
|                  |                 | 10             | 40 | 372588 |
|                  |                 | 15             | 50 | 372589 |
|                  |                 | 10             | 50 | 372590 |
|                  |                 | 10             | 60 | 372591 |
| 3.00             | 6.00            | 12             | 60 | 372592 |
|                  |                 | 20             | 60 | 372593 |
|                  |                 | 12             | 50 | 372594 |
| 3.50             | 3.50            | 12             | 50 | 372594 |
| 3.50             | 4.00            | 10             | 60 | 372595 |
|                  |                 | 12             | 50 | 372596 |
| 3.50             | 5.00            | 12             | 50 | 376933 |
| 4.00             | 4.00            | 8              | 50 | 376934 |
|                  |                 | 12             | 50 | 372597 |
|                  |                 | 12             | 60 | 372598 |
|                  |                 | 16             | 60 | 372599 |
|                  |                 | 22             | 60 | 372600 |
|                  |                 | 25             | 60 | 376935 |
|                  |                 | 30             | 70 | 372601 |

| D <sub>1e8</sub> | D <sub>h5</sub> | L <sub>1</sub> | L   | VHM    |
|------------------|-----------------|----------------|-----|--------|
| 4.00             | 6.00            | 12             | 50  | 372602 |
|                  |                 | 12             | 60  | 372603 |
|                  |                 | 12             | 80  | 372604 |
|                  |                 | 12             | 101 | 376936 |
| 4.00             | 6.00            | 21             | 60  | 372605 |
|                  |                 | 16             | 50  | 372606 |
|                  |                 | 16             | 60  | 372607 |
|                  |                 | 30             | 70  | 372608 |
| 5.00             | 5.00            | 12             | 60  | 376937 |
|                  |                 | 16             | 60  | 372609 |
|                  |                 | 20             | 60  | 372610 |
|                  |                 | 25             | 60  | 372611 |
| 5.00             | 8.00            | 25             | 80  | 372612 |
|                  |                 | 12             | 60  | 376938 |
| 6.00             | 6.00            | 20             | 50  | 372613 |
|                  |                 | 20             | 60  | 372614 |
|                  |                 | 24             | 70  | 372615 |
|                  |                 | 30             | 70  | 372616 |
|                  |                 | 38             | 80  | 372617 |
|                  |                 | 42             | 80  | 423984 |
| 6.00             | 8.00            | 20             | 80  | 372618 |
|                  |                 | 25             | 80  | 372619 |
|                  |                 | 30             | 80  | 372620 |
|                  |                 | 32             | 80  | 372621 |
|                  |                 | 38             | 80  | 372622 |
| 8.00             | 8.00            | 23             | 60  | 372623 |
|                  |                 | 25             | 80  | 372624 |
|                  |                 | 32             | 80  | 372625 |
|                  |                 | 33             | 80  | 372626 |
|                  |                 | 38             | 80  | 372627 |
| 8.00             | 10.00           | 33             | 75  | 423985 |
| 10.00            | 10.00           | 24             | 75  | 372628 |
|                  |                 | 30             | 75  | 372629 |
| 12.00            | 12.00           | 30             | 80  | 372630 |
|                  |                 | 51             | 100 | 372631 |



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EINZAHNFRÄSER FÜR KUNSTSTOFF  
RECHTSSPIRALISIERT



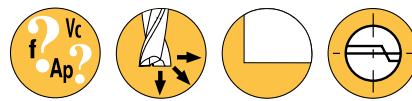
- Schafffräser, mit rechtem Drallwinkel, polierte Spannut und Freiflächen.
- Werkzeuge mit hoher Schärfe und hohem Spanfluss, empfohlen für feines Oberflächenfinish in Kunststoff, Holz und HPL. Verbesserte Oberflächengüte durch verstärkte Geometrie.

Schuppen ●●●●○ Schichten ●●●●○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |    | M                |      |      |                                    | K    |    |    |          |    |                  |    |                    |  |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|----|------------------|------|------|------------------------------------|------|----|----|----------|----|------------------|----|--------------------|--|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    |    | Rostfreier Stahl |      |      | Aust. Rostfreier Stahl (DUPLEX/PH) |      |    |    | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |  |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12 | 13               | 14.1 | 14.2 | 14.3                               | 14.4 | 15 | 16 | 17       | 18 | 19               | 20 |                    |  |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |    |                  |      |      |                                    |      |    |    |          |    |                  |    |                    |  |

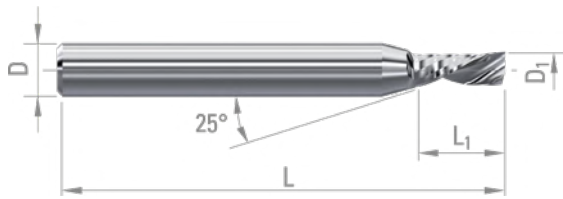
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         | ⊙          | ⊙    |                         |    |       |                          |    |    |                  |    |                  |  |

| D <sub>1e8</sub> | L <sub>1</sub> | D <sub>h5</sub> | L   | VHM    |
|------------------|----------------|-----------------|-----|--------|
| 2                | 8              | 3               | 30  | 414392 |
| 2                | 6              | 6               | 50  | 414393 |
| 3                | 9              | 3               | 30  | 414394 |
| 3                | 9              | 6               | 50  | 414395 |
| 4                | 13             | 4               | 50  | 414396 |
| 4                | 13             | 6               | 50  | 414397 |
| 5                | 16             | 5               | 60  | 414398 |
| 5                | 16             | 6               | 50  | 414399 |
| 6                | 16             | 6               | 50  | 414400 |
| 6                | 22             | 6               | 60  | 414401 |
| 6                | 32             | 6               | 70  | 414402 |
| 8                | 12             | 8               | 60  | 414403 |
| 8                | 22             | 8               | 60  | 414404 |
| 8                | 32             | 8               | 80  | 414405 |
| 10               | 23             | 10              | 60  | 414406 |
| 10               | 32             | 10              | 75  | 414407 |
| 12               | 42             | 12              | 100 | 414408 |



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EINZAHNFRÄSER FÜR KUNSTSTOFF  
RECHTSSCHNEIDEND, LINKS SPIRALISIERT



- Schafffräser, mit linkem Drallwinkel, polierte Spann- und Freiflächen.
- Einzahnfräser mit sehr scharfen Schneidkanten und hohem Spanfluss, empfohlen für bestes Oberflächenfinish in Kunststoff, Holz und HPL. Der Linksdrall reduziert die Gratbildung an der Oberfläche. Sehr gut geeignet für reduzierte Spankräfte am Werkstück (Vakuumplatte)

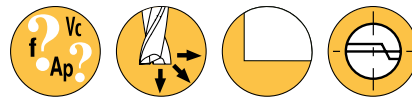
Schuppen ●●●●● Schichten ●●●●● gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |                                      |    | M    |      |          |                  | K  |                    |    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|--------------------------------------|----|------|------|----------|------------------|----|--------------------|----|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl | Aust. Rostfreier Stahl (DUPLEX / PH) |    |      |      | Grauguss | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12                                   | 13 | 14.1 | 14.2 | 14.3     | 14.4             | 15 | 16                 | 17 | 18 | 19 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |                  |                                      |    |      |      |          |                  |    |                    |    |    |    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |                  |    |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|------------------|----|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl | Hartes Gusseisen |    |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39               | 40 | 41 |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         |            | ⊙    | ⊙                       |    |       |                          |    |                  |                  |    |    |

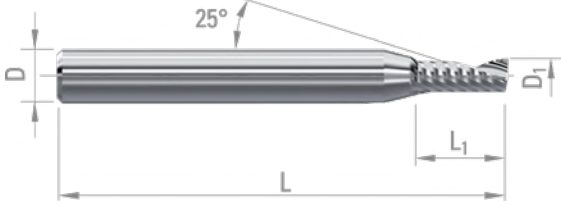
| D <sub>1e8</sub> | D <sub>h5</sub> | L <sub>1</sub> | L  | VHM    |
|------------------|-----------------|----------------|----|--------|
| 1.00             | 3.00            | 4              | 30 | 379705 |
|                  |                 | 4              | 38 | 372632 |
| 1.50             | 3.00            | 6              | 30 | 379706 |
|                  |                 | 6              | 38 | 372633 |
| 1.50             | 3.00            | 8              | 60 | 372634 |
| 2.00             | 2.00            | 8              | 30 | 372635 |
|                  |                 | 8              | 30 | 379707 |
| 2.00             | 3.00            | 8              | 38 | 372636 |
|                  |                 | 8              | 60 | 372637 |
| 2.00             | 4.00            | 8              | 60 | 379708 |
| 2.00             | 6.00            | 8              | 50 | 379709 |
| 2.50             | 2.50            | 8              | 38 | 379710 |
|                  |                 | 8              | 30 | 379711 |
| 2.50             | 3.00            | 8              | 38 | 372639 |
|                  |                 | 8              | 60 | 372640 |
|                  |                 | 8              | 60 | 372641 |
| 3.00             | 3.00            | 10             | 30 | 379712 |
|                  |                 | 10             | 38 | 372642 |
|                  |                 | 15             | 50 | 372643 |
|                  |                 | 8              | 60 | 372644 |
| 3.00             | 4.00            | 10             | 40 | 372645 |
|                  |                 | 15             | 50 | 372646 |
|                  |                 | 10             | 50 | 372647 |
| 3.00             | 6.00            | 10             | 60 | 372648 |
|                  |                 | 12             | 60 | 372649 |
|                  |                 | 20             | 60 | 372650 |
| 3.50             | 3.50            | 12             | 50 | 372651 |
| 3.50             | 4.00            | 10             | 60 | 372652 |
|                  |                 | 12             | 50 | 379713 |
| 3.50             | 5.00            | 12             | 50 | 379717 |
|                  |                 | 8              | 50 | 379718 |
|                  |                 | 12             | 50 | 372653 |
|                  |                 | 12             | 60 | 372654 |
| 4.00             | 4.00            | 16             | 60 | 372655 |
|                  |                 | 22             | 60 | 372656 |
|                  |                 | 25             | 60 | 379720 |
|                  |                 | 30             | 70 | 372657 |

| D <sub>1e8</sub> | D <sub>h5</sub> | L <sub>1</sub> | L   | VHM    |
|------------------|-----------------|----------------|-----|--------|
|                  |                 | 12             | 50  | 372658 |
|                  |                 | 12             | 60  | 372659 |
| 4.00             | 6.00            | 12             | 80  | 372660 |
|                  |                 | 12             | 101 | 379721 |
|                  |                 | 21             | 60  | 379723 |
|                  |                 | 16             | 50  | 379724 |
| 5.00             | 5.00            | 16             | 60  | 372661 |
|                  |                 | 30             | 70  | 372662 |
|                  |                 | 12             | 60  | 379726 |
| 5.00             | 6.00            | 16             | 60  | 372663 |
|                  |                 | 20             | 60  | 372664 |
|                  |                 | 25             | 60  | 379727 |
| 5.00             | 8.00            | 25             | 80  | 372665 |
|                  |                 | 12             | 60  | 379728 |
| 6.00             | 6.00            | 20             | 50  | 372666 |
|                  |                 | 20             | 60  | 372667 |
|                  |                 | 24             | 70  | 372668 |
|                  |                 | 30             | 70  | 372669 |
|                  |                 | 38             | 80  | 372670 |
|                  |                 | 20             | 80  | 372671 |
|                  |                 | 25             | 80  | 372672 |
| 6.00             | 8.00            | 30             | 80  | 372673 |
|                  |                 | 32             | 80  | 379729 |
|                  |                 | 38             | 80  | 379730 |
|                  |                 | 23             | 60  | 372674 |
|                  |                 | 25             | 80  | 372675 |
| 8.00             | 8.00            | 32             | 80  | 379731 |
|                  |                 | 33             | 80  | 372676 |
|                  |                 | 38             | 80  | 372677 |
| 10.00            | 10.00           | 24             | 75  | 372678 |
|                  |                 | 30             | 75  | 372679 |
| 12.00            | 12.00           | 30             | 80  | 372680 |
|                  |                 | 51             | 100 | 379732 |



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EINZAHNFRÄSER FÜR ALUMINIUM UND FASER-VERBUNDWERKSTOFFE (TYPE DIBOND)



- Schafffräser, mit rechtem Drallwinkel, polierte Spannut und Freiflächen.
- Werkzeuge mit hoher Schärfe und hohem Spanvolumen, empfohlen für hohe Oberflächengüte in Verbundwerkstoffen (Dibond).
- Die DLC-Beschichtung verbessert die Standzeiten in NE-Metallen bei der Trocken- oder Nassbearbeitung.

Schruppen ●●●●● Schlichten ●●●●● gut ⊙ ausgezeichnet

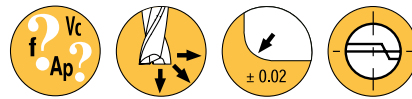
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                      |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ○                       | ○  | ○  |                   |                        |    |              |         | ○          |      |                         |    |       |                          |    |                  |    |                  |    |

| D <sub>1e8</sub> | D <sub>h5</sub> | L <sub>1</sub> | L      | VHM    | DLC*   |
|------------------|-----------------|----------------|--------|--------|--------|
| 1.00             | 3               | 3              | 30     | 372681 | 372719 |
|                  |                 | 3              | 38     | 372682 | 372720 |
| 1.50             | 3               | 4              | 30     | 372683 | 372721 |
|                  |                 | 4              | 38     | 372684 | 372722 |
| 2.00             | 3               | 5              | 30     | 372685 | 372723 |
|                  |                 | 5              | 38     | 372686 | 372724 |
| 2.00             | 6               | 5              | 38     | 372687 | 372725 |
| 2.50             | 3               | 6              | 30     | 372688 | 372726 |
|                  |                 | 6              | 38     | 372689 | 372727 |
| 3.00             | 3               | 5              | 38     | 372690 | 372728 |
|                  |                 | 8              | 30     | 372691 | 372729 |
|                  |                 | 8              | 38     | 372692 | 372730 |
| 3.00             | 4               | 8              | 40     | 372693 | 372731 |
|                  |                 | 6              | 5      |        | 414409 |
| 10               | 50              |                | 372694 | 372732 |        |
| 4.00             | 4               | 5              | 40     | 372695 | 372733 |
|                  |                 | 10             | 50     | 372696 | 372734 |
|                  |                 | 20             | 60     | 372697 | 372735 |
|                  |                 | 30             | 70     | 372698 | 372736 |
| 4.00             | 6               | 5              | 50     | 381024 | 381025 |
|                  |                 | 10             | 50     | 372699 | 372737 |
|                  |                 | 20             | 60     | 372700 | 372738 |
| 5.00             | 5               | 7              | 50     | 414410 | 414416 |
|                  |                 | 15             | 60     | 372701 | 372739 |
|                  |                 | 30             | 70     | 372702 | 372740 |
| 5.00             | 6               | 12             | 50     | 372703 | 372741 |
|                  |                 | 8              | 25     | 80     | 372704 |
| 6.00             | 6               |                | 9      | 50     | 414411 |
|                  |                 | 12             | 50     | 372705 | 372743 |
|                  |                 | 15             | 70     | 372706 | 372744 |
|                  |                 | 21             | 60     | 372707 | 372745 |
|                  |                 | 30             | 70     | 372708 | 372746 |
|                  |                 | 38             | 80     | 372709 | 372747 |

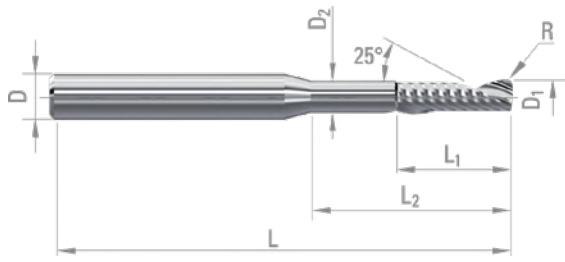
| D <sub>1e8</sub> | D <sub>h5</sub> | L <sub>1</sub> | L   | VHM    | DLC*   |
|------------------|-----------------|----------------|-----|--------|--------|
| 6.00             | 8               | 12             | 60  | 372710 | 372748 |
|                  |                 | 22             | 80  | 372711 | 372749 |
|                  |                 | 30             | 80  | 372712 | 372750 |
| 8.00             | 8               | 12             | 60  | 414412 | 414418 |
|                  |                 | 24             | 60  | 372713 | 372751 |
| 10.00            | 10              | 38             | 80  | 372714 | 372752 |
|                  |                 | 15             | 60  | 414413 | 414419 |
|                  |                 | 24             | 60  | 372715 | 372753 |
| 12.00            | 12              | 30             | 75  | 372716 | 372754 |
|                  |                 | 40             | 100 | 372717 | 372755 |
|                  |                 | 18             | 64  | 414414 | 414420 |
|                  |                 | 30             | 80  | 372718 | 372756 |
| 12.00            | 12              | 38             | 100 | 376944 | 376945 |

\* nicht für eisenhaltige Werkstoffe



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TORISCHER FRÄSER EINZAHN MIT HINTERSCHLIFF FÜR ALUMINIUMPROFILE



- Schafffräser, torisch, Drallwinkel rechts, polierte Spannutt, mit Hinterschliff.
- Werkzeug mit hoher Schnittleistung und hohem Spandurchsatz, empfohlen für hohe Oberflächengüten in Aluminiumprofilen.

Schuppen ●●●●●○ Schlichten ●●●●●○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |                  |    |    |      |                                      |      |          |    |                  |    |                    |    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      | S                       |    |       |                          |    | H                |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ○                       | ○  | ○  |                   |                        |    |              |         |            |      |                         |    |       |                          |    |                  |    |                  |    |

| D <sub>1 e8</sub> | L <sub>1</sub> | D <sub>2</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | R   | VHM    |
|-------------------|----------------|----------------|----------------|-----------------|----|-----|--------|
| 6                 | 20             | 5.6            | 35             | 8               | 80 | 1.5 | 372757 |
| 8                 | 22             | 7.6            | 50             | 10              | 90 | 1.5 | 372758 |



DIXI 7242

Z = 2



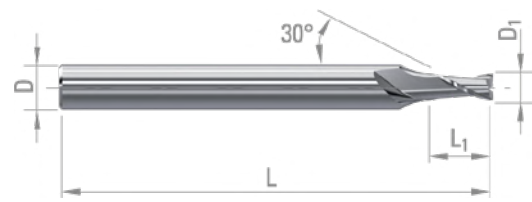
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D<sub>1</sub> > 6



SCHAFTFRÄSER  
VERSTÄRKTER SCHAFT



- Schaftfräser, verstärkter Schaft, für allgemeine Bearbeitungen.
- TiAIN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

Schuppen ●●●○○ Schichten ●●●○○○ ○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLIX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
|                        | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| VDI 3323               |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                      |      |      |      |          |    |                  |    |                    |    |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                      |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |              |         |            | S    |                         |    |    |                          |    | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|--------------|---------|------------|------|-------------------------|----|----|--------------------------|----|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |    | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
|                        | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28           | -       | -          | 29   | 30                      | 31 | 32 | 33-35                    | 36 | 37 | 38               | 39 | 40               | 41 |
| VDI 3323               |                         |    |                         |    |    |                   |                        |              |         |            |      |                         |    |    |                          |    |    |                  |    |                  |    |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊙                 | ○                      | ○            | ⊙       | ○          | ○    | ○                       | ○  | ○  | ○                        | ○  | ○  |                  |    |                  |    |

| D <sub>1</sub>   | L <sub>1</sub> | D <sub>h5</sub> | L | VHM | TiAIN |
|------------------|----------------|-----------------|---|-----|-------|
| Ø<2.00 - 0/-0.01 |                |                 |   |     |       |
| Ø<3.00 - 0/-0.02 |                |                 |   |     |       |
| Ø≥3.00 - e8      |                |                 |   |     |       |

| D <sub>1</sub>   | L <sub>1</sub> | D <sub>h5</sub> | L | VHM | TiAIN |
|------------------|----------------|-----------------|---|-----|-------|
| Ø<2.00 - 0/-0.01 |                |                 |   |     |       |
| Ø<3.00 - 0/-0.02 |                |                 |   |     |       |
| Ø≥3.00 - e8      |                |                 |   |     |       |

|      |      |   |    |        |        |
|------|------|---|----|--------|--------|
| 0.10 | 0.25 | 3 | 38 | 334534 |        |
| 0.15 | 0.30 | 3 | 38 | 52628  | 64920  |
| 0.20 | 0.40 | 3 | 38 | 45705  | 60021  |
| 0.25 | 0.60 | 3 | 38 | 47916  | 64921  |
| 0.30 | 0.60 | 3 | 38 | 42172  | 60121  |
|      | 1.00 |   |    | 48850  | 60122  |
| 0.35 | 0.80 | 3 | 38 | 47917  | 950699 |
| 0.40 | 0.80 | 3 | 38 | 42126  | 60123  |
|      | 2.00 |   |    | 48851  | 60124  |
| 0.45 | 1.00 | 3 | 38 | 47918  | 952421 |
| 0.50 | 1.00 | 3 | 38 | 35241  | 36230  |
|      | 2.50 |   |    | 48852  | 60125  |
| 0.55 | 1.20 | 3 | 38 | 47921  | 952422 |
| 0.60 | 1.20 | 3 | 38 | 35242  | 36231  |
|      | 3.00 |   |    | 48853  | 60126  |
| 0.65 | 1.40 | 3 | 38 | 47922  | 952423 |
| 0.70 | 1.40 | 3 | 38 | 35243  | 36232  |
|      | 3.50 |   |    | 48854  | 57162  |
| 0.75 | 1.60 | 3 | 38 | 47923  | 57163  |
| 0.80 | 1.60 | 3 | 38 | 35244  | 36233  |
|      | 4.00 |   |    | 48855  | 57164  |
| 0.85 | 1.80 | 3 | 38 | 47066  | 57165  |
| 0.90 | 1.80 | 3 | 38 | 35245  | 36234  |
|      | 4.50 |   |    | 48856  | 57166  |
| 0.95 | 2.00 | 3 | 38 | 42846  | 57167  |
| 1.00 | 2.00 | 3 | 38 | 35246  | 36235  |
|      | 5.00 |   |    | 42735  | 55950  |
| 1.05 | 2.20 | 3 | 38 | 47924  | 57168  |
| 1.10 | 2.20 | 3 | 38 | 35247  | 57169  |

|      |       |   |    |       |       |
|------|-------|---|----|-------|-------|
| 1.15 | 2.40  | 3 | 38 | 47925 | 57170 |
| 1.20 | 2.40  | 3 | 38 | 35248 | 36237 |
|      | 6.00  |   |    | 48857 | 57171 |
| 1.25 | 2.60  | 3 | 38 | 47926 | 57172 |
| 1.30 | 2.60  | 3 | 38 | 35249 | 57173 |
| 1.35 | 2.80  | 3 | 38 | 47927 | 57174 |
| 1.40 | 2.80  | 3 | 38 | 35250 | 36239 |
| 1.45 | 3.00  | 3 | 38 | 47928 | 57175 |
| 1.50 | 3.00  | 3 | 38 | 38489 | 36240 |
|      | 7.00  |   |    | 48858 | 57176 |
| 1.60 | 3.20  | 3 | 38 | 38490 | 57177 |
| 1.70 | 3.40  | 3 | 38 | 38491 | 44939 |
| 1.80 | 3.60  | 3 | 38 | 42096 | 38613 |
| 1.90 | 4.00  | 3 | 38 | 38493 | 57178 |
| 2.00 | 6.00  | 3 | 38 | 42784 | 39577 |
| 2.10 | 7.00  | 3 | 38 | 44058 | 64794 |
| 2.20 | 7.00  | 3 | 38 | 43956 | 64795 |
| 2.30 | 7.00  | 3 | 38 | 44877 | 60627 |
| 2.40 | 7.00  | 3 | 38 | 43527 | 64796 |
| 2.50 | 7.00  | 3 | 38 | 42201 | 36242 |
| 3.00 | 7.00  | 6 | 57 | 41806 | 46440 |
| 3.50 | 7.00  | 6 | 57 | 43353 | 57179 |
| 4.00 | 8.00  | 6 | 57 | 41856 | 57180 |
| 4.50 | 8.00  | 6 | 57 | 42202 | 57181 |
| 5.00 | 10.00 | 6 | 57 | 41996 | 36247 |
| 5.50 | 10.00 | 6 | 57 | 41807 | 57182 |
| 6.00 | 10.00 | 6 | 57 | 41907 | 57183 |

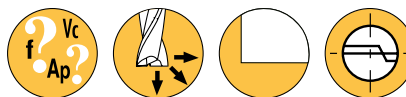
# SCHAFTFRÄSER VERSTÄRKTER SCHAFT



$D_1$   $L_1$   $D_{h5}$  L VHM TiAIN

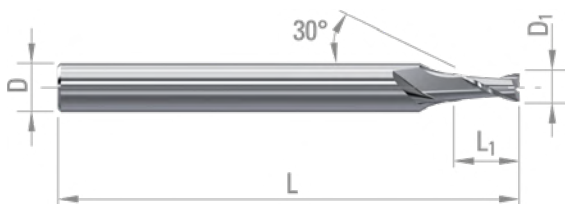
$\varnothing < 2.00 - 0/-0.01$   
 $\varnothing < 3.00 - 0/-0.02$   
 $\varnothing \geq 3.00 - e8$

| $D_1$ | $L_1$ | $D_{h5}$ | L   | VHM   | TiAIN |
|-------|-------|----------|-----|-------|-------|
| 6.50  | 13.00 | 8        | 63  | 28932 | 57184 |
| 7.00  | 13.00 | 8        | 63  | 28933 | 57185 |
| 7.50  | 16.00 | 8        | 63  | 28934 | 57186 |
| 8.00  | 16.00 | 8        | 63  | 42271 | 57187 |
| 8.50  | 16.00 | 10       | 72  | 28936 | 57195 |
| 9.00  | 16.00 | 10       | 72  | 28937 | 57196 |
| 9.50  | 19.00 | 10       | 72  | 43038 | 57197 |
| 10.00 | 19.00 | 10       | 72  | 42352 | 57198 |
| 12.00 | 22.00 | 12       | 83  | 39944 | 57199 |
| 16.00 | 26.00 | 16       | 92  | 42354 | 57201 |
| 20.00 | 32.00 | 20       | 104 | 42356 | 57203 |



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SCHAFTFRÄSER  
VERSTÄRKTER SCHAFT



- Schaftfräser, verstärkter Schaft, hohe Zerspanungsraten.
- Für die Bearbeitung von zähen Materialien entwickelt.
- Die dropless C-TOP-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Materialien.

Schuppen ●●●●● Schichten ●●●●● gut ○ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                    | ○    | ○    | ○    | ○        | ○  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ○                 | ○                      | ○  | ○            |         |            |      |                         | ○  | ○     | ○                        | ○  | ○  |                  |    |                  |  |

| D <sub>1</sub>   | L <sub>1</sub> | D <sub>h5</sub> | L | VHM | C-TOP |
|------------------|----------------|-----------------|---|-----|-------|
| Ø<2.00 - 0/-0.01 |                |                 |   |     |       |
| Ø<3.00 - 0/-0.02 |                |                 |   |     |       |
| Ø≥3.00 - e8      |                |                 |   |     |       |

| D <sub>1</sub>   | L <sub>1</sub> | D <sub>h5</sub> | L | VHM | C-TOP |
|------------------|----------------|-----------------|---|-----|-------|
| Ø<2.00 - 0/-0.01 |                |                 |   |     |       |
| Ø<3.00 - 0/-0.02 |                |                 |   |     |       |
| Ø≥3.00 - e8      |                |                 |   |     |       |

|      |      |   |    |        |        |
|------|------|---|----|--------|--------|
| 0.10 | 0.15 | 4 | 38 | 334850 | 334910 |
| 0.15 | 0.25 | 4 | 38 | 334851 | 334911 |
| 0.20 | 0.30 | 4 | 38 | 334852 | 334912 |
| 0.25 | 0.40 | 4 | 38 | 334853 | 334913 |
| 0.30 | 0.45 | 4 | 38 | 334854 | 334914 |
| 0.35 | 0.55 | 4 | 38 | 334855 | 334915 |
| 0.40 | 0.60 | 4 | 38 | 334856 | 334916 |
| 0.50 | 0.80 | 4 | 38 | 334857 | 334917 |
| 0.60 | 0.90 | 4 | 38 | 334858 | 334918 |
| 0.70 | 1.10 | 4 | 38 | 334859 | 334919 |
| 0.80 | 1.20 | 4 | 38 | 334860 | 334920 |
| 0.90 | 1.40 | 4 | 38 | 334861 | 334921 |
| 1.00 | 1.50 | 4 | 38 | 334862 | 334922 |
| 1.10 | 1.70 | 4 | 38 | 334863 | 334923 |
| 1.20 | 1.80 | 4 | 38 | 334864 | 334924 |
| 1.30 | 2.00 | 4 | 38 | 334865 | 334925 |
| 1.40 | 2.10 | 4 | 38 | 334866 | 334926 |
| 1.50 | 2.30 | 4 | 38 | 334867 | 334927 |
| 1.60 | 2.40 | 4 | 38 | 334868 | 334928 |
| 1.70 | 2.60 | 4 | 38 | 334869 | 334929 |
| 1.80 | 2.70 | 4 | 38 | 334870 | 334930 |

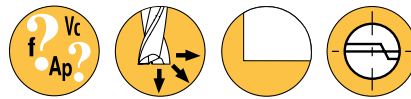
|       |       |    |    |        |        |
|-------|-------|----|----|--------|--------|
| 2.00  | 3.00  | 4  | 38 | 334872 | 334932 |
| 2.50  | 4.00  | 4  | 38 | 334873 | 334933 |
| 3.00  | 4.50  | 6  | 55 | 334874 | 334934 |
| 4.00  | 6.00  | 6  | 55 | 334875 | 334935 |
| 5.00  | 7.50  | 6  | 55 | 334876 | 334936 |
| 6.00  | 9.00  | 6  | 55 | 334877 | 334937 |
| 8.00  | 12.00 | 8  | 64 | 334878 | 334938 |
| 10.00 | 15.00 | 10 | 67 | 334879 | 334939 |
| 12.00 | 18.00 | 12 | 74 | 334880 | 334940 |





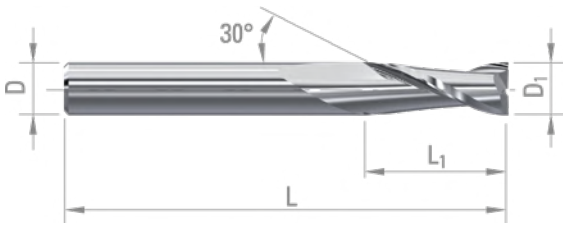
DIXI 7202

Z = 2



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SCHAFTFRÄSER



- Schaftfräser, für allgemeine Bearbeitungen.
- TiAIN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.
- Die DIAMANT-Beschichtung verbessert die Standzeit in abrasiven NE-Metallen.

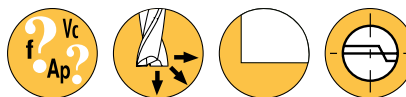
Schuppen ○○○○○ Schichten ●●●●●○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○                | ○  | ○  | ○    | ○                                    | ○    | ○        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊙                 | ○                      | ○  | ⊙            | ⊙       | ○          | ○    |                         |    |       | ○                        | ○  |                  |    |                  |    |

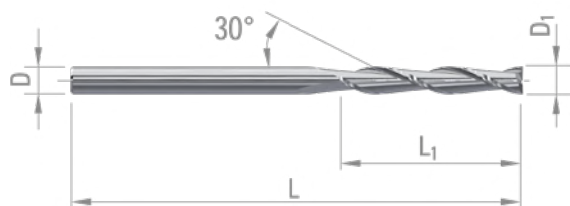
D<sub>1e8</sub> L<sub>1</sub> D<sub>h5</sub> L VHM TiAIN DIAMANT \*  
 Ø < 2.00 - 0/-0.01  
 Ø ≥ 2.00 - e8

|       |    |       |    |       |       |       |
|-------|----|-------|----|-------|-------|-------|
| 1.50  | 6  | 2.00  | 32 | 690   | 57063 |       |
| 2.00  | 8  | 2.00  | 32 | 691   | 57064 | 61616 |
| 2.50  | 8  | 2.50  | 32 | 692   | 57065 |       |
| 3.00  | 10 | 3.00  | 38 | 693   | 57066 | 36199 |
| 3.50  | 12 | 3.50  | 38 | 34760 | 57067 |       |
| 4.00  | 12 | 4.00  | 50 | 694   | 57068 | 63847 |
| 4.50  | 12 | 4.50  | 50 | 41135 | 57069 |       |
| 5.00  | 14 | 5.00  | 50 | 34623 | 57070 |       |
| 6.00  | 16 | 6.00  | 50 | 34624 | 57071 |       |
| 7.00  | 18 | 7.00  | 60 | 29769 | 57072 |       |
| 8.00  | 20 | 8.00  | 63 | 698   | 57073 | 67513 |
| 9.00  | 20 | 9.00  | 67 | 43726 |       |       |
| 10.00 | 22 | 10.00 | 72 | 699   | 57075 |       |
| 12.00 | 22 | 12.00 | 73 | 30940 | 57077 |       |



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SCHAFTFRÄSER  
LANGE AUSFÜHRUNG



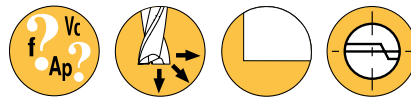
- Schaftfräser, lange Ausführung, für allgemeine Bearbeitungen.
- TiAIN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.
- Die DIAMANT-Beschichtung verbessert die Standzeit in abrasiven NE-Metallen.

Schuppen ●●●●●○ Schichten ●●●●●○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |    |    | M                |      |      |      | K                                  |    |          |    |                  |    |                    |  |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|----|----|------------------|------|------|------|------------------------------------|----|----------|----|------------------|----|--------------------|--|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    |    |    | Rostfreier Stahl |      |      |      | Aust. Rostfreier Stahl (DUPLEX/PH) |    | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |  |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12 | 13 | 14.1             | 14.2 | 14.3 | 14.4 | 15                                 | 16 | 17       | 18 | 19               | 20 |                    |  |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○  | ○  | ○  | ○                | ○    | ○    | ○    | ⊙                                  | ⊙  | ⊙        | ⊙  | ⊙                | ⊙  |                    |  |

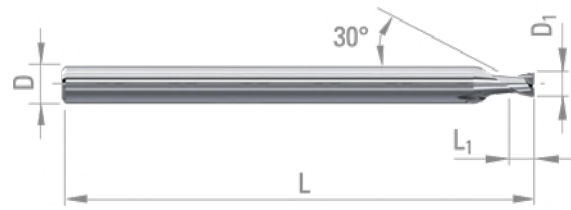
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ○            | ⊙       | ○          | ○    |                         |    |       | ○                        | ○  |                  |    |                  |    |

| D <sub>1e8</sub> | L <sub>1</sub> | D <sub>h5</sub> | L   | VHM   | TiAIN | DIAMANT * |
|------------------|----------------|-----------------|-----|-------|-------|-----------|
| 3                | 30             | 3               | 60  | 44756 | 57124 | 60231     |
| 4                | 30             | 4               | 60  | 44757 | 57125 | 60232     |
| 5                | 35             | 5               | 75  | 44758 | 57133 | 60233     |
| 6                | 40             | 6               | 100 | 44759 | 57134 | 60234     |
| 8                | 40             | 8               | 100 | 44760 | 57135 | 60235     |
| 10               | 40             | 10              | 100 | 44761 | 57136 | 60236     |
| 12               | 45             | 12              | 100 | 44762 | 57137 | 60237     |
| 20               | 65             | 20              | 150 | 44766 | 57140 |           |



P.198

SCHAFTFRÄSER MIT HINTERSCHLIFF  
EXTRA KURZ



- Schaftfräser, verstärkter Schaft, extra kurze Bearbeitungslänge, für allgemeine Bearbeitungen.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

Schuppen ○○○○○ Schichten ●●●○○○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
|                        | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                    | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

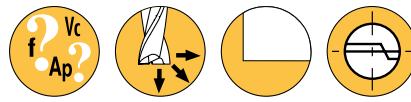
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
|                        | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊙                 | ○                      | ○  | ⊙            |         | ○          | ○    | ○                       | ○  | ○     | ○                        | ○  |                  |    |                  |    |

D<sub>1</sub> L<sub>1</sub> D<sub>h5</sub> L VHM TiAlN  
 Ø<2.00 - 0/-0.01  
 Ø<3.00 - 0/-0.02  
 Ø≥3.00 - e8

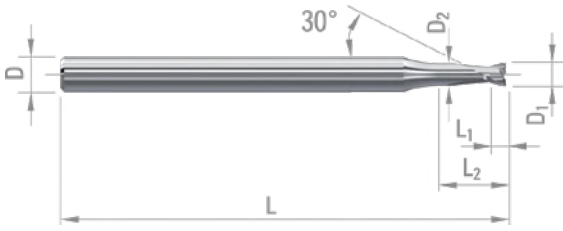
D<sub>1</sub> L<sub>1</sub> D<sub>h5</sub> L VHM TiAlN  
 Ø<2.00 - 0/-0.01  
 Ø<3.00 - 0/-0.02  
 Ø≥3.00 - e8

|      |      |   |    |        |        |
|------|------|---|----|--------|--------|
| 0.04 | 0.04 | 3 | 38 | 954084 |        |
| 0.05 | 0.05 | 3 | 38 | 954085 |        |
| 0.06 | 0.06 | 3 | 38 | 951973 |        |
| 0.07 | 0.07 | 3 | 38 | 954087 |        |
| 0.08 | 0.08 | 3 | 38 | 954086 |        |
| 0.09 | 0.09 | 3 | 38 | 954089 |        |
| 0.10 | 0.10 | 3 | 38 | 63609  | 64354  |
| 0.12 | 0.12 | 3 | 38 | 954090 | 956316 |
| 0.15 | 0.15 | 3 | 38 | 63608  | 64355  |
| 0.20 | 0.20 | 3 | 38 | 63610  | 64356  |
| 0.25 | 0.25 | 3 | 38 | 63678  | 64357  |
| 0.30 | 0.30 | 3 | 38 | 63679  | 64253  |
| 0.35 | 0.35 | 3 | 38 | 63680  | 64358  |
| 0.40 | 0.40 | 3 | 38 | 56551  | 61443  |
| 0.45 | 0.45 | 3 | 38 | 63681  | 64359  |
| 0.50 | 0.50 | 3 | 38 | 63682  | 64254  |
| 0.55 | 0.55 | 3 | 38 | 63683  | 64360  |
| 0.60 | 0.60 | 3 | 38 | 45571  | 64361  |
| 0.65 | 0.65 | 3 | 38 | 63684  | 64362  |
| 0.70 | 0.70 | 3 | 38 | 63685  | 64363  |
| 0.75 | 0.75 | 3 | 38 | 63686  | 64364  |
| 0.80 | 0.80 | 3 | 38 | 63687  | 64255  |
| 0.85 | 0.85 | 3 | 38 | 63688  | 64365  |
| 0.90 | 0.90 | 3 | 38 | 63689  | 62538  |
| 0.95 | 0.95 | 3 | 38 | 63690  | 64366  |
| 1.00 | 1.00 | 3 | 38 | 50547  | 64367  |
| 1.05 | 1.05 | 3 | 38 | 63691  | 64368  |
| 1.10 | 1.10 | 3 | 38 | 63692  | 64369  |
| 1.15 | 1.15 | 3 | 38 | 63805  | 64370  |

|      |      |   |    |       |       |
|------|------|---|----|-------|-------|
| 1.20 | 1.20 | 3 | 38 | 63806 | 64371 |
| 1.25 | 1.25 | 3 | 38 | 63807 | 64372 |
| 1.30 | 1.30 | 3 | 38 | 63808 | 64373 |
| 1.35 | 1.35 | 3 | 38 | 63809 | 64374 |
| 1.40 | 1.40 | 3 | 38 | 63810 | 64375 |
| 1.45 | 1.45 | 3 | 38 | 63811 | 64376 |
| 1.50 | 1.50 | 3 | 38 | 50548 | 56840 |
| 1.55 | 1.55 | 3 | 38 | 63812 | 64377 |
| 1.60 | 1.60 | 3 | 38 | 63813 | 64378 |
| 1.65 | 1.65 | 3 | 38 | 63814 | 64379 |
| 1.70 | 1.70 | 3 | 38 | 63815 | 64380 |
| 1.75 | 1.75 | 3 | 38 | 63816 | 64381 |
| 1.80 | 1.80 | 3 | 38 | 63817 | 64382 |
| 1.85 | 1.85 | 3 | 38 | 63818 | 64383 |
| 1.90 | 1.90 | 3 | 38 | 63819 | 64384 |
| 1.95 | 1.95 | 3 | 38 | 63820 | 64385 |
| 2.00 | 2.00 | 6 | 50 | 63821 | 64386 |
| 2.10 | 2.10 | 6 | 50 | 63823 | 64387 |
| 2.20 | 2.20 | 6 | 50 | 63824 | 64388 |
| 2.30 | 2.30 | 6 | 50 | 63825 | 64389 |
| 2.40 | 2.40 | 6 | 50 | 63826 | 64390 |
| 2.50 | 2.50 | 6 | 50 | 63827 | 64391 |
| 3.00 | 3.00 | 6 | 50 | 63828 | 64392 |
| 3.50 | 3.50 | 6 | 50 | 63829 | 64393 |
| 4.00 | 4.00 | 6 | 50 | 63830 | 64394 |
| 4.50 | 4.50 | 6 | 50 | 63831 | 64395 |
| 5.00 | 5.00 | 6 | 50 | 63832 | 64397 |
| 5.50 | 5.50 | 6 | 50 | 63833 | 64398 |



SCHAFTFRÄSER MIT HINTERSCHLIFF  
EXTRA KURZ



- Schaftfräser, verstärkter Schaft, extra kurze Bearbeitungslänge, 3xD<sub>1</sub>, 5xD<sub>1</sub>, 8xD<sub>1</sub>, 10xD<sub>1</sub>, 12xD<sub>1</sub>, 15xD<sub>1</sub> für allgemeine Bearbeitungen.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

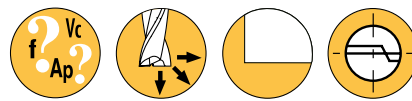
Schuppen ●●●●● Schichten ●●●●● gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                   |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|-------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLIX /PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                   | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          | H  |                  |    |                  |    |  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |  |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊙                 | ○                      | ○  | ⊙            |         | ○          | ○    | ○                       | ○  | ○     | ○                        | ○  |                  |    |                  |    |  |  |

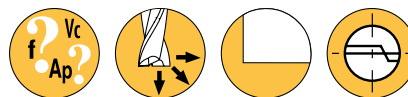
D<sub>1</sub> L<sub>1</sub> D<sub>2</sub> D<sub>h5</sub> L L<sub>2</sub> DIXI VHM TiAlN  
 Ø<2.00 - 0/-0.01  
 Ø<3.00 - 0/-0.02  
 Ø≥3.00 - e8

|      |      |      |   |    |      |          |        |        |
|------|------|------|---|----|------|----------|--------|--------|
| 0.15 | 0.15 | 0.13 | 3 | 38 | 0.45 | 7240-3D  | 66047  | 66149  |
| 0.20 | 0.20 | 0.17 | 3 | 38 | 0.60 | 7240-3D  | 66068  | 66150  |
| 0.25 | 0.25 | 0.22 | 3 | 38 | 0.75 | 7240-3D  | 66070  | 66151  |
| 0.30 | 0.30 | 0.27 | 3 | 38 | 0.90 | 7240-3D  | 66071  | 66152  |
|      |      |      |   |    | 1.50 | 7240-5D  | 66196  | 66254  |
| 0.35 | 0.35 | 0.32 | 3 | 38 | 1.05 | 7240-3D  | 66072  | 66153  |
|      |      |      |   |    | 1.75 | 7240-5D  | 66197  | 66255  |
| 0.40 | 0.40 | 0.37 | 3 | 38 | 1.20 | 7240-3D  | 66073  | 66154  |
|      |      |      |   |    | 2.00 | 7240-5D  | 66199  | 66256  |
|      |      |      |   |    | 3.20 | 7240-8D  | 66296  | 66355  |
| 0.45 | 0.45 | 0.42 | 3 | 38 | 1.35 | 7240-3D  | 66074  | 66155  |
|      |      |      |   |    | 2.25 | 7240-5D  | 66201  | 66257  |
|      |      |      |   |    | 3.60 | 7240-8D  | 66297  | 66356  |
|      |      |      |   |    | 1.50 | 7240-3D  | 66075  | 66156  |
|      |      |      |   |    | 2.50 | 7240-5D  | 66202  | 66258  |
|      |      |      |   |    | 4.00 | 7240-8D  | 66298  | 66357  |
| 0.50 | 0.50 | 0.45 | 3 | 38 | 5.00 | 7240-10D | 978569 | 979371 |
|      |      |      |   |    | 6.00 | 7240-12D | 979313 | 979447 |
|      |      |      |   |    | 7.50 | 7240-15D | 979475 | 979497 |
|      |      |      |   |    | 1.65 | 7240-3D  | 66076  | 66157  |
|      |      |      |   |    | 2.75 | 7240-5D  | 66203  | 66259  |
|      |      |      |   |    | 4.40 | 7240-8D  | 66299  | 66358  |
| 0.55 | 0.55 | 0.50 | 3 | 38 | 5.50 | 7240-10D | 979332 | 979373 |
|      |      |      |   |    | 6.60 | 7240-12D | 979413 | 979448 |
|      |      |      |   |    | 8.25 | 7240-15D | 979478 | 979498 |
|      |      |      |   |    | 1.80 | 7240-3D  | 66077  | 66158  |
|      |      |      |   |    | 3.00 | 7240-5D  | 66205  | 66260  |
|      |      |      |   |    | 4.80 | 7240-8D  | 66300  | 66366  |
| 0.60 | 0.60 | 0.55 | 3 | 38 | 6.00 | 7240-10D | 979333 | 979374 |
|      |      |      |   |    | 7.20 | 7240-12D | 979416 | 979449 |
|      |      |      |   |    | 9.00 | 7240-15D | 979480 | 979499 |



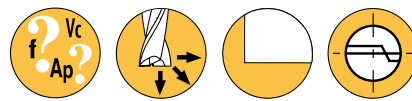
SCHAFTFRÄSER MIT HINTERSCHLIFF  
EXTRA KURZ

| D <sub>1</sub><br><small>0&lt;2.00 - 0/-0.01<br/>0&lt;3.00 - 0/-0.02<br/>0≥3.00 - e8</small> | L <sub>1</sub> | D <sub>2</sub> | D <sub>h5</sub> | L  | L <sub>2</sub> | DIXI     | VHM    | TiAIN  |
|--|----------------|----------------|-----------------|----|----------------|----------|--------|--------|
| 0.65   | 0.65           | 0.60           | 3               | 38 | 1.95           | 7240-3D  | 66078  | 66159  |
|  |                |                |                 |    | 3.25           | 7240-5D  | 66206  | 66261  |
|  |                |                |                 |    | 5.20           | 7240-8D  | 66301  | 66367  |
|  |                |                |                 |    | 6.50           | 7240-10D | 979334 | 979375 |
|  |                |                |                 |    | 7.80           | 7240-12D | 979417 | 979450 |
|  |                |                |                 |    | 9.75           | 7240-15D | 979482 | 979500 |
| 0.70   | 0.70           | 0.65           | 3               | 38 | 2.10           | 7240-3D  | 66079  | 66160  |
|  |                |                |                 |    | 3.50           | 7240-5D  | 66207  | 66262  |
|  |                |                |                 |    | 5.60           | 7240-8D  | 66302  | 66368  |
|  |                |                |                 |    | 7.00           | 7240-10D | 979335 | 979376 |
|  |                |                |                 |    | 8.40           | 7240-12D | 979419 | 979451 |
|  |                |                |                 |    | 10.50          | 7240-15D | 979483 | 979503 |
| 0.75   | 0.75           | 0.70           | 3               | 38 | 2.25           | 7240-3D  | 66080  | 66161  |
|  |                |                |                 |    | 3.75           | 7240-5D  | 66208  | 66263  |
|  |                |                |                 |    | 6.00           | 7240-8D  | 66303  | 66369  |
|  |                |                |                 |    | 7.50           | 7240-10D | 979336 | 979377 |
|  |                |                |                 |    | 9.00           | 7240-12D | 979420 | 979452 |
|  |                |                |                 |    | 11.25          | 7240-15D | 979484 | 979505 |
| 0.80   | 0.80           | 0.75           | 3               | 38 | 2.40           | 7240-3D  | 66081  | 66162  |
|  |                |                |                 |    | 4.00           | 7240-5D  | 66209  | 66264  |
|  |                |                |                 |    | 6.40           | 7240-8D  | 66304  | 66370  |
|  |                |                |                 |    | 8.00           | 7240-10D | 979337 | 979378 |
|  |                |                |                 |    | 9.60           | 7240-12D | 979421 | 979453 |
|  |                |                |                 |    | 12.00          | 7240-15D | 979485 | 979506 |
| 0.85   | 0.85           | 0.80           | 3               | 38 | 2.55           | 7240-3D  | 66082  | 66164  |
|  |                |                |                 |    | 4.25           | 7240-5D  | 66210  | 66265  |
|  |                |                |                 |    | 6.80           | 7240-8D  | 66305  | 66371  |
|  |                |                |                 |    | 8.50           | 7240-10D | 979338 | 979409 |
|  |                |                |                 |    | 10.20          | 7240-12D | 979423 | 979454 |
|  |                |                |                 |    | 12.75          | 7240-15D | 979486 | 979507 |
| 0.90   | 0.90           | 0.85           | 3               | 38 | 2.70           | 7240-3D  | 66083  | 66165  |
|  |                |                |                 |    | 4.50           | 7240-5D  | 66211  | 66266  |
|  |                |                |                 |    | 7.20           | 7240-8D  | 66306  | 66372  |
|  |                |                |                 |    | 9.00           | 7240-10D | 979339 | 979379 |
|  |                |                |                 |    | 10.80          | 7240-12D | 979430 | 979455 |
|  |                |                |                 |    | 13.50          | 7240-15D | 979487 | 979509 |
| 0.95   | 0.95           | 0.90           | 3               | 38 | 2.85           | 7240-3D  | 66084  | 66166  |
|  |                |                |                 |    | 4.75           | 7240-5D  | 66212  | 66267  |
|  |                |                |                 |    | 7.60           | 7240-8D  | 66307  | 66373  |
|  |                |                |                 |    | 9.50           | 7240-10D | 979340 | 979380 |
|  |                |                |                 |    | 11.40          | 7240-12D | 979431 | 979456 |
|  |                |                |                 |    | 14.25          | 7240-15D | 979488 | 979510 |
| 1.00   | 1.00           | 0.95           | 3               | 38 | 3.00           | 7240-3D  | 66110  | 66167  |
|  |                |                |                 |    | 5.00           | 7240-5D  | 66213  | 66268  |
|  |                |                |                 |    | 8.00           | 7240-8D  | 66308  | 66374  |
|  |                |                |                 |    | 10.00          | 7240-10D | 979341 | 979381 |
|  |                |                |                 |    | 12.00          | 7240-12D | 979206 | 979457 |
|  |                |                |                 |    | 15.00          | 7240-15D | 979489 | 979511 |
| 1.05   | 1.05           | 1.00           | 3               | 38 | 3.15           | 7240-3D  | 66113  | 66168  |
|  |                |                |                 |    | 5.25           | 7240-5D  | 66214  | 66269  |
|  |                |                |                 |    | 8.40           | 7240-8D  | 66309  | 66375  |
|  |                |                |                 |    | 10.50          | 7240-10D | 979342 | 979382 |
|  |                |                |                 |    | 12.60          | 7240-12D | 979432 | 979458 |
|  |                |                |                 |    | 15.75          | 7240-15D | 979490 | 979512 |
| 1.10   | 1.10           | 1.05           | 3               | 38 | 3.30           | 7240-3D  | 66115  | 66169  |
|  |                |                |                 |    | 5.50           | 7240-5D  | 66218  | 66270  |
|  |                |                |                 |    | 8.80           | 7240-8D  | 66310  | 66376  |
|  |                |                |                 |    | 11.00          | 7240-10D | 979343 | 979383 |
|  |                |                |                 |    | 13.20          | 7240-12D | 979433 | 979459 |
|  |                |                |                 |    | 16.50          | 7240-15D | 979491 | 979513 |



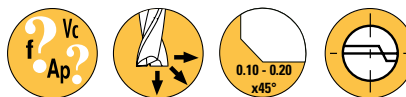
## SCHAFTFRÄSER MIT HINTERSCHLIFF EXTRA KURZ

| $D_1$<br><small><math>\varnothing &lt; 2.00 - 0/-0.01</math><br/><math>\varnothing &lt; 3.00 - 0/-0.02</math><br/><math>\varnothing \geq 3.00 - e8</math></small> | $L_1$ | $D_2$ | $D_{h5}$ | L  | $L_2$ | DIXI     | VHM    | TiAIN  |
|---|-------|-------|----------|----|-------|----------|--------|--------|
| 1.15  | 1.15  | 1.10  | 3        | 38 | 3.45  | 7240-3D  | 66116  | 66170  |
|   |       |       |          |    | 5.75  | 7240-5D  | 66219  | 66271  |
|   |       |       |          |    | 9.20  | 7240-8D  | 66313  | 66377  |
|   |       |       |          |    | 11.50 | 7240-10D | 979344 | 979384 |
|   |       |       |          |    | 13.80 | 7240-12D | 979434 | 979460 |
|   |       |       |          |    | 17.25 | 7240-15D | 979492 | 979514 |
| 1.20  | 1.20  | 1.15  | 3        | 38 | 3.60  | 7240-3D  | 66117  | 66171  |
|   |       |       |          |    | 6.00  | 7240-5D  | 66220  | 66272  |
|   |       |       |          |    | 9.60  | 7240-8D  | 66314  | 66378  |
|   |       |       |          |    | 12.00 | 7240-10D | 979345 | 979385 |
|   |       |       |          |    | 14.40 | 7240-12D | 979435 | 979461 |
|   |       |       |          |    | 18.00 | 7240-15D | 979493 | 979515 |
| 1.25  | 1.25  | 1.20  | 3        | 38 | 3.75  | 7240-3D  | 66118  | 66172  |
|   |       |       |          |    | 6.25  | 7240-5D  | 66221  | 66273  |
|   |       |       |          |    | 10.00 | 7240-8D  | 66315  | 66379  |
|   |       |       |          |    | 12.50 | 7240-10D | 979346 | 979386 |
|   |       |       |          |    | 15.00 | 7240-12D | 979437 | 979462 |
|   |       |       |          |    | 18.75 | 7240-15D | 979494 | 979516 |
| 1.30  | 1.30  | 1.25  | 3        | 38 | 3.90  | 7240-3D  | 66119  | 66173  |
|   |       |       |          |    | 6.50  | 7240-5D  | 66222  | 66274  |
|   |       |       |          |    | 10.40 | 7240-8D  | 66316  | 66380  |
|   |       |       |          |    | 13.00 | 7240-10D | 979347 | 979387 |
|   |       |       |          |    | 15.60 | 7240-12D | 979438 | 979463 |
|   |       |       |          |    | 19.50 | 7240-15D | 979495 | 979517 |
| 1.35  | 1.35  | 1.30  | 3        | 38 | 4.05  | 7240-3D  | 66120  | 66174  |
|   |       |       |          |    | 6.75  | 7240-5D  | 66223  | 66275  |
|   |       |       |          |    | 10.80 | 7240-8D  | 66317  | 66381  |
|   |       |       |          |    | 13.50 | 7240-10D | 979348 | 979388 |
|   |       |       |          |    | 16.20 | 7240-12D | 979439 | 979464 |
|   |       |       |          |    | 20.25 | 7240-15D | 979496 | 979518 |
| 1.40  | 1.40  | 1.35  | 3        | 38 | 4.20  | 7240-3D  | 66123  | 66175  |
|   |       |       |          |    | 7.00  | 7240-5D  | 66224  | 66276  |
|   |       |       |          |    | 11.20 | 7240-8D  | 66318  | 66382  |
|   |       |       |          |    | 14.00 | 7240-10D | 979349 | 979389 |
|   |       |       |          |    | 16.80 | 7240-12D | 979440 | 979465 |
|   |       |       |          |    |       |          |        |        |
| 1.45  | 1.45  | 1.40  | 3        | 38 | 4.35  | 7240-3D  | 66124  | 66176  |
|   |       |       |          |    | 7.25  | 7240-5D  | 66225  | 66277  |
|   |       |       |          |    | 11.60 | 7240-8D  | 66319  | 66383  |
|   |       |       |          |    | 14.50 | 7240-10D | 979350 | 979390 |
|   |       |       |          |    | 17.40 | 7240-12D | 979441 | 979466 |
|   |       |       |          |    |       |          |        |        |
| 1.50  | 1.50  | 1.45  | 3        | 38 | 4.50  | 7240-3D  | 66125  | 66177  |
|   |       |       |          |    | 7.50  | 7240-5D  | 66226  | 66278  |
|   |       |       |          |    | 12.00 | 7240-8D  | 66320  | 66384  |
|   |       |       |          |    | 15.00 | 7240-10D | 979351 | 979391 |
|   |       |       |          |    | 18.00 | 7240-12D | 979442 | 979467 |
|   |       |       |          |    |       |          |        |        |
| 1.55  | 1.55  | 1.50  | 3        | 38 | 4.65  | 7240-3D  | 66126  | 66178  |
|   |       |       |          |    | 7.75  | 7240-5D  | 66227  | 66279  |
|   |       |       |          |    | 12.40 | 7240-8D  | 66323  | 66385  |
|   |       |       |          |    | 15.50 | 7240-10D | 979352 | 979392 |
|   |       |       |          |    | 18.60 | 7240-12D | 979443 | 979468 |
|   |       |       |          |    |       |          |        |        |
| 1.60  | 1.60  | 1.55  | 3        | 38 | 4.80  | 7240-3D  | 66127  | 66179  |
|   |       |       |          |    | 8.00  | 7240-5D  | 66228  | 66280  |
|   |       |       |          |    | 12.80 | 7240-8D  | 66324  | 66386  |
|   |       |       |          |    | 16.00 | 7240-10D | 979353 | 979393 |
|   |       |       |          |    | 19.20 | 7240-12D | 979444 | 979469 |
|   |       |       |          |    |       |          |        |        |



SCHAFTFRÄSER MIT HINTERSCHLIFF  
EXTRA KURZ

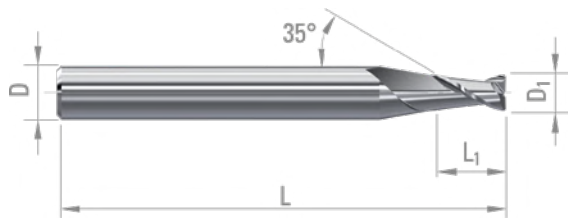
| D <sub>1</sub><br><small>0&lt;-2.00 - 0/-0.01<br/>0&lt;-3.00 - 0/-0.02<br/>0≥3.00 - e8</small> | L <sub>1</sub> | D <sub>2</sub> | D <sub>h5</sub> | L  | L <sub>2</sub> | DIXI     | VHM    | TiAIN  |
|--|----------------|----------------|-----------------|----|----------------|----------|--------|--------|
| 1.65   | 1.65           | 1.60           | 3               | 38 | 4.95           | 7240-3D  | 66128  | 66180  |
|  |                |                |                 |    | 8.25           | 7240-5D  | 66229  | 66281  |
|  |                |                |                 |    | 13.20          | 7240-8D  | 66325  | 66387  |
|  |                |                |                 |    | 16.50          | 7240-10D | 979354 | 979394 |
|  |                |                |                 |    | 19.80          | 7240-12D | 979445 | 979470 |
| 1.70   | 1.70           | 1.65           | 3               | 38 | 5.10           | 7240-3D  | 66129  | 66182  |
|  |                |                |                 |    | 8.50           | 7240-5D  | 66230  | 66282  |
|  |                |                |                 |    | 13.60          | 7240-8D  | 66326  | 66388  |
|  |                |                |                 |    | 17.00          | 7240-10D | 979355 | 979395 |
|  |                |                |                 |    | 20.40          | 7240-12D | 979446 | 979471 |
| 1.75   | 1.75           | 1.70           | 3               | 38 | 5.25           | 7240-3D  | 66130  | 66183  |
|  |                |                |                 |    | 8.75           | 7240-5D  | 66231  | 66283  |
|  |                |                |                 |    | 14.00          | 7240-8D  | 66327  | 66389  |
|  |                |                |                 |    | 17.50          | 7240-10D | 979356 | 979396 |
|  |                |                |                 |    | 5.40           | 7240-3D  | 66133  | 66184  |
| 1.80   | 1.80           | 1.75           | 3               | 38 | 9.00           | 7240-5D  | 66232  | 66284  |
|  |                |                |                 |    | 14.40          | 7240-8D  | 66328  | 66390  |
|  |                |                |                 |    | 18.00          | 7240-10D | 979357 | 979398 |
|  |                |                |                 |    | 5.55           | 7240-3D  | 66134  | 66185  |
|  |                |                |                 |    | 9.25           | 7240-5D  | 66233  | 66285  |
| 1.85   | 1.85           | 1.80           | 3               | 38 | 14.80          | 7240-8D  | 66329  | 66391  |
|  |                |                |                 |    | 18.50          | 7240-10D | 979358 | 979399 |
|  |                |                |                 |    | 5.70           | 7240-3D  | 66135  | 66186  |
|  |                |                |                 |    | 9.50           | 7240-5D  | 66234  | 66286  |
|  |                |                |                 |    | 15.20          | 7240-8D  | 66330  | 66392  |
| 1.90   | 1.90           | 1.85           | 3               | 38 | 19.00          | 7240-10D | 979359 | 979400 |
|  |                |                |                 |    | 5.85           | 7240-3D  | 66136  | 66187  |
|  |                |                |                 |    | 9.75           | 7240-5D  | 66235  | 66287  |
|  |                |                |                 |    | 15.60          | 7240-8D  | 66333  | 66393  |
|  |                |                |                 |    | 19.50          | 7240-10D | 979360 | 979401 |
| 2.00   | 2.00           | 1.90           | 6               | 50 | 6.00           | 7240-3D  | 66137  | 66188  |
|  |                |                |                 |    | 10.00          | 7240-5D  | 66236  | 66288  |
|  |                |                |                 |    | 16.00          | 7240-8D  | 66334  | 66394  |
|  |                |                |                 |    | 20.00          | 7240-10D | 979361 | 979402 |
|  |                |                |                 |    | 6.30           | 7240-3D  | 66138  | 66189  |
| 2.10   | 2.10           | 2.00           | 6               | 50 | 10.50          | 7240-5D  | 66237  | 66289  |
|  |                |                |                 |    | 16.80          | 7240-8D  | 66335  | 66395  |
|  |                |                |                 |    | 21.00          | 7240-10D | 979362 | 979403 |
|  |                |                |                 |    | 6.60           | 7240-3D  | 66194  | 66195  |
|  |                |                |                 |    | 11.00          | 7240-5D  | 66238  | 66290  |
| 2.20   | 2.20           | 2.10           | 6               | 50 | 17.60          | 7240-8D  | 66350  | 66396  |
|  |                |                |                 |    | 22.00          | 7240-10D | 979363 | 979404 |
|  |                |                |                 |    | 6.90           | 7240-3D  | 66139  | 66190  |
|  |                |                |                 |    | 11.50          | 7240-5D  | 66239  | 66291  |
|  |                |                |                 |    | 18.40          | 7240-8D  | 66351  | 66397  |
| 2.30   | 2.30           | 2.20           | 6               | 50 | 23.00          | 7240-10D | 979364 | 979405 |
|  |                |                |                 |    | 7.20           | 7240-3D  | 66140  | 66191  |
|  |                |                |                 |    | 12.00          | 7240-5D  | 66240  | 66292  |
|  |                |                |                 |    | 19.20          | 7240-8D  | 66352  | 66398  |
|  |                |                |                 |    | 24.00          | 7240-10D | 979368 | 979406 |
| 2.40   | 2.40           | 2.30           | 6               | 50 | 7.50           | 7240-3D  | 66143  | 66192  |
|  |                |                |                 |    | 12.50          | 7240-5D  | 66241  | 66293  |
|  |                |                |                 |    | 20.00          | 7240-8D  | 66353  | 66399  |
|  |                |                |                 |    | 25.00          | 7240-10D | 979369 | 979407 |
|  |                |                |                 |    | 9.00           | 7240-3D  | 66144  | 66193  |
| 3.00   | 3.00           | 2.90           | 6               | 50 | 15.00          | 7240-5D  | 66294  | 66295  |
|  |                |                |                 |    | 24.00          | 7240-8D  | 66354  | 66400  |
|  |                |                |                 |    | 30.00          | 7240-10D | 979370 | 979408 |



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$D_1 \geq 2.8$

SCHAFTFRÄSER  
VERSTÄRKTER SCHAFT



- Schaftfräser, verstärkter Schaft, für die Bearbeitung von Materialien mit geringer Härte entwickelt.
- TiAIN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

Schuppen ●●●○○ Schichten ●●●○○○ ○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ |                   |   |   |   |                |    |                  |    |                                    |      |      |      |          |    |                  |    |                    |    |

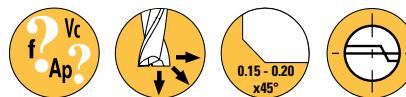
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ○                 | ○                      | ○  | ⊙            |         | ○          | ○    |                         |    |       |                          |    |    |                  |    |                  |  |  |

$D_1$  e8       $L_1$        $D_{h5}$       L      VHM      TiAIN

Ø-2.00 - 0/-0.01  
Ø-3.00 - 0/-0.02  
Ø≥3.00 - e8

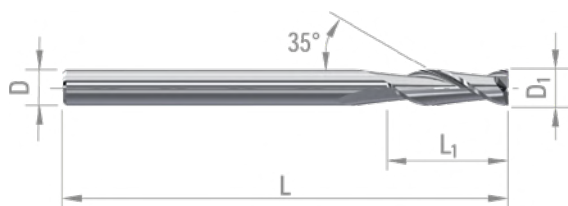
|       |    |    |     |       |       |
|-------|----|----|-----|-------|-------|
| 1.00  | 2  | 3  | 38  | 47357 | 56304 |
| 1.50  | 3  | 3  | 38  | 47358 | 56305 |
| 2.00  | 4  | 4  | 50  | 47359 | 56306 |
| 2.50  | 5  | 4  | 50  | 47360 | 56307 |
| 2.80  | 6  | 6  | 50  | 35734 | 36304 |
| 3.00  | 6  | 6  | 50  | 30298 | 36305 |
| 3.80  | 8  | 6  | 50  | 34973 | 36306 |
| 4.00  | 8  | 6  | 50  | 30299 | 36607 |
| 4.50  | 10 | 6  | 50  | 35709 | 56983 |
| 5.00  | 10 | 6  | 50  | 30300 | 36309 |
| 5.50  | 10 | 6  | 50  | 35735 | 56303 |
| 6.00  | 10 | 6  | 50  | 29100 | 36299 |
| 8.00  | 15 | 8  | 60  | 29101 | 36300 |
| 10.00 | 18 | 10 | 66  | 29102 | 56334 |
| 12.00 | 20 | 12 | 73  | 30521 | 36302 |
| 16.00 | 25 | 16 | 82  | 30523 | 56318 |
| 20.00 | 35 | 20 | 104 | 31858 | 56335 |





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SCHAFTFRÄSER  
LANGE AUSFÜHRUNG



- Schaftfräser, lange Ausführung, für die Bearbeitung von Materialien mit geringer Härte entwickelt.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.
- Die DIAMANT-Beschichtung verbessert die Standzeit in abrasiven NE-Metallen.

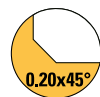
Schuppen ●●●○○○ Schichten ●●●○○○ ○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                  |      |          |                  | K  |                    |    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------------------------------------|------|----------|------------------|----|--------------------|----|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      | Grauguss | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                               | 14.2 | 14.3     | 14.4             | 15 | 16                 | 17 | 18 | 19 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ |                   |   |   |   |                |                  |    |    |                                    |      |          |                  |    |                    |    |    |    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |                  |    |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|------------------|----|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl | Hartes Gusseisen |    |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39               | 40 | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ○                 | ○                      | ○  | ⊙            | ⊙       | ○          | ○    |                         |    |       |                          |    |                  |                  |    |    |

| D <sub>1e8</sub> | L <sub>1</sub> | D <sub>h5</sub> | L   | VHM   | TiAlN | DIAMANT* |
|------------------|----------------|-----------------|-----|-------|-------|----------|
| 3                | 14             | 3               | 50  | 32484 | 56320 | 57045    |
| 4                | 16             | 4               | 50  | 32485 | 56321 | 57046    |
| 5                | 18             | 5               | 60  | 32486 | 56322 | 57047    |
| 6                | 20             | 6               | 75  | 32487 | 56337 | 57048    |
| 7                | 22             | 7               | 75  | 32488 |       |          |
| 8                | 25             | 8               | 75  | 32489 | 56336 | 57050    |
| 10               | 30             | 10              | 90  | 32491 | 56341 |          |
| 12               | 36             | 12              | 100 | 32492 | 56342 |          |

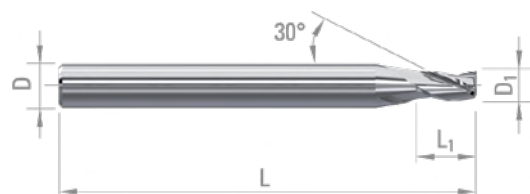
\* nicht für eisenhaltige Werkstoffe



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$D_1 > 6$

SCHAFTFRÄSER  
VERSTÄRKTER SCHAFT



- Schaftfräser, verstärkter Schaft, für allgemeine Bearbeitungen.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

Schuppen ●●●○○○ Schichten ●●●○○○ ○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLIX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
|                        | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                    | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          |    | H  |                  |    |                  |  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |  |
|                        | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |  |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊙                 | ○                      | ○  | ○            | ○       | ○          | ○    | ○                       | ○  | ○     | ○                        | ○  |    |                  |    |                  |  |  |

$D_1$      $L_1$      $D_{h5}$     L    VHM    TiAlN  
 Ø<2.00 - 0/-0.01  
 Ø<3.00 - 0/-0.02  
 Ø≥3.00 - e8

$D_1$      $L_1$      $D_{h5}$     L    VHM    TiAlN  
 Ø<2.00 - 0/-0.01  
 Ø<3.00 - 0/-0.02  
 Ø≥3.00 - e8

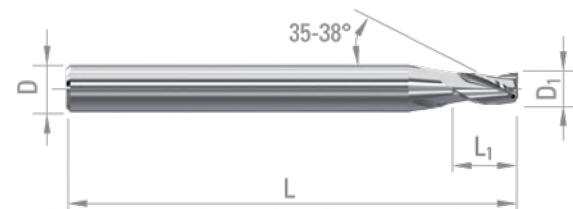
|      |      |   |    |        |        |
|------|------|---|----|--------|--------|
| 0.35 | 1.00 | 3 | 38 | 956955 | 956956 |
| 0.40 | 1.20 | 3 | 38 | 956957 | 956958 |
| 0.50 | 1.50 | 3 | 38 | 48089  | 60914  |
| 0.60 | 1.80 | 3 | 38 | 61842  | 61841  |
| 0.70 | 2.10 | 3 | 38 | 61843  | 61844  |
| 0.75 | 2.40 | 3 | 38 | 48090  | 57205  |
| 0.80 | 2.40 | 3 | 38 | 66799  | 61845  |
| 0.90 | 2.70 | 3 | 38 | 60383  | 952308 |
| 1.00 | 3.00 | 3 | 38 | 48091  | 57206  |
| 1.10 | 3.30 | 3 | 38 | 59356  | 950790 |
| 1.20 | 3.60 | 3 | 38 | 39932  | 61352  |
| 1.25 | 3.90 | 3 | 38 | 48092  | 57207  |
| 1.30 | 3.90 | 3 | 38 | 49835  | 950044 |
| 1.40 | 4.20 | 3 | 38 | 60201  | 952191 |
| 1.50 | 4.50 | 3 | 38 | 48093  | 57208  |
| 1.60 | 4.80 | 3 | 38 | 64985  | 950045 |
| 1.70 | 5.10 | 3 | 38 | 57785  | 67283  |
| 1.75 | 5.40 | 3 | 38 | 48094  | 57209  |
| 1.80 | 5.40 | 3 | 38 | 50297  | 66988  |
| 1.90 | 5.70 | 3 | 38 | 66798  | 952309 |
| 2.00 | 6.00 | 3 | 38 | 42203  | 40868  |
| 2.10 | 7.00 | 3 | 38 | 45168  | 64847  |
| 2.20 | 7.00 | 3 | 38 | 57873  | 67276  |
| 2.30 | 7.00 | 3 | 38 | 40848  | 67277  |
| 2.40 | 7.00 | 3 | 38 | 42329  | 64809  |
| 2.50 | 7.00 | 3 | 38 | 41909  | 42105  |
| 3.00 | 7.00 | 6 | 57 | 41855  | 42106  |
| 3.50 | 7.00 | 6 | 57 | 41928  | 57210  |
| 4.00 | 8.00 | 6 | 57 | 41880  | 42341  |

|        |       |    |     |       |       |
|--------|-------|----|-----|-------|-------|
| 4.50   | 8.00  | 6  | 57  | 41808 | 57211 |
| 5.00   | 10.00 | 6  | 57  | 41858 | 42107 |
| 5.50   | 10.00 | 6  | 57  | 41910 | 57690 |
| 6.00   | 10.00 | 6  | 57  | 41908 | 35589 |
| 6.00 > | 12.00 | 8  | 63  | 43409 | 57214 |
| 6.50   | 13.00 | 8  | 63  | 28948 | 57691 |
| 7.00   | 13.00 | 8  | 63  | 42562 | 57217 |
| 7.50   | 16.00 | 8  | 63  | 43920 | 57218 |
| 8.00   | 16.00 | 8  | 63  | 41809 | 36267 |
| 8.00 > | 15.00 | 10 | 63  | 28951 | 57692 |
| 8.50   | 16.00 | 10 | 72  | 43215 | 57220 |
| 9.00   | 16.00 | 10 | 72  | 28953 | 57221 |
| 9.50   | 19.00 | 10 | 72  | 28954 | 57222 |
| 10.00  | 19.00 | 10 | 72  | 42357 | 57223 |
| 12.00  | 22.00 | 12 | 83  | 39945 | 57224 |
| 14.00  | 22.00 | 14 | 83  | 27781 | 57225 |
| 16.00  | 26.00 | 16 | 92  | 42358 | 57226 |
| 20.00  | 32.00 | 20 | 104 | 42360 | 57228 |



P.204

SCHAFTFRÄSER VERSTÄRKTER SCHAFT MIT UNGLEICHEM DRALLWINKEL



- Schaftfräser, verstärkter Schaft, ungleicher Drillwinkel, für hohe Zerspanungsraten, entwickelt für die Bearbeitung von zähen Materialien.
- Die dropless C-TOP-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Materialien.

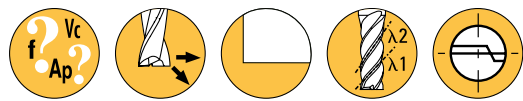
Schuppen ●●●●● Schichten ●●●●● gut ○ ausgezeichnet

| ISO          | P                 |   |   |   |   |                   |   |   |   |                |                                      |    |    | M    |          |      |                  | K  |                    |    |    |    |    |   |
|--------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|--------------------------------------|----|----|------|----------|------|------------------|----|--------------------|----|----|----|----|---|
|              | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Aust. Rostfreier Stahl (DUPLEX / PH) |    |    |      | Grauguss |      | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |    |   |
| VDI 3323     | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11                                   | 12 | 13 | 14.1 | 14.2     | 14.3 | 14.4             | 15 | 16                 | 17 | 18 | 19 | 20 |   |
| Empfehlungen | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○                                    | ○  | ○  | ○    | ○        | ○    | ○                | ○  | ○                  | ○  | ○  | ○  | ○  | ○ |

| ISO          | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |  |  |
|--------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|--|
|              | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |  |
| VDI 3323     | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |  |
| Empfehlungen | ○                       | ○  | ○                       | ○  | ○  | ○                 | ○                      | ○  | ○            |         |            |      | ○                       | ○  | ○     | ○                        | ○  |                  |    |                  |    |  |  |

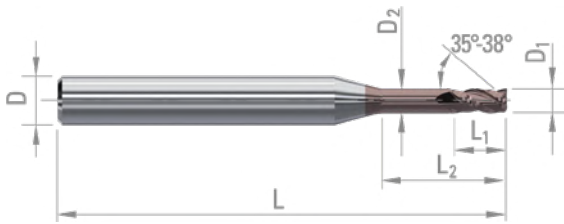
D<sub>1</sub>      L<sub>1</sub>      D<sub>h5</sub>      L      VHM      C-TOP  
 Ø<0.30 - 0/-0.01  
 Ø<2.00 - 0/-0.02  
 Ø≥6.00 - e8

|       |       |    |    |        |        |
|-------|-------|----|----|--------|--------|
| 0.30  | 0.70  | 4  | 38 | 334881 | 334941 |
| 0.35  | 0.80  | 4  | 38 | 334882 | 334942 |
| 0.40  | 0.90  | 4  | 38 | 334883 | 334943 |
| 0.45  | 1.00  | 4  | 38 | 334884 | 334944 |
| 0.50  | 1.10  | 4  | 38 | 334885 | 334945 |
| 0.60  | 1.40  | 4  | 38 | 334886 | 334946 |
| 0.70  | 1.60  | 4  | 38 | 334887 | 334947 |
| 0.80  | 1.80  | 4  | 38 | 334888 | 334948 |
| 0.90  | 2.00  | 4  | 38 | 334889 | 334949 |
| 1.00  | 2.20  | 4  | 38 | 334890 | 334950 |
| 1.10  | 2.40  | 4  | 38 | 334891 | 334951 |
| 1.20  | 2.60  | 4  | 38 | 334892 | 334952 |
| 1.30  | 2.80  | 4  | 38 | 334893 | 334953 |
| 1.40  | 3.00  | 4  | 38 | 334894 | 334954 |
| 1.50  | 3.20  | 4  | 38 | 334895 | 334955 |
| 1.60  | 3.40  | 4  | 38 | 334896 | 334956 |
| 1.70  | 3.60  | 4  | 38 | 334897 | 334957 |
| 1.80  | 3.80  | 4  | 38 | 334898 | 334958 |
| 1.90  | 4.00  | 4  | 38 | 334899 | 334959 |
| 2.00  | 4.30  | 4  | 38 | 334900 | 334960 |
| 2.50  | 5.30  | 4  | 38 | 334901 | 334961 |
| 3.00  | 6.30  | 6  | 55 | 334902 | 334962 |
| 4.00  | 8.30  | 6  | 55 | 334903 | 334963 |
| 5.00  | 10.30 | 6  | 55 | 334904 | 334964 |
| 6.00  | 13.00 | 6  | 55 | 334905 | 334965 |
| 8.00  | 18.00 | 8  | 64 | 334906 | 334966 |
| 10.00 | 22.00 | 10 | 67 | 334907 | 334967 |
| 12.00 | 26.00 | 12 | 74 | 334908 | 334968 |
| 16.00 | 30.00 | 16 | 83 | 334909 | 334969 |



P.208

## SCHAFTFRÄSER VERSTÄRKTER SCHAFT MIT UNGLEICHEM DRALLWINKEL



- Schaftfräser, verstärkter Schaft, ungleichem Drallwinkel, mit  $5 \times D_1$  Hinterschliff, hochleistungsfähig, entwickelt für die Bearbeitung von zähen Materialien.
- Die dropless C-TOP-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Materialien.

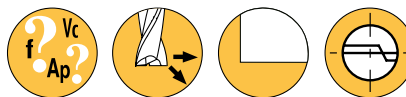
Schuppen ●●●●● Schichten ●●●●● gut ○ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLIX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ○        | ○  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ○                 | ○                      | ○  | ○            |         |            |      | ○                       | ○  | ○     | ○                        | ○  |    |                  |    |                  |  |

$D_1$        $L_1$        $L_2$        $D_{h5}$       L      C-TOP  
 $\varnothing \leq 2.00 - 0/-0.01$   
 $\varnothing < 6.00 - 0/-0.02$   
 $\varnothing \geq 6.00 - e8$

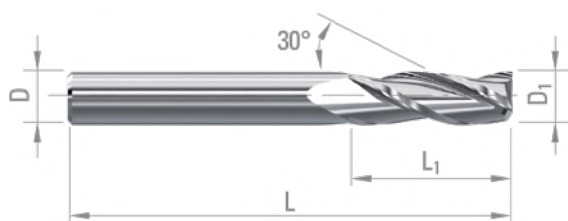
|       |       |       |    |     |        |
|-------|-------|-------|----|-----|--------|
| 0.30  | 0.70  | 1.60  | 4  | 38  | 412124 |
| 0.40  | 0.90  | 2.20  | 4  | 38  | 412125 |
| 0.50  | 1.10  | 2.70  | 4  | 38  | 412126 |
| 0.60  | 1.40  | 3.20  | 4  | 38  | 412127 |
| 0.70  | 1.60  | 3.80  | 4  | 38  | 412128 |
| 0.80  | 1.80  | 4.30  | 4  | 38  | 412129 |
| 0.90  | 2.00  | 4.80  | 4  | 38  | 412130 |
| 1.00  | 2.20  | 5.20  | 4  | 38  | 412131 |
| 1.10  | 2.40  | 5.80  | 4  | 38  | 412132 |
| 1.20  | 2.60  | 6.30  | 4  | 38  | 412133 |
| 1.30  | 2.80  | 6.70  | 4  | 38  | 412134 |
| 1.40  | 3.00  | 7.30  | 4  | 38  | 412135 |
| 1.50  | 3.20  | 7.80  | 4  | 38  | 412136 |
| 1.60  | 3.40  | 8.30  | 4  | 38  | 412137 |
| 1.70  | 3.60  | 8.70  | 4  | 38  | 412138 |
| 1.80  | 3.80  | 9.20  | 4  | 38  | 412139 |
| 1.90  | 4.00  | 9.70  | 4  | 38  | 412140 |
| 2.00  | 4.50  | 10.30 | 6  | 55  | 412141 |
| 2.50  | 5.50  | 12.80 | 6  | 55  | 412142 |
| 3.00  | 6.50  | 15.30 | 6  | 55  | 412143 |
| 4.00  | 8.50  | 20.40 | 6  | 55  | 412144 |
| 5.00  | 10.60 | 25.40 | 6  | 66  | 412145 |
| 6.00  | 13.30 | 30.50 | 6  | 66  | 412146 |
| 8.00  | 18.30 | 40.70 | 8  | 80  | 412147 |
| 10.00 | 22.50 | 50.80 | 10 | 100 | 412148 |
| 12.00 | 26.40 | 61.00 | 12 | 120 | 412149 |



P.196

SCHAFTFRÄSER

- Schafffräser, für allgemeine Bearbeitungen.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

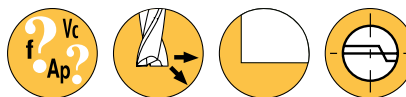


Schuppen ●●●○○○ Schlichten ●●●●○○○ ○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |          |      | K                |    |                    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|----------|------|------------------|----|--------------------|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |      | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3     | 14.4 | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                    | ○    | ○        | ○    | ⊙                | ⊙  | ⊙                  | ⊙  | ⊙  | ⊙  |

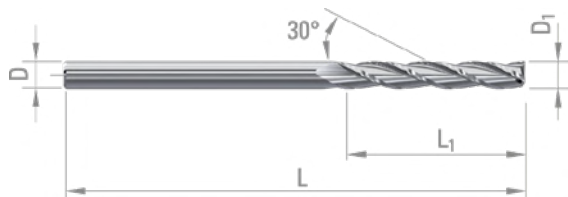
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ○            |         | ○          | ○    |                         |    |       | ○                        | ○  |                  |    |                  |    |

| D <sub>1 e8</sub> | L <sub>1</sub> | D <sub>h5</sub> | L   | VHM   | TiAlN |
|-------------------|----------------|-----------------|-----|-------|-------|
| 2.00              | 8              | 2.00            | 32  | 701   | 57082 |
| 2.50              | 8              | 2.50            | 32  | 702   | 57089 |
| 3.00              | 10             | 3.00            | 38  | 703   | 57090 |
| 3.50              | 12             | 3.50            | 38  | 34761 | 57101 |
| 4.00              | 12             | 4.00            | 50  | 704   | 57102 |
| 5.00              | 15             | 5.00            | 50  | 34626 | 57103 |
| 6.00              | 18             | 6.00            | 50  | 34627 | 57104 |
| 7.00              | 20             | 7.00            | 60  | 27097 | 57105 |
| 8.00              | 25             | 8.00            | 63  | 707   | 57106 |
| 9.00              | 25             | 9.00            | 67  | 43184 | 57107 |
| 10.00             | 30             | 10.00           | 72  | 30853 | 57108 |
| 11.00             | 30             | 11.00           | 73  | 30938 | 57109 |
| 12.00             | 30             | 12.00           | 73  | 30854 | 57110 |
| 13.00             | 30             | 13.00           | 75  | 23885 | 57111 |
| 16.00             | 30             | 16.00           | 92  | 27072 | 57114 |
| 18.00             | 40             | 18.00           | 125 | 26086 | 57115 |
| 20.00             | 40             | 20.00           | 130 | 26087 | 57117 |



P.212

SCHAFTFRÄSER  
LANGE AUSFÜHRUNG



- Schaftfräser, lange Ausführung, für allgemeine Bearbeitungen.
- TiAIN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.
- Die DIAMANT-Beschichtung verbessert die Standzeit in abrasiven NE-Metallen.

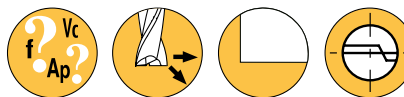
Schuppen ○○○○○ Schichten ●●●●● gut ○ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |    | M                |      |      |                                    | K    |    |    |          |    |                  |    |                    |  |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|----|------------------|------|------|------------------------------------|------|----|----|----------|----|------------------|----|--------------------|--|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    |    | Rostfreier Stahl |      |      | Aust. Rostfreier Stahl (DUPLEX/PH) |      |    |    | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |  |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12 | 13               | 14.1 | 14.2 | 14.3                               | 14.4 | 15 | 16 | 17       | 18 | 19               | 20 |                    |  |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○  | ○  | ○                | ○    | ○    | ○                                  | ○    | ○  | ○  | ○        | ○  | ○                | ○  | ○                  |  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |  |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ○                 | ○                      | ○  | ○            | ○       | ○          | ○    |                         |    |       |                          |    | ○                | ○  |                  |    |  |  |

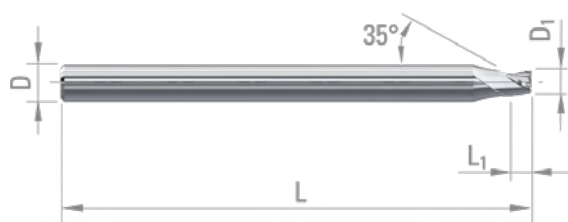
| D <sub>1e8</sub> | L <sub>1</sub> | D <sub>h5</sub> | L   | VHM   | TiAIN | DIAMANT * |
|------------------|----------------|-----------------|-----|-------|-------|-----------|
| 3                | 30             | 3               | 60  | 44695 | 57141 | 60249     |
| 4                | 30             | 4               | 60  | 44696 | 57142 | 60250     |
| 5                | 35             | 5               | 75  | 44697 | 57143 | 60251     |
| 6                | 40             | 6               | 100 | 44698 | 57144 | 59009     |
| 8                | 40             | 8               | 100 | 44699 | 57145 | 60252     |
| 10               | 40             | 10              | 100 | 44700 | 57146 | 60253     |
| 12               | 45             | 12              | 100 | 44701 | 57147 | 60254     |

\* nicht für eisenhaltige Werkstoffe



P.200

SCHAFTFRÄSER EXTRA KURZ



- Schaftfräser, verstärkter Schaft, extra kurz, für allgemeine Bearbeitungen.
- Die CUTINOX-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen.

Schuppen ●●●●● Schichten ●●●●● gut ⊙ ausgezeichnet

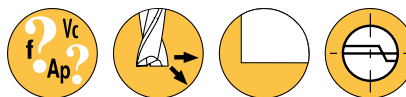
| ISO          | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |
|--------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
|              | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |    |
| VDI 3323     | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙              | ⊙                | ⊙  | ⊙  | ⊙    | ⊙                                    | ⊙    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  | ⊙  |

| ISO          | N                       |    |                         |    |    |                   |                        |    |              |         |            |      | S                       |    |       |                          |    | H                |    |                  |    |
|--------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
|              | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323     | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      | ⊙                       | ⊙  | ⊙     | ⊙                        | ⊙  |                  |    |                  |    |

D<sub>1 e8</sub>      L<sub>1</sub>      D<sub>h5</sub>      L      VHM      CUTINOX

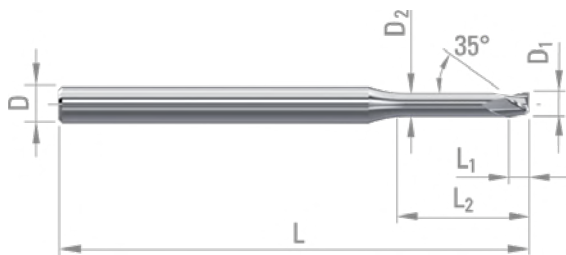
Ø < 2.00 - 0/-0.01  
 Ø < 3.00 - 0/-0.02  
 Ø ≥ 3.00 - e8

|       |       |    |    |        |        |
|-------|-------|----|----|--------|--------|
| 0.30  | 0.30  | 3  | 38 | 977779 | 977815 |
| 0.35  | 0.70  | 3  | 38 | 986521 | 373287 |
| 0.40  | 0.40  | 3  | 38 | 977780 | 977816 |
| 0.50  | 0.50  | 3  | 38 | 977781 | 977817 |
| 0.60  | 0.60  | 3  | 38 | 977782 | 977818 |
| 0.70  | 0.70  | 3  | 38 | 977783 | 977819 |
| 0.80  | 0.80  | 3  | 38 | 977784 | 977820 |
| 0.90  | 0.90  | 3  | 38 | 977785 | 977821 |
| 1.00  | 1.00  | 3  | 38 | 977786 | 977822 |
| 1.10  | 1.10  | 3  | 38 | 977787 | 977823 |
| 1.20  | 1.20  | 3  | 38 | 977788 | 977825 |
| 1.30  | 1.30  | 3  | 38 | 977789 | 977826 |
| 1.40  | 1.40  | 3  | 38 | 977790 | 977827 |
| 1.50  | 1.50  | 3  | 38 | 977791 | 977828 |
| 1.60  | 1.60  | 3  | 38 | 977792 | 977829 |
| 1.70  | 1.70  | 3  | 38 | 977793 | 977830 |
| 1.80  | 1.80  | 3  | 38 | 977794 | 977831 |
| 1.90  | 1.90  | 3  | 38 | 977795 | 977832 |
| 2.00  | 2.00  | 3  | 38 | 977796 | 977833 |
| 2.50  | 2.50  | 3  | 38 | 977797 | 977834 |
| 3.00  | 3.00  | 3  | 38 | 977798 | 977835 |
| 4.00  | 4.00  | 4  | 42 | 977799 | 977836 |
| 5.00  | 5.00  | 5  | 50 | 977800 | 977837 |
| 6.00  | 6.00  | 6  | 50 | 977801 | 977838 |
| 8.00  | 8.00  | 8  | 63 | 977802 | 977839 |
| 10.00 | 10.00 | 10 | 72 | 977803 | 977840 |



P.200

SCHAFTFRÄSER EXTRA KURZ



- Schaftfräser, verstärkter Schaft, extra kurze, mit 3xD<sub>1</sub> Hinterschliff.
- Hochleistungswerkzeuge.
- Die CUTINOX-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen.

Schuppen ●●●●● Schichten ●●●●● gut ⊙ ausgezeichnet

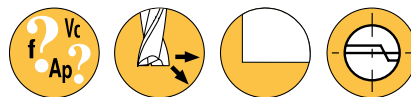
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙              | ⊙  | ⊙                | ⊙  | ⊙                                  | ⊙    | ⊙    | ⊙    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      | ⊙                       | ⊙  | ⊙     | ⊙                        | ⊙  |    |                  |    |                  |  |

D<sub>1</sub> L<sub>1</sub> D<sub>2</sub> D<sub>h5</sub> L L<sub>2</sub> DIXI VHM CUTINOX  
 Ø<2.00 - 0/-0.01  
 Ø<3.00 - 0/-0.02  
 Ø≥3.00 - e8

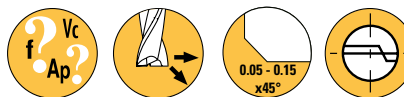
| D <sub>1</sub> | L <sub>1</sub> | D <sub>2</sub> | D <sub>h5</sub> | L  | L <sub>2</sub> | DIXI    | VHM    | CUTINOX |
|----------------|----------------|----------------|-----------------|----|----------------|---------|--------|---------|
| 0.30           | 0.30           | 0.27           | 3               | 38 | 0.90           | 7333-3D | 978791 | 978793  |
|                |                |                |                 |    | 1.50           | 7333-5D | 978895 | 978896  |
|                |                |                |                 |    | 2.40           | 7333-8D | 978591 | 978922  |
| 0.40           | 0.40           | 0.37           | 3               | 38 | 1.20           | 7333-3D | 978794 | 978795  |
|                |                |                |                 |    | 2.00           | 7333-5D | 978897 | 978898  |
|                |                |                |                 |    | 3.20           | 7333-8D | 978928 | 979009  |
| 0.50           | 0.50           | 0.45           | 3               | 38 | 1.50           | 7333-3D | 978796 | 978798  |
|                |                |                |                 |    | 2.50           | 7333-5D | 978899 | 978900  |
|                |                |                |                 |    | 4.00           | 7333-8D | 979010 | 979011  |
| 0.60           | 0.60           | 0.55           | 3               | 38 | 1.80           | 7333-3D | 978799 | 978800  |
|                |                |                |                 |    | 3.00           | 7333-5D | 978901 | 978902  |
|                |                |                |                 |    | 4.80           | 7333-8D | 979012 | 979014  |
| 0.70           | 0.70           | 0.65           | 3               | 38 | 2.10           | 7333-3D | 978801 | 978802  |
|                |                |                |                 |    | 3.50           | 7333-5D | 978903 | 978904  |
|                |                |                |                 |    | 5.60           | 7333-8D | 979016 | 979017  |
| 0.80           | 0.80           | 0.75           | 3               | 38 | 2.40           | 7333-3D | 978803 | 978804  |
|                |                |                |                 |    | 4.00           | 7333-5D | 978905 | 978906  |
|                |                |                |                 |    | 6.40           | 7333-8D | 979018 | 979019  |
| 0.90           | 0.90           | 0.85           | 3               | 38 | 2.70           | 7333-3D | 978805 | 978806  |
|                |                |                |                 |    | 4.50           | 7333-5D | 978907 | 978908  |
|                |                |                |                 |    | 7.20           | 7333-8D | 979020 | 979021  |
| 1.00           | 1.00           | 0.95           | 3               | 38 | 3.00           | 7333-3D | 978807 | 978808  |
|                |                |                |                 |    | 5.00           | 7333-5D | 978909 | 978910  |
|                |                |                |                 |    | 8.00           | 7333-8D | 979022 | 979023  |
| 1.10           | 1.10           | 1.05           | 3               | 38 | 3.30           | 7333-3D | 978809 | 978811  |
|                |                |                |                 |    | 5.50           | 7333-5D | 978911 | 978912  |
|                |                |                |                 |    | 8.80           | 7333-8D | 979024 | 979025  |
| 1.20           | 1.20           | 1.15           | 3               | 38 | 3.60           | 7333-3D | 978812 | 978813  |
|                |                |                |                 |    | 6.00           | 7333-5D | 978913 | 978914  |
|                |                |                |                 |    | 9.60           | 7333-8D | 979026 | 979027  |
| 1.30           | 1.30           | 1.25           | 3               | 38 | 3.90           | 7333-3D | 978814 | 978815  |
|                |                |                |                 |    | 6.50           | 7333-5D | 978915 | 978916  |
|                |                |                |                 |    | 10.40          | 7333-8D | 979028 | 979029  |





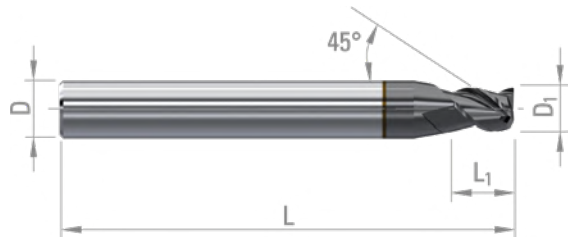
## SCHAFTFRÄSER EXTRA KURZ

| $D_1$ | $L_1$ | $D_2$ | $D_{h5}$ | L  | $L_2$ | DIXI    | VHM    | CUTINOX |
|-------|-------|-------|----------|----|-------|---------|--------|---------|
| 1.30  | 1.30  | 1.25  | 3        | 38 | 3.90  | 7333-3D | 978814 | 978815  |
|       |       |       |          |    | 6.50  | 7333-5D | 978915 | 978916  |
|       |       |       |          |    | 10.40 | 7333-8D | 979028 | 979029  |
| 1.40  | 1.40  | 1.35  | 3        | 38 | 4.20  | 7333-3D | 978816 | 978817  |
|       |       |       |          |    | 7.00  | 7333-5D | 978917 | 978918  |
|       |       |       |          |    | 11.20 | 7333-8D | 979030 | 979031  |
| 1.50  | 1.50  | 1.45  | 3        | 38 | 4.50  | 7333-3D | 978818 | 978819  |
|       |       |       |          |    | 7.50  | 7333-5D | 978919 | 978920  |
|       |       |       |          |    | 12.00 | 7333-8D | 979032 | 979033  |
| 1.60  | 1.60  | 1.55  | 3        | 38 | 4.80  | 7333-3D | 978820 | 978821  |
|       |       |       |          |    | 8.00  | 7333-5D | 978921 | 978923  |
|       |       |       |          |    | 12.80 | 7333-8D | 979034 | 979035  |
| 1.70  | 1.70  | 1.65  | 3        | 38 | 5.10  | 7333-3D | 978823 | 978824  |
|       |       |       |          |    | 8.50  | 7333-5D | 978924 | 978925  |
|       |       |       |          |    | 13.60 | 7333-8D | 979036 | 979037  |
| 1.80  | 1.80  | 1.75  | 3        | 38 | 5.40  | 7333-3D | 978826 | 978828  |
|       |       |       |          |    | 9.00  | 7333-5D | 978926 | 978927  |
|       |       |       |          |    | 14.40 | 7333-8D | 979038 | 979039  |
| 1.90  | 1.90  | 1.85  | 3        | 38 | 5.70  | 7333-3D | 978829 | 978830  |
|       |       |       |          |    | 9.50  | 7333-5D | 978929 | 978930  |
|       |       |       |          |    | 15.20 | 7333-8D | 979041 | 979040  |
| 2.00  | 2.00  | 1.90  | 3        | 38 | 6.00  | 7333-3D | 978848 | 978849  |
|       |       |       |          |    | 10.00 | 7333-5D | 978931 | 978932  |
|       |       |       |          |    | 16.00 | 7333-8D | 979042 | 979043  |
| 2.50  | 2.50  | 2.40  | 3        | 38 | 7.50  | 7333-3D | 978850 | 978851  |
|       |       |       |          |    | 12.50 | 7333-5D | 978933 | 978934  |
|       |       |       |          |    | 20.00 | 7333-8D | 979044 | 979045  |
| 3.00  | 3.00  | 2.90  | 3        | 38 | 9.00  | 7333-3D | 978852 | 978853  |
|       |       |       |          |    | 15.00 | 7333-5D | 978935 | 978936  |
|       |       |       |          |    | 24.00 | 7333-8D | 979046 | 979047  |
| 4.00  | 4.00  | 3.80  | 4        | 42 | 12.00 | 7333-3D | 978854 | 978855  |



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SCHAFTFRÄSER  
VERSTÄRKTER SCHAFT



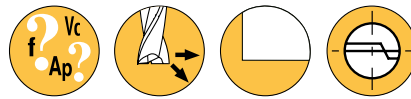
- Schaftfräser, verstärkter Schaft, extra kurze Bearbeitungslänge, für hohe Schnittgeschwindigkeiten bei rostfreiem Stahl entwickelt.
- Die XIDUR-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren.

Schuppen ●●●●○ Schichten ●●●●○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLIX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ⊙                                  | ⊙    | ⊙    | ⊙    | ○        | ○  | ○                | ○  | ○                  | ○  |

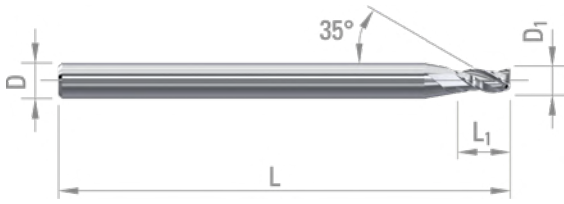
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         |            |      |                         |    |       | ⊙                        | ⊙  |                  |    |                  |    |

| D <sub>1</sub>   | L <sub>1</sub> | D <sub>h5</sub> | L  | XIDUR |
|------------------|----------------|-----------------|----|-------|
| Ø<2.00 - 0/-0.01 |                |                 |    |       |
| Ø<3.00 - 0/-0.02 |                |                 |    |       |
| Ø≥3.00 - e8      |                |                 |    |       |
| 1.00             | 2.00           | 4               | 50 | 51704 |
| 1.50             | 3.00           | 4               | 50 | 63945 |
| 2.00             | 3.00           | 4               | 50 | 51705 |
| 2.50             | 3.00           | 4               | 50 | 63946 |
| 3.00             | 4.50           | 6               | 57 | 51706 |
| 4.00             | 6.00           | 6               | 57 | 51707 |
| 5.00             | 7.00           | 6               | 57 | 51708 |
| 6.00             | 8.00           | 8               | 63 | 51709 |
| 8.00             | 10.00          | 10              | 72 | 51710 |
| 10.00            | 12.00          | 10              | 72 | 51711 |
| 12.00            | 15.00          | 12              | 83 | 51712 |



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SCHAFTFRÄSER  
VERSTÄRKTER SCHAFT



- Schaftfräser, verstärkter Schaft, für die Bearbeitung von Materialien mit geringer Härte entwickelt.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.
- Die DLC-Beschichtung verbessert die Standzeit in NE-Werkstoffen.

Schuppen ●●●●○ Schichten ●●●●○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                    |      |          |                  | K  |                    |    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|--------------------------------------|------|----------|------------------|----|--------------------|----|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                 | 14.2 | 14.3     | 14.4             | 15 | 16                 | 17 | 18 | 19 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○                | ○  | ○  | ○                                    | ○    | ○        | ○                | ○  | ○                  | ○  | ○  | ○  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |                  |    |    |  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|------------------|----|----|--|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl | Hartes Gusseisen |    |    |  |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39               | 40 | 41 |  |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            | ○    | ○                       |    |       |                          |    | ○                | ○                |    |    |  |  |

D<sub>1</sub> L<sub>1</sub> D<sub>h5</sub> L VHM TiAlN DLC \*  
 Ø<2.00 - 0/-0.01  
 Ø<3.00 - 0/-0.02  
 Ø≥3.00 - e8

|      |       |   |    |        |        |        |
|------|-------|---|----|--------|--------|--------|
| 0.30 | 0.60  | 3 | 38 | 972403 | 972404 | 975572 |
| 0.40 | 0.80  | 3 | 38 | 972405 | 972406 | 982427 |
| 0.50 | 1.00  | 3 | 38 | 52565  | 963644 | 977361 |
| 0.60 | 1.20  | 3 | 38 | 963676 | 963678 | 982428 |
| 0.70 | 1.40  | 3 | 38 | 963677 | 963679 | 973037 |
| 0.80 | 1.60  | 3 | 38 | 954650 | 963680 | 982429 |
| 0.90 | 1.80  | 3 | 38 | 951666 | 963681 | 983104 |
| 1.00 | 2.00  | 3 | 38 | 31445  | 44659  | 960097 |
| 1.10 | 2.20  | 3 | 38 | 66496  | 66497  | 983105 |
| 1.20 | 2.40  | 3 | 38 | 66498  | 66499  | 973027 |
| 1.30 | 2.60  | 3 | 38 | 66500  | 66501  | 983106 |
| 1.40 | 2.80  | 3 | 38 | 66502  | 66503  | 983107 |
| 1.50 | 3.00  | 3 | 38 | 29407  | 40913  | 957103 |
| 1.60 | 3.20  | 3 | 38 | 41962  | 66510  | 983108 |
| 1.70 | 3.40  | 3 | 38 | 66504  | 66505  | 983109 |
| 1.80 | 3.60  | 3 | 38 | 66506  | 66507  | 983111 |
| 1.90 | 3.80  | 3 | 38 | 66508  | 66509  | 983112 |
| 2.00 | 4.00  | 3 | 38 | 39304  | 40081  | 61971  |
| 2.50 | 5.00  | 3 | 38 | 39213  | 40580  | 61973  |
| 3.00 | 6.00  | 6 | 50 | 40739  | 41954  | 61974  |
| 4.00 | 8.00  | 6 | 50 | 34377  | 53324  | 984169 |
| 5.00 | 10.00 | 6 | 50 | 48700  | 53325  | 984170 |
| 6.00 | 12.00 | 6 | 50 | 978074 | 978075 | 984171 |

# DIXI 7253 CUTINOX

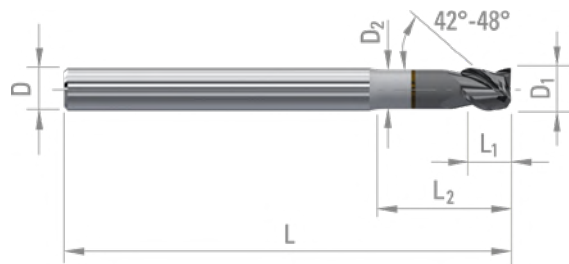
Z = 3



P.268

$D_1 \geq 10$

## FRÄSER MIT UNGLEICHEM DRALLWINKEL MIT HINTERSCHLIFF



- Schafffräser, extra kurze Bearbeitungslänge, mit Hinterschliff, ungleichem Drallwinkel, hohe Schnittleistungen entwickelt für die Bearbeitung von zähen Materialien.
- Die CUTINOX-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen.

Schuppen ●●●●● Schichten ●●●●● gut ○ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ○        | ○  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         |            |      | ○                       | ○  | ○     | ○                        | ○  |                  |    |                  |    |

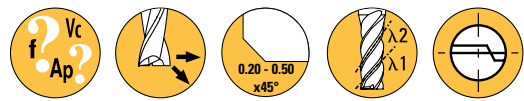
$D_1$      $L_1$      $D_2$      $L_2$      $D_{h5}$     L    CUTINOX

$\varnothing < 2.00 - 0/-0.01$   
 $\varnothing < 3.00 - 0/-0.02$   
 $\varnothing \geq 3.00 - e8$

|    |    |       |    |    |    |        |
|----|----|-------|----|----|----|--------|
| 3  | 4  | 2.80  | 9  | 6  | 57 | 968764 |
| 4  | 5  | 3.70  | 12 | 6  | 57 | 968765 |
| 5  | 6  | 4.60  | 15 | 6  | 57 | 968766 |
| 6  | 7  | 5.50  | 18 | 8  | 63 | 968767 |
| 8  | 9  | 7.50  | 24 | 10 | 72 | 968768 |
| 10 | 11 | 9.30  | 30 | 10 | 72 | 968769 |
| 12 | 13 | 11.20 | 36 | 12 | 83 | 968770 |
| 16 | 17 | 15.20 | 48 | 16 | 92 | 968771 |

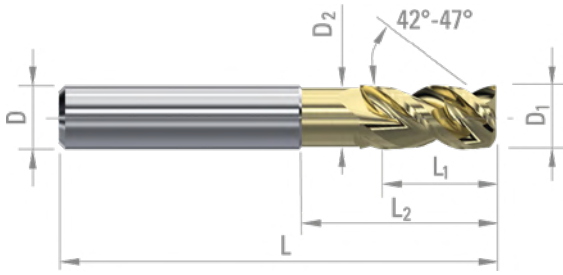
# DIXI 7563 - 7563-FC DIXAL

Z = 3



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## FRÄSER MIT UNGLEICHEM DRALLWINKEL



- Schafffräser mit ungleichem Drallwinkel und Doppelnut-Geometrie, entwickelt für die Bearbeitung von NE-Metallen.
- DIXI 7563-FC mit Innenkühlung in der Spannut.
- Die DIXAL-Beschichtung verbessert die Standzeit in NE-Metallen und reduziert die Bildung von Aufbauschneiden.

Schuppen ●●●●●○ Schichten ●●●●●○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |                  |    |    |      |                                      |      |          |    |                  |    |                    |    |    |

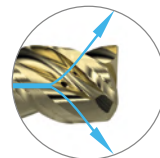
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ○                 | ○                      | ○  | ○            |         |            |      |                         |    |       |                          |    |                  |    |                  |    |

| $D_{1\ h10}$ | $D_2$ | $D_{h5}$ | $L_1$    | $L_2$     | L          | 7563 DIXAL  | 7563-FC DIXAL    |
|--------------|-------|----------|----------|-----------|------------|-------------|------------------|
| 4            | 3.60  | 4        | 9        | 14        | 57         | 991388      | -                |
| 6            | 5.60  | 6        | 13<br>13 | 21<br>42  | 57<br>76   | 991389<br>- | 321899<br>374028 |
| 8            | 7.40  | 8        | 19<br>21 | 26<br>62  | 63<br>100  | 991390<br>- | 321900<br>374029 |
| 10           | 9.30  | 10       | 22<br>22 | 30<br>58  | 72<br>100  | 991391<br>- | 321901<br>374030 |
| 12           | 11.00 | 12       | 26<br>26 | 37<br>73  | 83<br>120  | 991392<br>- | 321902<br>374031 |
| 16           | 15.00 | 16       | 32<br>36 | 42<br>100 | 92<br>150  | 991393<br>- | 321903<br>374032 |
| 20           | 19.00 | 20       | 38<br>41 | 50<br>98  | 104<br>150 | 991394<br>- | 322866<br>374033 |

### DIXI 7563



### DIXI 7563-FC





DIXI 7273

Z = 3



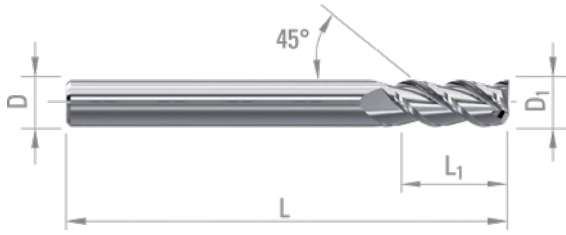
P.218



$D_1 \geq 12$



SCHLICHTFRÄSER



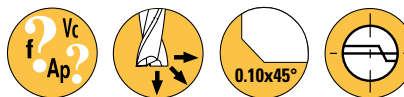
- Schaftfräser. Für die Schlichtbearbeitung von Werkstoffen mit geringer Härte.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

Schruppen ●●●●○ Schlichten ●●●●●○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                    | ○    | ○    | ○    | ○        | ○  | ○                | ○  | ○                  | ○  |

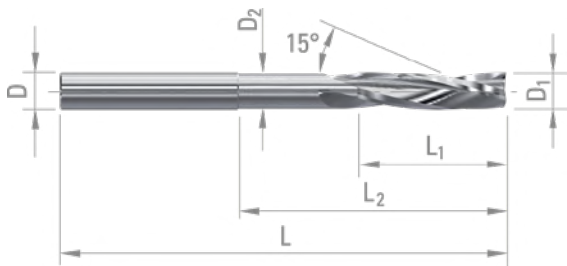
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ○                 | ○                      | ○  | ○            |         | ○          | ○    |                         |    |       | ○                        | ○  |    |                  |    |                  |  |

| $D_{1 \text{ e}8}$ | $L_1$ | $D_{\text{h}5}$ | L  | VHM   | TiAlN |
|--------------------|-------|-----------------|----|-------|-------|
| 3                  | 10    | 3               | 38 | 35741 | 57254 |
| 4                  | 12    | 4               | 50 | 35742 | 57255 |
| 5                  | 14    | 5               | 50 | 34225 | 57256 |
| 6                  | 16    | 6               | 57 | 35743 | 57258 |
| 8                  | 20    | 8               | 63 | 34227 | 57259 |
| 10                 | 22    | 10              | 72 | 34228 | 57260 |
| 12                 | 22    | 12              | 73 | 34229 | 57261 |
| 16                 | 27    | 16              | 82 | 35745 |       |



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SCHAUMSTOFF-FRÄSER



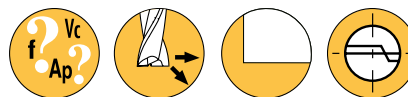
- Schafffräser entwickelt für die Bearbeitung weicher Materialien.
- Werkzeuge empfohlen zur Erzielung rissfreier Oberflächen bei dichten Schäumen.

Schuppen ●●●●○ Schichten ●●○○○○○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                    |      |          | K  |                  |    |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX/PH) |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                               | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |                  |    |    |      |                                    |      |          |    |                  |    |                    |    |    |

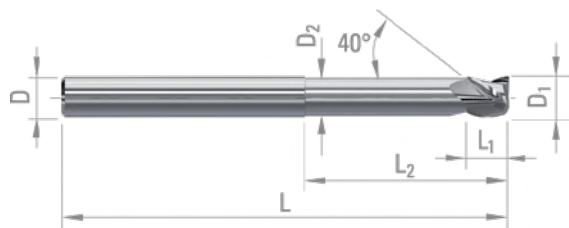
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         | ⊙          |      |                         |    |       |                          |    |                  |    |                  |    |

| D <sub>1e8</sub> | L <sub>1</sub> | D <sub>2</sub> | L <sub>2</sub> | D  | L   | VHM    |
|------------------|----------------|----------------|----------------|----|-----|--------|
| 3                | 12             | 2.40           | 20             | 3  | 50  | 389845 |
| 3                | 20             | 2.40           | 45             | 3  | 75  | 389846 |
| 4                | 30             | 3.60           | 45             | 4  | 75  | 389847 |
| 6                | 25             | 5.60           | 45             | 6  | 75  | 389848 |
| 6                | 40             | 5.60           | 70             | 6  | 100 | 389849 |
| 8                | 25             | 7.60           | 45             | 8  | 75  | 389850 |
| 8                | 40             | 7.60           | 70             | 8  | 100 | 389851 |
| 10               | 40             | 9.60           | 70             | 10 | 100 | 389852 |
| 10               | 50             | 9.60           | 85             | 10 | 120 | 389853 |
| 12               | 50             | 11.60          | 115            | 12 | 150 | 389854 |



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SCHAFTFRÄSER  
MIT HINTERSCHLIFF



- Schaftfräser mit Hinterschliff. Werkzeuge entwickelt für die Bearbeitung von tiefen Taschen und Nuten in Aluminiumlegierungen.

Schuppen ●●●●○ Schichten ●●●●○ gut ⊙ ausgezeichnet

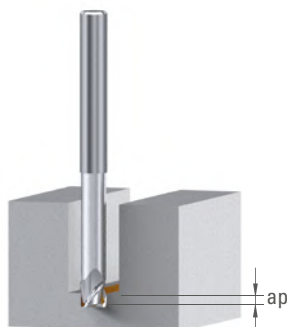
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                    |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  |                   |                        |    |              |         |            |      |                         |    |       |                          |    |    |                  |    |                  |  |

| D <sub>1h5</sub> | L <sub>1</sub> | D <sub>2</sub> | L <sub>2</sub> | D <sub>h5</sub> | L   | Z | VHM   |
|------------------|----------------|----------------|----------------|-----------------|-----|---|-------|
| 6                | 6              | 5.60           | 30             | 6               | 66  | 3 | 49281 |
| 8                | 8              | 7.60           | 45             | 8               | 81  | 3 | 49282 |
| 10               | 10             | 9.60           | 50             | 10              | 90  | 3 | 49283 |
| 12               | 12             | 11.60          | 55             | 12              | 100 | 3 | 49284 |
| 16               | 16             | 15.60          | 72             | 16              | 120 | 3 | 49285 |
| 20               | 20             | 19.60          | 80             | 20              | 130 | 4 | 49286 |

SCHNITTBEDINGUNGEN

| D <sub>1</sub> | Z | Vc [m/min] | n [tr/min] | Vf [mm/min] | ap [mm] | ae [mm] | fz [mm] |
|----------------|---|------------|------------|-------------|---------|---------|---------|
| 6.00           | 3 | 400        | 21220      | 570         | 3       | 6       | 0.009   |
| 8.00           | 3 | 400        | 15920      | 570         | 4       | 8       | 0.012   |
| 10.00          | 3 | 400        | 12730      | 760         | 5       | 10      | 0.020   |
| 12.00          | 3 | 400        | 10610      | 760         | 6       | 12      | 0.024   |
| 16.00          | 3 | 400        | 7960       | 760         | 8       | 16      | 0.032   |
| 18.00          | 3 | 400        | 7070       | 760         | 9       | 18      | 0.036   |
| 20.00          | 4 | 400        | 5370       | 1020        | 10      | 20      | 0.040   |





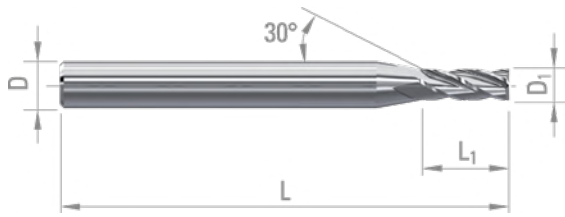


Z = 4



P.196

# SCHAFTFRÄSER VERSTÄRKTER SCHAFT



- Schafffräser, verstärkter Schaft, für allgemeine Bearbeitungen.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.
- Die DIAMANT-Beschichtung verbessert die Standzeit in abrasiven NE-Metallen.

Schuppen ●●●○○○ Schichten ●●●●○○○ ○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    | M  |                                      |      |          | K    |                  |    |                    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|--------------------------------------|------|----------|------|------------------|----|--------------------|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |      | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                 | 14.2 | 14.3     | 14.4 | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○                | ○  | ○  | ○                                    | ○    | ○        | ○    | ⊙                | ⊙  | ⊙                  | ⊙  | ⊙  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ○            | ⊙       | ○          | ○    |                         |    |       |                          | ○  | ○                |    |                  |    |  |

D<sub>1</sub>    L<sub>1</sub>    D<sub>h5</sub>    L    VHM    TiAlN    DIAMANT \*

0<2.00 - 0/-0.01  
0<3.00 - 0/-0.02  
0≥3.00 - e8

|       |       |    |     |       |       |       |
|-------|-------|----|-----|-------|-------|-------|
| 0.40  | 1.20  | 3  | 38  | 45695 | 61846 |       |
| 0.50  | 1.50  | 3  | 38  | 45696 | 61345 |       |
| 1.00  | 3.00  | 3  | 38  | 55964 | 57230 | 63697 |
| 1.50  | 4.00  | 3  | 38  | 56731 | 57231 | 63698 |
| 2.00  | 7.00  | 3  | 38  | 52357 | 57232 | 63699 |
| 3.00  | 8.00  | 6  | 57  | 28959 | 57233 | 63700 |
| 4.00  | 11.00 | 6  | 57  | 42123 | 57239 | 63701 |
| 4.50  | 11.00 | 6  | 57  | 42124 | 57241 |       |
| 5.00  | 13.00 | 6  | 57  | 41881 | 57242 | 63703 |
| 6.00  | 13.00 | 6  | 57  | 28965 | 57243 | 36278 |
| 7.00  | 16.00 | 8  | 63  | 28967 | 57244 |       |
| 8.00  | 19.00 | 8  | 63  | 42906 | 57245 |       |
| 9.00  | 19.00 | 10 | 72  | 28971 | 57246 |       |
| 10.00 | 22.00 | 10 | 72  | 42361 | 57247 |       |
| 12.00 | 26.00 | 12 | 83  | 39946 | 57248 |       |
| 14.00 | 26.00 | 14 | 83  | 42362 | 57249 |       |
| 16.00 | 32.00 | 16 | 92  | 42363 | 57251 |       |
| 20.00 | 38.00 | 20 | 104 | 42227 | 57253 |       |

\* nicht für eisenhaltige Werkstoffe

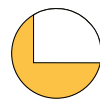


DIXI 7204

Z = 4

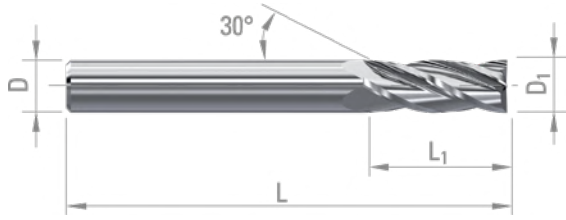


P.196



$D_1 \geq 6$

SCHAFTFRÄSER



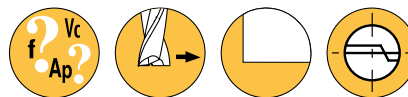
Schuppen ●●●○○○ Schichten ●●●●○○○ ○ gut ⊙ ausgezeichnet

- Schaftfräser, zylindrischer Schaft, für allgemeine Bearbeitungen.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ○            | ⊙       | ○          | ○    |                         |    |       | ○                        | ○  |                  |    |                  |    |

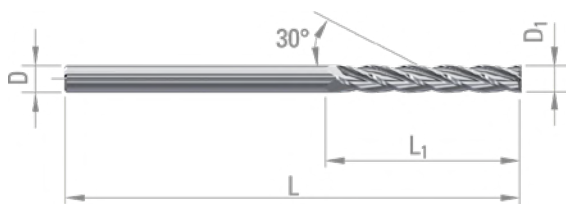
| $D_{1e8}$ | $L_1$ | $D_{h5}$ | L  | VHM   | TiAlN |
|-----------|-------|----------|----|-------|-------|
| 2.00      | 8     | 2.00     | 32 | 32944 | 57118 |
| 2.50      | 8     | 2.50     | 32 | 32945 | 57119 |
| 3.00      | 10    | 3.00     | 38 | 710   | 57120 |
| 4.00      | 12    | 4.00     | 50 | 711   | 57121 |
| 5.00      | 14    | 5.00     | 50 | 34629 | 57122 |
| 6.00      | 16    | 6.00     | 50 | 34630 | 57123 |



P.212

$D_1 \geq 6$

SCHAFTFRÄSER  
LANGE AUSFÜHRUNG



- Fräser, zylindrischer Schaft, lange Ausführung, für allgemeine Bearbeitungen.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.
- Die DIAMANT-Beschichtung verbessert die Standzeit in abrasiven NE-Metallen.

Schuppen ●○○○○ Schichten ●●●●● gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○                | ○  | ○  | ○    | ○                                    | ○    | ○        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  | ⊙  |

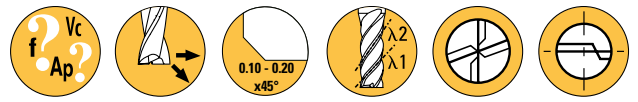
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ○            | ⊙       | ○          | ○    |                         |    |       | ○                        |    |                  |    |                  |    |

| $D_{1e8}$ | $L_1$ | $D_{h5}$ | L   | VHM   | TiAlN | DIAMANT * |
|-----------|-------|----------|-----|-------|-------|-----------|
| 3         | 30    | 3        | 60  | 44769 | 57152 | 60255     |
| 4         | 30    | 4        | 60  | 44770 | 57154 | 60258     |
| 5         | 35    | 5        | 75  | 44771 | 57155 | 60259     |
| 6         | 40    | 6        | 100 | 44706 | 57156 | 60260     |
| 8         | 40    | 8        | 100 | 44772 | 57157 | 60003     |
| 10        | 40    | 10       | 100 | 44707 | 57158 | 60004     |
| 12        | 45    | 12       | 100 | 44773 | 57159 | 60261     |
| 14        | 65    | 14       | 150 | 44708 | 57160 |           |
| 16        | 65    | 16       | 150 | 44709 | 55770 |           |
| 20        | 65    | 20       | 150 | 44776 | 57161 |           |

\* nicht für eisenhaltige Werkstoffe

# DIXI 7264 - 7264-3D CUTINOX

Z = 4



P.268

$D_1 \geq 10$

## FRÄSER MIT UNGLEICHEM DRALLWINKEL UND UNGLEICHER TEILUNG

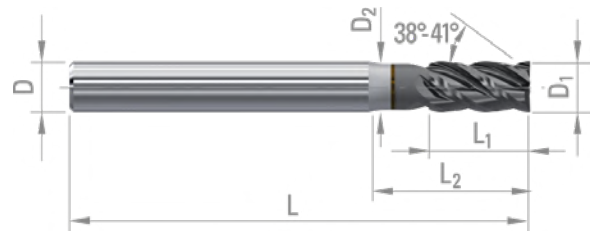


- Schafffräser, mit ungleichem Drallwinkel und ungleicher Teilung, mit  $3xD_1$  Hinterschliff. Für die Bearbeitung von zähen Materialien.
- Die CUTINOX-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen.

Schuppen ●●●●● Schichten ●●●●● gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |    |    | M                |      |      |      | K                                  |    |          |    |                  |    |                    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|----|----|------------------|------|------|------|------------------------------------|----|----------|----|------------------|----|--------------------|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    |    |    | Rostfreier Stahl |      |      |      | Aust. Rostfreier Stahl (DUPLEX/PH) |    | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12 | 13 | 14.1             | 14.2 | 14.3 | 14.4 | 15                                 | 16 | 17       | 18 | 19               | 20 |                    |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙              | ⊙  | ⊙  | ⊙  | ⊙                | ⊙    | ⊙    | ⊙    | ⊙                                  | ⊙  | ⊙        | ⊙  | ⊙                | ⊙  |                    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         |            |      | ⊙                       | ⊙  | ⊙     | ⊙                        | ⊙  |                  |    |                  |    |



| $D_1$  | $L_1$ | $D_{h5}$ | L   | CUTINOX |
|--|-------|----------|-----|---------|
| $\varnothing < 3.00 - \varnothing / -0.02$<br>$\varnothing \geq 3.00 - e8$ |       |          |     |         |
| 1.50   | 3     | 3        | 38  | 974805  |
| 2.00   | 4     | 3        | 38  | 974804  |
| 3.00   | 8     | 6        | 57  | 968672  |
| 4.00   | 11    | 6        | 57  | 968678  |
| 5.00   | 13    | 6        | 57  | 968679  |
| 6.00   | 13    | 6        | 57  | 968680  |
| 8.00   | 19    | 8        | 63  | 968681  |
| 10.00  | 22    | 10       | 72  | 968682  |
| 12.00  | 26    | 12       | 83  | 968683  |
| 16.00  | 32    | 16       | 92  | 968684  |
| 20.00  | 38    | 20       | 104 | 968685  |

| $D_1$  | $L_1$ | $D_2$ | $L_2$ | $D_{h5}$ | L   | CUTINOX |
|--|-------|-------|-------|----------|-----|---------|
| $\varnothing < 3.00 - \varnothing / -0.02$<br>$\varnothing \geq 3.00 - e8$ |       |       |       |          |     |         |
| 6.00   | 13    | 5.70  | 18    | 6        | 57  | 997930  |
| 8.00   | 19    | 7.70  | 24    | 8        | 63  | 997931  |
| 10.00  | 22    | 9.60  | 30    | 10       | 72  | 997932  |
| 12.00  | 26    | 11.60 | 36    | 12       | 83  | 997933  |
| 16.00  | 32    | 15.50 | 48    | 16       | 92  | 997934  |
| 20.00  | 38    | 19.50 | 60    | 20       | 104 | 997935  |

# DIXI 7254 CUTINOX

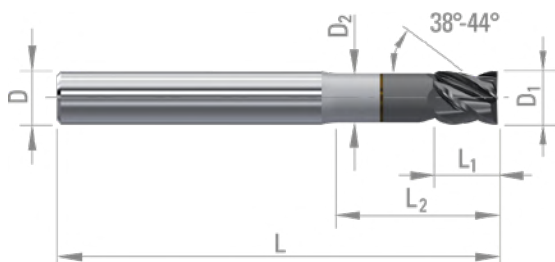
Z = 4



P.268

$D_1 \geq 10$

## FRÄSER MIT UNGLEICHEM DRALLWINKEL MIT HINTERSCHLIFF



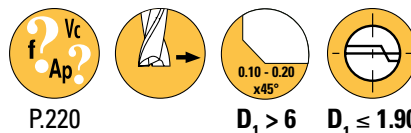
- Schafffräser, extra kurze, mit Hinterschliff, ungleichem Drallwinkel. Für die Bearbeitung von zähen Materialien.
- Die CUTINOX-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen.

Schuppen ●●●●● Schichten ●●●●● gut ○ ausgezeichnet

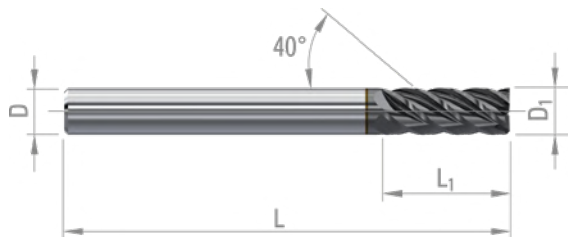
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○                | ○  | ○  | ○    | ○                                    | ○    | ○        | ○  | ○                | ○  | ○                  | ○  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      |                         | S  |       |                          |    |                  | H  |                  |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         |            |      | ○                       | ○  | ○     | ○                        | ○  |                  |    |                  |    |  |

| $D_{1\text{e}8}$ | $L_1$ | $D_2$ | $L_2$ | $D_{h5}$ | L  | CUTINOX |
|------------------|-------|-------|-------|----------|----|---------|
| 3                | 4     | 2.80  | 9     | 6        | 57 | 968686  |
| 4                | 5     | 3.70  | 12    | 6        | 57 | 968687  |
| 5                | 6     | 4.60  | 15    | 6        | 57 | 968688  |
| 6                | 7     | 5.50  | 18    | 8        | 63 | 968689  |
| 8                | 9     | 7.50  | 24    | 10       | 72 | 968690  |
| 10               | 11    | 9.30  | 30    | 10       | 72 | 968691  |
| 12               | 13    | 11.20 | 36    | 12       | 83 | 968692  |



MULTIZAHN-FRÄSER



- Multizahn-Fräser entwickelt für die Schlichtbearbeitung.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.
- Die DLC-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

Schuppen ○○○○○ Schichten ●●●●●○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLIX / PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ○                                    | ○    | ○    | ○    | ⊙        | ⊙  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |              |         |            | S    |                         |    |    |                          |    | H  |                  |    |                  |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|--------------|---------|------------|------|-------------------------|----|----|--------------------------|----|----|------------------|----|------------------|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |    | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28           | -       | -          | 29   | 30                      | 31 | 32 | 33-35                    | 36 | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen           |                         |    |                         |    |    | ⊙                 | ⊙                      | ⊙            | ⊙       |            |      | ○                       | ○  | ○  | ○                        | ○  | ○  | ○                |    |                  |    |  |

| D <sub>1</sub>     | L <sub>1</sub> | D <sub>h5</sub> | L  | Z | VHM    | TiAlN  | DLC*   |
|--------------------|----------------|-----------------|----|---|--------|--------|--------|
|                    |                |                 |    |   |        |        |        |
| Ø < 2.00 - 0/-0.01 |                |                 |    |   |        |        |        |
| Ø ≥ 2.00 - e8      |                |                 |    |   |        |        |        |
| 0.35               | 0.90           | 3               | 38 | 3 | 964114 | 966117 | 966057 |
| 0.40               | 1.00           | 3               | 38 | 3 | 964115 | 966118 | 966058 |
| 0.45               | 1.10           | 3               | 38 | 3 | 964116 | 966119 | 966059 |
| 0.50               | 1.25           | 3               | 38 | 3 | 964117 | 966120 | 966060 |
| 0.55               | 1.40           | 3               | 38 | 3 | 964118 | 966121 | 966061 |
| 0.60               | 1.50           | 3               | 38 | 3 | 964119 | 966122 | 966062 |
| 0.65               | 1.70           | 3               | 38 | 3 | 964120 | 966123 | 966063 |
| 0.70               | 1.75           | 3               | 38 | 3 | 964121 | 966124 | 966064 |
| 0.75               | 1.90           | 3               | 38 | 3 | 964122 | 966125 | 966065 |
| 0.80               | 2.00           | 3               | 38 | 3 | 964123 | 966126 | 966066 |
| 0.85               | 2.15           | 3               | 38 | 3 | 964124 | 966127 | 966067 |
| 0.90               | 2.25           | 3               | 38 | 3 | 964125 | 966128 | 966068 |
| 0.95               | 2.40           | 3               | 38 | 3 | 964126 | 966129 | 966069 |
| 1.00               | 2.50           | 3               | 38 | 3 | 964127 | 966130 | 966070 |
| 1.10               | 2.75           | 3               | 38 | 3 | 964128 | 966131 | 966071 |
| 1.20               | 3.00           | 3               | 38 | 3 | 964129 | 966132 | 966072 |
| 1.30               | 3.25           | 3               | 38 | 3 | 964130 | 966133 | 966073 |
| 1.40               | 3.50           | 3               | 38 | 3 | 964131 | 966134 | 966074 |
| 1.50               | 3.75           | 3               | 38 | 3 | 964132 | 966136 | 966075 |
| 1.60               | 4.00           | 3               | 38 | 3 | 964133 | 966138 | 966076 |
| 1.70               | 4.25           | 3               | 38 | 3 | 964134 | 966139 | 966094 |
| 1.80               | 4.50           | 3               | 38 | 3 | 964135 | 966140 | 966095 |
| 1.90               | 4.75           | 3               | 38 | 3 | 964136 | 966142 | 966096 |
| 2.00               | 8.00           | 3               | 38 | 5 | 964108 | 964112 | 964113 |

| D <sub>1</sub>     | L <sub>1</sub> | D <sub>h5</sub> | L   | Z | VHM    | TiAlN  | DLC*   |
|--------------------|----------------|-----------------|-----|---|--------|--------|--------|
|                    |                |                 |     |   |        |        |        |
| Ø < 2.00 - 0/-0.01 |                |                 |     |   |        |        |        |
| Ø ≥ 2.00 - e8      |                |                 |     |   |        |        |        |
| 2.10               | 5.25           | 3               | 38  | 5 | 964137 | 966145 | 966097 |
| 2.20               | 5.50           | 3               | 38  | 5 | 964140 | 966146 | 966098 |
| 2.30               | 5.75           | 3               | 38  | 5 | 964141 | 966147 | 966099 |
| 2.40               | 6.00           | 3               | 38  | 5 | 964142 | 966148 | 966101 |
| 2.50               | 8.00           | 3               | 38  | 5 | 964109 | 964110 | 964111 |
| 2.60               | 6.50           | 3               | 38  | 5 | 964143 | 966149 | 966102 |
| 2.70               | 6.75           | 3               | 38  | 5 | 964144 | 966150 | 966104 |
| 2.80               | 7.00           | 3               | 38  | 5 | 964145 | 966151 | 966105 |
| 2.90               | 7.00           | 3               | 38  | 5 | 964146 | 966152 | 966106 |
| 3.00               | 10.00          | 3               | 38  | 5 | 45657  | 49683  | 966107 |
| 4.00               | 12.00          | 4               | 50  | 5 | 45658  | 49684  | 964325 |
| 5.00               | 14.00          | 5               | 50  | 5 | 45659  | 49685  | 966115 |
| 6.00               | 16.00          | 6               | 57  | 5 | 45546  | 49686  | 966116 |
| 8.00               | 19.00          | 8               | 63  | 5 | 45547  | 49688  |        |
| 9.00               | 22.00          | 9               | 67  | 5 | 45661  | 49689  |        |
| 10.00              | 22.00          | 10              | 72  | 6 | 45548  | 49690  |        |
| 12.00              | 26.00          | 12              | 83  | 6 | 45662  | 49691  |        |
| 16.00              | 32.00          | 16              | 92  | 6 | 45549  | 49693  |        |
| 20.00              | 38.00          | 20              | 104 | 8 | 45550  | 49694  |        |

\* nicht für eisenhaltige Werkstoffe

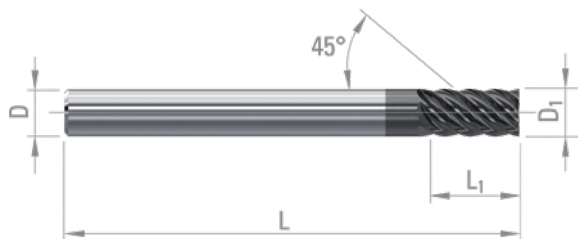


P.222

$D_1 > 6$

$D_1 \leq 1.50$

MULTIZAHN-FRÄSER



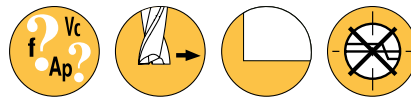
Schuppen ○○○○○ Schichten ●●●●● gut ○ ausgezeichnet ⊙

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   | ○              | ○                | ○  | ○  |                                      |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         |            |      | ○                       | ○  | ○     |                          |    | ⊙                | ⊙  | ⊙                | ⊙  |

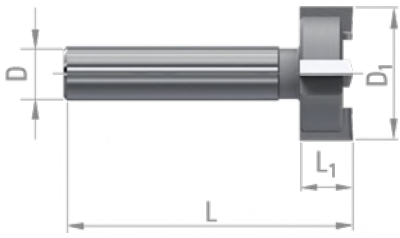
| $D_1$ | $L_1$ | $D_{h5}$ | L  | Z  | XIDUR  |
|-------|-------|----------|----|----|--------|
| 0.40  | 0.80  | 3        | 38 | 3  | 956595 |
| 0.50  | 1.00  | 3        | 38 | 3  | 956596 |
| 0.60  | 1.20  | 3        | 38 | 3  | 956597 |
| 0.70  | 1.40  | 3        | 38 | 3  | 956598 |
| 0.80  | 1.60  | 3        | 38 | 3  | 956599 |
| 0.90  | 1.80  | 3        | 38 | 3  | 956600 |
| 1.00  | 2.00  | 3        | 38 | 4  | 956601 |
| 1.50  | 3.00  | 3        | 38 | 4  | 956602 |
| 2.00  | 4.00  | 3        | 38 | 5  | 956603 |
| 2.50  | 5.00  | 3        | 38 | 5  | 957465 |
| 3.00  | 6.00  | 3        | 38 | 5  | 49107  |
| 4.00  | 8.00  | 4        | 50 | 5  | 49108  |
| 6.00  | 12.00 | 6        | 57 | 6  | 49109  |
| 8.00  | 16.00 | 8        | 63 | 6  | 49110  |
| 10.00 | 20.00 | 10       | 72 | 6  | 49111  |
| 12.00 | 24.00 | 12       | 83 | 8  | 49112  |
| 16.00 | 32.00 | 16       | 92 | 10 | 49113  |

$\varnothing < 2.00 - \varnothing / -0.01$   
 $\varnothing < 3.00 - \varnothing / -0.02$   
 $\varnothing \geq 3.00 - e8$



P.224

**PLANFRÄSER MIT GELÖTETEN EINSÄTZEN**



- Planfräser mit gelöteten Einsätzen für das Zerspanen von Kunststoffen.
- Das Werkzeug eignet sich ebenfalls zum Überfräsen des Maschinentisches.

Schuppen ●●●○○ Schichten ●●●●○○○ ○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLIX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                    |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         | ⊙          |      |                         |    |       |                          |    |    |                  |    |                  |  |

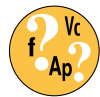
| $D_{1 \pm 0.05}$ | $L_1$ | $D_{h6}$ | L  | Z | VHM    | VHM    |
|------------------|-------|----------|----|---|--------|--------|
| 12               | 8     | 6        | 43 | 4 | 381186 | 381192 |
| 20               | 8     | 8        | 43 | 4 | 381187 | 381193 |
| 25               | 8     | 8        | 43 | 5 | 381188 | 381194 |
| 30               | 8     | 8        | 43 | 5 | 381190 | 381195 |
| 35               | 8     | 8        | 43 | 6 | 381191 | 381196 |



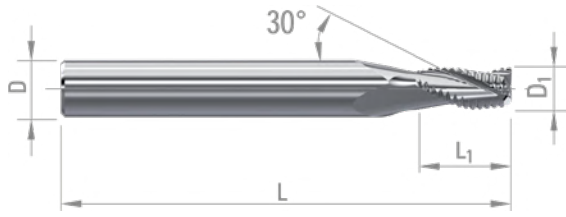


DIXI 7210

Z = 3



SCHRUPPFÄSER



P.224

- Schruppfräser, für allgemeine Bearbeitungen, feiner Spanbruch.
- Die CUTINOX-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen.

Schruppen ●●●●● Schlichten ○○○○○○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○                | ○  | ○  | ⊙    | ⊙                                    | ⊙    | ⊙        | ⊙  | ⊙                | ○  | ○                  | ○  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      |                         |    |       | ○                        | ○  |                  |    |                  |    |

| D <sub>1 d12</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    | CUTINOX |
|--------------------|----------------|-----------------|----|--------|---------|
| 3                  | 8              | 6               | 57 | 955178 | 955179  |
| 4                  | 10             | 6               | 57 | 955092 | 955091  |
| 5                  | 13             | 6               | 57 | 955089 | 955090  |
| 6                  | 13             | 8               | 63 | 955088 | 955087  |
| 7                  | 16             | 8               | 63 | 955086 | 955085  |
| 8                  | 16             | 8               | 63 | 955082 | 955033  |
| 10                 | 22             | 10              | 72 | 955093 | 955094  |
| 12                 | 25             | 12              | 83 | 959048 | 956993  |



Auf Anfrage



DIXI 7213

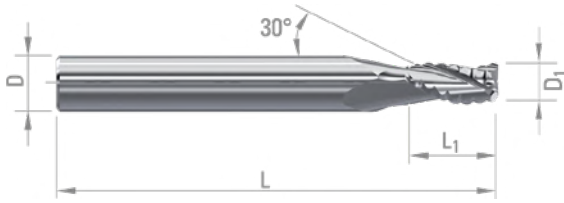
Z = 3



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SCHRUPPFÄRÄSER

- Schruppfräser, für allgemeine Bearbeitungen.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.



Schruppen ●●○○○ Schichten ○○○○○○ ○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ○                 | ○                      | ○  | ○            | ○       |            |      |                         |    |       | ○                        | ○  |                  |    |                  |    |

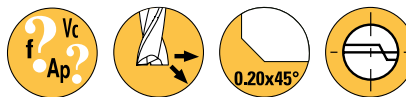


DIN 6535 HA



DIN 6535 HB

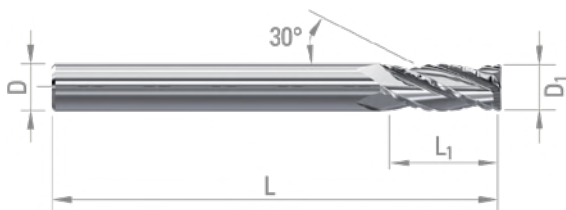
| D <sub>1 d12</sub> | L <sub>1</sub> | D <sub>h5</sub> | L   | VHM   | TiAlN | VHM    | TiAlN  |
|--------------------|----------------|-----------------|-----|-------|-------|--------|--------|
| 4                  | 10             | 6               | 57  | 31451 | 57018 | 367642 | 367638 |
| 5                  | 13             | 6               | 57  | 37136 | 57019 | 367629 | 367633 |
| 6                  | 13             | 8               | 63  | 37137 | 57020 | 367640 | 367630 |
| 7                  | 16             | 8               | 63  | 37138 | 57021 | 367632 | 367645 |
| 8                  | 16             | 10              | 72  | 43218 | 57022 | 367634 | 367625 |
| 10                 | 22             | 10              | 72  | 43214 | 57024 | 367636 | 367631 |
| 11                 | 22             | 12              | 83  | 37142 | 57025 | 367646 | 367626 |
| 12                 | 25             | 12              | 83  | 37143 | 57026 | 367644 | 367635 |
| 14                 | 27             | 14              | 83  | 37144 | 57027 | 367643 | 367641 |
| 16                 | 36             | 16              | 100 | 37145 | 57028 | 367628 | 367627 |
| 20                 | 40             | 20              | 104 | 37588 | 57029 | 367637 | 367639 |



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SCHRUPPFÄRÄSER

- Schruppfräser, für allgemeine Bearbeitungen.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.



Schruppen ●●●●● Schlichten ○○○○○○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○                | ○  | ○  | ○    | ○                                    | ○    | ○        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ○                 | ○                      | ○  | ○            | ○       |            |      |                         |    |       | ○                        | ○  |                  |    |                  |    |



DIN 6535 HA



DIN 6535 HB

| $D_{1d12}$ | $L_1$ | $D_{h5}$ | L   | VHM   | TiAlN | VHM    | TiAlN  |
|------------|-------|----------|-----|-------|-------|--------|--------|
| 6          | 15    | 6        | 57  | 45798 | 61412 | 367654 | 367651 |
| 8          | 16    | 10       | 72  | 39954 | 62426 | 367657 | 367650 |
| 10         | 22    | 10       | 72  | 37146 | 31133 | 367648 | 367656 |
| 12         | 25    | 12       | 83  | 37148 | 60949 | 367647 | 367658 |
| 16         | 36    | 16       | 100 | 37151 | 63333 | 367652 | 367655 |
| 20         | 40    | 20       | 104 | 37152 | 63334 | 367653 | 367649 |

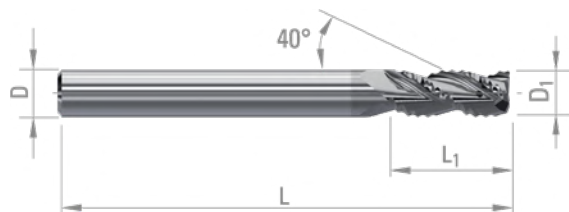
# DIXI 7215 - 7215-FC DAC

Z = 3



P.232

## SCHRUPPFÄRSE ALUMINIUM

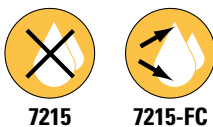


- Schrappfräser mit Innenkühlung in der Spannutt. Entwickelt für die Bearbeitung von NE-Metallen.
- DIXI 7215-FC mit Innenkühlung in der Spannutt.
- Die DAC-Beschichtung verbessert die Standzeit in NE-Metallen und reduziert die Bildung von Aufbauschneiden.

Schruppen ●●●●● Schichten ○○○○○○ ○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                    |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      |                         |    |       |                          |    |                  |    |                  |    |



| D <sub>1 d12</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | DAC    | DAC    |
|--------------------|----------------|-----------------|----|--------|--------|
| 6                  | 14             | 6               | 57 | 993017 | 995594 |
| 8                  | 21             | 8               | 63 | 993018 | 995595 |
| 10                 | 24             | 10              | 72 | 993003 | 995596 |
| 12                 | 28             | 12              | 83 | 990143 | 995597 |
| 16                 | 34             | 16              | 92 | 993019 | 307320 |

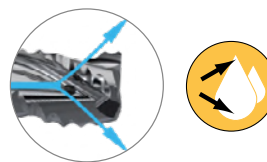


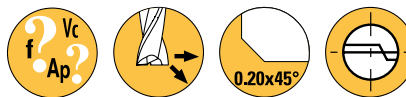
Auf Anfrage

### DIXI 7215



### DIXI 7215-FC

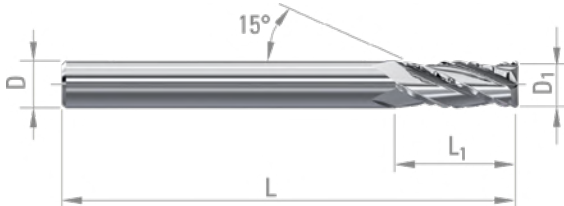




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SCHRUPPFRÄSER KUNSTSTOFF

- Schruppfräser. Entwickelt für die Kunststoffbearbeitung.

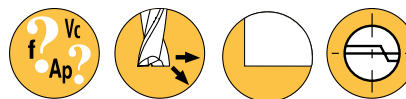


Schruppen ●●●●● Schlichten ○○○○○○ ○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |                  |    |    |                                      |      |      |      |          |    |                  |    |                    |    |

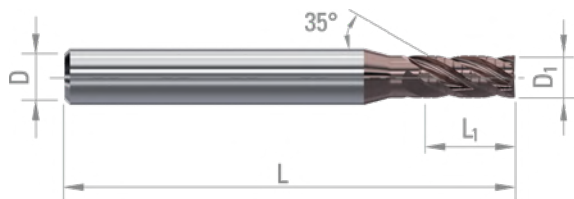
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         | ⊙          | ⊙    |                         |    |       |                          |    |                  |    |                  |    |

| D <sub>1 d12</sub> | D <sub>h5</sub> | L <sub>1</sub> | L   | VHM    |
|--------------------|-----------------|----------------|-----|--------|
| 6                  | 6               | 16             | 50  | 381093 |
|                    |                 | 25             | 75  | 381095 |
| 8                  | 8               | 22             | 63  | 381096 |
|                    |                 | 33             | 79  | 381097 |
| 10                 | 10              | 32             | 73  | 381098 |
|                    |                 | 42             | 102 | 381100 |
| 12                 | 12              | 42             | 102 | 381101 |



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SCHRUPPFRÄSER  
FÜR SCHWER ZERSPANBARE MATERIALIEN

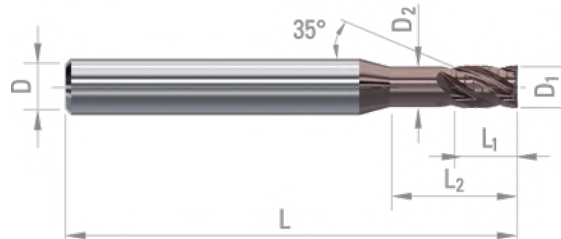
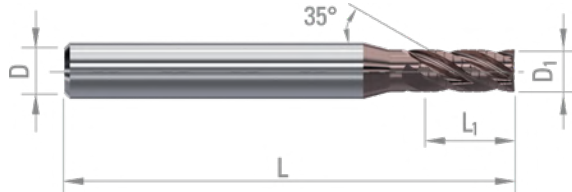


- Schruppfräser für die Bearbeitung von schwer zerspanbaren Materialien.
- Erzeugt eine bessere Oberflächengüte als ein herkömmlicher Schruppfräser.
- Die dropless C-TOP-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Materialien.

Schruppen ●●●●● Schichten ●●○○○○○ ○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙              | ⊙  | ⊙                | ⊙  | ⊙                                  | ⊙    | ⊙    | ⊙    | ○        | ○  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           |                         |    |                         |    |    | ○                 | ○                      | ○  | ⊙            |         |            |      | ⊙                       | ⊙  | ⊙     | ⊙                        | ⊙  |                  |    |                  |    |



| $D_{1d12}$ | $D_{h5}$ | L  | Z | $L_1$ | 7220 C-TOP |
|------------|----------|----|---|-------|------------|
| 3.00       | 6        | 55 | 3 | 4.50  | 358881     |
|            |          |    |   | 8.00  | 358883     |
| 3.50       | 6        | 55 | 3 | 5.50  | 358884     |
| 4.00       | 6        | 55 | 3 | 6.00  | 358886     |
|            |          |    |   | 10.00 | 358888     |
| 4.50       | 6        | 55 | 3 | 7.00  | 358889     |
| 5.00       | 6        | 55 | 3 | 7.50  | 358891     |
|            |          |    |   | 13.00 | 358893     |
| 6.00       | 6        | 55 | 4 | 9.00  | 358894     |
|            | 8        | 64 |   | 13.00 | 358896     |
| 8.00       | 8        | 64 | 4 | 12.00 | 358897     |
|            |          |    |   | 16.00 | 358899     |
| 10.00      | 10       | 67 | 4 | 15.00 | 358900     |
|            |          |    |   | 22.00 | 358902     |
| 12.00      | 12       | 83 | 4 | 18.00 | 358903     |
|            |          |    |   | 26.00 | 358905     |
| 16.00      | 16       | 92 | 4 | 24.00 | 358906     |

| $D_{1d12}$ | $L_1$ | $D_2$ | $L_2$ | $D_{h5}$ | L  | Z | 7220-3D C-TOP |
|------------|-------|-------|-------|----------|----|---|---------------|
| 3.00       | 4.50  | 2.80  | 9.00  | 6        | 55 | 3 | 358882        |
| 3.50       | 5.50  | 3.30  | 10.50 | 6        | 55 | 3 | 358885        |
| 4.00       | 6.00  | 3.70  | 12.00 | 6        | 55 | 3 | 358887        |
| 4.50       | 7.00  | 4.20  | 13.50 | 6        | 55 | 3 | 358890        |
| 5.00       | 7.50  | 4.60  | 15.00 | 6        | 55 | 3 | 358892        |
| 6.00       | 9.00  | 5.50  | 18.00 | 6        | 55 | 4 | 358895        |
| 8.00       | 12.00 | 7.50  | 24.00 | 8        | 64 | 4 | 358898        |

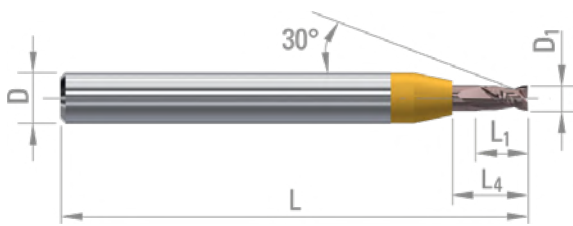


Auf Anfrage



P.240

SCHAFTFRÄSER, VERSTÄRKTER SCHAFT  
BESCHLEUNIGTE SCHMIERUNG



- Schaftfräser, verstärkter Schaft, hohe Leistung. Werkzeuge, die für die Bearbeitung von zähen Materialien entwickelt wurden.
- Das patentierte Kühlmittelkonzept COOL+ ermöglicht eine höhere Produktivität.
- Die dropless C-TOP-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Materialien.

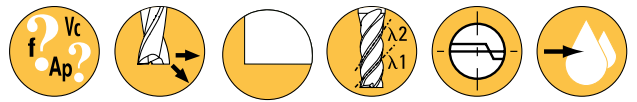
Schuppen ●●●●● Schichten ●●●●● ○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |          |      | K                |    |                    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|----------|------|------------------|----|--------------------|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |      | Kugelgraphitguss |    | Gusseisen, formbar |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3     | 14.4 | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙              | ⊙  | ⊙                | ⊙  | ⊙                                    | ⊙    | ⊙        | ⊙    | ○                | ○  | ○                  | ○  | ○  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      |                         | S  |       |                          |    |                  | H  |                  |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen           |                         |    |                         |    |    | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      | ⊙                       | ⊙  | ⊙     | ⊙                        | ⊙  |                  |    |                  |    |  |

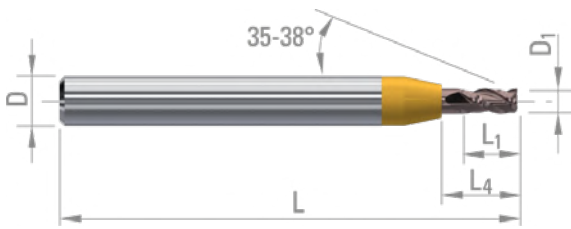
D<sub>1</sub> L<sub>1</sub> D<sub>h5</sub> L L<sub>4</sub> VHM C-TOP  
 Ø=2.00 - 0/-0.01  
 Ø>6.00 - 0/-0.02

|      |      |   |    |       |        |        |
|------|------|---|----|-------|--------|--------|
| 0.30 | 0.45 | 4 | 38 | 2.10  | 381928 | 381944 |
| 0.40 | 0.60 | 4 | 38 | 2.10  | 381929 | 381945 |
| 0.50 | 0.80 | 4 | 38 | 2.10  | 381930 | 381946 |
| 0.60 | 0.90 | 4 | 38 | 2.90  | 381931 | 381947 |
| 0.70 | 1.10 | 4 | 38 | 3.00  | 381932 | 381948 |
| 0.80 | 1.20 | 4 | 38 | 3.00  | 381933 | 381949 |
| 0.90 | 1.40 | 4 | 38 | 3.00  | 381934 | 381950 |
| 1.00 | 1.50 | 4 | 38 | 3.00  | 381935 | 381951 |
| 1.10 | 1.70 | 4 | 38 | 3.00  | 381936 | 381953 |
| 1.20 | 1.80 | 4 | 38 | 4.10  | 381937 | 381954 |
| 1.30 | 2.00 | 4 | 38 | 3.90  | 381938 | 381955 |
| 1.40 | 2.10 | 4 | 38 | 3.80  | 381939 | 381956 |
| 1.50 | 2.30 | 4 | 38 | 3.90  | 381940 | 381957 |
| 1.60 | 2.40 | 6 | 55 | 4.50  | 383393 | 384649 |
| 1.70 | 2.60 | 6 | 55 | 3.90  | 384641 | 384650 |
| 1.80 | 2.70 | 6 | 55 | 3.90  | 384642 | 384651 |
| 1.90 | 2.90 | 6 | 55 | 5.20  | 384644 | 384653 |
| 2.00 | 3.00 | 6 | 55 | 5.10  | 384645 | 384654 |
| 2.50 | 3.80 | 6 | 55 | 5.00  | 384646 | 384655 |
| 3.00 | 4.50 | 6 | 55 | 6.60  | 383394 | 384656 |
| 4.00 | 6.00 | 8 | 64 | 8.80  | 384648 | 384657 |
| 5.00 | 7.50 | 8 | 64 | 10.60 | 383396 | 384658 |



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SCHAFTFRÄSER, VERSTÄRKTER SCHAFT  
BESCHLEUNIGTE SCHMIERUNG



- Schaftfräser, verstärkter Schaft, ungleicher Drillwinkel. Werkzeuge, die für die Bearbeitung von zähen Materialien entwickelt wurden.
  - Das patentierte COOL+ Kühlmittelkonzept ermöglicht eine höhere Produktivität.
  - Die dropless C-TOP-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Materialien.
- Schruppen ●●●●● Schichten ●●●●●  gut  ausgezeichnet

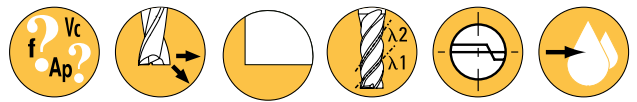
| ISO                    | P                                |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  | M                                  |                                  |                                  |                                  | K                     |                       |                       |                       |                       |                       |
|------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|------------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Werkstoff Beschreibung | Unlegierter Stahl                |                                  |                                  |                                  |                                  | Niedrigleg. Stahl                |                                  |                                  |                                  | Hochleg. Stahl                   |                                  | Rostfreier Stahl                 |                                  | Aust. Rostfreier Stahl (DUPLEX/PH) |                                  |                                  |                                  | Grauguss              |                       | Kugelgraphitguss      |                       | Gusseisen, formbar    |                       |
| VDI 3323               | 1                                | 2                                | 3                                | 4                                | 5                                | 6                                | 7                                | 8                                | 9                                | 10                               | 11                               | 12                               | 13                               | 14.1                               | 14.2                             | 14.3                             | 14.4                             | 15                    | 16                    | 17                    | 18                    | 19                    | 20                    |
| Empfehlungen           | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/>   | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

| ISO                    | N                       |    |                         |    |    |                                  |                                  |                                  |                                  |         | S          |      |                         |                                  |                                  |                                  | H                                |                                  |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|----------------------------------|----------------------------------|----------------------------------|----------------------------------|---------|------------|------|-------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung                | Cu-Legierung Schwierig           |                                  | Gold, Silber                     | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |                                  |                                  | Titan / Titanlegierungen         |                                  |                                  | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                               | 27                               | 28                               | -                                | -       | 29         | 30   | 31                      | 32                               | 33-35                            | 36                               | 37                               | 38                               | 39               | 40 | 41               |  |
| Empfehlungen           |                         |    |                         |    |    | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> |         |            |      |                         | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> |                  |    |                  |  |

D<sub>1</sub> L<sub>1</sub> L<sub>4</sub> D<sub>h5</sub> L VHM C-TOP  
 Ø = 2.00 - 0/-0.01  
 Ø < 6.00 - 0/-0.02  
 Ø ≥ 6.00 - e8

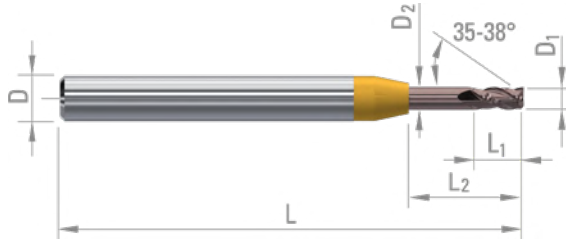
|       |       |       |    |    |        |        |
|-------|-------|-------|----|----|--------|--------|
| 0.30  | 0.70  | 1.80  | 4  | 38 | 388775 | 388797 |
| 0.40  | 0.90  | 1.90  | 4  | 38 | 388776 | 388798 |
| 0.50  | 1.10  | 2.80  | 4  | 38 | 388777 | 388799 |
| 0.60  | 1.40  | 2.80  | 4  | 38 | 388778 | 388800 |
| 0.70  | 1.60  | 2.90  | 4  | 38 | 388779 | 388801 |
| 0.80  | 1.80  | 3.00  | 4  | 38 | 388780 | 388802 |
| 0.90  | 2.00  | 3.00  | 4  | 38 | 388781 | 388803 |
| 1.00  | 2.20  | 3.10  | 4  | 38 | 388782 | 388804 |
| 1.10  | 2.40  | 3.20  | 4  | 38 | 388783 | 388805 |
| 1.20  | 2.60  | 4.30  | 4  | 38 | 388784 | 388806 |
| 1.30  | 2.80  | 4.40  | 4  | 38 | 388785 | 388807 |
| 1.40  | 3.00  | 4.40  | 4  | 38 | 388786 | 388808 |
| 1.50  | 3.20  | 4.50  | 4  | 38 | 388787 | 388809 |
| 1.60  | 3.40  | 5.20  | 6  | 55 | 388788 | 388810 |
| 1.70  | 3.60  | 5.20  | 6  | 55 | 388789 | 388811 |
| 1.80  | 3.80  | 5.30  | 6  | 55 | 388790 | 388812 |
| 1.90  | 4.00  | 6.70  | 6  | 55 | 388791 | 388813 |
| 2.00  | 4.30  | 6.70  | 6  | 55 | 388792 | 388814 |
| 2.50  | 5.30  | 7.10  | 6  | 55 | 388793 | 388815 |
| 3.00  | 6.30  | 9.20  | 6  | 55 | 388794 | 388816 |
| 4.00  | 8.30  | 12.00 | 8  | 55 | 425015 | 413887 |
|       |       |       |    | 64 | 388795 | 388817 |
| 5.00  | 10.30 | 15.10 | 8  | 55 | 425016 | 413888 |
|       |       |       |    | 64 | 388796 | 388818 |
| 6.00  | 13.00 | 16.90 | 8  | 60 | 423532 | 423535 |
| 8.00  | 18.00 | 21.90 | 10 | 70 | 423533 | 423536 |
| 10.00 | 22.00 | 26.90 | 12 | 79 | 423534 | 423537 |





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SCHAFTFRÄSER, VERSTÄRKTER SCHAFT  
BESCHLEUNIGTE SCHMIERUNG



- Schaftfräser, verstärkter Schaft, ungleicher Drallwinkel, mit 5xD<sub>1</sub> Hinterschliff. Werkzeuge, die für die Bearbeitung von zähen Materialien entwickelt wurden.
- Das patentierte COOL+ Kühlmittelkonzept ermöglicht eine höhere Produktivität.
- Die dropless C-TOP-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Materialien.

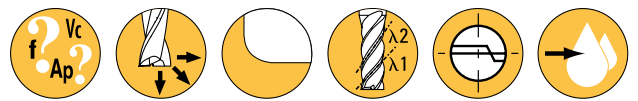
Schuppen ●●●●● Schichten ●●●●● ○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙              | ⊙                | ⊙  | ⊙  | ⊙    | ⊙                                    | ⊙    | ⊙        | ○  | ○                | ○  | ○                  | ○  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           |                         |    |                         |    |    | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      | ⊙                       | ⊙  | ⊙     | ⊙                        | ⊙  |                  |    |                  |    |

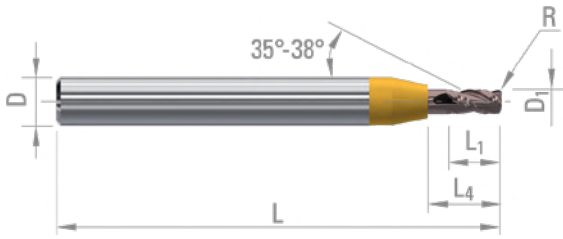
D<sub>1</sub> L<sub>1</sub> D<sub>2</sub> L<sub>2</sub> D<sub>h5</sub> L C-TOP  
 Ø = 2.00 - 0/-0.01  
 Ø < 6.00 - 0/-0.02  
 Ø ≥ 6.00 - e8

|       |       |      |       |    |     |        |
|-------|-------|------|-------|----|-----|--------|
| 0.30  | 0.70  | 0.27 | 1.60  | 4  | 38  | 412150 |
| 0.40  | 0.90  | 0.36 | 2.20  | 4  | 38  | 412151 |
| 0.50  | 1.10  | 0.45 | 2.70  | 4  | 38  | 412152 |
| 0.60  | 1.40  | 0.54 | 3.20  | 4  | 38  | 412153 |
| 0.70  | 1.60  | 0.63 | 3.80  | 4  | 38  | 412154 |
| 0.80  | 1.80  | 0.72 | 4.30  | 4  | 38  | 412155 |
| 0.90  | 2.00  | 0.81 | 4.80  | 4  | 38  | 412156 |
| 1.00  | 2.20  | 0.90 | 5.20  | 4  | 38  | 412157 |
| 1.10  | 2.40  | 0.99 | 5.80  | 4  | 38  | 412158 |
| 1.20  | 2.60  | 1.08 | 6.30  | 4  | 38  | 412159 |
| 1.30  | 2.80  | 1.17 | 6.70  | 4  | 38  | 412160 |
| 1.40  | 3.00  | 1.26 | 7.30  | 4  | 38  | 412161 |
| 1.50  | 3.20  | 1.39 | 7.80  | 4  | 38  | 412162 |
| 1.60  | 3.40  | 1.48 | 8.30  | 6  | 55  | 412163 |
| 1.70  | 3.60  | 1.58 | 8.70  | 6  | 55  | 412164 |
| 1.80  | 3.80  | 1.67 | 9.20  | 6  | 55  | 412165 |
| 1.90  | 4.00  | 1.76 | 9.70  | 6  | 55  | 412166 |
| 2.00  | 4.50  | 1.85 | 10.30 | 6  | 55  | 412167 |
| 2.50  | 5.50  | 2.32 | 12.80 | 6  | 55  | 412168 |
| 3.00  | 6.50  | 2.78 | 15.30 | 6  | 55  | 412169 |
| 4.00  | 8.50  | 3.72 | 20.40 | 8  | 64  | 412170 |
| 5.00  | 10.60 | 4.65 | 25.40 | 8  | 80  | 412171 |
| 6.00  | 13.30 | 5.55 | 30.70 | 8  | 74  | 423538 |
| 8.00  | 18.30 | 7.40 | 42.30 | 10 | 90  | 423539 |
| 10.00 | 22.50 | 9.25 | 51.90 | 12 | 105 | 423540 |



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TORISCHER FRÄSER, VERSTÄRKTER KÖRPER MIT BESCHLEUNIGTER SCHMIERUNG



- Torische Schaftfräser, verstärkter Schaft, mit symmetrischem Stirnanschliff. Werkzeuge, die für die Bearbeitung von zähen Materialien entwickelt wurden.
- Das patentierte COOL+ Kühlmittelkonzept ermöglicht eine höhere Produktivität. Die dropleless C-TOP-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Materialien.

Schuppen ●●●●● Schichten ●●●●● gut ○ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ○        | ○  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           |                         |    |                         |    |    | ○                 | ○                      | ○  | ○            |         |            |      | ○                       | ○  | ○     | ○                        | ○  |                  |    |                  |    |

| D <sub>1</sub>    | L <sub>1</sub> | L <sub>4</sub> | D <sub>h5</sub> | L | R               | C-TOP |
|-------------------|----------------|----------------|-----------------|---|-----------------|-------|
| Ø >0.40 - 0/-0.01 |                |                |                 |   | R ≤ 0.10 ± 0.01 |       |
| Ø <2.00 - 0/-0.02 |                |                |                 |   | R <0.30 ± 0.015 |       |
| Ø ≥6.00 - e8      |                |                |                 |   | R ≥ 0.30 ± 0.02 |       |

| D <sub>1</sub>    | L <sub>1</sub> | L <sub>4</sub> | D <sub>h5</sub> | L | R               | C-TOP |
|-------------------|----------------|----------------|-----------------|---|-----------------|-------|
| Ø >0.40 - 0/-0.01 |                |                |                 |   | R ≤ 0.10 ± 0.01 |       |
| Ø <2.00 - 0/-0.02 |                |                |                 |   | R <0.30 ± 0.015 |       |
| Ø ≥6.00 - e8      |                |                |                 |   | R ≥ 0.30 ± 0.02 |       |

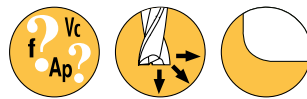
|      |      |       |   |    |                      |                            |
|------|------|-------|---|----|----------------------|----------------------------|
| 0.40 | 0.90 | 1.90  | 4 | 38 | 0.05<br>0.10         | 413162<br>413163           |
| 0.50 | 1.10 | 2.80  | 4 | 38 | 0.05<br>0.10         | 413164<br>413165           |
| 0.60 | 1.40 | 2.80  | 4 | 38 | 0.05<br>0.10         | 413166<br>413167           |
| 0.70 | 1.60 | 2.90  | 4 | 38 | 0.05<br>0.10         | 413168<br>413169           |
| 0.80 | 1.80 | 2.97  | 4 | 38 | 0.05<br>0.10         | 413170<br>413171           |
| 0.90 | 2.00 | 3.03  | 4 | 38 | 0.05<br>0.10         | 413172<br>413173           |
| 1.00 | 2.20 | 3.10  | 4 | 38 | 0.10<br>0.20         | 413174<br>413175           |
| 1.50 | 3.20 | 4.50  | 4 | 38 | 0.10<br>0.20         | 413176<br>413177           |
| 2.00 | 4.50 | 6.70  | 6 | 55 | 0.20<br>0.30         | 413179<br>413180           |
| 2.50 | 5.50 | 7.10  | 6 | 55 | 0.20<br>0.30         | 413181<br>413182           |
| 3.00 | 6.50 | 9.20  | 6 | 55 | 0.20<br>0.30<br>0.50 | 413183<br>413184<br>413185 |
| 4.00 | 8.50 | 12.00 | 8 | 55 | 0.30<br>0.50<br>1.00 | 425017<br>425018<br>425019 |

|       |       |       |    |    |                              |                                      |
|-------|-------|-------|----|----|------------------------------|--------------------------------------|
| 4.00  | 8.50  | 12.00 | 8  | 64 | 0.30<br>0.50<br>1.00         | 413186<br>413187<br>413188           |
| 5.00  | 10.60 | 15.10 | 8  | 55 | 0.30<br>0.50<br>1.00         | 425020<br>425021<br>425022           |
| 5.00  | 10.60 | 15.10 | 8  | 64 | 0.30<br>0.50<br>1.00         | 413189<br>413190<br>413191           |
| 6.00  | 13.30 | 16.90 | 8  | 60 | 0.30<br>0.50<br>1.00<br>1.50 | 425664<br>425665<br>425666<br>425667 |
| 8.00  | 18.30 | 21.90 | 10 | 70 | 0.50<br>1.00<br>1.50<br>2.00 | 425668<br>425669<br>425670<br>425671 |
| 10.00 | 22.50 | 26.90 | 12 | 79 | 0.50<br>1.00<br>1.50<br>2.00 | 425672<br>425673<br>425674<br>425675 |



**DIXI 7702 XIDUR**

Z = 2

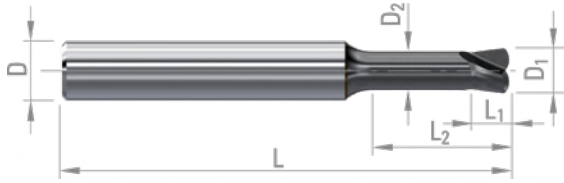


P.258

**HFC-FRÄSER**

- HFC-Fräser entwickelt für die Hochvorschub und Eintauchbearbeitung.
- Kann in allen Materialien eingesetzt werden.
- Die XIDUR-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen bis 65 HRC.

Schuppen ●●●●● Schichten ●●●●● gut ⊙ ausgezeichnet



| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K                |    |                    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|------------------|----|--------------------|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙              | ⊙                | ⊙  | ⊙  | ⊙    | ⊙                                    | ⊙    | ⊙        | ⊙                | ⊙  | ⊙                  | ⊙  | ⊙  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      |                         | S  |                          |    |                  | H  |                  |    |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|--------------------------|----|------------------|----|------------------|----|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35                    | 36 | 37               | 38 | 39               | 40 | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      | ⊙                       | ⊙  | ⊙                        | ⊙  | ⊙                | ⊙  | ⊙                | ⊙  | ⊙  |

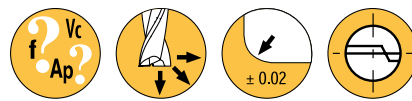
$D_1$                        $L_1$                        $D_2$                        $L_2$                        $D_{h6}$                        $L$                       XIDUR  

 D ≤ 0.80 - 0/-0.01  
 D ≤ 6.00 - 0/-0.02  
 D > 6.00 - e8

|       |      |       |       |    |    |        |
|-------|------|-------|-------|----|----|--------|
| 0.50  | 0.50 | 0.42  | 1.50  | 6  | 40 | 305279 |
| 0.80  | 0.80 | 0.68  | 2.40  | 6  | 40 | 305280 |
| 1.00  | 1.00 | 0.85  | 3.00  | 6  | 40 | 997920 |
| 1.50  | 1.50 | 1.27  | 4.50  | 6  | 40 | 997921 |
| 2.00  | 1.60 | 1.77  | 6.00  | 6  | 40 | 997922 |
| 3.00  | 2.40 | 2.65  | 9.00  | 6  | 40 | 997923 |
| 4.00  | 3.20 | 3.53  | 12.00 | 6  | 57 | 997924 |
| 5.00  | 4.00 | 4.42  | 15.00 | 6  | 57 | 997925 |
| 6.00  | 4.80 | 5.30  | 18.00 | 8  | 63 | 997926 |
| 8.00  | 6.40 | 7.05  | 24.00 | 10 | 80 | 997927 |
| 10.00 | 8.00 | 8.81  | 30.00 | 10 | 80 | 997928 |
| 12.00 | 9.60 | 10.60 | 36.00 | 12 | 80 | 997929 |

**Zum Herunterladen der Schnittdaten (pdf + xls) sowie die dxf-Dateien  
[www.dixipolytool.com](http://www.dixipolytool.com)**

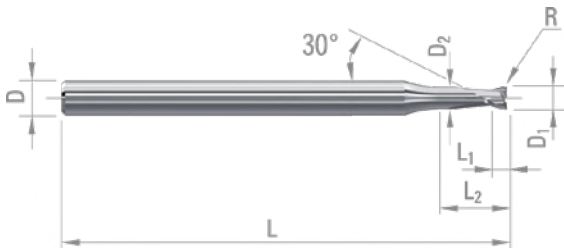




P.198

TORISCHER FRÄSER EXTRA KURZE SPIRALISIERUNG MIT HINTERSCHLIFF

- Torische Schaftfräser, extra kurz, mit 3xD<sub>1</sub> Hinterschliff, für allgemeine Bearbeitungen.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.



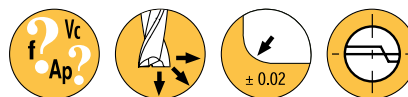
Schuppen ●●●●● Schichten ●●●●● gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ○            | ○       | ○          | ○    |                         |    |       | ○                        | ○  |                  |    |                  |    |

D<sub>1</sub> L<sub>1</sub> D<sub>2</sub> D<sub>h5</sub> L L<sub>2</sub> R VHM TiAlN  
 Ø<2.00 - 0/-0.01  
 Ø<3.00 - 0/-0.02  
 Ø≥3.00 - e8

|      |      |      |   |    |      |      |        |        |
|------|------|------|---|----|------|------|--------|--------|
| 0.40 | 0.40 | 0.37 | 3 | 38 | 1.20 | 0.05 | 958447 | 958452 |
| 0.45 | 0.45 | 0.42 | 3 | 38 | 1.35 | 0.05 | 958453 | 958454 |
| 0.50 | 0.50 | 0.45 | 3 | 38 | 1.50 | 0.05 | 958455 | 958456 |
| 0.55 | 0.55 | 0.50 | 3 | 38 | 1.65 | 0.05 | 958457 | 958458 |
| 0.60 | 0.60 | 0.55 | 3 | 38 | 1.80 | 0.05 | 958465 | 958466 |
| 0.65 | 0.65 | 0.60 | 3 | 38 | 1.95 | 0.05 | 958467 | 958468 |
| 0.70 | 0.70 | 0.65 | 3 | 38 | 2.10 | 0.05 | 958469 | 958470 |
| 0.75 | 0.75 | 0.70 | 3 | 38 | 2.25 | 0.05 | 958472 | 958473 |
| 0.80 | 0.80 | 0.75 | 3 | 38 | 2.40 | 0.05 | 958474 | 958475 |
| 0.85 | 0.85 | 0.80 | 3 | 38 | 2.55 | 0.05 | 958476 | 958477 |
| 0.90 | 0.90 | 0.85 | 3 | 38 | 2.70 | 0.10 | 958478 | 958479 |
| 0.95 | 0.95 | 0.90 | 3 | 38 | 2.85 | 0.10 | 958481 | 958482 |
| 1.00 | 1.00 | 0.95 | 3 | 38 | 3.00 | 0.10 | 958483 | 958484 |
| 1.05 | 1.05 | 1.00 | 3 | 38 | 3.15 | 0.10 | 958486 | 958487 |
| 1.10 | 1.10 | 1.05 | 3 | 38 | 3.30 | 0.10 | 958488 | 958489 |
| 1.15 | 1.15 | 1.10 | 3 | 38 | 3.45 | 0.10 | 958490 | 958491 |
| 1.20 | 1.20 | 1.15 | 3 | 38 | 3.60 | 0.10 | 958492 | 958493 |
| 1.25 | 1.25 | 1.20 | 3 | 38 | 3.75 | 0.10 | 958494 | 958495 |
| 1.30 | 1.30 | 1.25 | 3 | 38 | 3.90 | 0.10 | 958496 | 958497 |
| 1.35 | 1.35 | 1.30 | 3 | 38 | 4.05 | 0.10 | 958499 | 958501 |
| 1.40 | 1.40 | 1.35 | 3 | 38 | 4.20 | 0.10 | 958502 | 958503 |
| 1.45 | 1.45 | 1.40 | 3 | 38 | 4.35 | 0.10 | 958504 | 958505 |
| 1.50 | 1.50 | 1.45 | 3 | 38 | 4.50 | 0.20 | 958506 | 958507 |
| 1.55 | 1.55 | 1.50 | 3 | 38 | 4.65 | 0.20 | 958508 | 958509 |



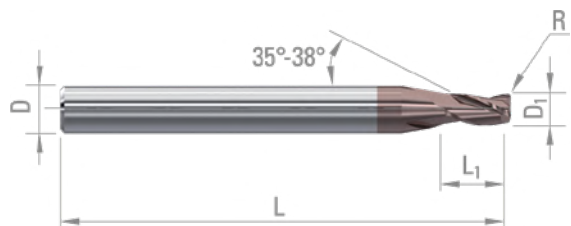
TORISCHER FRÄSER EXTRA KURZE  
SPIRALISIERUNG MIT HINTERSCHLIFF

| $D_1$<br><small><math>\emptyset &lt; 2.00 - 0/-0.01</math><br/><math>\emptyset &lt; 3.00 - 0/-0.02</math><br/><math>\emptyset \approx 3.00 - e8</math></small> | $L_1$ | $D_2$ | $D_{h5}$ | L  | $L_2$ | R    | VHM    | TiAIN  |
|--|-------|-------|----------|----|-------|------|--------|--------|
| 1.60   | 1.60  | 1.55  | 3        | 38 | 4.80  | 0.20 | 958510 | 958511 |
| 1.65   | 1.65  | 1.60  | 3        | 38 | 4.95  | 0.20 | 958512 | 958513 |
| 1.70   | 1.70  | 1.65  | 3        | 38 | 5.10  | 0.20 | 958514 | 958515 |
| 1.75   | 1.75  | 1.70  | 3        | 38 | 5.25  | 0.20 | 958516 | 958517 |
| 1.80   | 1.80  | 1.75  | 3        | 38 | 5.40  | 0.20 | 958518 | 958519 |
| 1.85   | 1.85  | 1.80  | 3        | 38 | 5.55  | 0.20 | 958520 | 958521 |
| 1.90   | 1.90  | 1.85  | 3        | 38 | 5.70  | 0.20 | 958522 | 958523 |
| 1.95   | 1.95  | 1.90  | 3        | 38 | 5.85  | 0.20 | 958524 | 958525 |
| 2.00   | 2.00  | 1.90  | 6        | 50 | 6.00  | 0.20 | 958527 | 958531 |
| 2.10   | 2.10  | 2.00  | 6        | 50 | 6.30  | 0.20 | 958532 | 958533 |
| 2.20   | 2.20  | 2.10  | 6        | 50 | 6.60  | 0.20 | 958534 | 958535 |
| 2.30   | 2.30  | 2.20  | 6        | 50 | 6.90  | 0.20 | 958886 | 958887 |
| 2.40   | 2.40  | 2.30  | 6        | 50 | 7.20  | 0.20 | 958888 | 958889 |
| 2.50   | 2.50  | 2.40  | 6        | 50 | 7.50  | 0.20 | 958890 | 958891 |
| 3.00   | 3.00  | 2.90  | 6        | 50 | 9.00  | 0.20 | 958892 | 958893 |



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TORISCHER FRÄSER, VERSTÄRKTER SCHAFT MIT UNGLEICHEM DRALLWINKEL



- Torische Schaftfräser, verstärkter Schaft, mit symmetrischem Stirnanschliff. Werkzeuge, die für die Bearbeitung von zähen Materialien entwickelt wurden.
- Die dropless C-TOP-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Materialien.

Schuppen ●●●●● Schichten ●●●●● gut ○ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ○        | ○  | ○                | ○  | ○                  | ○  |

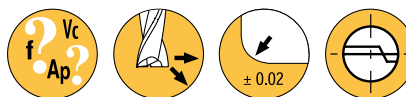
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen           |                         |    |                         |    |    | ○                 | ○                      | ○  | ○            |         |            | ○    | ○                       | ○  | ○     | ○                        |    |                  |    |                  |    |  |

| D <sub>1</sub>    | L <sub>1</sub> | D <sub>h5</sub> | L | R                | VHM | C-TOP |
|-------------------|----------------|-----------------|---|------------------|-----|-------|
| Ø >0.40 - 0/-0.01 |                |                 |   | R ≤ 0.10 ± 0.01  |     |       |
| Ø <2.00 - 0/-0.02 |                |                 |   | R < 0.30 ± 0.015 |     |       |
| Ø ≥6.00 - e8      |                |                 |   | R ≥ 0.30 ± 0.02  |     |       |

| D <sub>1</sub>    | L <sub>1</sub> | D <sub>h5</sub> | L | R                | VHM | C-TOP |
|-------------------|----------------|-----------------|---|------------------|-----|-------|
| Ø >0.40 - 0/-0.01 |                |                 |   | R ≤ 0.10 ± 0.01  |     |       |
| Ø <2.00 - 0/-0.02 |                |                 |   | R < 0.30 ± 0.015 |     |       |
| Ø ≥6.00 - e8      |                |                 |   | R ≥ 0.30 ± 0.02  |     |       |

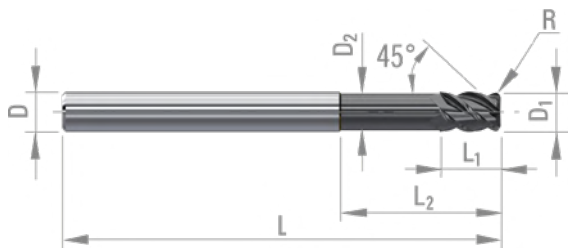
|      |      |   |    |      |        |        |
|------|------|---|----|------|--------|--------|
| 0.40 | 0.90 | 4 | 38 | 0.05 | 392798 | 392915 |
|      |      |   |    | 0.10 | 392799 | 392916 |
| 0.50 | 1.10 | 4 | 38 | 0.05 | 392800 | 392917 |
|      |      |   |    | 0.10 | 392801 | 392918 |
| 0.60 | 1.40 | 4 | 38 | 0.05 | 392802 | 392919 |
|      |      |   |    | 0.10 | 392803 | 392920 |
| 0.70 | 1.60 | 4 | 38 | 0.05 | 392804 | 392921 |
|      |      |   |    | 0.10 | 392805 | 392922 |
| 0.80 | 1.80 | 4 | 38 | 0.05 | 392806 | 392923 |
|      |      |   |    | 0.10 | 392807 | 392924 |
| 0.90 | 2.00 | 4 | 38 | 0.05 | 392808 | 392925 |
|      |      |   |    | 0.10 | 392809 | 392926 |
| 1.00 | 2.20 | 4 | 38 | 0.10 | 392810 | 392927 |
|      |      |   |    | 0.20 | 392811 | 392928 |
| 1.50 | 3.20 | 4 | 38 | 0.10 | 392812 | 392929 |
|      |      |   |    | 0.20 | 392813 | 392930 |
| 2.00 | 4.30 | 4 | 38 | 0.10 | 392814 | 392931 |
|      |      |   |    | 0.20 | 392815 | 392932 |
|      |      |   |    | 0.30 | 392816 | 392933 |
| 2.50 | 5.30 | 4 | 38 | 0.20 | 392817 | 392934 |
|      |      |   |    | 0.30 | 392818 | 392935 |
| 3.00 | 6.30 | 6 | 55 | 0.20 | 392819 | 392936 |
|      |      |   |    | 0.30 | 392820 | 392937 |

|       |       |    |    |      |        |        |
|-------|-------|----|----|------|--------|--------|
| 4.00  | 8.30  | 6  | 55 | 0.20 | 392821 | 392938 |
|       |       |    |    | 0.30 | 392822 | 392939 |
|       |       |    |    | 0.50 | 392823 | 392940 |
|       |       |    |    | 1.00 | 392824 | 392941 |
| 5.00  | 10.30 | 6  | 55 | 0.30 | 392825 | 392942 |
|       |       |    |    | 0.50 | 392826 | 392943 |
|       |       |    |    | 1.00 | 392827 | 392944 |
| 6.00  | 13.00 | 6  | 55 | 0.30 | 392828 | 392945 |
|       |       |    |    | 0.50 | 392829 | 392946 |
|       |       |    |    | 1.00 | 392830 | 392947 |
|       |       |    |    | 1.50 | 392831 | 392948 |
| 8.00  | 18.00 | 8  | 64 | 0.50 | 392832 | 392949 |
|       |       |    |    | 1.00 | 392833 | 392950 |
|       |       |    |    | 1.50 | 392834 | 392951 |
|       |       |    |    | 2.00 | 392835 | 392952 |
| 10.00 | 22.00 | 10 | 67 | 0.50 | 392836 | 392953 |
|       |       |    |    | 1.00 | 392837 | 392954 |
|       |       |    |    | 1.50 | 392838 | 392955 |
|       |       |    |    | 2.00 | 392839 | 392956 |
| 12.00 | 26.00 | 12 | 74 | 0.50 | 392840 | 392957 |
|       |       |    |    | 1.00 | 392841 | 392958 |
|       |       |    |    | 1.50 | 392842 | 392959 |
|       |       |    |    | 2.00 | 392843 | 392960 |



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TORISCHER MULTIZAHN-FRÄSER  
MIT HINTERSCHLIFF



- Torische Schaftfräser, Multizahn, mit Hinterschliff. Werkzeuge für die Bearbeitung von Formen und Gesenken entwickelt.
- Die XIDUR-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen bis 65 HRC.

Schuppen ●●●○○○ Schichten ●●●●●●○ gut ⊙ ausgezeichnet

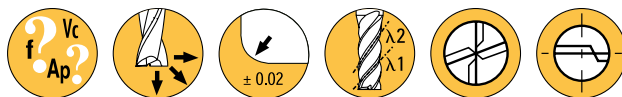
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                    |      |          |                  | K  |                    |    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|--------------------------------------|------|----------|------------------|----|--------------------|----|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                 | 14.2 | 14.3     | 14.4             | 15 | 16                 | 17 | 18 | 19 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   | ○              | ○                |    |    |                                      |      |          |                  |    |                    |    |    |    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      |                         | S  |                          |    |                  | H                |    |    |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|--------------------------|----|------------------|------------------|----|----|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    | Titan / Titanlegierungen |    | Gehärteter Stahl | Hartes Gusseisen |    |    |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35                    | 36 | 37               | 38               | 39 | 40 | 41 |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         |            |      | ○                       | ○  | ○                        |    |                  | ⊙                | ⊙  | ⊙  | ⊙  |

| D <sub>1 e8</sub> | L <sub>1</sub> | D <sub>2</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | R   | XIDUR |
|-------------------|----------------|----------------|----------------|-----------------|----|---|-----|-------|
| 3                 | 4.50           | 2.75           | 12.00          | 57              | 57 | 4 | 0.5 | 56643 |
| 4                 | 6.00           | 3.70           | 13.50          | 57              | 57 | 4 | 0.5 | 56644 |
| 5                 | 7.50           | 4.60           | 17.50          | 57              | 57 | 4 | 0.5 | 56645 |
| 6                 | 9.00           | 5.50           | 24.00          | 66              | 66 | 4 | 0.5 | 56627 |
|                   |                |                |                |                 |    |   | 0.8 | 56646 |
|                   |                |                |                |                 |    |   | 1.0 | 56628 |
|                   |                |                |                |                 |    |   | 1.5 | 56647 |
| 8                 | 10.00          | 7.50           | 28.00          | 75              | 75 | 6 | 0.5 | 56634 |
|                   |                |                |                |                 |    |   | 1.0 | 56635 |
|                   |                |                |                |                 |    |   | 1.5 | 56648 |
|                   |                |                |                |                 |    |   | 2.0 | 56649 |
| 10                | 12.00          | 9.25           | 30.00          | 75              | 75 | 6 | 0.5 | 56636 |
|                   |                |                |                |                 |    |   | 1.0 | 56637 |
|                   |                |                |                |                 |    |   | 1.5 | 56650 |
|                   |                |                |                |                 |    |   | 2.0 | 56651 |
|                   |                |                |                |                 |    |   | 2.5 | 56652 |
| 12                | 12.00          | 11.00          | 32.00          | 75              | 75 | 6 | 1.0 | 56653 |
|                   |                |                |                |                 |    |   | 2.0 | 56655 |
|                   |                |                |                |                 |    |   | 3.0 | 56656 |

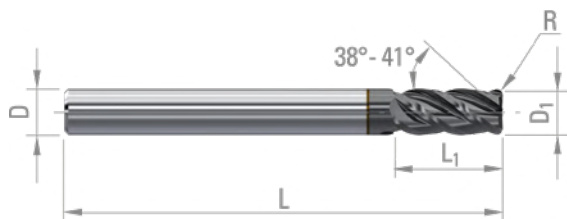
# DIXI 7265 CUTINOX

Z = 4



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## FRÄSER MIT UNGLEICHEM DRALLWINKEL MIT ECKENRADIUS



- Torische Schaftfräser, mit ungleichem Drallwinkel und ungleicher Teilung. Werkzeuge entwickelt für die Bearbeitung von zähen Materialien.
- Die CUTINOX-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen.

Schuppen ●●●●●○ Schichten ●●●●●○ gut ○ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ○        | ○  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         |            |      | ○                       | ○  | ○     | ○                        | ○  |                  |    |                  |    |

D<sub>1</sub>      L<sub>1</sub>      D<sub>h5</sub>      L      R      CUTINOX

Ø<3.00 - 0/-0.02  
Ø≥3.00 - e8

|    |       |    |    |     |        |
|----|-------|----|----|-----|--------|
| 2  | 4.00  | 3  | 38 | 0.5 | 997936 |
| 3  | 8.00  | 6  | 57 | 0.5 | 997937 |
| 4  | 11.00 | 6  | 57 | 0.5 | 997938 |
| 5  | 13.00 | 6  | 57 | 0.5 | 997939 |
| 6  | 13.00 | 6  | 57 | 0.5 | 997940 |
|    |       |    |    | 1.0 | 997941 |
| 8  | 19.00 | 8  | 63 | 0.5 | 997942 |
|    |       |    |    | 1.0 | 997943 |
| 10 | 22.00 | 10 | 72 | 0.5 | 997944 |
|    |       |    |    | 1.0 | 997945 |
| 12 | 26.00 | 12 | 83 | 0.5 | 997946 |
|    |       |    |    | 1.0 | 997947 |



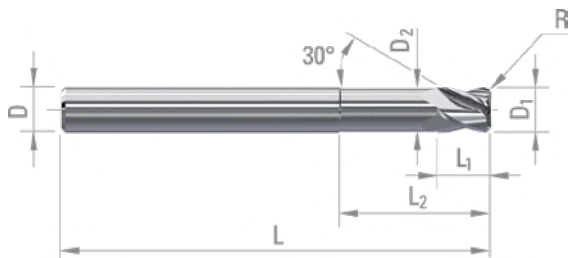


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D<sub>1</sub> ≥ 6

# TORISCHER FRÄSER MIT HINTERSCHLIFF



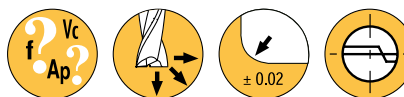
Schuppen ●●●●● Schichten ●●●●● gut ○ ausgezeichnet

- Torische Schaftfräser, mit Hinterschliff, für allgemeine Bearbeitungen.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○                | ○  | ○  | ○    | ○                                    | ○    | ○        | ○  | ○                | ○  | ○                  | ○  | ○  |

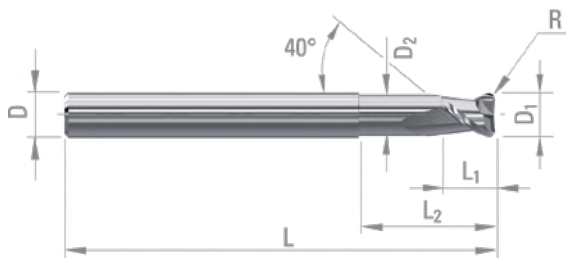
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ○                 | ○                      | ○  | ○            |         | ○          | ○    |                         |    |       | ○                        | ○  |                  |    |                  |    |

| D <sub>1</sub>                      | L <sub>1</sub> | D <sub>2</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | R            | VHM            | TiAlN          |
|-------------------------------------|----------------|----------------|----------------|-----------------|----|--------------|----------------|----------------|
| Ø < 3.00 - 0/-0.02<br>Ø ≥ 3.00 - e8 |                |                |                |                 |    |              |                |                |
| 2                                   | 3              | 1.90           | 10             | 4               | 42 | 0.20         | 64465          | 64466          |
| 3                                   | 4              | 2.80           | 15             | 6               | 57 | 0.20         | 64467          | 64468          |
| 4                                   | 5              | 3.80           | 18             | 6               | 57 | 0.30         | 64469          | 64470          |
| 6                                   | 7              | 5.70           | 20             | 6               | 57 | 0.50<br>1.00 | 64471<br>64473 | 64472<br>64474 |
| 8                                   | 10             | 7.70           | 30             | 8               | 63 | 0.50<br>1.00 | 64475<br>64477 | 64476<br>64478 |
| 10                                  | 12             | 9.60           | 35             | 10              | 72 | 0.50<br>1.00 | 64479<br>64481 | 64480<br>64482 |
| 12                                  | 14             | 11.50          | 40             | 12              | 83 | 0.50<br>1.00 | 64485<br>64487 | 64486<br>64488 |



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TORISCHER FRÄSER  
MIT HINTERSCHLIFF



- Torische Schaftfräser, mit Hinterschliff, Werkzeuge, die für die Bearbeitung von Materialien mit geringer Härte entwickelt wurden.
- Die DICUT-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

Schuppen ●●●●○ Schichten ●●●●○ gut ○ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  |                                      |      |      |      | ○        | ○  | ○                | ○  | ○                  | ○  |

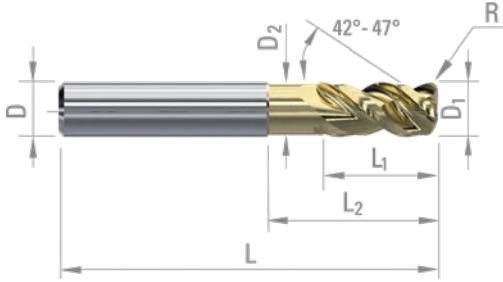
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ○                 | ○                      | ○  | ○            |         |            |      |                         |    |       | ○                        | ○  |                  |    |                  |    |

| D <sub>1e8</sub> | L <sub>1</sub> | D <sub>2</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | R    | VHM   | DICUT |
|------------------|----------------|----------------|----------------|-----------------|----|------|-------|-------|
| 3                | 4              | 2.75           | 10             | 6               | 57 | 0.50 | 60765 | 63493 |
| 4                | 5              | 3.70           | 12             | 6               | 57 | 0.50 | 60766 | 63494 |
| 5                | 6              | 4.60           | 15             | 6               | 57 | 0.50 | 60767 | 63495 |
| 6                | 7              | 5.50           | 18             | 6               | 57 | 1.00 | 60768 | 63496 |
| 8                | 9              | 7.50           | 23             | 8               | 63 | 1.00 | 60769 | 63497 |
| 10               | 11             | 9.25           | 30             | 10              | 75 | 1.50 | 60770 | 63498 |
| 12               | 13             | 11.00          | 35             | 12              | 83 | 1.50 | 60771 | 63499 |
| 16               | 17             | 15.00          | 44             | 16              | 92 | 4.00 | 66805 |       |



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## TORISCHER FRÄSER MIT UNGLEICHEM DRALLWINKEL



- Torischer Schaftfräser, ungleicher Drallwinkel und Doppelnut Geometrie. Für die Bearbeitung von NE-Metallen.
- DIXI 7565-FC mit Innenkühlung in der Spannut.
- Die DIXAL-Beschichtung verbessert die Standzeit in NE-Metallen und reduziert die Bildung von Aufbauschneiden.

Schuppen ●●●●○ Schichten ●●●●●○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |          |      | K                |    |                    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|----------|------|------------------|----|--------------------|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |      | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3     | 14.4 | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                      |      |          |      |                  |    |                    |    |    |    |

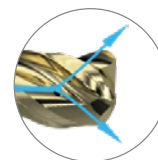
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      | S                       |    |       |                          |    | H                |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ○                 | ○                      | ○  | ○            |         |            |      |                         |    |       |                          |    |                  |    |                  |    |

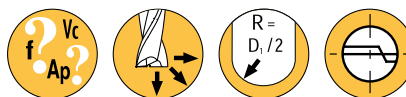
| D <sub>h10</sub> | L <sub>1</sub> | D <sub>2</sub> | L <sub>2</sub> | D <sub>h5</sub> | L   | R    | 7565 DIXAL | 7565-FC DIXAL |
|------------------|----------------|----------------|----------------|-----------------|-----|------|------------|---------------|
| 4                | 9              | 3.6            | 14             | 4               | 57  | 0.50 | 339042     |               |
|                  |                |                |                |                 |     | 1.00 | 339043     |               |
| 6                | 13             | 5.6            | 21             | 6               | 57  | 0.50 | 339044     | 339067        |
|                  |                |                |                |                 |     | 1.00 | 339045     | 339068        |
|                  |                |                |                |                 |     | 1.50 | 339046     | 339069        |
| 8                | 19             | 7.4            | 26             | 8               | 63  | 0.50 | 339047     | 339070        |
|                  |                |                |                |                 |     | 1.00 | 339048     | 339071        |
|                  |                |                |                |                 |     | 2.00 | 339049     | 339072        |
|                  |                |                |                |                 |     | 3.00 | 339050     | 339073        |
| 10               | 22             | 9.3            | 30             | 10              | 72  | 0.50 | 339051     | 339074        |
|                  |                |                |                |                 |     | 1.00 | 339052     | 339075        |
|                  |                |                |                |                 |     | 2.00 | 339053     | 339076        |
|                  |                |                |                |                 |     | 3.00 | 339054     | 339077        |
| 12               | 26             | 11.0           | 37             | 12              | 83  | 0.50 | 339055     | 339078        |
|                  |                |                |                |                 |     | 1.00 | 339056     | 339079        |
|                  |                |                |                |                 |     | 2.00 | 339057     | 339080        |
|                  |                |                |                |                 |     | 3.00 | 339058     | 339081        |
| 16               | 32             | 15.0           | 42             | 16              | 92  | 1.00 | 339059     | 339082        |
|                  |                |                |                |                 |     | 2.00 | 339060     | 339083        |
|                  |                |                |                |                 |     | 3.00 | 339061     | 339084        |
|                  |                |                |                |                 |     | 4.00 | 339062     | 339085        |
| 20               | 38             | 19.0           | 50             | 20              | 104 | 1.00 | 339063     | 339086        |
|                  |                |                |                |                 |     | 2.00 | 339064     | 339087        |
|                  |                |                |                |                 |     | 3.00 | 339065     | 339088        |
|                  |                |                |                |                 |     | 4.00 | 339066     | 339089        |

### DIXI 7565



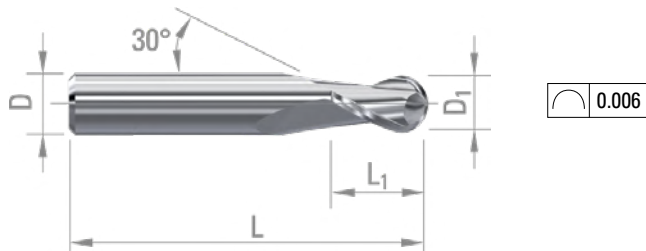
### DIXI 7565-FC





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STIRNRADIUSFRÄSER



- Stirnradiusfräser, für allgemeine Bearbeitungen.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.
- Die DIAMANT-Beschichtung verbessert die Standzeit in abrasiven NE-Metallen.
- Die DICUT-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

Schuppen ●●●●○ Schichten ●●●●○ gut ○ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ○        | ○  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |  |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ○                 | ○                      | ○  | ○            | ○       | ○          | ○    | ○                       | ○  | ○     | ○                        | ○  |    |                  |    |                  |  |  |

D<sub>1</sub>      L<sub>1</sub>      D<sub>h5</sub>      L      VHM      TiAlN      DICUT      DIAMANT\*

Ø < 0.30 - 0/-0.01  
 Ø < 3.00 - 0/-0.02  
 Ø ≥ 3.00 - e8

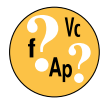
|      |      |   |    |        |        |        |        |
|------|------|---|----|--------|--------|--------|--------|
| 0.06 | 0.12 | 3 | 38 | 959060 |        |        |        |
| 0.08 | 0.16 | 3 | 38 | 959059 |        |        |        |
| 0.10 | 0.20 | 3 | 38 | 959058 |        |        |        |
| 0.15 | 0.30 | 3 | 38 | 954665 |        |        |        |
| 0.20 | 0.30 | 3 | 38 | 952795 | 952796 | 952797 | 952799 |
| 0.25 | 0.40 | 3 | 38 | 952800 | 952801 | 952802 | 952803 |
| 0.30 | 0.50 | 3 | 38 | 952804 | 952805 | 952806 | 58852  |
| 0.40 | 0.60 | 3 | 38 | 952807 | 952808 | 952809 | 952810 |
| 0.50 | 0.80 | 3 | 38 | 952811 | 952812 | 952813 | 952814 |
| 0.60 | 0.90 | 3 | 38 | 952815 | 952816 | 952817 | 952818 |
| 0.70 | 1.10 | 3 | 38 | 952819 | 952820 | 952821 | 950363 |
| 0.80 | 1.20 | 3 | 38 | 952822 | 952823 | 950703 | 950364 |
| 0.90 | 1.40 | 3 | 38 | 952825 | 952826 | 952824 | 950365 |
| 1.00 | 1.50 | 3 | 38 | 952827 | 952828 | 952829 | 952830 |
| 1.10 | 1.70 | 3 | 38 | 952832 | 952833 | 952831 | 950366 |
| 1.20 | 1.80 | 3 | 38 | 952835 | 952836 | 952834 | 950367 |
| 1.30 | 1.90 | 3 | 38 | 952838 | 952839 | 952837 | 950368 |
| 1.40 | 2.10 | 3 | 38 | 952841 | 952842 | 952840 | 950369 |
| 1.50 | 2.30 | 3 | 38 | 952843 | 952846 | 952845 | 952844 |
| 1.60 | 2.50 | 3 | 38 | 55539  | 955784 | 956236 | 956237 |
| 1.70 | 2.50 | 3 | 38 | 60112  | 956238 | 956239 | 956240 |
| 1.80 | 2.75 | 3 | 38 | 48747  | 956241 | 956242 | 956243 |
| 1.90 | 2.75 | 3 | 38 | 57714  | 956244 | 956245 | 956246 |
| 2.00 | 3.00 | 3 | 38 | 44604  | 56136  | 64280  | 59783  |

\* nicht für eisenhaltige Werkstoffe

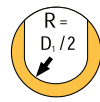
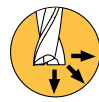


DIXI 7032

Z = 2



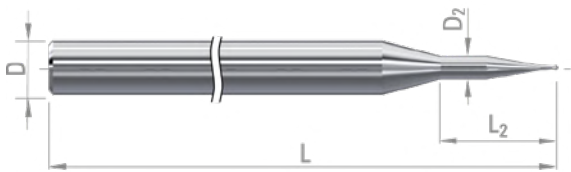
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STIRNRADIUSFRÄSER

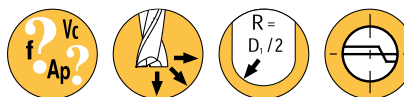
| $D_1$<br><small><math>\emptyset &lt; 3.00 - 0/-0.02</math><br/><math>\emptyset \geq 3.00 - e8</math></small> | $L_1$ | $D_{h5}$ | L  | VHM   | TiAIN  | DICUT  | DIAMANT* |
|--|-------|----------|----|-------|--------|--------|----------|
| 2.10   | 3.00  | 3        | 38 | 55540 | 956247 | 956248 | 956249   |
| 2.20   | 3.50  | 3        | 38 | 48457 | 956250 | 956251 | 956253   |
| 2.30   | 3.50  | 3        | 38 | 66547 | 62925  | 956254 | 956255   |
| 2.40   | 3.50  | 3        | 38 | 60788 | 62926  | 956256 | 956257   |
| 2.50   | 4.00  | 3        | 38 | 44605 | 56137  | 64288  | 60221    |
| 3.00   | 5.00  | 3        | 38 | 43115 | 56138  | 63876  | 59988    |
| 3.50   | 6.00  | 4        | 50 | 44607 | 56139  | 64289  | 950370   |
| 4.00   | 6.00  | 4        | 50 | 34120 | 56140  | 64290  | 59784    |
| 4.50   | 7.00  | 5        | 50 | 44609 | 56141  | 64291  | 950371   |
| 5.00   | 8.00  | 5        | 50 | 34748 | 36172  | 64292  | 60222    |
| 5.50   | 9.00  | 6        | 57 | 44611 | 56172  | 64293  | 950372   |
| 6.00   | 9.00  | 6        | 57 | 34749 | 56179  | 63923  | 46800    |
| 7.00   | 11.00 | 7        | 60 | 34740 | 56176  | 64294  | 66878    |
| 8.00   | 12.00 | 8        | 63 | 43389 | 36174  | 64295  | 58860    |
| 10.00  | 15.00 | 10       | 72 | 42940 | 56177  | 63924  | 36175    |
| 12.00  | 18.00 | 12       | 73 | 32387 | 56173  | 64296  | 60223    |
| 16.00  | 24.00 | 16       | 82 | 32136 | 56175  |        |          |

\* nicht für eisenhaltige Werkstoffe



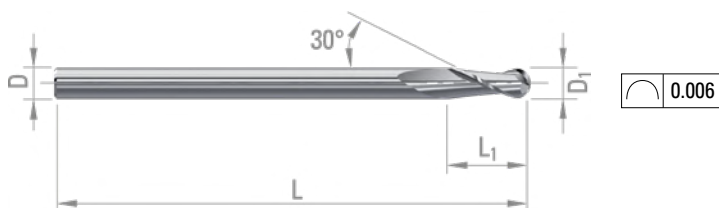
Für  $D_1 \leq 0.15$  :  
 $D_2 = 1.20$   
 $L_2 = 5.30$





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STIRNRADIUSFRÄSER



- Stirnradiusfräser, lange Ausführung, für allgemeine Bearbeitungen.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.
- Die DIAMANT-Beschichtung verbessert die Standzeit in abrasiven NE-Metallen.

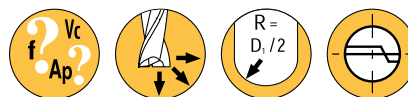
Schuppen ○○○○○ Schichten ●●●●●○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLIX / PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                    | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            | ⊙       | ⊙          | ⊙    | ○                       | ○  | ○     | ○                        | ○  |                  |    |                  |    |

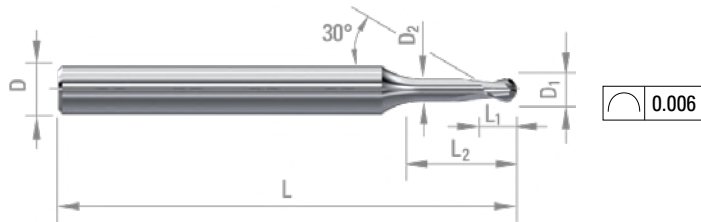
| D <sub>1e8</sub> | L <sub>1</sub> | D <sub>h5</sub> | L   | VHM   | TiAlN | DIAMANT * |
|------------------|----------------|-----------------|-----|-------|-------|-----------|
| 2                | 10             | 2               | 61  | 41974 | 56238 | 60224     |
| 3                | 10             | 3               | 61  | 39512 | 56239 | 60225     |
| 4                | 12             | 4               | 75  | 38639 | 56240 | 60226     |
| 5                | 14             | 5               | 86  | 38942 | 56241 | 60227     |
| 6                | 16             | 6               | 93  | 38623 | 56242 | 60228     |
| 8                | 20             | 8               | 100 | 38640 | 56243 | 60229     |
| 10               | 24             | 10              | 100 | 38641 | 56244 | 58790     |
| 12               | 28             | 12              | 110 | 40728 | 56245 | 60230     |
| 16               | 36             | 16              | 120 | 40730 | 56247 |           |
| 20               | 45             | 20              | 150 | 40732 | 56248 |           |

\* nicht für eisenhaltige Werkstoffe



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STIRNRADIUSFRÄSER  
MIT HINTERSCHLIFF



- Stirnradiusfräser mit Hinterschliff, für allgemeine Bearbeitungen.
- TiAIN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.
- Die DIAMANT-Beschichtung verbessert die Standzeit in abrasiven NE-Metallen.
- Die DICUT-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

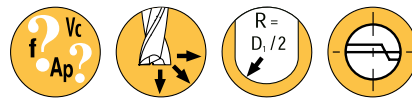
Schuppen ○○○○○ Schichten ●●●●● gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                                      |    |    | M    |          |                  |      | K                  |    |    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|--------------------------------------|----|----|------|----------|------------------|------|--------------------|----|----|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Aust. Rostfreier Stahl (DUPLEX / PH) |    |    |      | Grauguss | KugelgraphitGuss |      | Gusseisen, formbar |    |    |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11                                   | 12 | 13 | 14.1 | 14.2     | 14.3             | 14.4 | 15                 | 16 | 17 | 18 | 19 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○                                    | ○  | ○  | ○    | ○        | ○                | ○    | ⊙                  | ⊙  | ⊙  | ⊙  | ⊙  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            | ⊙       | ⊙          | ⊙    | ○                       | ○  | ○     | ○                        | ○  |                  |    |                  |    |  |  |

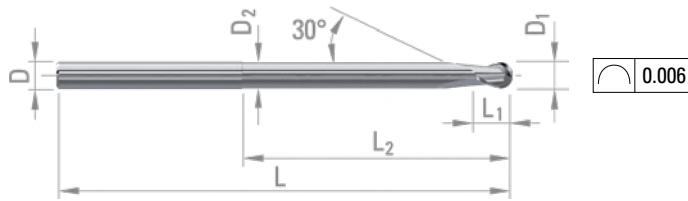
| D <sub>1</sub> | L <sub>1</sub> | D <sub>2</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | VHM   | TiAIN | DICUT | DIAMANT * |
|----------------|----------------|----------------|----------------|-----------------|----|-------|-------|-------|-----------|
| 0.20           | 0.50           | 0.18           | 1.00           | 4               | 55 | 64714 | 64719 | 64724 | 64729     |
| 0.30           | 0.60           | 0.27           | 1.50           | 4               | 55 | 64715 | 64720 | 64725 | 64730     |
| 0.40           | 0.80           | 0.37           | 2.00           | 4               | 55 | 64716 | 64721 | 64726 | 64731     |
| 0.50           | 1.00           | 0.45           | 3.00           | 4               | 55 | 64542 | 64556 | 64572 | 64584     |
| 0.60           | 1.60           | 0.55           | 4.00           | 4               | 55 | 64717 | 64722 | 64727 | 64732     |
| 0.80           | 1.80           | 0.75           | 5.00           | 4               | 55 | 64718 | 64723 | 64728 | 64733     |
| 1.00           | 2.00           | 0.95           | 6.00           | 4               | 55 | 64544 | 64557 | 64573 | 64585     |
| 1.50           | 2.50           | 1.45           | 9.00           | 4               | 55 | 64546 | 64558 | 64574 | 64586     |
| 2.00           | 3.00           | 1.90           | 12.00          | 4               | 55 | 64547 | 64559 | 64575 | 64587     |
| 2.50           | 4.00           | 2.40           | 12.00          | 4               | 55 | 64548 | 64560 | 64576 | 64588     |
| 3.00           | 5.00           | 2.80           | 12.00          | 6               | 57 | 64549 | 64561 | 64577 | 64589     |
| 4.00           | 6.00           | 3.80           | 15.00          | 6               | 57 | 64550 | 64562 | 64578 | 64590     |
| 5.00           | 7.00           | 4.80           | 15.00          | 6               | 57 | 64551 | 64567 | 64579 | 64591     |
| 6.00           | 8.00           | 5.70           | 15.00          | 6               | 57 | 64552 | 64568 | 64580 | 64592     |
| 8.00           | 10.00          | 7.70           | 25.00          | 8               | 63 | 64553 | 64569 | 64581 | 64593     |
| 10.00          | 12.00          | 9.60           | 30.00          | 10              | 72 | 64554 | 64570 | 64582 | 64594     |
| 12.00          | 14.00          | 11.60          | 40.00          | 12              | 83 | 64555 | 64571 | 64583 | 64595     |

\* nicht für eisenhaltige Werkstoffe



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STIRNRADIUSFRÄSER  
MIT HINTERSCHLIFF



- Stirnradiusfräser mit 8xD<sub>1</sub>, 10xD<sub>1</sub>, 12xD<sub>1</sub>, 15xD<sub>1</sub>, 18xD<sub>1</sub> Hinterschliff, für allgemeine Bearbeitungen.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.
- Die DIAMANT-Beschichtung verbessert die Standzeit in abrasiven NE-Metallen.
- Die DICUT-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

Schuppen ○○○○○ Schichten ●●●●●○ ○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |    | M                |      |      |                                    | K    |    |    |          |    |                  |    |                    |  |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|----|------------------|------|------|------------------------------------|------|----|----|----------|----|------------------|----|--------------------|--|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    |    | Rostfreier Stahl |      |      | Aust. Rostfreier Stahl (DUPELX/PH) |      |    |    | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |  |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12 | 13               | 14.1 | 14.2 | 14.3                               | 14.4 | 15 | 16 | 17       | 18 | 19               | 20 |                    |  |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○  | ○                | ○    | ○    | ○                                  | ○    | ⊙  | ⊙  | ⊙        | ⊙  | ⊙                | ⊙  |                    |  |

| ISO                    | N                       |    |                         |    |    |                   |                        |              |         |            |      | S                       |    |    |                          |    | H                |    |                  |    |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|--------------|---------|------------|------|-------------------------|----|----|--------------------------|----|------------------|----|------------------|----|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |    | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28           | -       | -          | 29   | 30                      | 31 | 32 | 33-35                    | 36 | 37               | 38 | 39               | 40 | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙            | ⊙       | ⊙          | ⊙    | ⊙                       | ○  | ○  | ○                        | ⊙  | ⊙                |    |                  |    |    |

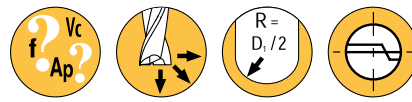
D<sub>1</sub>      L<sub>1</sub>      D<sub>2</sub>      D<sub>h5</sub>      L      L<sub>2</sub>      DIXI      VHM      TiAlN      DICUT      DIAMANT \*

Ø<3.00 - 0/-0.02  
Ø≥ 3.00 - e8

|      |      |      |   |    |       |          |        |        |        |        |
|------|------|------|---|----|-------|----------|--------|--------|--------|--------|
| 0.20 | 0.50 | 0.18 | 4 | 62 | 1.00  | 7045     | 64694  | 64699  | 64704  | 64709  |
|      |      |      |   |    | 1.60  | 7047-8D  | 979531 | 979555 | 979576 | 979595 |
|      |      |      |   |    | 2.00  | 7047-10D | 64735  | 64742  | 64750  | 64755  |
|      |      |      |   |    | 2.40  | 7047-12D | 979613 | 979626 | 979639 | 979664 |
|      |      |      |   |    | 3.00  | 7047-15D | 979711 | 979722 | 979732 | 979744 |
|      |      |      |   |    | 3.60  | 7047-18D | 979756 | 979768 | 979779 | 979790 |
| 0.30 | 0.60 | 0.27 | 4 | 62 | 1.50  | 7045     | 64695  | 64700  | 64705  | 64710  |
|      |      |      |   |    | 2.40  | 7047-8D  | 979534 | 979558 | 979578 | 979596 |
|      |      |      |   |    | 3.00  | 7047-10D | 64738  | 64743  | 64751  | 64756  |
|      |      |      |   |    | 3.60  | 7047-12D | 979614 | 979627 | 979640 | 979652 |
|      |      |      |   |    | 4.50  | 7047-15D | 979712 | 979724 | 979733 | 979745 |
|      |      |      |   |    | 5.40  | 7047-18D | 979757 | 979769 | 979780 | 979791 |
| 0.40 | 0.80 | 0.37 | 4 | 62 | 2.00  | 7045     | 64696  | 64701  | 64706  | 64711  |
|      |      |      |   |    | 3.20  | 7047-8D  | 979535 | 979559 | 979579 | 979597 |
|      |      |      |   |    | 4.00  | 7047-10D | 64739  | 64744  | 64752  | 64757  |
|      |      |      |   |    | 4.80  | 7047-12D | 979615 | 979628 | 979641 | 979653 |
|      |      |      |   |    | 6.00  | 7047-15D | 979713 | 979723 | 979734 | 979746 |
|      |      |      |   |    | 7.20  | 7047-18D | 979758 | 979770 | 979781 | 979792 |
| 0.50 | 1.00 | 0.45 | 4 | 62 | 3.00  | 7045     | 64491  | 64503  | 64515  | 64527  |
|      |      |      |   |    | 4.00  | 7047-8D  | 979536 | 979560 | 979580 | 979598 |
|      |      |      |   |    | 5.00  | 7047-10D | 64596  | 64608  | 64623  | 64635  |
|      |      |      |   |    | 6.00  | 7047-12D | 979616 | 979629 | 979642 | 979654 |
|      |      |      |   |    | 7.50  | 7047-15D | 979714 | 979725 | 979735 | 979747 |
|      |      |      |   |    | 9.00  | 7047-18D | 979759 | 979771 | 979782 | 979793 |
| 0.60 | 1.60 | 0.55 | 4 | 62 | 4.00  | 7045     | 64697  | 64702  | 64707  | 64712  |
|      |      |      |   |    | 4.80  | 7047-8D  | 979537 | 979561 | 979581 | 979599 |
|      |      |      |   |    | 6.00  | 7047-10D | 64740  | 64745  | 64753  | 64758  |
|      |      |      |   |    | 7.20  | 7047-12D | 979617 | 979630 | 979643 | 979655 |
|      |      |      |   |    | 9.00  | 7047-15D | 979715 | 979726 | 979736 | 979748 |
|      |      |      |   |    | 10.80 | 7047-18D | 979760 | 979772 | 979783 | 979794 |
| 0.80 | 1.80 | 0.75 | 4 | 62 | 5.00  | 7045     | 64698  | 64703  | 64708  | 64713  |
|      |      |      |   |    | 6.40  | 7047-8D  | 979538 | 979562 | 979582 | 979600 |
|      |      |      |   |    | 8.00  | 7047-10D | 64741  | 64746  | 64754  | 64759  |
|      |      |      |   |    | 9.60  | 7047-12D | 979618 | 979631 | 979644 | 979656 |
|      |      |      |   |    | 12.00 | 7047-15D | 979716 | 979727 | 979737 | 979749 |
|      |      |      |   |    | 14.40 | 7047-18D | 979761 | 979773 | 979784 | 979795 |

\* nicht für eisenhaltige Werkstoffe



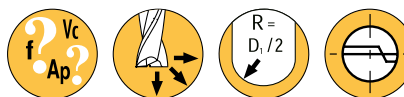


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## STIRNRADIUSFRÄSER MIT HINTERSCHLIFF

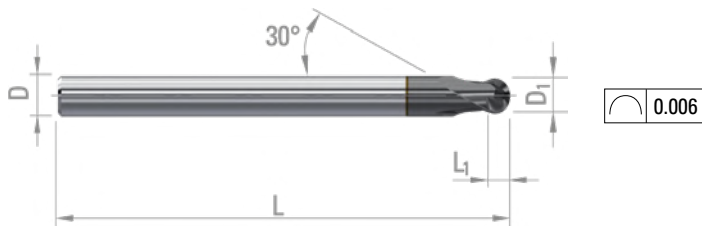
| $D_1$ | $L_1$    | $D_2$  | $D_{h5}$ | L      | $L_2$  | DIXI     | VHM    | TiAlN  | DICUT  | DIAMANT * |
|-------|----------|--------|----------|--------|--------|----------|--------|--------|--------|-----------|
| 1.00  | 2        | 0.95   | 4        | 75     | 6.00   | 7045     | 64492  | 64504  | 64516  | 64528     |
|       |          |        |          |        | 8.00   | 7047-8D  | 979540 | 979563 | 979583 | 979601    |
|       |          |        |          |        | 10.00  | 7047-10D | 64597  | 64609  | 64624  | 64636     |
|       |          |        |          |        | 12.00  | 7047-12D | 979619 | 954101 | 979314 | 979657    |
|       |          |        |          |        | 15.00  | 7047-15D | 975225 | 979728 | 979738 | 979750    |
|       |          |        |          |        | 18.00  | 7047-18D | 979522 | 979774 | 979785 | 979523    |
| 1.50  | 2.5      | 1.45   | 4        | 75     | 9.00   | 7045     | 64493  | 64505  | 64517  | 64529     |
|       |          |        |          |        | 12.00  | 7047-8D  | 979541 | 979565 | 979585 | 979602    |
|       |          |        |          |        | 15.00  | 7047-10D | 64598  | 64610  | 64625  | 64637     |
|       |          |        |          |        | 18.00  | 7047-12D | 979620 | 979632 | 979645 | 979658    |
|       |          |        |          |        | 22.50  | 7047-15D | 979717 | 979729 | 979739 | 979751    |
|       |          |        |          |        | 27.00  | 7047-18D | 979763 | 979775 | 979786 | 979799    |
| 2.00  | 3        | 1.90   | 4        | 75     | 12.00  | 7045     | 64494  | 64506  | 64518  | 64530     |
|       |          |        |          |        | 16.00  | 7047-8D  | 979542 | 979566 | 979588 | 979603    |
|       |          |        |          |        | 20.00  | 7047-10D | 64599  | 64611  | 64626  | 64638     |
|       |          |        |          |        | 24.00  | 7047-12D | 979621 | 979633 | 979646 | 979659    |
|       |          |        |          |        | 30.00  | 7047-15D | 972993 | 954105 | 979740 | 979752    |
|       |          |        |          |        | 36.00  | 7047-18D | 979765 | 979776 | 979787 | 979796    |
| 2.50  | 4        | 2.40   | 4        | 75     | 12.00  | 7045     | 64495  | 64507  | 64519  | 64531     |
|       |          |        |          |        | 20.00  | 7047-8D  | 979544 | 979567 | 979589 | 979604    |
|       |          |        |          |        | 25.00  | 7047-10D | 64600  | 64612  | 64627  | 64639     |
|       |          |        |          |        | 30.00  | 7047-12D | 979622 | 979635 | 979648 | 979660    |
|       |          |        |          |        | 37.50  | 7047-15D | 979719 | 979718 | 979741 | 979753    |
|       |          |        |          |        | 45.00  | 7047-18D | 979766 | 979777 | 979788 | 979797    |
| 3.00  | 5        | 2.80   | 6        | 102    | 12.00  | 7045     | 64496  | 64508  | 64520  | 64532     |
|       |          |        |          |        | 24.00  | 7047-8D  | 979545 | 979568 | 979590 | 979605    |
|       |          |        |          |        | 30.00  | 7047-10D | 64601  | 64613  | 64628  | 64640     |
|       |          |        |          |        | 36.00  | 7047-12D | 979623 | 979636 | 979649 | 979661    |
|       |          |        |          |        | 45.00  | 7047-15D | 979720 | 979730 | 979742 | 979754    |
|       |          |        |          |        | 54.00  | 7047-18D | 979767 | 979778 | 979789 | 979798    |
| 4.00  | 6        | 3.80   | 6        | 102    | 15.00  | 7045     | 64497  | 64509  | 64521  | 64533     |
|       |          |        |          |        | 32.00  | 7047-8D  | 979547 | 979569 | 979591 | 979607    |
|       |          |        |          |        | 40.00  | 7047-10D | 64602  | 64614  | 64629  | 64641     |
|       |          |        |          |        | 48.00  | 7047-12D | 979624 | 979637 | 979650 | 979662    |
|       |          |        |          |        | 60.00  | 7047-15D | 979721 | 979731 | 979743 | 979755    |
|       |          |        |          |        | 5.00   | 7        | 4.80   | 6      | 102    | 15.00     |
| 40.00 | 7047-8D  | 979549 | 979570   | 979592 |        |          |        |        |        | 979608    |
| 50.00 | 7047-10D | 64603  | 64615    | 64630  |        |          |        |        |        | 64642     |
| 60.00 | 7047-12D | 979625 | 979638   | 979651 |        |          |        |        |        | 979663    |
| 6.00  | 8        | 5.70   | 6        | 102    | 15.00  | 7045     | 64499  | 64511  | 64523  | 64536     |
|       |          |        |          |        | 48.00  | 7047-8D  | 979550 | 979571 | 979593 | 979609    |
|       |          |        |          |        | 60.00  | 7047-10D | 64604  | 64616  | 64631  | 64643     |
| 8.00  | 10       | 7.70   | 8        | 117    | 25.00  | 7045     | 64500  | 64512  | 64524  | 64537     |
|       |          |        |          |        | 64.00  | 7047-8D  | 979551 | 979572 | 979594 | 979610    |
|       |          |        |          |        | 80.00  | 7047-10D | 64605  | 64617  | 64632  | 64644     |
| 10.00 | 12       | 9.60   | 10       | 133    | 30.00  | 7045     | 64501  | 64513  | 64525  | 64538     |
|       |          |        |          |        | 80.00  | 7047-8D  | 979552 | 979573 | 979586 | 979611    |
|       |          |        |          |        | 90.00  | 7047-10D | 64606  | 64618  | 64633  | 64645     |
| 12.00 | 14       | 11.60  | 12       | 151    | 40.00  | 7045     | 64502  | 64514  | 64526  | 64539     |
|       |          |        |          |        | 96.00  | 7047-8D  | 979553 | 979574 | 979587 | 979612    |
|       |          |        |          |        | 110.00 | 7047-10D | 64607  | 64619  | 64634  | 64646     |

\* nicht für eisenhaltige Werkstoffe



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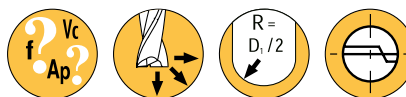
- Stirnradiusfräser. Werkzeuge für die Bearbeitung gehärteter Stähle entwickelt.
- Die XIDUR-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen bis 65 HRC.

Schuppen ○○○○○ Schichten ●●●●●○ gut ○ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   | ○              | ○  |                  |    |                                    |      |      |      |          |    |                  |    |                    |    |

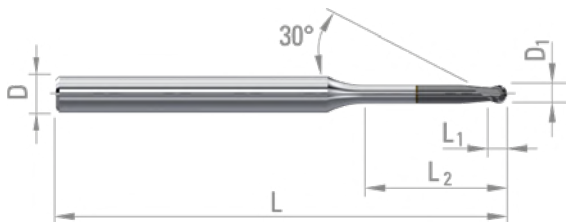
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         |            |      | ○                       | ○  | ○     |                          |    | ⊙  | ⊙                | ⊙  | ⊙                |  |

| D <sub>1</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | XIDUR  |
|----------------|----------------|-----------------|----|--------|
| 0.20           | 0.20           | 4               | 50 | 973380 |
| 0.30           | 0.30           | 4               | 50 | 972176 |
| 0.40           | 0.40           | 4               | 50 | 973379 |
| 0.50           | 0.50           | 4               | 50 | 973378 |
| 0.60           | 0.60           | 4               | 50 | 973377 |
| 0.70           | 0.70           | 4               | 50 | 972177 |
| 0.80           | 0.80           | 4               | 50 | 973376 |
| 0.90           | 0.80           | 4               | 50 | 973375 |
| 1.00           | 0.80           | 4               | 50 | 67253  |
| 1.50           | 1.20           | 4               | 50 | 67254  |
| 2.00           | 1.60           | 4               | 50 | 67257  |
| 3.00           | 2.40           | 6               | 57 | 67258  |
| 4.00           | 3.20           | 6               | 66 | 67259  |
| 5.00           | 4.00           | 6               | 66 | 67260  |
| 6.00           | 4.80           | 6               | 66 | 67261  |
| 8.00           | 6.40           | 8               | 75 | 67262  |
| 10.00          | 8.00           | 10              | 90 | 67255  |



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STIRNRADIUSFRÄSER



0.006

- Stirnradiusfräser mit 3xD<sub>1</sub>, 5xD<sub>1</sub>, 8xD<sub>1</sub>, 10xD<sub>1</sub>, 12xD<sub>1</sub>, 15xD<sub>1</sub>, Hinterschliff. Werkzeuge für die Bearbeitung gehärteter Stähle entwickelt.
- Die XIDUR-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen bis 65 HRC.

Schuppen ○○○○○ Schichten ●●●●● gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                   |      |          |      | K                |    |                    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|-------------------------------------|------|----------|------|------------------|----|--------------------|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX /PH) |      | Grauguss |      | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                | 14.2 | 14.3     | 14.4 | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   | ○              | ○  |                  |    |                                     |      |          |      |                  |    |                    |    |    |    |

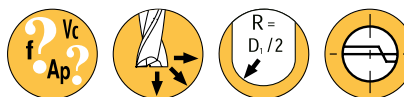
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         |            |      | ○                       | ○  | ○     |                          |    | ⊙                | ⊙  | ⊙                | ⊙  |

D<sub>1</sub> L<sub>1</sub> D<sub>h5</sub> L L<sub>2</sub> DIXI XIDUR  
 Ø<3.00 - 0/-0.02  
 Ø≥3.00 - e8

D<sub>1</sub> L<sub>1</sub> D<sub>h5</sub> L L<sub>2</sub> DIXI XIDUR  
 Ø<3.00 - 0/-0.02  
 Ø≥3.00 - e8

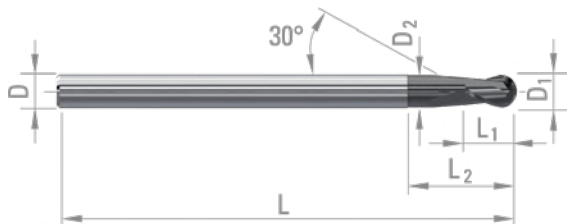
|      |      |   |    |      |          |        |
|------|------|---|----|------|----------|--------|
| 0.20 | 0.20 | 4 | 50 | 0.6  | 7532-3D  | 978593 |
|      |      |   |    | 1.0  | 7532-5D  | 979083 |
|      |      |   |    | 1.6  | 7532-8D  | 979102 |
| 0.30 | 0.30 | 4 | 50 | 0.9  | 7532-3D  | 979058 |
|      |      |   |    | 1.5  | 7532-5D  | 979084 |
|      |      |   |    | 2.4  | 7532-8D  | 979103 |
| 0.40 | 0.40 | 4 | 50 | 1.2  | 7532-3D  | 979059 |
|      |      |   |    | 2.0  | 7532-5D  | 979085 |
|      |      |   |    | 3.2  | 7532-8D  | 979104 |
|      |      |   |    | 4.0  | 7532-10D | 979116 |
| 0.50 | 0.50 | 4 | 50 | 1.5  | 7532-3D  | 979060 |
|      |      |   |    | 2.5  | 7532-5D  | 979086 |
|      |      |   |    | 4.0  | 7532-8D  | 979105 |
|      |      |   |    | 5.0  | 7532-10D | 979117 |
| 0.60 | 0.60 | 4 | 50 | 6.0  | 7532-12D | 979136 |
|      |      |   |    | 1.8  | 7532-3D  | 979061 |
|      |      |   |    | 3.0  | 7532-5D  | 979087 |
|      |      |   |    | 4.8  | 7532-8D  | 979106 |
| 0.70 | 0.70 | 4 | 50 | 6.0  | 7532-10D | 979118 |
|      |      |   |    | 7.2  | 7532-12D | 979137 |
|      |      |   |    | 9.0  | 7532-15D | 979144 |
|      |      |   |    | 2.1  | 7532-3D  | 979062 |
| 0.80 | 0.80 | 4 | 50 | 3.5  | 7532-5D  | 979088 |
|      |      |   |    | 5.6  | 7532-8D  | 979107 |
|      |      |   |    | 7.0  | 7532-10D | 979119 |
|      |      |   |    | 8.4  | 7532-12D | 979138 |
| 0.90 | 0.80 | 4 | 50 | 10.5 | 7532-15D | 979145 |
|      |      |   |    | 2.4  | 7532-3D  | 979063 |
|      |      |   |    | 4.0  | 7532-5D  | 979089 |
|      |      |   |    | 6.4  | 7532-8D  | 979108 |
| 0.90 | 0.80 | 4 | 50 | 8.0  | 7532-10D | 979120 |
|      |      |   |    | 9.6  | 7532-12D | 979139 |
|      |      |   |    | 12.0 | 7532-15D | 979146 |
|      |      |   |    | 2.7  | 7532-3D  | 979064 |
| 0.90 | 0.80 | 4 | 50 | 4.5  | 7532-5D  | 979091 |
|      |      |   |    | 7.2  | 7532-8D  | 979109 |
|      |      |   |    | 9.0  | 7532-10D | 979121 |
|      |      |   |    | 10.8 | 7532-12D | 979140 |
| 0.90 | 0.80 | 4 | 50 | 13.5 | 7532-15D | 979147 |

|       |      |    |    |      |          |        |
|-------|------|----|----|------|----------|--------|
| 1.00  | 0.80 | 4  | 50 | 3.0  | 7532-3D  | 979065 |
|       |      |    |    | 5.0  | 7532-5D  | 979092 |
|       |      |    |    | 8.0  | 7532-8D  | 979111 |
| 1.50  | 1.20 | 4  | 50 | 10.0 | 7532-10D | 979122 |
|       |      |    |    | 12.0 | 7532-12D | 979141 |
|       |      |    |    | 15.0 | 7532-15D | 979148 |
| 2.00  | 1.60 | 4  | 50 | 4.5  | 7532-3D  | 979066 |
|       |      |    |    | 7.5  | 7532-5D  | 979093 |
|       |      |    |    | 12.0 | 7532-8D  | 979112 |
|       |      |    |    | 15.0 | 7532-10D | 979123 |
| 3.00  | 2.40 | 6  | 57 | 18.0 | 7532-12D | 979142 |
|       |      |    |    | 22.5 | 7532-15D | 979149 |
|       |      |    |    | 6.0  | 7532-3D  | 979067 |
|       |      |    |    | 10.0 | 7532-5D  | 979094 |
| 4.00  | 3.20 | 6  | 66 | 16.0 | 7532-8D  | 979113 |
|       |      |    |    | 20.0 | 7532-10D | 979124 |
|       |      |    |    | 24.0 | 7532-12D | 979143 |
|       |      |    |    | 30.0 | 7532-15D | 979150 |
| 5.00  | 4.00 | 6  | 66 | 9.0  | 7532-3D  | 979068 |
|       |      |    |    | 15.0 | 7532-5D  | 979095 |
|       |      |    |    | 24.0 | 7532-8D  | 979114 |
|       |      |    |    | 30.0 | 7532-10D | 979125 |
| 6.00  | 4.80 | 6  | 66 | 12.0 | 7532-3D  | 979069 |
|       |      |    |    | 20.0 | 7532-5D  | 979096 |
|       |      |    |    | 32.0 | 7532-8D  | 979115 |
| 8.00  | 6.40 | 8  | 75 | 15.0 | 7532-3D  | 979070 |
|       |      |    |    | 25.0 | 7532-5D  | 979097 |
| 10.00 | 8.00 | 10 | 90 | 18.0 | 7532-3D  | 979071 |
|       |      |    |    | 30.0 | 7532-5D  | 979098 |
| 10.00 | 8.00 | 10 | 90 | 24.0 | 7532-3D  | 979072 |
|       |      |    |    | 40.0 | 7532-5D  | 979099 |
| 10.00 | 8.00 | 10 | 90 | 30.0 | 7532-3D  | 979073 |
|       |      |    |    | 50.0 | 7532-5D  | 979100 |



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STIRNRADIUSFRÄSER  
LANGE AUSFÜHRUNG



0.006

- Stirnradiusfräser, lange Ausführung, mit Hinterschliff. Werkzeuge für die Bearbeitung gehärteter Stähle entwickelt.
- Die XIDUR-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen bis 65 HRC.

Schuppen ○○○○○ Schichten ●●●●● gut ○ ausgezeichnet ⊙

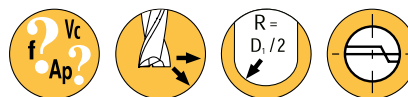
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |    | M                |      |      |                                    | K    |    |    |          |    |                  |    |                    |  |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|----|------------------|------|------|------------------------------------|------|----|----|----------|----|------------------|----|--------------------|--|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    |    | Rostfreier Stahl |      |      | Aust. Rostfreier Stahl (DUPLEX/PH) |      |    |    | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |  |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12 | 13               | 14.1 | 14.2 | 14.3                               | 14.4 | 15 | 16 | 17       | 18 | 19               | 20 |                    |  |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   | ○              | ○  |    |                  |      |      |                                    |      |    |    |          |    |                  |    |                    |  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         |            |      | ○                       | ○  | ○     |                          |    | ⊙  | ⊙                | ⊙  | ⊙                |  |

D<sub>1</sub> L<sub>1</sub> D<sub>2</sub> L<sub>2</sub> D<sub>h5</sub> L XIDUR

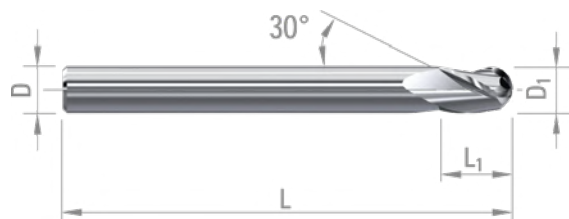
Ø < 3.00 - 0/-0.02  
Ø ≥ 3.00 - e8

|       |    |       |       |    |     |       |
|-------|----|-------|-------|----|-----|-------|
| 1.00  | 2  | 0.90  | 3.20  | 6  | 66  | 61355 |
| 1.50  | 3  | 1.40  | 4.70  | 6  | 66  | 61356 |
| 2.00  | 3  | 1.85  | 6.20  | 6  | 66  | 61357 |
| 3.00  | 5  | 2.85  | 9.20  | 6  | 66  | 61358 |
| 4.00  | 6  | 3.80  | 12.50 | 6  | 80  | 61359 |
| 5.00  | 7  | 4.70  | 15.50 | 6  | 80  | 61360 |
| 6.00  | 9  | 5.70  | 19.00 | 6  | 80  | 61361 |
| 8.00  | 12 | 7.50  | 25.00 | 8  | 90  | 61362 |
| 10.00 | 15 | 9.50  | 31.00 | 10 | 110 | 61363 |
| 12.00 | 18 | 11.50 | 37.00 | 12 | 120 | 61364 |



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STIRNRADIUSFRÄSER



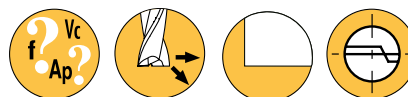
- Stirnradiusfräser, für allgemeine Bearbeitungen.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

Schuppen ○○○○○ Schichten ●●●●● gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○                | ○  | ○  | ○                                    | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ⊙          | ⊙    | ○                       | ○  | ○     | ⊙                        | ⊙  |                  |    |                  |    |

| D <sub>1 e8</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM   | TiAlN |
|-------------------|----------------|-----------------|----|-------|-------|
| 1.00              | 2.00           | 3               | 38 | 45950 | 56154 |
| 1.50              | 2.50           | 3               | 38 | 45230 | 56155 |
| 2.00              | 3.00           | 3               | 38 | 45231 | 56156 |
| 2.50              | 4.00           | 3               | 38 | 45232 | 56157 |
| 3.00              | 5.00           | 3               | 38 | 43637 | 56158 |
| 4.00              | 6.00           | 4               | 50 | 43638 | 56159 |
| 5.00              | 8.00           | 5               | 50 | 43639 | 56162 |
| 6.00              | 9.00           | 6               | 57 | 42993 | 56163 |
| 8.00              | 12.00          | 8               | 63 | 32969 | 56165 |
| 10.00             | 15.00          | 10              | 72 | 32970 | 56166 |



KOMPRESSIONSFRÄSER



- Schafffräser. Werkzeuge, die für die Bearbeitung von Verbundwerkstoffen entwickelt wurden. Reduziert Delaminationserscheinungen.

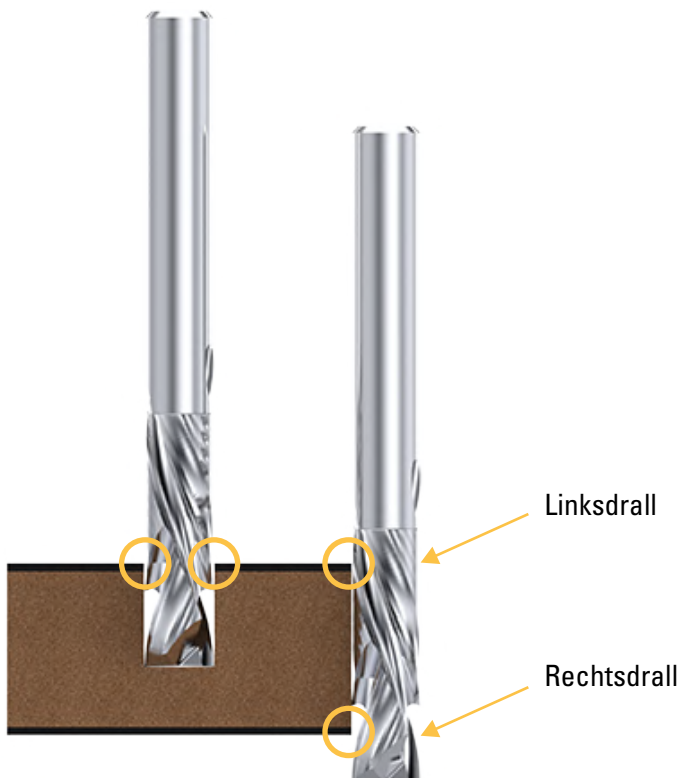
Schuppen ●●●●○ Schichten ●●●●○ gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                    |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         | ⊙          | ⊙    |                         |    |       |                          |    |    |                  |    |                  |  |

| D <sub>1e8</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | VHM    | DLC *  |
|------------------|----------------|----------------|-----------------|----|--------|--------|
| 6                | 6.5            | 22             | 6               | 70 | 414421 | 414425 |
| 8                | 8.7            | 22             | 8               | 70 | 414422 | 414426 |
| 10               | 10.9           | 22             | 10              | 75 | 414423 | 414427 |
| 12               | 13.0           | 28             | 12              | 80 | 414424 | 414428 |

\* nicht für eisenhaltige Werkstoffe



○ Keine Delaminierung



KONTURENFRÄSER  
FÜR FASER-VERBUNDWERKSTOFFE / KEVLAR®

- Fräser, für die Bearbeitung von Verbundwerkstoffen entwickelt. Reduziert das Lösen von Schichten.



Schuppen ●●●●● Schichten ●●●●● gut ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |          |      | K                |    |                    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|----------|------|------------------|----|--------------------|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |      | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3     | 14.4 | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                      |      |          |      |                  |    |                    |    |    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         | ⊙          | ⊙    |                         |    |       |                          |    |                  |    |                  |    |

| D <sub>1</sub> | inches | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM   |
|----------------|--------|----------------|-----------------|----|-------|
| 5.00           |        | 20             | 5.00            | 75 | 26252 |
| 6.00           |        | 25             | 6.00            | 75 | 26873 |
| 6.35           | 1/4"   | 25             | 6.35            | 75 | 26264 |
| 8.00           |        | 25             | 8.00            | 75 | 27851 |
| 10.00          |        | 25             | 10.00           | 75 | 28072 |
| 12.70          | 1/2"   | 27             | 12.70           | 75 | 26254 |

**SCHNITTBEDINGUNGEN :**

Umfangsbearbeitung Vc = 250 - 500 m/min  
Vf = 500 - 2000 mm/min



DIXI 7631 SP R  L  Z =

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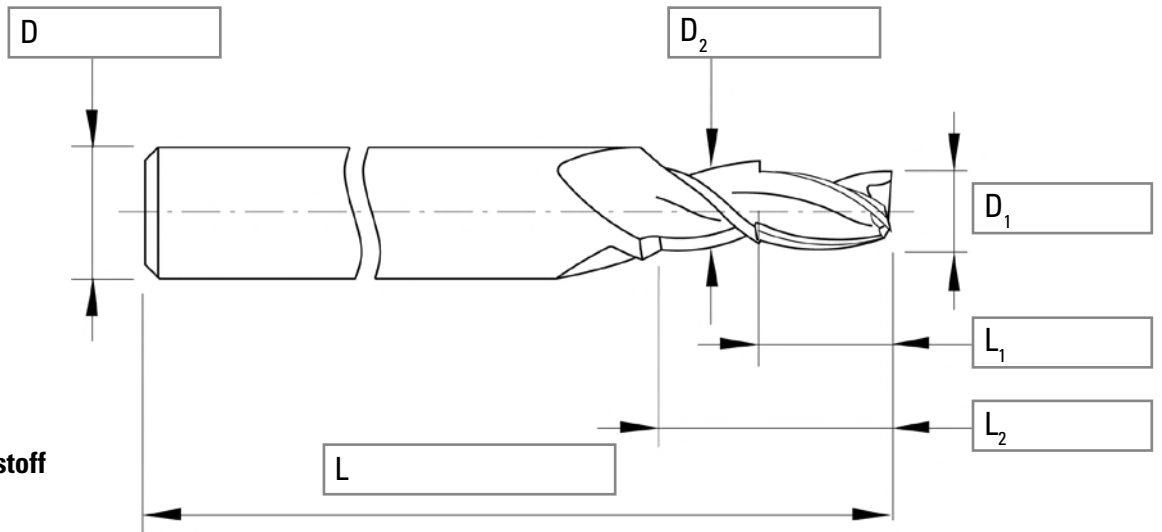
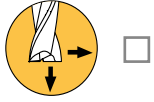


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STUFENFRÄSER



Menge

---

Zu bearbeitender Werkstoff

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DIXI 7645 SP R  L

KONISCHE SCHAFTFRÄSER

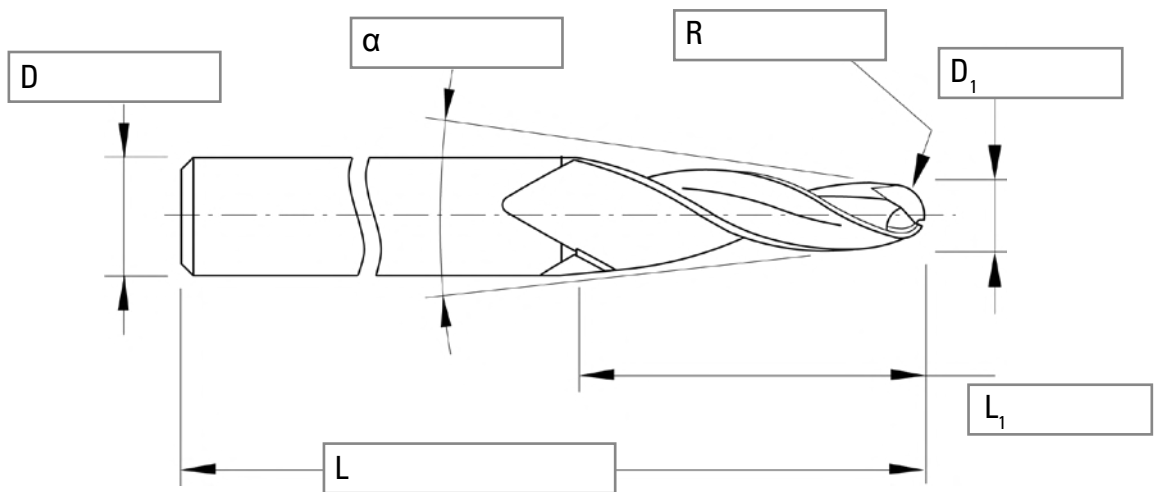
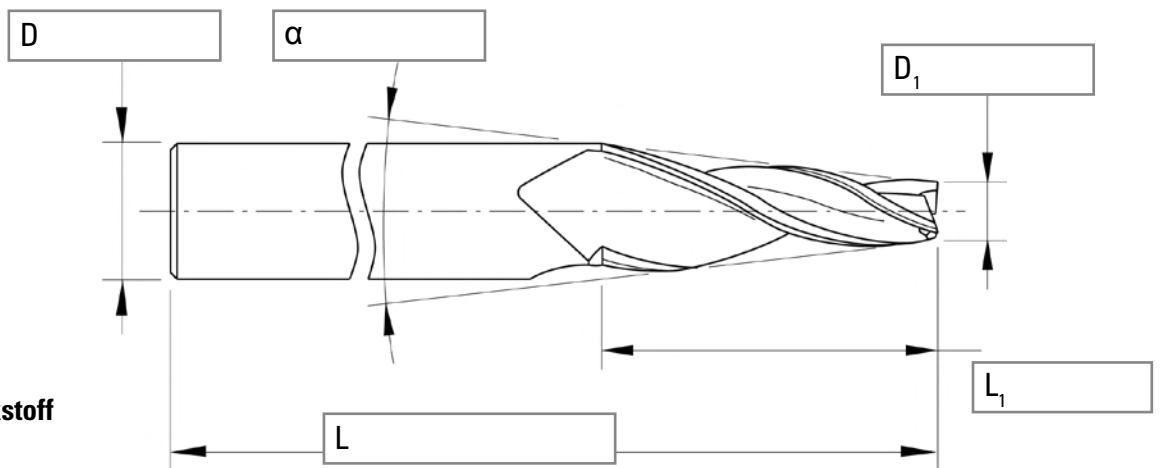
Z =

Menge

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Zu bearbeitender Werkstoff

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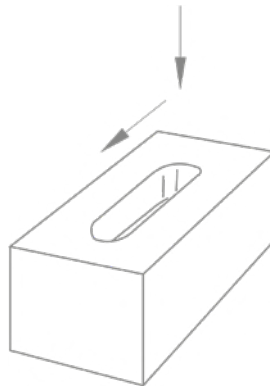


NUTZEN SIE UNSER ANFRAGEFORMULAR UNTER  
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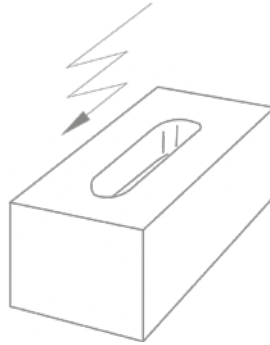
Taschenbearbeitung



Z 2



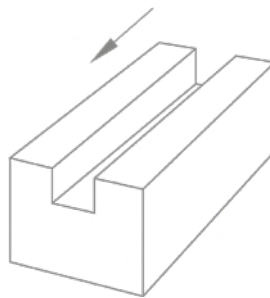
Zirkularfräsen (Rampen)



Z 2 - Z 3



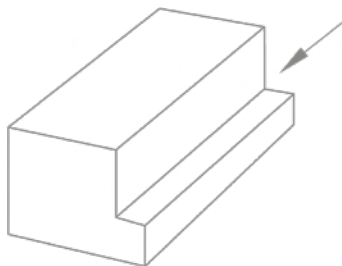
Nutbearbeitung



Z 2 - Z 3



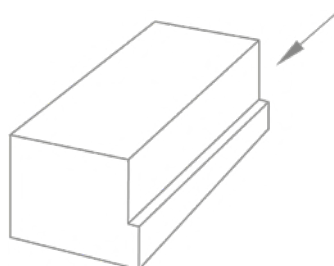
Umfangsbearbeitung (Schruppen)



Z 3 - Z 4



Umfangsbearbeitung (Schlichten)



Multizahn



## UMFANGSBEARBEITUNG

|                           |  | VDI<br>3323           |  | VHM<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |
|---------------------------|--|-----------------------|--|-------------------|------------|------------|
| <b>P</b>                  | Unlegierter Stahl, Automaten Stahl         | 1 - 5                 |  | <b>155</b>        | < 0.3×ØD1  | <1×L1      |
|                           | Alu-Knetlegierung < 12% Si                 | 21 - 22               |  | <b>200</b>        | < 0.5×ØD1  | <1×L1      |
| Alu-Gusslegierung >12% Si | 23 - 25                                    | <b>175</b>            |  | <0.4×ØD1          | <1×L1      |            |
| <b>N</b>                  | Kupferlegierung gute Zerspanbarkeit mit Pb | 26                    |  | <b>170</b>        | < 0.5×ØD1  | <1×L1      |
|                           | Kupferlegierung schwere Zerspanbarkeit     | 27 - 28               |  | <b>150</b>        | < 0.4×ØD1  | <1×L1      |
|                           | Kunststoff, Holz                           | 29 - 30               |  | <b>150</b>        | < 0.5×ØD1  | <1×L1      |
|                           | Gold, Silber                               | -                     |  | <b>150</b>        | < 0.3×ØD1  | <1×L1      |
|                           | <b>S</b>                                   | Titan, Titanlegierung |  | 36 - 37           | <b>60</b>  | < 0.2×ØD1  |

## NUTBEARBEITUNG

|                           |  | VDI<br>3323           |  | VHM<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |
|---------------------------|--|-----------------------|--|-------------------|------------|------------|
| <b>P</b>                  | Unlegierter Stahl, Automaten Stahl         | 1 - 5                 |  | <b>80</b>         | 1×ØD1      | < 0.3×ØD1  |
|                           | Alu-Knetlegierung < 12% Si                 | 21 - 22               |  | <b>70</b>         | 1×ØD1      | < 0.5×ØD1  |
| Alu-Gusslegierung >12% Si | 23 - 25                                    | <b>60</b>             |  | 1×ØD1             | < 0.4×ØD1  |            |
| <b>N</b>                  | Kupferlegierung gute Zerspanbarkeit mit Pb | 26                    |  | <b>120</b>        | 1×ØD1      | < 0.5×ØD1  |
|                           | Kupferlegierung schwere Zerspanbarkeit     | 27 - 28               |  | <b>105</b>        | 1×ØD1      | < 0.4×ØD1  |
|                           | Kunststoff, Holz                           | 29 - 30               |  | <b>55</b>         | 1×ØD1      | < 0.5×ØD1  |
|                           | Gold, Silber                               | -                     |  | <b>105</b>        | 1×ØD1      | < 0.3×ØD1  |
|                           | <b>S</b>                                   | Titan, Titanlegierung |  | 36 - 37           | <b>40</b>  | 1×ØD1      |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

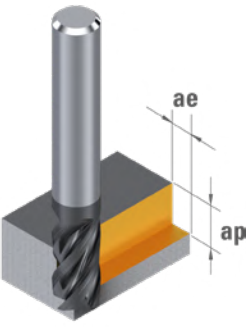
| $\emptyset D_1$<br>0.40 - 0.90 | $\emptyset D_1$<br>1.00 - 1.50 | $\emptyset D_1$<br>1.60 - 2.00 | $\emptyset D_1$<br>2.20 - 2.80 | $\emptyset D_1$<br>3.00 - 4.00 | $\emptyset D_1$<br>4.50 - 6.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| 0.004 - 0.009                  | 0.010 - 0.015                  | 0.016 - 0.020                  | 0.022 - 0.028                  | 0.030 - 0.040                  | 0.046 - 0.060                  |
| 0.006 - 0.014                  | 0.015 - 0.023                  | 0.024 - 0.030                  | 0.033 - 0.042                  | 0.045 - 0.060                  | 0.068 - 0.090                  |
| 0.005 - 0.012                  | 0.013 - 0.020                  | 0.021 - 0.026                  | 0.029 - 0.036                  | 0.039 - 0.052                  | 0.058 - 0.080                  |
| 0.006 - 0.014                  | 0.015 - 0.023                  | 0.024 - 0.030                  | 0.033 - 0.042                  | 0.045 - 0.060                  | 0.068 - 0.090                  |
| 0.005 - 0.011                  | 0.012 - 0.018                  | 0.019 - 0.024                  | 0.026 - 0.034                  | 0.036 - 0.048                  | 0.054 - 0.070                  |
| 0.006 - 0.014                  | 0.015 - 0.023                  | 0.024 - 0.030                  | 0.033 - 0.042                  | 0.045 - 0.060                  | 0.068 - 0.090                  |
| 0.004 - 0.009                  | 0.010 - 0.015                  | 0.016 - 0.020                  | 0.022 - 0.028                  | 0.030 - 0.040                  | 0.046 - 0.060                  |
| 0.003 - 0.007                  | 0.008 - 0.011                  | 0.012 - 0.015                  | 0.017 - 0.021                  | 0.023 - 0.030                  | 0.034 - 0.045                  |

Vorschub pro Zahn  $f_z$  [mm]

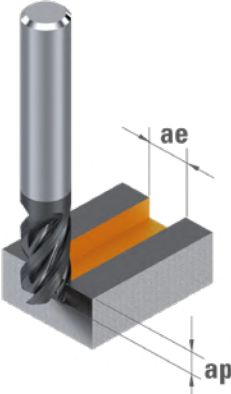
| $\emptyset D_1$<br>0.40 - 0.90 | $\emptyset D_1$<br>1.00 - 1.50 | $\emptyset D_1$<br>1.60 - 2.00 | $\emptyset D_1$<br>2.20 - 2.80 | $\emptyset D_1$<br>3.00 - 4.00 | $\emptyset D_1$<br>4.50 - 6.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| 0.003 - 0.007                  | 0.008 - 0.011                  | 0.012 - 0.015                  | 0.017 - 0.021                  | 0.023 - 0.030                  | 0.034 - 0.045                  |
| 0.005 - 0.011                  | 0.011 - 0.017                  | 0.018 - 0.023                  | 0.025 - 0.032                  | 0.034 - 0.045                  | 0.052 - 0.070                  |
| 0.004 - 0.009                  | 0.010 - 0.015                  | 0.016 - 0.020                  | 0.022 - 0.027                  | 0.029 - 0.039                  | 0.044 - 0.060                  |
| 0.005 - 0.011                  | 0.011 - 0.017                  | 0.018 - 0.023                  | 0.025 - 0.032                  | 0.034 - 0.045                  | 0.052 - 0.070                  |
| 0.004 - 0.008                  | 0.009 - 0.014                  | 0.014 - 0.018                  | 0.020 - 0.026                  | 0.027 - 0.036                  | 0.040 - 0.055                  |
| 0.005 - 0.011                  | 0.011 - 0.017                  | 0.018 - 0.023                  | 0.025 - 0.032                  | 0.034 - 0.045                  | 0.052 - 0.070                  |
| 0.003 - 0.007                  | 0.008 - 0.011                  | 0.012 - 0.015                  | 0.017 - 0.021                  | 0.023 - 0.030                  | 0.034 - 0.045                  |
| 0.002 - 0.005                  | 0.006 - 0.008                  | 0.009 - 0.011                  | 0.013 - 0.016                  | 0.017 - 0.023                  | 0.026 - 0.035                  |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

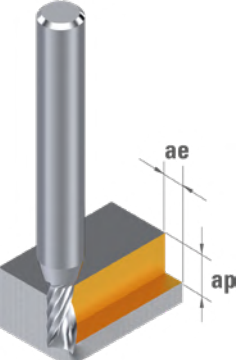
UMFANGSBEARBEITUNG

|          |  | VDI 3323 |  | VHM Vc [m/min] | ae (mm)   | ap (mm)   |
|----------|--|----------|---|----------------|-----------|-----------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl         | 1 - 5    |   |                | <b>70</b> | <0.40×ØD1 |
| <b>N</b> | Alu-Knetlegierung < 12% Si                 | 21 - 22  |   | <b>200</b>     | <0.50×ØD1 | <0.95×L1  |
|          | Alu-Gusslegierung >12% Si                  | 23 - 25  |   | <b>175</b>     | <0.50×ØD1 | <0.95×L1  |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb | 26       |   | <b>150</b>     | <0.40×ØD1 | <0.95×L1  |
|          | Kupferlegierung schwere Zerspanbarkeit     | 27 - 28  |   | <b>100</b>     | <0.25×ØD1 | <0.95×L1  |
|          | Gold, Silber                               | -        |   | <b>120</b>     | <0.25×ØD1 | <0.95×L1  |
| <b>S</b> | Titan, Titanlegierung                      | 36 - 37  |   | <b>45</b>      | <0.30×ØD1 | <0.95×L1  |

NUTBEARBEITUNG

|          |  | VDI 3323 |  | VHM Vc [m/min] | ae (mm)   | ap (mm)  |
|----------|--|----------|--|----------------|-----------|----------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl         | 1 - 5    |  |                | <b>70</b> | 1×ØD1    |
| <b>N</b> | Alu-Knetlegierung < 12% Si                 | 21 - 22  |  | <b>200</b>     | 1×ØD1     | <0.95×L1 |
|          | Alu-Gusslegierung >12% Si                  | 23 - 25  |  | <b>175</b>     | 1×ØD1     | <0.95×L1 |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb | 26       |  | <b>150</b>     | 1×ØD1     | <0.95×L1 |
|          | Kupferlegierung schwere Zerspanbarkeit     | 27 - 28  |  | <b>100</b>     | 1×ØD1     | <0.95×L1 |
|          | Gold, Silber                               | -        |  | <b>120</b>     | 1×ØD1     | <0.95×L1 |
| <b>S</b> | Titan, Titanlegierung                      | 36 - 37  |  | <b>45</b>      | 1×ØD1     | <0.95×L1 |

UMFANGSBEARBEITUNG

|          |  | VDI 3323 |  | VHM Vc [m/min] | DLC Vc [m/min] | ae (mm)    | ap (mm)  |
|----------|--|----------|---|----------------|----------------|------------|----------|
| <b>N</b> | Alu-Knetlegierung < 12% Si                 | 21 - 22  |   |                | <b>250</b>     | <b>330</b> | <1×ØD1   |
|          | Alu-Gusslegierung >12% Si                  | 23 - 25  |   | <b>200</b>     | <b>260</b>     | <1×ØD1     | <1×ØD1   |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb | 26       |   | <b>275</b>     | <b>360</b>     | <1×ØD1     | <1×ØD1   |
|          | Kupferlegierung schwere Zerspanbarkeit     | 27 - 28  |   | <b>150</b>     | <b>200</b>     | <1×ØD1     | <0.5×ØD1 |
|          | Gold, Silber                               | -        |   | <b>150</b>     | <b>200</b>     | <1×ØD1     | <0.5×ØD1 |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.50 - 0.70 | $\emptyset D_1$<br>0.80 - 1.00 | $\emptyset D_1$<br>1.10 - 1.50 | $\emptyset D_1$<br>1.60 - 1.90 | $\emptyset D_1$<br>2.00 - 2.50 | $\emptyset D_1$<br>3.00 - 8.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| 0.002 - 0.003                  | 0.003 - 0.004                  | 0.005 - 0.006                  | 0.007 - 0.008                  | 0.008 - 0.009                  | 0.010 - 0.026                  |
| 0.007 - 0.009                  | 0.010 - 0.013                  | 0.014 - 0.020                  | 0.021 - 0.025                  | 0.025 - 0.029                  | 0.033 - 0.083                  |
| 0.006 - 0.008                  | 0.010 - 0.012                  | 0.013 - 0.018                  | 0.019 - 0.023                  | 0.023 - 0.027                  | 0.031 - 0.077                  |
| 0.005 - 0.007                  | 0.008 - 0.010                  | 0.011 - 0.015                  | 0.016 - 0.019                  | 0.019 - 0.023                  | 0.026 - 0.064                  |
| 0.004 - 0.006                  | 0.006 - 0.008                  | 0.009 - 0.012                  | 0.013 - 0.015                  | 0.015 - 0.018                  | 0.020 - 0.051                  |
| 0.004 - 0.006                  | 0.006 - 0.008                  | 0.009 - 0.012                  | 0.013 - 0.015                  | 0.015 - 0.018                  | 0.020 - 0.051                  |
| 0.004 - 0.008                  | 0.006 - 0.010                  | 0.009 - 0.014                  | 0.013 - 0.017                  | 0.015 - 0.020                  | 0.020 - 0.053                  |

Vorschub pro Zahn  $f_z$  [mm]

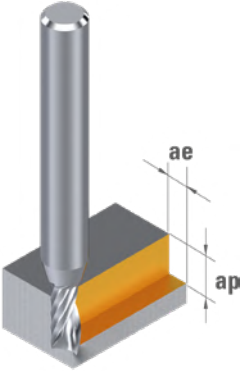
| $\emptyset D_1$<br>0.50 - 0.70 | $\emptyset D_1$<br>0.80 - 1.00 | $\emptyset D_1$<br>1.10 - 1.50 | $\emptyset D_1$<br>1.60 - 1.90 | $\emptyset D_1$<br>2.00 - 2.50 | $\emptyset D_1$<br>3.00 - 8.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| 0.001 - 0.002                  | 0.002 - 0.003                  | 0.004 - 0.004                  | 0.005 - 0.006                  | 0.006 - 0.006                  | 0.007 - 0.018                  |
| 0.005 - 0.006                  | 0.007 - 0.009                  | 0.010 - 0.014                  | 0.015 - 0.018                  | 0.018 - 0.020                  | 0.023 - 0.058                  |
| 0.004 - 0.006                  | 0.007 - 0.008                  | 0.009 - 0.013                  | 0.013 - 0.016                  | 0.016 - 0.019                  | 0.022 - 0.054                  |
| 0.004 - 0.005                  | 0.006 - 0.007                  | 0.008 - 0.011                  | 0.011 - 0.013                  | 0.013 - 0.016                  | 0.018 - 0.045                  |
| 0.003 - 0.004                  | 0.004 - 0.006                  | 0.006 - 0.008                  | 0.009 - 0.011                  | 0.011 - 0.013                  | 0.014 - 0.036                  |
| 0.003 - 0.004                  | 0.004 - 0.006                  | 0.006 - 0.008                  | 0.009 - 0.011                  | 0.011 - 0.013                  | 0.014 - 0.036                  |
| 0.001 - 0.002                  | 0.002 - 0.003                  | 0.004 - 0.004                  | 0.005 - 0.006                  | 0.006 - 0.006                  | 0.007 - 0.018                  |

Vorschub pro Zahn  $f_z$  [mm]

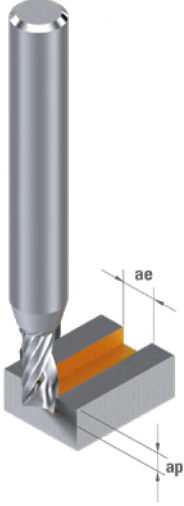
| $\emptyset D_1$<br>2.00 - 3.00 | $\emptyset D_1$<br>4.00 - 5.00 | $\emptyset D_1$<br>6.00 - 8.00 | $\emptyset D_1$<br>10.00 - 12.00 |
|--------------------------------|--------------------------------|--------------------------------|----------------------------------|
| 0.045 - 0.068                  | 0.090 - 0.112                  | 0.125 - 0.160                  | 0.180 - 0.200                    |
| 0.030 - 0.045                  | 0.060 - 0.076                  | 0.085 - 0.100                  | 0.120 - 0.130                    |
| 0.036 - 0.054                  | 0.072 - 0.090                  | 0.100 - 0.120                  | 0.140 - 0.160                    |
| 0.024 - 0.036                  | 0.048 - 0.060                  | 0.065 - 0.080                  | 0.100 - 0.110                    |
| 0.024 - 0.036                  | 0.048 - 0.060                  | 0.065 - 0.080                  | 0.100 - 0.110                    |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

## UMFANGSBEARBEITUNG

|   |   | VDI<br>3323 |  | VHM<br>Vc [m/min] | DLC<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |
|---|---|-------------|--|-------------------|-------------------|------------|------------|
| N | Alu-Knetlegierung < 12% Si, DIBOND                            | 21 - 22     |  | 330               | 380               | <0.3×ØD1   | <0.5×ØD1   |
|   | Kunststoff gute Zerspanbarkeit (PVC expandiert)               | 29          |  | 400               | 460               | <0.5×ØD1   | <1×ØD1     |
|   | Kunststoff moderiert Zerspanbarkeit (PETG, PPH, PC, PE-PP)    | 29          |  | 400               | 460               | <0.4×ØD1   | <1×ØD1     |
|   | Kunststoff schwere Zerspanbarkeit (PVC kompakt, PMMA schwarz) | 29          |  | 400               | 460               | <0.3×ØD1   | <1×ØD1     |
|   | Holz  | 30          |  | 400               | 460               | <0.3×ØD1   | <1×ØD1     |
|   | Geleimtes Holz (Agglomerat, Sperrholz)                        | 30          |  | 400               | 460               | <0.3×ØD1   | <1×ØD1     |

## NUTBEARBEITUNG

|   |   | VDI<br>3323 |   | VHM<br>Vc [m/min] | DLC<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |
|---|---|-------------|---|-------------------|-------------------|------------|------------|
| N | Alu-Knetlegierung < 12% Si, DIBOND                            | 21 - 22     |  | 330               | 380               | 1×ØD1      | <0.5×ØD1   |
|   | Kunststoff gute Zerspanbarkeit (PVC expandiert)               | 29          |   | 400               | 460               | 1×ØD1      | <1×ØD1     |
|   | Kunststoff moderiert Zerspanbarkeit (PETG, PPH, PC, PE-PP)    | 29          |   | 400               | 460               | 1×ØD1      | <1×ØD1     |
|   | Kunststoff schwere Zerspanbarkeit (PVC kompakt, PMMA schwarz) | 29          |   | 400               | 460               | 1×ØD1      | <1×ØD1     |
|   | Holz  | 30          |   | 400               | 460               | 1×ØD1      | <1×ØD1     |
|   | Geleimtes Holz (Agglomerat, Sperrholz)                        | 30          |   | 400               | 460               | 1×ØD1      | <1×ØD1     |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>1 - 1.50 | $\varnothing D_1$<br>2.00 - 3.00 | $\varnothing D_1$<br>4.00 - 5.00 | $\varnothing D_1$<br>6.00 - 8.00 | $\varnothing D_1$<br>10.00 - 12.00 |  |
|-------------------------------|----------------------------------|----------------------------------|----------------------------------|------------------------------------|--|
| 0.018 - 0.027                 | 0.036 - 0.054                    | 0.062 - 0.080                    | 0.070 - 0.100                    | 0.110 - 0.130                      |  |
| 0.030 - 0.045                 | 0.060 - 0.090                    | 0.104 - 0.130                    | 0.120 - 0.160                    | 0.180 - 0.220                      |  |
| 0.027 - 0.041                 | 0.054 - 0.081                    | 0.094 - 0.115                    | 0.110 - 0.140                    | 0.160 - 0.190                      |  |
| 0.024 - 0.036                 | 0.048 - 0.072                    | 0.084 - 0.105                    | 0.100 - 0.130                    | 0.140 - 0.170                      |  |
| 0.030 - 0.045                 | 0.060 - 0.090                    | 0.104 - 0.130                    | 0.120 - 0.160                    | 0.180 - 0.220                      |  |
| 0.021 - 0.032                 | 0.042 - 0.063                    | 0.072 - 0.090                    | 0.080 - 0.110                    | 0.130 - 0.150                      |  |

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>1 - 1.50 | $\varnothing D_1$<br>2.00 - 3.00 | $\varnothing D_1$<br>4.00 - 5.00 | $\varnothing D_1$<br>6.00 - 8.00 | $\varnothing D_1$<br>10.00 - 12.00 |  |
|-------------------------------|----------------------------------|----------------------------------|----------------------------------|------------------------------------|--|
| 0.005 - 0.007                 | 0.007 - 0.011                    | 0.012 - 0.015                    | 0.017 - 0.023                    | 0.026 - 0.032                      |  |
| 0.008 - 0.012                 | 0.012 - 0.018                    | 0.020 - 0.025                    | 0.029 - 0.038                    | 0.044 - 0.053                      |  |
| 0.006 - 0.010                 | 0.010 - 0.014                    | 0.016 - 0.020                    | 0.023 - 0.031                    | 0.035 - 0.042                      |  |
| 0.006 - 0.008                 | 0.008 - 0.013                    | 0.014 - 0.020                    | 0.020 - 0.027                    | 0.031 - 0.037                      |  |
| 0.008 - 0.012                 | 0.012 - 0.018                    | 0.020 - 0.025                    | 0.029 - 0.038                    | 0.044 - 0.053                      |  |
| 0.006 - 0.008                 | 0.008 - 0.013                    | 0.014 - 0.020                    | 0.020 - 0.027                    | 0.031 - 0.037                      |  |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

## UMFANGSBEARBEITUNG

|          |  |           | VDI 3323 |  | VHM<br>Vc [m/min] | TiAlN<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |       |
|----------|--|-----------|----------|--|-------------------|---------------------|------------|------------|-------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl   | 1 - 5     |          |  |                   | <b>100</b>          | <0.30×ØD1  | <1×L1      |       |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>  | 6 - 9     |          |  |                   | <b>80</b>           | <0.20×ØD1  | <1×L1      |       |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer/ martensitischer Edelstahl | 10 - 13   |          |  |                   | <b>55</b>           | <0.15×ØD1  | <1×L1      |       |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                  | 14.1-14.2 |          |  |                   | <b>80</b>           | <0.15×ØD1  | <1×L1      |       |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                        | 14.3-14.4 |          |  |                   | <b>55</b>           | <0.10×ØD1  | <1×L1      |       |
| <b>K</b> | Grauguss < 250 HB  | 15 - 16   |          |  |                   | <b>110</b>          | <b>125</b> | <0.40×ØD1  | <1×L1 |
|          | Duktiles Gusseisen, Temperguss > 250 HB  | 17 - 20   |          |  |                   | <b>75</b>           | <b>100</b> | <0.30×ØD1  | <1×L1 |
| <b>N</b> | Alu-Knetlegierung < 12% Si   | 21 - 22   |          |  |                   | <b>320</b>          |            | <0.45×ØD1  | <1×L1 |
|          | Alu-Gusslegierung >12% Si  | 23 - 25   |          |  |                   | <b>260</b>          |            | <0.35×ØD1  | <1×L1 |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb   | 26        |          |  |                   | <b>160</b>          |            | <0.40×ØD1  | <1×L1 |
|          | Kupferlegierung schwere Zerspanbarkeit   | 27 - 28   |          |  | <b>140</b>        |                     | <0.40×ØD1  | <1×L1      |       |
|          | Kunststoff, Holz   | 29 - 30   |          |  | <b>210</b>        |                     | <0.45×ØD1  | <1×L1      |       |
|          | Gold, Silber   | -         |          |  | <b>180</b>        |                     | <0.40×ØD1  | <1×L1      |       |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung  | 31 - 35   |          |  | <b>15</b>         | <b>20</b>           | <0.05×ØD1  | <1×L1      |       |
|          | Titan, Titanlegierung  | 36 - 37   |          |  | <b>60</b>         | <b>70</b>           | <0.30×ØD1  | <1×L1      |       |

## NUTBEARBEITUNG

|          |  |           | VDI 3323 |  | VHM<br>Vc [m/min] | TiAlN<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |           |
|----------|--|-----------|----------|--|-------------------|---------------------|------------|------------|-----------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl   | 1 - 5     |          |  |                   | <b>70</b>           | 1×ØD1      | <0.50×ØD1  |           |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>  | 6 - 9     |          |  |                   | <b>55</b>           | 1×ØD1      | <0.30×ØD1  |           |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer/ martensitischer Edelstahl | 10 - 13   |          |  |                   | <b>40</b>           | 1×ØD1      | <0.20×ØD1  |           |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                  | 14.1-14.2 |          |  |                   | <b>55</b>           | 1×ØD1      | <0.20×ØD1  |           |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                        | 14.3-14.4 |          |  |                   | <b>40</b>           | 1×ØD1      | <0.15×ØD1  |           |
| <b>K</b> | Grauguss < 250 HB  | 15 - 16   |          |  |                   | <b>90</b>           | <b>100</b> | 1×ØD1      | <0.50×ØD1 |
|          | Duktiles Gusseisen, Temperguss > 250 HB  | 17 - 20   |          |  |                   | <b>60</b>           | <b>70</b>  | 1×ØD1      | <0.35×ØD1 |
| <b>N</b> | Alu-Knetlegierung < 12% Si   | 21 - 22   |          |  |                   | <b>230</b>          |            | 1×ØD1      | <1.00×ØD1 |
|          | Alu-Gusslegierung >12% Si  | 23 - 25   |          |  |                   | <b>190</b>          |            | 1×ØD1      | <0.80×ØD1 |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb   | 26        |          |  |                   | <b>110</b>          |            | 1×ØD1      | <1.00×ØD1 |
|          | Kupferlegierung schwere Zerspanbarkeit   | 27 - 28   |          |  | <b>100</b>        |                     | 1×ØD1      | <0.50×ØD1  |           |
|          | Kunststoff, Holz   | 29 - 30   |          |  | <b>150</b>        |                     | 1×ØD1      | <0.70×ØD1  |           |
|          | Gold, Silber   | -         |          |  | <b>130</b>        |                     | 1×ØD1      | <0.70×ØD1  |           |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung  | 31 - 35   |          |  | <b>10</b>         | <b>15</b>           | 1×ØD1      | <1.00×ØD1  |           |
|          | Titan, Titanlegierung  | 36 - 37   |          |  | <b>50</b>         | <b>50</b>           | 1×ØD1      | <0.25×ØD1  |           |



$$n \text{ [U/min]} = \frac{Vc \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$Vf \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn **fz [mm]**

| $\varnothing D_1$<br>0.10 - 0.30 | $\varnothing D_1$<br>0.35 - 0.60 | $\varnothing D_1$<br>0.65 - 1.00 | $\varnothing D_1$<br>1.05 - 2.00 | $\varnothing D_1$<br>2.10 - 3.00 | $\varnothing D_1$<br>3.50 - 6.00 | $\varnothing D_1$<br>6.50 - 10.00 | $\varnothing D_1$<br>12.00 - 20.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|
| 0.0008 - 0.003                   | 0.004 - 0.006                    | 0.007 - 0.010                    | 0.011 - 0.020                    | 0.021 - 0.030                    | 0.036 - 0.060                    | 0.060 - 0.090                     | 0.100 - 0.140                      |
| 0.0007 - 0.002                   | 0.003 - 0.005                    | 0.006 - 0.009                    | 0.009 - 0.018                    | 0.019 - 0.027                    | 0.032 - 0.055                    | 0.050 - 0.080                     | 0.090 - 0.130                      |
| 0.0006 - 0.002                   | 0.003 - 0.005                    | 0.005 - 0.008                    | 0.008 - 0.016                    | 0.017 - 0.024                    | 0.028 - 0.050                    | 0.050 - 0.070                     | 0.080 - 0.110                      |
| 0.0006 - 0.002                   | 0.003 - 0.005                    | 0.005 - 0.008                    | 0.008 - 0.016                    | 0.017 - 0.024                    | 0.028 - 0.050                    | 0.050 - 0.070                     | 0.080 - 0.110                      |
| 0.0006 - 0.002                   | 0.002 - 0.004                    | 0.005 - 0.007                    | 0.007 - 0.014                    | 0.015 - 0.021                    | 0.024 - 0.040                    | 0.040 - 0.060                     | 0.070 - 0.100                      |
| 0.0010 - 0.003                   | 0.004 - 0.007                    | 0.008 - 0.012                    | 0.013 - 0.024                    | 0.025 - 0.036                    | 0.042 - 0.070                    | 0.070 - 0.110                     | 0.120 - 0.170                      |
| 0.0008 - 0.003                   | 0.004 - 0.006                    | 0.007 - 0.010                    | 0.011 - 0.020                    | 0.021 - 0.030                    | 0.036 - 0.060                    | 0.060 - 0.090                     | 0.100 - 0.140                      |
| 0.0012 - 0.004                   | 0.005 - 0.009                    | 0.010 - 0.015                    | 0.016 - 0.030                    | 0.032 - 0.045                    | 0.052 - 0.090                    | 0.090 - 0.140                     | 0.140 - 0.210                      |
| 0.0010 - 0.004                   | 0.005 - 0.008                    | 0.008 - 0.013                    | 0.014 - 0.026                    | 0.027 - 0.039                    | 0.046 - 0.080                    | 0.080 - 0.120                     | 0.120 - 0.180                      |
| 0.0012 - 0.004                   | 0.005 - 0.009                    | 0.010 - 0.015                    | 0.016 - 0.030                    | 0.032 - 0.045                    | 0.052 - 0.090                    | 0.090 - 0.140                     | 0.140 - 0.210                      |
| 0.0010 - 0.003                   | 0.004 - 0.007                    | 0.008 - 0.012                    | 0.013 - 0.024                    | 0.025 - 0.036                    | 0.042 - 0.070                    | 0.070 - 0.110                     | 0.120 - 0.170                      |
| 0.0012 - 0.004                   | 0.005 - 0.009                    | 0.010 - 0.015                    | 0.016 - 0.030                    | 0.032 - 0.045                    | 0.052 - 0.090                    | 0.090 - 0.140                     | 0.140 - 0.210                      |
| 0.0008 - 0.003                   | 0.004 - 0.006                    | 0.007 - 0.010                    | 0.011 - 0.020                    | 0.021 - 0.030                    | 0.036 - 0.060                    | 0.060 - 0.090                     | 0.100 - 0.140                      |
| 0.0004 - 0.001                   | 0.002 - 0.003                    | 0.003 - 0.005                    | 0.005 - 0.010                    | 0.011 - 0.015                    | 0.018 - 0.030                    | 0.030 - 0.050                     | 0.050 - 0.070                      |
| 0.0008 - 0.003                   | 0.004 - 0.006                    | 0.007 - 0.010                    | 0.011 - 0.020                    | 0.021 - 0.030                    | 0.036 - 0.060                    | 0.060 - 0.090                     | 0.100 - 0.140                      |

Vorschub pro Zahn **fz [mm]**

| $\varnothing D_1$<br>0.10 - 0.30 | $\varnothing D_1$<br>0.35 - 0.60 | $\varnothing D_1$<br>0.65 - 1.00 | $\varnothing D_1$<br>1.05 - 2.00 | $\varnothing D_1$<br>2.10 - 3.00 | $\varnothing D_1$<br>3.50 - 6.00 | $\varnothing D_1$<br>6.50 - 10.00 | $\varnothing D_1$<br>12.00 - 20.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|
| 0.0006 - 0.002                   | 0.003 - 0.005                    | 0.005 - 0.008                    | 0.008 - 0.015                    | 0.016 - 0.023                    | 0.028 - 0.045                    | 0.050 - 0.070                     | 0.080 - 0.110                      |
| 0.0005 - 0.002                   | 0.002 - 0.004                    | 0.005 - 0.007                    | 0.007 - 0.014                    | 0.014 - 0.020                    | 0.024 - 0.040                    | 0.040 - 0.060                     | 0.070 - 0.100                      |
| 0.0005 - 0.002                   | 0.002 - 0.004                    | 0.004 - 0.006                    | 0.006 - 0.012                    | 0.013 - 0.018                    | 0.022 - 0.040                    | 0.040 - 0.050                     | 0.060 - 0.080                      |
| 0.0005 - 0.002                   | 0.002 - 0.004                    | 0.004 - 0.006                    | 0.006 - 0.012                    | 0.013 - 0.018                    | 0.022 - 0.040                    | 0.040 - 0.050                     | 0.060 - 0.080                      |
| 0.0005 - 0.002                   | 0.002 - 0.003                    | 0.004 - 0.005                    | 0.005 - 0.011                    | 0.011 - 0.016                    | 0.018 - 0.030                    | 0.030 - 0.050                     | 0.050 - 0.080                      |
| 0.0008 - 0.002                   | 0.003 - 0.005                    | 0.006 - 0.009                    | 0.010 - 0.018                    | 0.019 - 0.027                    | 0.032 - 0.055                    | 0.050 - 0.080                     | 0.090 - 0.130                      |
| 0.0006 - 0.002                   | 0.003 - 0.005                    | 0.005 - 0.008                    | 0.008 - 0.015                    | 0.016 - 0.023                    | 0.028 - 0.045                    | 0.050 - 0.070                     | 0.080 - 0.110                      |
| 0.0009 - 0.003                   | 0.004 - 0.007                    | 0.008 - 0.011                    | 0.012 - 0.023                    | 0.024 - 0.034                    | 0.040 - 0.070                    | 0.070 - 0.110                     | 0.110 - 0.160                      |
| 0.0008 - 0.003                   | 0.004 - 0.006                    | 0.006 - 0.010                    | 0.011 - 0.020                    | 0.020 - 0.029                    | 0.034 - 0.060                    | 0.060 - 0.090                     | 0.090 - 0.140                      |
| 0.0009 - 0.003                   | 0.004 - 0.007                    | 0.008 - 0.011                    | 0.012 - 0.023                    | 0.024 - 0.034                    | 0.040 - 0.070                    | 0.070 - 0.110                     | 0.110 - 0.160                      |
| 0.0008 - 0.002                   | 0.003 - 0.005                    | 0.006 - 0.009                    | 0.010 - 0.018                    | 0.019 - 0.027                    | 0.032 - 0.055                    | 0.050 - 0.080                     | 0.090 - 0.130                      |
| 0.0009 - 0.003                   | 0.004 - 0.007                    | 0.008 - 0.011                    | 0.012 - 0.023                    | 0.024 - 0.034                    | 0.040 - 0.070                    | 0.070 - 0.110                     | 0.110 - 0.160                      |
| 0.0006 - 0.002                   | 0.003 - 0.005                    | 0.005 - 0.008                    | 0.008 - 0.015                    | 0.016 - 0.023                    | 0.028 - 0.045                    | 0.050 - 0.070                     | 0.080 - 0.110                      |
| 0.0003 - 0.001                   | 0.002 - 0.002                    | 0.002 - 0.004                    | 0.004 - 0.008                    | 0.008 - 0.011                    | 0.014 - 0.025                    | 0.020 - 0.040                     | 0.040 - 0.050                      |
| 0.0006 - 0.002                   | 0.003 - 0.005                    | 0.005 - 0.008                    | 0.008 - 0.015                    | 0.016 - 0.023                    | 0.028 - 0.045                    | 0.050 - 0.070                     | 0.080 - 0.110                      |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

**UMFANGSBEARBEITUNG**

|          |   | VDI 3323  |  | VHM<br>Vc [m/min] | C-TOP<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |           |
|----------|---|-----------|--|-------------------|---------------------|------------|------------|-----------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |  |                   | <b>150</b>          | <0.40×ØD1  | <1.50×ØD1  |           |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9     |  |                   | <b>125</b>          | <0.30×ØD1  | <1.50×ØD1  |           |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13   |  |                   | <b>85</b>           | <0.30×ØD1  | <1.50×ØD1  |           |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2 |  |                   | <b>95</b>           | <0.30×ØD1  | <1.50×ØD1  |           |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4 |  |                   | <b>65</b>           | <0.25×ØD1  | <1.50×ØD1  |           |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16   |  |                   | <b>170</b>          | <b>180</b> | <0.40×ØD1  | <1.50×ØD1 |
|          | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20   |  |                   | <b>105</b>          | <b>130</b> | <0.30×ØD1  | <1.50×ØD1 |
| <b>N</b> | Alu-Knetlegierung < 12% Si  | 21 - 22   |  |                   | <b>185</b>          |            | <0.40×ØD1  | <1.50×ØD1 |
|          | Alu-Gusslegierung >12% Si   | 23 - 25   |  |                   | <b>145</b>          |            | <0.40×ØD1  | <1.50×ØD1 |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26        |  |                   | <b>110</b>          |            | <0.40×ØD1  | <1.50×ØD1 |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28   |  | <b>95</b>         |                     | <0.40×ØD1  | <1.50×ØD1  |           |
|          | Gold, Silber  | -         |  | <b>165</b>        |                     | <0.40×ØD1  | <1.50×ØD1  |           |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   |  | <b>30</b>         | <b>40</b>           | <0.15×ØD1  | <1.50×ØD1  |           |
|          | Titan, Titanlegierung   | 36 - 37   |  | <b>60</b>         | <b>70</b>           | <0.30×ØD1  | <1.50×ØD1  |           |

**NUTBEARBEITUNG**

|          |   | VDI 3323  |  | VHM<br>Vc [m/min] | C-TOP<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |           |
|----------|---|-----------|--|-------------------|---------------------|------------|------------|-----------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |  |                   | <b>115</b>          | 1×ØD1      | <1.00×ØD1  |           |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9     |  |                   | <b>95</b>           | 1×ØD1      | <1.00×ØD1  |           |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13   |  |                   | <b>65</b>           | 1×ØD1      | <1.00×ØD1  |           |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2 |  |                   | <b>70</b>           | 1×ØD1      | <1.00×ØD1  |           |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4 |  |                   | <b>50</b>           | 1×ØD1      | <1.00×ØD1  |           |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16   |  |                   | <b>100</b>          | <b>135</b> | 1×ØD1      | <1.00×ØD1 |
|          | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20   |  |                   | <b>85</b>           | <b>95</b>  | 1×ØD1      | <1.00×ØD1 |
| <b>N</b> | Alu-Knetlegierung < 12% Si  | 21 - 22   |  |                   | <b>140</b>          |            | 1×ØD1      | <1.25×ØD1 |
|          | Alu-Gusslegierung >12% Si   | 23 - 25   |  |                   | <b>105</b>          |            | 1×ØD1      | <1.00×ØD1 |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26        |  |                   | <b>85</b>           |            | 1×ØD1      | <1.25×ØD1 |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28   |  | <b>70</b>         |                     | 1×ØD1      | <1.00×ØD1  |           |
|          | Gold, Silber  | -         |  | <b>125</b>        |                     | 1×ØD1      | <1.00×ØD1  |           |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   |  | <b>25</b>         | <b>30</b>           | 1×ØD1      | <0.20×ØD1  |           |
|          | Titan, Titanlegierung   | 36 - 37   |  | <b>55</b>         | <b>55</b>           | 1×ØD1      | <1.00×ØD1  |           |

$$n \text{ [U/min]} = \frac{Vc \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$Vf \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $fz$  [mm]

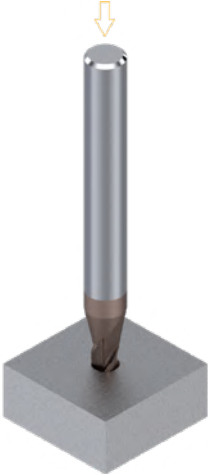
| $\varnothing D_1$<br>0.10 - 0.60 | $\varnothing D_1$<br>0.70 - 1.00 | $\varnothing D_1$<br>1.10 - 1.50 | $\varnothing D_1$<br>1.60 - 2.50 | $\varnothing D_1$<br>3.00 - 5.00 | $\varnothing D_1$<br>6.00 - 8.00 | $\varnothing D_1$<br>10.00 - 12.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|------------------------------------|
| 0.0036 - 0.009                   | 0.011 - 0.016                    | 0.017 - 0.023                    | 0.025 - 0.039                    | 0.046 - 0.080                    | 0.090 - 0.110                    | 0.120 - 0.130                      |
| 0.0033 - 0.008                   | 0.010 - 0.014                    | 0.016 - 0.021                    | 0.023 - 0.036                    | 0.042 - 0.070                    | 0.080 - 0.100                    | 0.110 - 0.120                      |
| 0.0030 - 0.007                   | 0.009 - 0.013                    | 0.014 - 0.020                    | 0.021 - 0.033                    | 0.040 - 0.065                    | 0.070 - 0.090                    | 0.100 - 0.110                      |
| 0.0030 - 0.007                   | 0.009 - 0.013                    | 0.014 - 0.020                    | 0.021 - 0.033                    | 0.040 - 0.065                    | 0.070 - 0.090                    | 0.100 - 0.110                      |
| 0.0027 - 0.006                   | 0.008 - 0.012                    | 0.013 - 0.018                    | 0.019 - 0.029                    | 0.036 - 0.060                    | 0.060 - 0.080                    | 0.090 - 0.100                      |
| 0.0042 - 0.010                   | 0.013 - 0.018                    | 0.020 - 0.027                    | 0.029 - 0.046                    | 0.054 - 0.090                    | 0.100 - 0.120                    | 0.140 - 0.150                      |
| 0.0036 - 0.009                   | 0.011 - 0.016                    | 0.017 - 0.023                    | 0.025 - 0.039                    | 0.046 - 0.080                    | 0.090 - 0.110                    | 0.120 - 0.130                      |
| 0.0051 - 0.012                   | 0.015 - 0.022                    | 0.024 - 0.033                    | 0.035 - 0.055                    | 0.066 - 0.110                    | 0.120 - 0.150                    | 0.170 - 0.180                      |
| 0.0045 - 0.011                   | 0.014 - 0.020                    | 0.021 - 0.029                    | 0.031 - 0.049                    | 0.058 - 0.100                    | 0.110 - 0.130                    | 0.150 - 0.160                      |
| 0.0051 - 0.012                   | 0.015 - 0.022                    | 0.024 - 0.033                    | 0.035 - 0.055                    | 0.066 - 0.110                    | 0.120 - 0.150                    | 0.170 - 0.180                      |
| 0.0042 - 0.010                   | 0.013 - 0.018                    | 0.020 - 0.027                    | 0.029 - 0.046                    | 0.054 - 0.090                    | 0.100 - 0.120                    | 0.140 - 0.150                      |
| 0.0036 - 0.009                   | 0.011 - 0.016                    | 0.017 - 0.023                    | 0.025 - 0.039                    | 0.046 - 0.080                    | 0.090 - 0.110                    | 0.120 - 0.130                      |
| 0.0021 - 0.005                   | 0.006 - 0.009                    | 0.010 - 0.014                    | 0.015 - 0.021                    | 0.022 - 0.033                    | 0.033 - 0.046                    | 0.046 - 0.060                      |
| 0.0036 - 0.009                   | 0.011 - 0.016                    | 0.017 - 0.023                    | 0.025 - 0.039                    | 0.046 - 0.080                    | 0.090 - 0.110                    | 0.120 - 0.130                      |

Vorschub pro Zahn  $fz$  [mm]

| $\varnothing D_1$<br>0.10 - 0.60 | $\varnothing D_1$<br>0.70 - 1.00 | $\varnothing D_1$<br>1.10 - 1.50 | $\varnothing D_1$<br>1.60 - 2.50 | $\varnothing D_1$<br>3.00 - 5.00 | $\varnothing D_1$<br>6.00 - 8.00 | $\varnothing D_1$<br>10.00 - 12.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|------------------------------------|
| 0.0022 - 0.005                   | 0.007 - 0.010                    | 0.010 - 0.014                    | 0.015 - 0.023                    | 0.028 - 0.050                    | 0.050 - 0.070                    | 0.070 - 0.080                      |
| 0.0020 - 0.005                   | 0.006 - 0.009                    | 0.009 - 0.013                    | 0.014 - 0.021                    | 0.026 - 0.040                    | 0.050 - 0.060                    | 0.070 - 0.070                      |
| 0.0018 - 0.004                   | 0.005 - 0.008                    | 0.009 - 0.012                    | 0.012 - 0.020                    | 0.024 - 0.040                    | 0.040 - 0.050                    | 0.060 - 0.070                      |
| 0.0018 - 0.004                   | 0.005 - 0.008                    | 0.009 - 0.012                    | 0.012 - 0.020                    | 0.024 - 0.040                    | 0.040 - 0.050                    | 0.060 - 0.070                      |
| 0.0016 - 0.004                   | 0.005 - 0.007                    | 0.008 - 0.011                    | 0.011 - 0.018                    | 0.022 - 0.035                    | 0.040 - 0.050                    | 0.050 - 0.060                      |
| 0.0025 - 0.006                   | 0.008 - 0.011                    | 0.012 - 0.016                    | 0.017 - 0.027                    | 0.032 - 0.055                    | 0.060 - 0.070                    | 0.080 - 0.090                      |
| 0.0022 - 0.005                   | 0.007 - 0.009                    | 0.010 - 0.014                    | 0.015 - 0.023                    | 0.028 - 0.050                    | 0.050 - 0.070                    | 0.070 - 0.080                      |
| 0.0031 - 0.007                   | 0.009 - 0.013                    | 0.014 - 0.020                    | 0.021 - 0.033                    | 0.040 - 0.065                    | 0.070 - 0.090                    | 0.100 - 0.110                      |
| 0.0027 - 0.007                   | 0.008 - 0.012                    | 0.013 - 0.017                    | 0.019 - 0.029                    | 0.035 - 0.060                    | 0.070 - 0.080                    | 0.090 - 0.100                      |
| 0.0031 - 0.007                   | 0.009 - 0.013                    | 0.015 - 0.020                    | 0.021 - 0.033                    | 0.040 - 0.065                    | 0.070 - 0.090                    | 0.100 - 0.110                      |
| 0.0025 - 0.006                   | 0.008 - 0.011                    | 0.012 - 0.016                    | 0.017 - 0.027                    | 0.032 - 0.055                    | 0.060 - 0.070                    | 0.080 - 0.090                      |
| 0.0022 - 0.005                   | 0.007 - 0.009                    | 0.010 - 0.014                    | 0.015 - 0.023                    | 0.028 - 0.050                    | 0.050 - 0.070                    | 0.070 - 0.080                      |
| 0.0013 - 0.003                   | 0.004 - 0.005                    | 0.006 - 0.008                    | 0.009 - 0.014                    | 0.016 - 0.025                    | 0.030 - 0.040                    | 0.040 - 0.050                      |
| 0.0022 - 0.005                   | 0.007 - 0.009                    | 0.010 - 0.014                    | 0.015 - 0.023                    | 0.028 - 0.050                    | 0.050 - 0.070                    | 0.070 - 0.080                      |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

## FRÄSER

|          |   | VDI<br>3323 |   | VHM<br>Vc [m/min] | C-TOP<br>Vc [m/min] | Tiefe<br>(mm) |           |
|----------|---|-------------|---|-------------------|---------------------|---------------|-----------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5       |  |                   | <b>85</b>           | <1.25xØD1     |           |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9       |   |                   | <b>70</b>           | <1.00xØD1     |           |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13     |   |                   | <b>50</b>           | <0.80xØD1     |           |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2   |   |                   | <b>55</b>           | <0.40xØD1     |           |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4   |   |                   | <b>40</b>           | <0.20xØD1     |           |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16     |   |                   | <b>75</b>           | <b>100</b>    | <1.25xØD1 |
|          | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20     |   |                   | <b>65</b>           | <b>70</b>     | <1.00xØD1 |
| <b>N</b> | Alu-Knetlegierung < 12% Si  | 21 - 22     |   |                   | <b>105</b>          |               | <1.25xØD1 |
|          | Alu-Gusslegierung > 12% Si  | 23 - 25     |   |                   | <b>80</b>           |               | <1.25xØD1 |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26          |   |                   | <b>65</b>           |               | <1.25xØD1 |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28     |   | <b>55</b>         |                     | <1.00xØD1     |           |
|          | Gold, Silber  | -           |   | <b>95</b>         |                     | <1.00xØD1     |           |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31 - 35     |   | <b>20</b>         | <b>25</b>           | <0.20xØD1     |           |
|          | Titan, Titanlegierung   | 36 - 37     |   | <b>40</b>         | <b>40</b>           | <0.60xØD1     |           |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.10 - 0.60 | $\emptyset D_1$<br>0.70 - 1.00 | $\emptyset D_1$<br>1.10 - 1.50 | $\emptyset D_1$<br>1.60 - 2.50 | $\emptyset D_1$<br>3.00 - 5.00 | $\emptyset D_1$<br>6.00 - 8.00 | $\emptyset D_1$<br>10.00 - 12.00 |  |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|----------------------------------|--|
| 0.0014 - 0.003                 | 0.007 - 0.010                  | 0.010 - 0.014                  | 0.015 - 0.023                  | 0.028 - 0.050                  | 0.050 - 0.070                  | 0.070 - 0.080                    |  |
| 0.0013 - 0.003                 | 0.006 - 0.009                  | 0.009 - 0.013                  | 0.014 - 0.021                  | 0.026 - 0.040                  | 0.050 - 0.060                  | 0.070 - 0.070                    |  |
| 0.0012 - 0.003                 | 0.005 - 0.008                  | 0.009 - 0.012                  | 0.012 - 0.020                  | 0.024 - 0.040                  | 0.040 - 0.050                  | 0.060 - 0.070                    |  |
| 0.0012 - 0.003                 | 0.005 - 0.008                  | 0.009 - 0.012                  | 0.012 - 0.020                  | 0.024 - 0.040                  | 0.040 - 0.050                  | 0.060 - 0.070                    |  |
| 0.0010 - 0.003                 | 0.005 - 0.007                  | 0.008 - 0.011                  | 0.011 - 0.018                  | 0.022 - 0.035                  | 0.040 - 0.050                  | 0.050 - 0.060                    |  |
| 0.0016 - 0.004                 | 0.008 - 0.011                  | 0.012 - 0.016                  | 0.017 - 0.027                  | 0.032 - 0.055                  | 0.060 - 0.070                  | 0.080 - 0.090                    |  |
| 0.0014 - 0.003                 | 0.007 - 0.009                  | 0.010 - 0.014                  | 0.015 - 0.023                  | 0.028 - 0.050                  | 0.050 - 0.070                  | 0.070 - 0.080                    |  |
| 0.0020 - 0.005                 | 0.009 - 0.013                  | 0.014 - 0.020                  | 0.021 - 0.033                  | 0.040 - 0.065                  | 0.070 - 0.090                  | 0.100 - 0.110                    |  |
| 0.0018 - 0.005                 | 0.008 - 0.012                  | 0.013 - 0.017                  | 0.019 - 0.029                  | 0.035 - 0.060                  | 0.070 - 0.080                  | 0.090 - 0.100                    |  |
| 0.0020 - 0.005                 | 0.009 - 0.013                  | 0.015 - 0.020                  | 0.021 - 0.033                  | 0.040 - 0.065                  | 0.070 - 0.090                  | 0.100 - 0.110                    |  |
| 0.0016 - 0.004                 | 0.008 - 0.011                  | 0.012 - 0.016                  | 0.017 - 0.027                  | 0.032 - 0.055                  | 0.060 - 0.070                  | 0.080 - 0.090                    |  |
| 0.0014 - 0.003                 | 0.007 - 0.009                  | 0.010 - 0.014                  | 0.015 - 0.023                  | 0.028 - 0.050                  | 0.050 - 0.070                  | 0.070 - 0.080                    |  |
| 0.0008 - 0.002                 | 0.004 - 0.005                  | 0.006 - 0.008                  | 0.009 - 0.014                  | 0.016 - 0.025                  | 0.030 - 0.040                  | 0.040 - 0.050                    |  |
| 0.0014 - 0.003                 | 0.007 - 0.009                  | 0.010 - 0.014                  | 0.015 - 0.023                  | 0.028 - 0.050                  | 0.050 - 0.070                  | 0.070 - 0.080                    |  |

## UMFANGSBEARBEITUNG

|          |   | VDI<br>3323           |  | VHM<br>Vc [m/min] | TiAIN<br>Vc [m/min] | DIAMANT<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |
|----------|---|-----------------------|--|-------------------|---------------------|-----------------------|------------|------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5                 |  |                   | <b>95</b>           |                       | <0.025×ØD1 | <1×L1      |
|          | Niedrig legierter Stahl < 800 N/mm²                                       | 6 - 9                 |  | <b>85</b>         | <0.025×ØD1          | <1×L1                 |            |            |
|          | Hochlegierter Stahl > 800 N/mm², ferritischer / martensitischer Edelstahl | 10 - 13               |  | <b>65</b>         | <0.015×ØD1          | <1×L1                 |            |            |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm²                               | 14.1-14.2             |  | <b>65</b>         | <0.015×ØD1          | <1×L1                 |            |            |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm²                        | 14.3 - 14.4           |  | <b>55</b>         | <0.010×ØD1          | <1×L1                 |            |            |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16               |  | <b>125</b>        | <b>125</b>          | <0.065×ØD1            | <1×L1      |            |
|          | Duktilen Gusseisen, Temperguss > 250 HB                                   | 17 - 20               |  | <b>90</b>         | <b>90</b>           | <0.040×ØD1            | <1×L1      |            |
| <b>N</b> | Alu-Knetlegierung < 12% Si  | 21 - 22               |  | <b>165</b>        |                     | <0.030×ØD1            | <1×L1      |            |
|          | Alu-Gusslegierung >12% Si   | 23 - 25               |  | <b>125</b>        |                     | <0.040×ØD1            | <1×L1      |            |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb                                | 26                    |  | <b>125</b>        |                     | <0.040×ØD1            | <1×L1      |            |
|          | Kupferlegierung schwere Zerspanbarkeit                                    | 27 - 28               |  | <b>100</b>        |                     | <0.025×ØD1            | <1×L1      |            |
|          | Kunststoff, Holz  | 29 - 30               |  | <b>110</b>        |                     | <0.040×ØD1            | <1×L1      |            |
|          | Graphit   | -                     |  |                   | <b>200</b>          | <0.160×ØD1            | <1×L1      |            |
|          | Gold, Silber  | -                     |  | <b>90</b>         |                     | <0.030×ØD1            | <1×L1      |            |
|          | <b>S</b>  | Titan, Titanlegierung |  | 36 - 37           | <b>50</b>           | <b>65</b>             | <0.025×ØD1 | <1×L1      |

## NUTBEARBEITUNG

|          |   | VDI<br>3323           |  | VHM<br>Vc [m/min] | TiAIN<br>Vc [m/min] | DIAMANT<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |
|----------|---|-----------------------|--|-------------------|---------------------|-----------------------|------------|------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5                 |  |                   | <b>75</b>           |                       | 1×ØD1      | <0.12×ØD1  |
|          | Niedrig legierter Stahl < 800 N/mm²                                       | 6 - 9                 |  | <b>70</b>         | 1×ØD1               | <0.10×ØD1             |            |            |
|          | Hochlegierter Stahl > 800 N/mm², ferritischer / martensitischer Edelstahl | 10 - 13               |  | <b>50</b>         | 1×ØD1               | <0.10×ØD1             |            |            |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm²                               | 14.1-14.2             |  | <b>50</b>         | 1×ØD1               | <0.10×ØD1             |            |            |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm²                        | 14.3-14.4             |  | <b>45</b>         | 1×ØD1               | <0.08×ØD1             |            |            |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16               |  | <b>100</b>        | <b>100</b>          | 1×ØD1                 | <0.14×ØD1  |            |
|          | Duktilen Gusseisen, Temperguss > 250 HB                                   | 17 - 20               |  | <b>70</b>         | <b>70</b>           | 1×ØD1                 | <0.12×ØD1  |            |
| <b>N</b> | Alu-Knetlegierung < 12% Si  | 21 - 22               |  | <b>130</b>        |                     | 1×ØD1                 | <0.16×ØD1  |            |
|          | Alu-Gusslegierung >12% Si   | 23 - 25               |  | <b>100</b>        |                     | 1×ØD1                 | <0.14×ØD1  |            |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb                                | 26                    |  | <b>100</b>        |                     | 1×ØD1                 | <0.16×ØD1  |            |
|          | Kupferlegierung schwere Zerspanbarkeit                                    | 27 - 28               |  | <b>80</b>         |                     | 1×ØD1                 | <0.14×ØD1  |            |
|          | Kunststoff, Holz  | 29 - 30               |  | <b>90</b>         |                     | 1×ØD1                 | <0.16×ØD1  |            |
|          | Graphit   | -                     |  |                   | <b>160</b>          | 1×ØD1                 | <0.22×ØD1  |            |
|          | Gold, Silber  | -                     |  | <b>130</b>        |                     | 1×ØD1                 | <0.12×ØD1  |            |
|          | <b>S</b>  | Titan, Titanlegierung |  | 36 - 37           | <b>40</b>           | <b>50</b>             | 1×ØD1      | <0.12×ØD1  |

$$n \text{ [U/min]} = \frac{Vc \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$Vf \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $fz$  [mm]

| $\emptyset D_1$<br>0.40 - 1.40 | $\emptyset D_1$<br>1.50 - 2.00 | $\emptyset D_1$<br>2.50 - 4.00 | $\emptyset D_1$<br>5.00 - 6.00 | $\emptyset D_1$<br>7.00 - 8.00 | $\emptyset D_1$<br>10.00 - 12.00 | $\emptyset D_1$<br>13.00 - 16.00 | $\emptyset D_1$<br>18.00 - 20.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|----------------------------------|----------------------------------|----------------------------------|
| 0.003 - 0.011                  | 0.012 - 0.016                  | 0.020 - 0.032                  | 0.040 - 0.048                  | 0.056 - 0.065                  | 0.080 - 0.100                    | 0.100 - 0.120                    | 0.130 - 0.140                    |
| 0.003 - 0.010                  | 0.011 - 0.014                  | 0.018 - 0.029                  | 0.036 - 0.043                  | 0.050 - 0.060                  | 0.070 - 0.090                    | 0.090 - 0.110                    | 0.110 - 0.130                    |
| 0.003 - 0.009                  | 0.010 - 0.013                  | 0.016 - 0.026                  | 0.032 - 0.038                  | 0.044 - 0.050                  | 0.060 - 0.080                    | 0.080 - 0.100                    | 0.100 - 0.110                    |
| 0.003 - 0.009                  | 0.010 - 0.013                  | 0.016 - 0.026                  | 0.032 - 0.038                  | 0.044 - 0.050                  | 0.060 - 0.080                    | 0.080 - 0.100                    | 0.100 - 0.110                    |
| 0.002 - 0.008                  | 0.008 - 0.011                  | 0.014 - 0.022                  | 0.028 - 0.034                  | 0.040 - 0.045                  | 0.060 - 0.070                    | 0.070 - 0.080                    | 0.090 - 0.100                    |
| 0.004 - 0.013                  | 0.014 - 0.019                  | 0.024 - 0.038                  | 0.048 - 0.058                  | 0.068 - 0.075                  | 0.100 - 0.120                    | 0.120 - 0.140                    | 0.150 - 0.170                    |
| 0.003 - 0.011                  | 0.012 - 0.016                  | 0.020 - 0.032                  | 0.040 - 0.048                  | 0.056 - 0.065                  | 0.080 - 0.100                    | 0.100 - 0.120                    | 0.130 - 0.140                    |
| 0.005 - 0.017                  | 0.018 - 0.024                  | 0.030 - 0.048                  | 0.060 - 0.072                  | 0.084 - 0.095                  | 0.120 - 0.140                    | 0.150 - 0.180                    | 0.190 - 0.210                    |
| 0.004 - 0.015                  | 0.016 - 0.021                  | 0.026 - 0.042                  | 0.052 - 0.062                  | 0.072 - 0.085                  | 0.100 - 0.120                    | 0.130 - 0.160                    | 0.160 - 0.180                    |
| 0.005 - 0.017                  | 0.018 - 0.024                  | 0.030 - 0.048                  | 0.060 - 0.072                  | 0.084 - 0.095                  | 0.120 - 0.140                    | 0.150 - 0.180                    | 0.190 - 0.210                    |
| 0.004 - 0.013                  | 0.014 - 0.019                  | 0.024 - 0.038                  | 0.048 - 0.058                  | 0.068 - 0.075                  | 0.100 - 0.120                    | 0.120 - 0.140                    | 0.150 - 0.170                    |
| 0.005 - 0.017                  | 0.018 - 0.024                  | 0.030 - 0.048                  | 0.060 - 0.072                  | 0.084 - 0.095                  | 0.120 - 0.140                    | 0.150 - 0.180                    | 0.190 - 0.210                    |
| 0.006 - 0.022                  | 0.024 - 0.032                  | 0.040 - 0.064                  | 0.080 - 0.096                  | 0.112 - 0.130                  | 0.160 - 0.190                    | 0.200 - 0.240                    | 0.250 - 0.280                    |
| 0.003 - 0.011                  | 0.012 - 0.016                  | 0.020 - 0.032                  | 0.040 - 0.048                  | 0.056 - 0.065                  | 0.080 - 0.100                    | 0.100 - 0.120                    | 0.130 - 0.140                    |
| 0.003 - 0.011                  | 0.012 - 0.016                  | 0.020 - 0.032                  | 0.040 - 0.048                  | 0.056 - 0.065                  | 0.080 - 0.100                    | 0.100 - 0.120                    | 0.130 - 0.140                    |

Vorschub pro Zahn  $fz$  [mm]

| $\emptyset D_1$<br>0.40 - 1.40 | $\emptyset D_1$<br>1.50 - 2.00 | $\emptyset D_1$<br>2.50 - 4.00 | $\emptyset D_1$<br>5.00 - 6.00 | $\emptyset D_1$<br>7.00 - 8.00 | $\emptyset D_1$<br>10.00 - 12.00 | $\emptyset D_1$<br>13.00 - 16.00 | $\emptyset D_1$<br>18.00 - 20.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|----------------------------------|----------------------------------|----------------------------------|
| 0.002 - 0.008                  | 0.008 - 0.011                  | 0.014 - 0.022                  | 0.028 - 0.034                  | 0.039 - 0.046                  | 0.056 - 0.070                    | 0.070 - 0.080                    | 0.090 - 0.100                    |
| 0.002 - 0.007                  | 0.008 - 0.010                  | 0.013 - 0.020                  | 0.025 - 0.030                  | 0.035 - 0.042                  | 0.050 - 0.065                    | 0.060 - 0.080                    | 0.080 - 0.090                    |
| 0.002 - 0.006                  | 0.007 - 0.009                  | 0.011 - 0.018                  | 0.022 - 0.027                  | 0.031 - 0.035                  | 0.042 - 0.055                    | 0.060 - 0.070                    | 0.070 - 0.080                    |
| 0.002 - 0.006                  | 0.007 - 0.009                  | 0.011 - 0.018                  | 0.022 - 0.027                  | 0.031 - 0.035                  | 0.042 - 0.055                    | 0.060 - 0.070                    | 0.070 - 0.080                    |
| 0.001 - 0.006                  | 0.006 - 0.008                  | 0.010 - 0.015                  | 0.020 - 0.024                  | 0.028 - 0.032                  | 0.042 - 0.050                    | 0.050 - 0.060                    | 0.060 - 0.070                    |
| 0.003 - 0.009                  | 0.010 - 0.013                  | 0.017 - 0.027                  | 0.034 - 0.041                  | 0.048 - 0.053                  | 0.070 - 0.085                    | 0.080 - 0.100                    | 0.110 - 0.120                    |
| 0.002 - 0.008                  | 0.008 - 0.011                  | 0.014 - 0.022                  | 0.028 - 0.034                  | 0.039 - 0.046                  | 0.056 - 0.070                    | 0.070 - 0.080                    | 0.090 - 0.100                    |
| 0.004 - 0.012                  | 0.013 - 0.017                  | 0.021 - 0.034                  | 0.042 - 0.050                  | 0.059 - 0.067                  | 0.084 - 0.100                    | 0.110 - 0.130                    | 0.130 - 0.150                    |
| 0.003 - 0.011                  | 0.011 - 0.015                  | 0.018 - 0.029                  | 0.036 - 0.043                  | 0.050 - 0.060                  | 0.070 - 0.085                    | 0.090 - 0.110                    | 0.110 - 0.130                    |
| 0.004 - 0.012                  | 0.013 - 0.017                  | 0.021 - 0.034                  | 0.042 - 0.050                  | 0.059 - 0.067                  | 0.084 - 0.100                    | 0.110 - 0.130                    | 0.130 - 0.150                    |
| 0.003 - 0.009                  | 0.010 - 0.013                  | 0.017 - 0.027                  | 0.034 - 0.041                  | 0.048 - 0.053                  | 0.070 - 0.085                    | 0.080 - 0.100                    | 0.110 - 0.120                    |
| 0.004 - 0.012                  | 0.013 - 0.017                  | 0.021 - 0.034                  | 0.042 - 0.050                  | 0.059 - 0.067                  | 0.084 - 0.100                    | 0.110 - 0.130                    | 0.130 - 0.150                    |
| 0.004 - 0.015                  | 0.017 - 0.022                  | 0.028 - 0.045                  | 0.056 - 0.067                  | 0.078 - 0.091                  | 0.112 - 0.135                    | 0.140 - 0.170                    | 0.180 - 0.200                    |
| 0.002 - 0.008                  | 0.008 - 0.011                  | 0.014 - 0.022                  | 0.028 - 0.034                  | 0.039 - 0.046                  | 0.056 - 0.070                    | 0.070 - 0.080                    | 0.090 - 0.100                    |
| 0.002 - 0.008                  | 0.008 - 0.011                  | 0.014 - 0.022                  | 0.028 - 0.034                  | 0.039 - 0.046                  | 0.056 - 0.070                    | 0.070 - 0.080                    | 0.090 - 0.100                    |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

UMFANGSBEARBEITUNG

|   |  | VDI 3323  |  | VHM Vc [m/min] | TiAlN Vc [m/min] | ae (mm)    | ap (mm)  |        |
|---|--|-----------|--|----------------|------------------|------------|----------|--------|
| P | Unlegierter Stahl, Automaten Stahl   | 1 - 5     |  |                | <b>100</b>       | <0.3×ØD1   | <1×ØD1   |        |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>  | 6 - 9     |  |                | <b>80</b>        | <0.2×ØD1   | <1×ØD1   |        |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> , ferritischer / martensitischer Edelstahl | 10 - 13   |  |                | <b>55</b>        | <0.2×ØD1   | <1×ØD1   |        |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                | 14.1-14.2 |  |                |                  | <b>80</b>  | <0.2×ØD1 | <1×ØD1 |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                         | 14.3-14.4 |  |                |                  | <b>55</b>  | <0.1×ØD1 | <1×ØD1 |
| K | Grauguss < 250 HB  | 15 - 16   |  |                | <b>110</b>       | <b>125</b> | <0.4×ØD1 | <1×ØD1 |
|   | Duktiles Gusseisen, Temperguss > 250 HB  | 17 - 20   |  |                | <b>75</b>        | <b>115</b> | <0.3×ØD1 | <1×ØD1 |
| N | Alu-Knetlegierung < 12% Si   | 21 - 22   |  |                | <b>320</b>       |            | <0.4×ØD1 | <1×ØD1 |
|   | Alu-Gusslegierung >12% Si  | 23 - 25   |  |                | <b>260</b>       |            | <0.4×ØD1 | <1×ØD1 |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb   | 26        |  |                | <b>160</b>       |            | <0.1×ØD1 | <1×ØD1 |
|   | Kupferlegierung schwere Zerspanbarkeit   | 27 - 28   |  |                | <b>140</b>       |            | <0.3×ØD1 | <1×ØD1 |
|   | Kunststoff, Holz   | 29 - 30   |  |                | <b>210</b>       |            | <0.5×ØD1 | <1×ØD1 |
|   | Gold, Silber   | -         |  | <b>180</b>     |                  | <0.4×ØD1   | <1×ØD1   |        |
| S | Spezielle Nickel-Kobalt-Legierung  | 31 - 35   |  | <b>15</b>      | <b>30</b>        | <0.1×ØD1   | <1×ØD1   |        |
|   | Titan, Titanlegierung  | 36 - 37   |  | <b>60</b>      | <b>70</b>        | <0.3×ØD1   | <1×ØD1   |        |

NUTBEARBEITUNG

|   |  | VDI 3323  |  | VHN Vc [m/min] | TiAlN Vc [m/min] | ae (mm)   | ap (mm)  |          |
|---|--|-----------|--|----------------|------------------|-----------|----------|----------|
| P | Unlegierter Stahl, Automaten Stahl   | 1 - 5     |  |                | <b>70</b>        | 1×ØD1     | <0.8×ØD1 |          |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>  | 6 - 9     |  |                | <b>55</b>        | 1×ØD1     | <0.8×ØD1 |          |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> , ferritischer / martensitischer Edelstahl | 10 - 13   |  |                | <b>40</b>        | 1×ØD1     | <0.6×ØD1 |          |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                | 14.1-14.2 |  |                |                  | <b>55</b> | 1×ØD1    | <0.6×ØD1 |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                         | 14.3-14.4 |  |                |                  | <b>40</b> | 1×ØD1    | <0.6×ØD1 |
| K | Grauguss < 250 HB  | 15 - 16   |  |                | <b>75</b>        | <b>90</b> | 1×ØD1    | <0.8×ØD1 |
|   | Duktiles Gusseisen, Temperguss > 250 HB  | 17 - 20   |  |                | <b>55</b>        | <b>80</b> | 1×ØD1    | <0.8×ØD1 |
| N | Alu-Knetlegierung < 12% Si   | 21 - 22   |  |                | <b>225</b>       |           | 1×ØD1    | <1.0×ØD1 |
|   | Alu-Gusslegierung >12% Si  | 23 - 25   |  |                | <b>185</b>       |           | 1×ØD1    | <0.8×ØD1 |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb   | 26        |  |                | <b>110</b>       |           | 1×ØD1    | <0.8×ØD1 |
|   | Kupferlegierung schwere Zerspanbarkeit   | 27 - 28   |  |                | <b>95</b>        |           | 1×ØD1    | <0.8×ØD1 |
|   | Kunststoff, Holz   | 29 - 30   |  |                | <b>150</b>       |           | 1×ØD1    | <1.0×ØD1 |
|   | Gold, Silber   | -         |  | <b>125</b>     |                  | 1×ØD1     | <1.0×ØD1 |          |
| S | Spezielle Nickel-Kobalt-Legierung  | 31 - 35   |  | <b>10</b>      | <b>20</b>        | 1×ØD1     | <0.3×ØD1 |          |
|   | Titan, Titanlegierung  | 36 - 37   |  | <b>40</b>      | <b>50</b>        | 1×ØD1     | <0.8×ØD1 |          |

DIXI 7250-3D / DIXI 7240-3D / DIXI 7240-5D ⇒ (ap & ae) -25 %  
 DIXI 7240-8D / DIXI 7240-10D ⇒ (ap & ae) -50 %  
 DIXI 7240-12D / DIXI 7240-15D ⇒ (ap & ae) -75 %



$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.04 - 0.15 | $\emptyset D_1$<br>0.20 - 0.50 | $\emptyset D_1$<br>0.55 - 0.95 | $\emptyset D_1$<br>1.00 - 1.50 | $\emptyset D_1$<br>1.55 - 1.95 | $\emptyset D_1$<br>2.00 - 3.00 | $\emptyset D_1$<br>3.50 - 4.00 | $\emptyset D_1$<br>4.50 - 5.50 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| 0.0003 - 0.0011                | 0.002 - 0.004                  | 0.004 - 0.008                  | 0.008 - 0.012                  | 0.012 - 0.016                  | 0.016 - 0.025                  | 0.028 - 0.032                  | 0.036 - 0.044                  |
| 0.0002 - 0.0009                | 0.001 - 0.004                  | 0.004 - 0.007                  | 0.007 - 0.011                  | 0.011 - 0.014                  | 0.014 - 0.020                  | 0.025 - 0.028                  | 0.032 - 0.039                  |
| 0.0002 - 0.0008                | 0.001 - 0.003                  | 0.003 - 0.006                  | 0.006 - 0.009                  | 0.009 - 0.012                  | 0.012 - 0.020                  | 0.021 - 0.024                  | 0.027 - 0.033                  |
| 0.0002 - 0.0008                | 0.001 - 0.003                  | 0.003 - 0.006                  | 0.006 - 0.009                  | 0.009 - 0.012                  | 0.012 - 0.020                  | 0.021 - 0.024                  | 0.027 - 0.033                  |
| 0.0002 - 0.0007                | 0.001 - 0.003                  | 0.003 - 0.005                  | 0.005 - 0.008                  | 0.008 - 0.010                  | 0.010 - 0.015                  | 0.018 - 0.020                  | 0.023 - 0.028                  |
| 0.0004 - 0.0016                | 0.002 - 0.006                  | 0.007 - 0.011                  | 0.012 - 0.018                  | 0.019 - 0.023                  | 0.024 - 0.035                  | 0.042 - 0.048                  | 0.054 - 0.066                  |
| 0.0003 - 0.0014                | 0.002 - 0.005                  | 0.006 - 0.010                  | 0.010 - 0.015                  | 0.016 - 0.020                  | 0.020 - 0.030                  | 0.035 - 0.040                  | 0.045 - 0.055                  |
| 0.0005 - 0.0020                | 0.003 - 0.008                  | 0.008 - 0.014                  | 0.015 - 0.023                  | 0.023 - 0.029                  | 0.030 - 0.045                  | 0.053 - 0.060                  | 0.068 - 0.083                  |
| 0.0004 - 0.0018                | 0.003 - 0.007                  | 0.007 - 0.012                  | 0.013 - 0.020                  | 0.020 - 0.025                  | 0.026 - 0.040                  | 0.046 - 0.052                  | 0.058 - 0.072                  |
| 0.0005 - 0.0020                | 0.003 - 0.008                  | 0.008 - 0.014                  | 0.015 - 0.023                  | 0.023 - 0.029                  | 0.030 - 0.045                  | 0.053 - 0.060                  | 0.068 - 0.083                  |
| 0.0004 - 0.0016                | 0.002 - 0.006                  | 0.007 - 0.011                  | 0.012 - 0.018                  | 0.019 - 0.023                  | 0.024 - 0.035                  | 0.042 - 0.048                  | 0.054 - 0.066                  |
| 0.0005 - 0.0020                | 0.003 - 0.008                  | 0.008 - 0.014                  | 0.015 - 0.023                  | 0.023 - 0.029                  | 0.030 - 0.045                  | 0.053 - 0.060                  | 0.068 - 0.083                  |
| 0.0003 - 0.0014                | 0.002 - 0.005                  | 0.006 - 0.010                  | 0.010 - 0.015                  | 0.016 - 0.020                  | 0.020 - 0.030                  | 0.035 - 0.040                  | 0.045 - 0.055                  |
| 0.0001 - 0.0005                | 0.001 - 0.002                  | 0.002 - 0.004                  | 0.004 - 0.006                  | 0.006 - 0.008                  | 0.008 - 0.010                  | 0.014 - 0.016                  | 0.018 - 0.022                  |
| 0.0003 - 0.0014                | 0.002 - 0.005                  | 0.006 - 0.010                  | 0.010 - 0.015                  | 0.016 - 0.020                  | 0.020 - 0.030                  | 0.035 - 0.040                  | 0.045 - 0.055                  |

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.04 - 0.15 | $\emptyset D_1$<br>0.20 - 0.50 | $\emptyset D_1$<br>0.55 - 0.95 | $\emptyset D_1$<br>1.00 - 1.50 | $\emptyset D_1$<br>1.55 - 1.95 | $\emptyset D_1$<br>2.00 - 3.00 | $\emptyset D_1$<br>3.50 - 4.00 | $\emptyset D_1$<br>4.50 - 5.50 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| 0.0002 - 0.0010                | 0.002 - 0.003                  | 0.003 - 0.006                  | 0.006 - 0.009                  | 0.009 - 0.012                  | 0.012 - 0.020                  | 0.021 - 0.024                  | 0.027 - 0.033                  |
| 0.0002 - 0.0010                | 0.001 - 0.003                  | 0.003 - 0.005                  | 0.005 - 0.008                  | 0.008 - 0.011                  | 0.011 - 0.015                  | 0.019 - 0.021                  | 0.024 - 0.029                  |
| 0.0002 - 0.0010                | 0.001 - 0.002                  | 0.002 - 0.005                  | 0.005 - 0.007                  | 0.007 - 0.009                  | 0.009 - 0.015                  | 0.016 - 0.018                  | 0.020 - 0.025                  |
| 0.0002 - 0.0010                | 0.001 - 0.002                  | 0.002 - 0.005                  | 0.005 - 0.007                  | 0.007 - 0.009                  | 0.009 - 0.015                  | 0.016 - 0.018                  | 0.020 - 0.025                  |
| 0.0002 - 0.0010                | 0.001 - 0.002                  | 0.002 - 0.004                  | 0.004 - 0.006                  | 0.006 - 0.008                  | 0.008 - 0.010                  | 0.014 - 0.015                  | 0.017 - 0.021                  |
| 0.0003 - 0.0010                | 0.002 - 0.005                  | 0.005 - 0.008                  | 0.009 - 0.014                  | 0.014 - 0.017                  | 0.018 - 0.025                  | 0.032 - 0.036                  | 0.041 - 0.050                  |
| 0.0002 - 0.0010                | 0.002 - 0.004                  | 0.005 - 0.008                  | 0.008 - 0.011                  | 0.012 - 0.015                  | 0.015 - 0.025                  | 0.026 - 0.030                  | 0.034 - 0.041                  |
| 0.0004 - 0.0020                | 0.002 - 0.006                  | 0.006 - 0.011                  | 0.011 - 0.017                  | 0.017 - 0.022                  | 0.023 - 0.035                  | 0.040 - 0.045                  | 0.051 - 0.062                  |
| 0.0003 - 0.0010                | 0.002 - 0.005                  | 0.005 - 0.009                  | 0.010 - 0.015                  | 0.015 - 0.019                  | 0.020 - 0.030                  | 0.035 - 0.039                  | 0.044 - 0.054                  |
| 0.0004 - 0.0020                | 0.002 - 0.006                  | 0.006 - 0.011                  | 0.011 - 0.017                  | 0.017 - 0.022                  | 0.023 - 0.035                  | 0.040 - 0.045                  | 0.051 - 0.062                  |
| 0.0003 - 0.0010                | 0.002 - 0.005                  | 0.005 - 0.008                  | 0.009 - 0.014                  | 0.014 - 0.017                  | 0.018 - 0.025                  | 0.032 - 0.036                  | 0.041 - 0.050                  |
| 0.0004 - 0.0020                | 0.002 - 0.006                  | 0.006 - 0.011                  | 0.011 - 0.017                  | 0.017 - 0.022                  | 0.023 - 0.035                  | 0.040 - 0.045                  | 0.051 - 0.062                  |
| 0.0002 - 0.0010                | 0.002 - 0.004                  | 0.005 - 0.008                  | 0.008 - 0.011                  | 0.012 - 0.015                  | 0.015 - 0.025                  | 0.026 - 0.030                  | 0.034 - 0.041                  |
| 0.0001 - 0.0004                | 0.001 - 0.002                  | 0.002 - 0.003                  | 0.003 - 0.005                  | 0.005 - 0.006                  | 0.006 - 0.010                  | 0.011 - 0.012                  | 0.014 - 0.017                  |
| 0.0002 - 0.0010                | 0.002 - 0.004                  | 0.005 - 0.008                  | 0.008 - 0.011                  | 0.012 - 0.015                  | 0.015 - 0.025                  | 0.026 - 0.030                  | 0.034 - 0.041                  |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

**UMFANGSBEARBEITUNG**

|          |   | VDI 3323  |  | VHM Vc [m/min] | CUTINOX Vc [m/min] | ae (mm)    | ap (mm)   |        |
|----------|---|-----------|--|----------------|--------------------|------------|-----------|--------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |  |                | <b>135</b>         | <0.50×ØD1  | <1×ØD1    |        |
|          | Niedrig legierter Stahl < 800 N/mm²                                       | 6 - 9     |  |                | <b>105</b>         | <0.50×ØD1  | <1×ØD1    |        |
|          | Hochlegierter Stahl > 800 N/mm², ferritischer / martensitischer Edelstahl | 10 - 13   |  |                | <b>80</b>          | <0.30×ØD1  | <1×ØD1    |        |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm²                               | 14.1-14.2 |  |                | <b>100</b>         | <0.30×ØD1  | <1×ØD1    |        |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm²                        | 14.3-14.4 |  |                | <b>80</b>          | <0.25×ØD1  | <1×ØD1    |        |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16   |  |                | <b>180</b>         | <b>200</b> | <0.50×ØD1 | <1×ØD1 |
|          | Duktiles Gusseisen, Temperguss > 250 HB                                   | 17 - 20   |  |                | <b>95</b>          | <b>130</b> | <0.50×ØD1 | <1×ØD1 |
| <b>N</b> | Alu-Knetlegierung < 12% Si  | 21 - 22   |  |                | <b>320</b>         |            | <0.50×ØD1 | <1×ØD1 |
|          | Alu-Gusslegierung >12% Si   | 23 - 25   |  |                | <b>260</b>         |            | <0.50×ØD1 | <1×ØD1 |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb                                | 26        |  |                | <b>160</b>         |            | <0.50×ØD1 | <1×ØD1 |
|          | Kupferlegierung schwere Zerspanbarkeit                                    | 27 - 28   |  | <b>140</b>     |                    | <0.50×ØD1  | <1×ØD1    |        |
|          | Kunststoff, Holz  | 29 - 30   |  | <b>210</b>     |                    | <0.50×ØD1  | <1×ØD1    |        |
|          | Gold, Silber  | -         |  | <b>180</b>     |                    | <0.50×ØD1  | <1×ØD1    |        |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   |  | <b>20</b>      | <b>30</b>          | <0.15×ØD1  | <1×ØD1    |        |
|          | Titan, Titanlegierung   | 36 - 37   |  | <b>65</b>      | <b>70</b>          | <0.40×ØD1  | <1×ØD1    |        |

**NUTBEARBEITUNG**

|          |   | VDI 3323  |  | VHM Vc [m/min] | CUTINOX Vc [m/min] | ae (mm)    | ap (mm)  |          |
|----------|---|-----------|--|----------------|--------------------|------------|----------|----------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |  |                | <b>100</b>         | 1×ØD1      | <1×ØD1   |          |
|          | Niedrig legierter Stahl < 800 N/mm²                                       | 6 - 9     |  |                | <b>85</b>          | 1×ØD1      | <1.0×ØD1 |          |
|          | Hochlegierter Stahl > 800 N/mm², ferritischer / martensitischer Edelstahl | 10 - 13   |  |                | <b>55</b>          | 1×ØD1      | <0.8×ØD1 |          |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm²                               | 14.1-14.2 |  |                | <b>75</b>          | 1×ØD1      | <0.8×ØD1 |          |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm²                        | 14.3-14.4 |  |                | <b>45</b>          | 1×ØD1      | <0.7×ØD1 |          |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16   |  |                | <b>125</b>         | <b>145</b> | 1×ØD1    | <1.0×ØD1 |
|          | Duktiles Gusseisen, Temperguss > 250 HB                                   | 17 - 20   |  |                | <b>65</b>          | <b>75</b>  | 1×ØD1    | <1.0×ØD1 |
| <b>N</b> | Alu-Knetlegierung < 12% Si  | 21 - 22   |  |                | <b>230</b>         |            | 1×ØD1    | <1.0×ØD1 |
|          | Alu-Gusslegierung >12% Si   | 23 - 25   |  |                | <b>190</b>         |            | 1×ØD1    | <1.0×ØD1 |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb                                | 26        |  |                | <b>110</b>         |            | 1×ØD1    | <0.4×ØD1 |
|          | Kupferlegierung schwere Zerspanbarkeit                                    | 27 - 28   |  | <b>100</b>     |                    | 1×ØD1      | <1.0×ØD1 |          |
|          | Kunststoff, Holz  | 29 - 30   |  | <b>150</b>     |                    | 1×ØD1      | <1.0×ØD1 |          |
|          | Gold, Silber  | -         |  | <b>130</b>     |                    | 1×ØD1      | <1.0×ØD1 |          |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   |  | <b>15</b>      | <b>25</b>          | 1×ØD1      | <1.0×ØD1 |          |
|          | Titan, Titanlegierung   | 36 - 37   |  | <b>45</b>      | <b>55</b>          | 1×ØD1      | <1.0×ØD1 |          |

DIXI 7333-3D / DIXI 7333-5D ⇒ (ap & ae) -25 %  
 DIXI 7333-8D / DIXI 7333-10D ⇒ (ap & ae) -50 %  
 DIXI 7333-12D / DIXI 7333-15D ⇒ (ap & ae) -75 %

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.30 - 0.50 | $\emptyset D_1$<br>0.60 - 1.00 | $\emptyset D_1$<br>1.10 - 1.50 | $\emptyset D_1$<br>1.60 - 2.00 | $\emptyset D_1$<br>2.50 - 3.00 | $\emptyset D_1$<br>4.00 - 6.00 | $\emptyset D_1$<br>8.00 - 10.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|
| 0.002 - 0.005                  | 0.006 - 0.010                  | 0.011 - 0.015                  | 0.016 - 0.020                  | 0.025 - 0.030                  | 0.040 - 0.060                  | 0.070 - 0.080                   |
| 0.002 - 0.005                  | 0.005 - 0.009                  | 0.010 - 0.014                  | 0.014 - 0.018                  | 0.023 - 0.027                  | 0.036 - 0.055                  | 0.065 - 0.070                   |
| 0.002 - 0.004                  | 0.005 - 0.008                  | 0.009 - 0.012                  | 0.013 - 0.016                  | 0.020 - 0.024                  | 0.032 - 0.050                  | 0.060 - 0.065                   |
| 0.002 - 0.004                  | 0.005 - 0.008                  | 0.009 - 0.012                  | 0.013 - 0.016                  | 0.020 - 0.024                  | 0.032 - 0.050                  | 0.060 - 0.065                   |
| 0.002 - 0.004                  | 0.004 - 0.007                  | 0.008 - 0.011                  | 0.011 - 0.014                  | 0.018 - 0.021                  | 0.028 - 0.040                  | 0.050 - 0.055                   |
| 0.003 - 0.006                  | 0.007 - 0.012                  | 0.013 - 0.018                  | 0.019 - 0.024                  | 0.030 - 0.036                  | 0.048 - 0.070                  | 0.085 - 0.095                   |
| 0.002 - 0.005                  | 0.006 - 0.010                  | 0.011 - 0.015                  | 0.016 - 0.020                  | 0.025 - 0.030                  | 0.040 - 0.060                  | 0.070 - 0.080                   |
| 0.004 - 0.008                  | 0.009 - 0.015                  | 0.017 - 0.023                  | 0.024 - 0.030                  | 0.038 - 0.045                  | 0.060 - 0.090                  | 0.110 - 0.120                   |
| 0.003 - 0.007                  | 0.008 - 0.013                  | 0.014 - 0.020                  | 0.021 - 0.026                  | 0.033 - 0.039                  | 0.052 - 0.080                  | 0.095 - 0.105                   |
| 0.004 - 0.008                  | 0.009 - 0.015                  | 0.017 - 0.023                  | 0.024 - 0.030                  | 0.038 - 0.045                  | 0.060 - 0.090                  | 0.110 - 0.120                   |
| 0.003 - 0.006                  | 0.007 - 0.012                  | 0.013 - 0.018                  | 0.019 - 0.024                  | 0.030 - 0.036                  | 0.048 - 0.070                  | 0.085 - 0.095                   |
| 0.004 - 0.008                  | 0.009 - 0.015                  | 0.017 - 0.023                  | 0.024 - 0.030                  | 0.038 - 0.045                  | 0.060 - 0.090                  | 0.110 - 0.120                   |
| 0.002 - 0.005                  | 0.006 - 0.010                  | 0.011 - 0.015                  | 0.016 - 0.020                  | 0.025 - 0.030                  | 0.040 - 0.060                  | 0.070 - 0.080                   |
| 0.001 - 0.003                  | 0.003 - 0.005                  | 0.006 - 0.008                  | 0.008 - 0.010                  | 0.013 - 0.015                  | 0.020 - 0.030                  | 0.035 - 0.040                   |
| 0.002 - 0.005                  | 0.006 - 0.010                  | 0.011 - 0.015                  | 0.016 - 0.020                  | 0.025 - 0.030                  | 0.040 - 0.060                  | 0.070 - 0.080                   |

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.30 - 0.50 | $\emptyset D_1$<br>0.60 - 1.00 | $\emptyset D_1$<br>1.10 - 1.50 | $\emptyset D_1$<br>1.60 - 2.00 | $\emptyset D_1$<br>2.50 - 3.00 | $\emptyset D_1$<br>4.00 - 6.00 | $\emptyset D_1$<br>8.00 - 10.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|
| 0.002 - 0.004                  | 0.005 - 0.008                  | 0.008 - 0.011                  | 0.012 - 0.015                  | 0.019 - 0.023                  | 0.030 - 0.045                  | 0.055 - 0.060                   |
| 0.002 - 0.004                  | 0.004 - 0.007                  | 0.008 - 0.011                  | 0.011 - 0.014                  | 0.017 - 0.02                   | 0.027 - 0.040                  | 0.050 - 0.055                   |
| 0.002 - 0.003                  | 0.004 - 0.006                  | 0.007 - 0.009                  | 0.01 - 0.012                   | 0.015 - 0.018                  | 0.024 - 0.040                  | 0.045 - 0.050                   |
| 0.002 - 0.003                  | 0.004 - 0.006                  | 0.007 - 0.009                  | 0.01 - 0.012                   | 0.015 - 0.018                  | 0.024 - 0.040                  | 0.045 - 0.050                   |
| 0.002 - 0.003                  | 0.003 - 0.005                  | 0.006 - 0.008                  | 0.008 - 0.011                  | 0.014 - 0.016                  | 0.021 - 0.030                  | 0.040 - 0.040                   |
| 0.002 - 0.005                  | 0.005 - 0.009                  | 0.01 - 0.014                   | 0.014 - 0.018                  | 0.023 - 0.027                  | 0.036 - 0.055                  | 0.065 - 0.070                   |
| 0.002 - 0.004                  | 0.005 - 0.008                  | 0.008 - 0.011                  | 0.012 - 0.015                  | 0.019 - 0.023                  | 0.030 - 0.045                  | 0.055 - 0.060                   |
| 0.003 - 0.006                  | 0.007 - 0.011                  | 0.013 - 0.017                  | 0.018 - 0.023                  | 0.029 - 0.034                  | 0.045 - 0.070                  | 0.085 - 0.090                   |
| 0.002 - 0.005                  | 0.005 - 0.009                  | 0.010 - 0.014                  | 0.014 - 0.018                  | 0.023 - 0.027                  | 0.036 - 0.055                  | 0.070 - 0.080                   |
| 0.003 - 0.006                  | 0.007 - 0.011                  | 0.013 - 0.017                  | 0.018 - 0.023                  | 0.029 - 0.034                  | 0.045 - 0.070                  | 0.085 - 0.090                   |
| 0.002 - 0.005                  | 0.006 - 0.01                   | 0.011 - 0.015                  | 0.016 - 0.020                  | 0.025 - 0.029                  | 0.039 - 0.060                  | 0.065 - 0.070                   |
| 0.003 - 0.006                  | 0.007 - 0.011                  | 0.013 - 0.017                  | 0.018 - 0.023                  | 0.029 - 0.034                  | 0.045 - 0.070                  | 0.085 - 0.090                   |
| 0.002 - 0.004                  | 0.005 - 0.008                  | 0.008 - 0.011                  | 0.012 - 0.015                  | 0.019 - 0.023                  | 0.030 - 0.045                  | 0.055 - 0.060                   |
| 0.001 - 0.002                  | 0.002 - 0.004                  | 0.005 - 0.006                  | 0.006 - 0.008                  | 0.010 - 0.011                  | 0.015 - 0.025                  | 0.025 - 0.030                   |
| 0.002 - 0.004                  | 0.005 - 0.008                  | 0.008 - 0.011                  | 0.012 - 0.015                  | 0.019 - 0.023                  | 0.030 - 0.045                  | 0.055 - 0.060                   |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

**RAMPEN**

|          |  | VDI 3323  |            | VHM Vc [m/min] | CUTINOX Vc [m/min] | Rampenwinkel $\alpha$ | Tiefe (mm) |
|----------|--|-----------|------------|----------------|--------------------|-----------------------|------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl                                       | 1 - 5     |            |                | <b>120</b>         | <8°                   | <1×ØD1     |
|          | Niedrig legierter Stahl < 800 N/mm²                                      | 6 - 9     |            | <b>95</b>      | <5°                | <1×ØD1                |            |
|          | Hochlegierter Stahl > 800 N/mm², ferritischer/ martensitischer Edelstahl | 10 - 13   |            | <b>70</b>      | <4°                | <0.8×ØD1              |            |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm²                              | 14.1-14.2 |            | <b>85</b>      | <4°                | <0.8×ØD1              |            |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm²                       | 14.3-14.4 |            | <b>60</b>      | <3°                | <0.7×ØD1              |            |
| <b>K</b> | Grauguss < 250 HB  | 15 - 16   |            | <b>150</b>     | <b>175</b>         | <10°                  | <1×ØD1     |
|          | Duktiles Gusseisen, Temperguss > 250 HB                                  | 17 - 20   |            | <b>80</b>      | <b>100</b>         | <5°                   | <1×ØD1     |
| <b>N</b> | Alu-Knetlegierung < 12% Si   | 21 - 22   |            | <b>270</b>     |                    | <8°                   | <1×ØD1     |
|          | Alu-Gusslegierung >12% Si  | 23 - 25   |            | <b>220</b>     |                    | <5°                   | <1×ØD1     |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb                               | 26        |            | <b>130</b>     |                    | <10°                  | <1×ØD1     |
|          | Kupferlegierung schwere Zerspanbarkeit                                   | 27 - 28   | <b>120</b> |                | <5°                | <1×ØD1                |            |
|          | Kunststoff, Holz   | 29 - 30   | <b>180</b> |                | <8°                | <1×ØD1                |            |
|          | Gold, Silber   | -         | <b>150</b> |                | <4°                | <1×ØD1                |            |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung  | 31- 35    | <b>20</b>  | <b>30</b>      | <2°                | <0.4×ØD1              |            |
|          | Titan, Titanlegierung  | 36 - 37   | <b>55</b>  | <b>65</b>      | <3°                | <1×ØD1                |            |

DIXI 7333-3D / DIXI 7333-5D ⇒ (ap & ae) -25 %  
 DIXI 7333-8D / DIXI 7333-10D ⇒ (ap & ae) -50 %  
 DIXI 7333-12D / DIXI 7333-15D ⇒ (ap & ae) -75 %

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

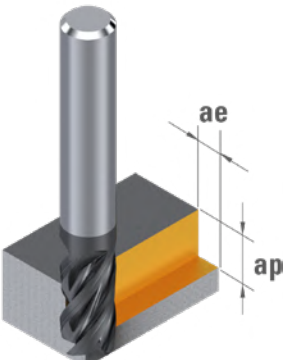
$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

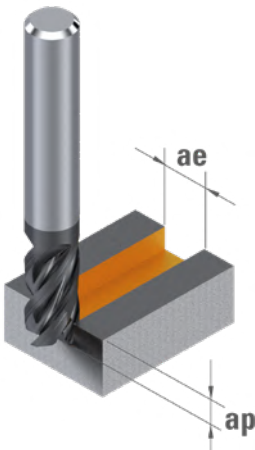
| $\varnothing D_1$<br>0.30 - 0.50 | $\varnothing D_1$<br>0.60 - 1.00 | $\varnothing D_1$<br>1.10 - 1.50 | $\varnothing D_1$<br>1.60 - 2.00 | $\varnothing D_1$<br>2.50 - 3.00 | $\varnothing D_1$<br>4.00 - 6.00 | $\varnothing D_1$<br>8.00 - 10.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|
| 0.002 - 0.003                    | 0.004 - 0.006                    | 0.006 - 0.009                    | 0.010 - 0.012                    | 0.015 - 0.018                    | 0.024 - 0.036                    | 0.044 - 0.048                     |
| 0.002 - 0.003                    | 0.003 - 0.006                    | 0.006 - 0.009                    | 0.009 - 0.011                    | 0.014 - 0.016                    | 0.022 - 0.032                    | 0.040 - 0.044                     |
| 0.002 - 0.002                    | 0.003 - 0.005                    | 0.006 - 0.007                    | 0.008 - 0.010                    | 0.012 - 0.014                    | 0.019 - 0.032                    | 0.036 - 0.040                     |
| 0.002 - 0.002                    | 0.003 - 0.005                    | 0.006 - 0.007                    | 0.008 - 0.010                    | 0.012 - 0.014                    | 0.019 - 0.032                    | 0.036 - 0.040                     |
| 0.002 - 0.002                    | 0.002 - 0.004                    | 0.005 - 0.006                    | 0.006 - 0.009                    | 0.011 - 0.013                    | 0.017 - 0.024                    | 0.032 - 0.032                     |
| 0.002 - 0.004                    | 0.004 - 0.007                    | 0.008 - 0.011                    | 0.011 - 0.014                    | 0.018 - 0.022                    | 0.029 - 0.044                    | 0.052 - 0.056                     |
| 0.002 - 0.003                    | 0.004 - 0.006                    | 0.006 - 0.009                    | 0.010 - 0.012                    | 0.015 - 0.018                    | 0.024 - 0.036                    | 0.044 - 0.048                     |
| 0.002 - 0.005                    | 0.006 - 0.009                    | 0.010 - 0.014                    | 0.014 - 0.018                    | 0.023 - 0.027                    | 0.036 - 0.056                    | 0.068 - 0.072                     |
| 0.002 - 0.004                    | 0.005 - 0.008                    | 0.009 - 0.012                    | 0.013 - 0.016                    | 0.020 - 0.023                    | 0.031 - 0.048                    | 0.056 - 0.064                     |
| 0.002 - 0.005                    | 0.006 - 0.009                    | 0.010 - 0.014                    | 0.014 - 0.018                    | 0.023 - 0.027                    | 0.036 - 0.056                    | 0.068 - 0.072                     |
| 0.002 - 0.004                    | 0.004 - 0.007                    | 0.008 - 0.011                    | 0.011 - 0.014                    | 0.018 - 0.022                    | 0.029 - 0.044                    | 0.052 - 0.056                     |
| 0.002 - 0.005                    | 0.006 - 0.009                    | 0.010 - 0.014                    | 0.014 - 0.018                    | 0.023 - 0.027                    | 0.036 - 0.056                    | 0.068 - 0.072                     |
| 0.002 - 0.003                    | 0.004 - 0.006                    | 0.006 - 0.009                    | 0.010 - 0.012                    | 0.015 - 0.018                    | 0.012 - 0.020                    | 0.044 - 0.048                     |
| 0.001 - 0.002                    | 0.002 - 0.003                    | 0.004 - 0.005                    | 0.005 - 0.006                    | 0.008 - 0.009                    | 0.012 - 0.020                    | 0.020 - 0.024                     |
| 0.002 - 0.003                    | 0.004 - 0.006                    | 0.006 - 0.009                    | 0.010 - 0.012                    | 0.015 - 0.018                    | 0.024 - 0.036                    | 0.044 - 0.048                     |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

UMFANGSBEARBEITUNG

|          |   | VDI<br>3323 |   | VHM<br>Vc [m/min] | C-TOP<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |        |
|----------|---|-------------|---|-------------------|---------------------|------------|------------|--------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5       |  |                   | <b>150</b>          | <0.40×ØD1  | <2×ØD1     |        |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9       |   |                   | <b>125</b>          | <0.30×ØD1  | <2×ØD1     |        |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13     |   |                   | <b>85</b>           | <0.30×ØD1  | <2×ØD1     |        |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2   |   |                   |                     | <b>95</b>  | <0.30×ØD1  | <2×ØD1 |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                            | 14.3-14.4   |   |                   |                     | <b>65</b>  | <0.25×ØD1  | <2×ØD1 |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16     |   |                   | <b>170</b>          | <b>180</b> | <0.40×ØD1  | <2×ØD1 |
|          | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20     |   |                   | <b>105</b>          | <b>130</b> | <0.30×ØD1  | <2×ØD1 |
| <b>N</b> | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26          |   |                   | <b>110</b>          |            | <0.40×ØD1  | <2×ØD1 |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28     |   |                   |                     | <b>95</b>  | <0.40×ØD1  | <2×ØD1 |
|          | Gold, Silber  | -           |   |                   |                     | <b>165</b> | <0.40×ØD1  | <2×ØD1 |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31 - 35     |   |                   | <b>30</b>           | <b>40</b>  | <0.15×ØD1  | <2×ØD1 |
|          | Titan, Titanlegierung   | 36 - 37     |   |                   | <b>60</b>           | <b>70</b>  | <0.30×ØD1  | <2×ØD1 |

NUTBEARBEITUNG

|          |   | VDI<br>3323 |   | VHM<br>Vc [m/min] | C-TOP<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |          |          |
|----------|---|-------------|---|-------------------|---------------------|------------|------------|----------|----------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5       |  |                   |                     | <b>115</b> | 1×ØD1      | <2×ØD1   |          |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9       |   |                   |                     | <b>95</b>  | 1×ØD1      | <1.5×ØD1 |          |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13     |   |                   |                     | <b>65</b>  | 1×ØD1      | <1×ØD1   |          |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2   |   |                   |                     |            | <b>70</b>  | 1×ØD1    | <1×ØD1   |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                            | 14.3-14.4   |   |                   |                     |            | <b>50</b>  | 1×ØD1    | <0.8×ØD1 |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16     |   |                   | <b>100</b>          | <b>135</b> | 1×ØD1      | <2×ØD1   |          |
|          | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20     |   |                   | <b>85</b>           | <b>95</b>  | 1×ØD1      | <1×ØD1   |          |
| <b>N</b> | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26          |   |                   | <b>85</b>           |            | 1×ØD1      | <2×ØD1   |          |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28     |   |                   |                     | <b>70</b>  | 1×ØD1      | <1.5×ØD1 |          |
|          | Gold, Silber  | -           |   |                   |                     | <b>125</b> | 1×ØD1      | <1×ØD1   |          |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31 - 35     |   |                   | <b>25</b>           | <b>30</b>  | 1×ØD1      | <0.2×ØD1 |          |
|          | Titan, Titanlegierung   | 36 - 37     |   |                   | <b>55</b>           | <b>55</b>  | 1×ØD1      | <1×ØD1   |          |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

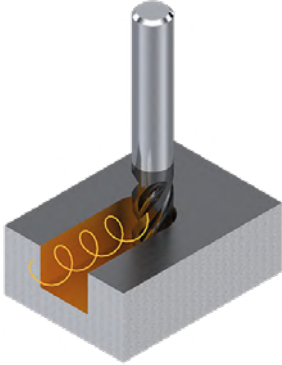
| $\emptyset D_1$<br>0.30 - 0.70 | $\emptyset D_1$<br>0.80 - 1.40 | $\emptyset D_1$<br>1.50 - 1.90 | $\emptyset D_1$<br>2.00 - 3.00 | $\emptyset D_1$<br>4.00 - 6.00 | $\emptyset D_1$<br>8.00 - 10.00 | $\emptyset D_1$<br>12.00 - 16.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|----------------------------------|
| 0.004 - 0.010                  | 0.012 - 0.022                  | 0.023 - 0.030                  | 0.031 - 0.047                  | 0.062 - 0.095                  | 0.120 - 0.130                   | 0.140 - 0.170                    |
| 0.003 - 0.009                  | 0.011 - 0.020                  | 0.021 - 0.027                  | 0.029 - 0.043                  | 0.058 - 0.085                  | 0.110 - 0.120                   | 0.130 - 0.160                    |
| 0.003 - 0.008                  | 0.010 - 0.018                  | 0.020 - 0.025                  | 0.026 - 0.039                  | 0.052 - 0.080                  | 0.100 - 0.110                   | 0.120 - 0.140                    |
| 0.003 - 0.008                  | 0.010 - 0.018                  | 0.020 - 0.025                  | 0.026 - 0.039                  | 0.052 - 0.080                  | 0.100 - 0.110                   | 0.120 - 0.140                    |
| 0.003 - 0.008                  | 0.0009 - 0.016                 | 0.018 - 0.022                  | 0.023 - 0.035                  | 0.046 - 0.070                  | 0.090 - 0.100                   | 0.110 - 0.130                    |
| 0.004 - 0.012                  | 0.015 - 0.025                  | 0.027 - 0.035                  | 0.036 - 0.055                  | 0.072 - 0.110                  | 0.130 - 0.150                   | 0.170 - 0.200                    |
| 0.004 - 0.010                  | 0.012 - 0.022                  | 0.023 - 0.030                  | 0.031 - 0.047                  | 0.062 - 0.095                  | 0.120 - 0.130                   | 0.140 - 0.170                    |
| 0.005 - 0.014                  | 0.018 - 0.031                  | 0.033 - 0.042                  | 0.044 - 0.066                  | 0.088 - 0.135                  | 0.160 - 0.190                   | 0.200 - 0.240                    |
| 0.004 - 0.012                  | 0.015 - 0.025                  | 0.027 - 0.035                  | 0.036 - 0.055                  | 0.072 - 0.110                  | 0.130 - 0.150                   | 0.170 - 0.200                    |
| 0.004 - 0.010                  | 0.012 - 0.022                  | 0.023 - 0.030                  | 0.031 - 0.047                  | 0.062 - 0.095                  | 0.120 - 0.130                   | 0.140 - 0.170                    |
| 0.002 - 0.006                  | 0.007 - 0.013                  | 0.014 - 0.017                  | 0.018 - 0.027                  | 0.036 - 0.055                  | 0.070 - 0.080                   | 0.080 - 0.100                    |
| 0.004 - 0.010                  | 0.012 - 0.022                  | 0.023 - 0.030                  | 0.031 - 0.047                  | 0.062 - 0.095                  | 0.120 - 0.130                   | 0.140 - 0.170                    |

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.30 - 0.70 | $\emptyset D_1$<br>0.80 - 1.40 | $\emptyset D_1$<br>1.50 - 1.90 | $\emptyset D_1$<br>2.00 - 3.00 | $\emptyset D_1$<br>4.00 - 6.00 | $\emptyset D_1$<br>8.00 - 10.00 | $\emptyset D_1$<br>12.00 - 16.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|----------------------------------|
| 0.002 - 0.006                  | 0.007 - 0.013                  | 0.014 - 0.018                  | 0.019 - 0.028                  | 0.038 - 0.055                  | 0.070 - 0.080                   | 0.080 - 0.100                    |
| 0.002 - 0.006                  | 0.007 - 0.012                  | 0.013 - 0.016                  | 0.017 - 0.026                  | 0.034 - 0.050                  | 0.070 - 0.070                   | 0.080 - 0.100                    |
| 0.002 - 0.005                  | 0.006 - 0.011                  | 0.012 - 0.015                  | 0.016 - 0.023                  | 0.032 - 0.050                  | 0.060 - 0.070                   | 0.070 - 0.080                    |
| 0.002 - 0.005                  | 0.006 - 0.011                  | 0.012 - 0.015                  | 0.016 - 0.023                  | 0.032 - 0.050                  | 0.060 - 0.070                   | 0.070 - 0.080                    |
| 0.002 - 0.005                  | 0.006 - 0.010                  | 0.011 - 0.013                  | 0.014 - 0.021                  | 0.028 - 0.040                  | 0.050 - 0.060                   | 0.070 - 0.080                    |
| 0.002 - 0.007                  | 0.009 - 0.015                  | 0.016 - 0.021                  | 0.022 - 0.033                  | 0.044 - 0.065                  | 0.080 - 0.090                   | 0.100 - 0.120                    |
| 0.002 - 0.006                  | 0.007 - 0.013                  | 0.014 - 0.018                  | 0.019 - 0.028                  | 0.038 - 0.055                  | 0.070 - 0.080                   | 0.080 - 0.100                    |
| 0.003 - 0.009                  | 0.011 - 0.019                  | 0.020 - 0.025                  | 0.027 - 0.040                  | 0.052 - 0.080                  | 0.100 - 0.110                   | 0.120 - 0.140                    |
| 0.002 - 0.007                  | 0.009 - 0.015                  | 0.016 - 0.021                  | 0.022 - 0.033                  | 0.044 - 0.065                  | 0.080 - 0.090                   | 0.100 - 0.120                    |
| 0.002 - 0.006                  | 0.007 - 0.013                  | 0.014 - 0.018                  | 0.019 - 0.028                  | 0.038 - 0.055                  | 0.070 - 0.080                   | 0.080 - 0.100                    |
| 0.001 - 0.004                  | 0.004 - 0.008                  | 0.008 - 0.010                  | 0.011 - 0.016                  | 0.022 - 0.035                  | 0.040 - 0.050                   | 0.050 - 0.060                    |
| 0.002 - 0.006                  | 0.007 - 0.013                  | 0.014 - 0.018                  | 0.019 - 0.028                  | 0.038 - 0.055                  | 0.070 - 0.080                   | 0.080 - 0.100                    |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

## TROCHOIDALE BEARBEITUNG

|          |   | VDI<br>3323 |   |            | VHM<br>Vc [m/min] | C-TOP<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |
|----------|---|-------------|---|------------|-------------------|---------------------|------------|------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5       |  |            | <b>450</b>        | <0.05×ØD1           | <2×ØD1     |            |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9       |   |            | <b>375</b>        | <0.04×ØD1           | <2×ØD1     |            |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13     |   |            | <b>255</b>        | <0.04×ØD1           | <2×ØD1     |            |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2   |   |            |                   | <b>190</b>          | <0.04×ØD1  | <2×ØD1     |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                            | 14.3-14.4   |   |            |                   | <b>130</b>          | <0.04×ØD1  | <2×ØD1     |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16     |   |            | <b>510</b>        | <b>495</b>          | <0.06×ØD1  | <2×ØD1     |
|          | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20     |   |            | <b>315</b>        | <b>360</b>          | <0.04×ØD1  | <2×ØD1     |
| <b>N</b> | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26          |   |            | <b>305</b>        |                     | <0.06×ØD1  | <2×ØD1     |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28     |   |            | <b>260</b>        |                     | <0.04×ØD1  | <2×ØD1     |
|          | Gold, Silber  | -           |   |            | <b>455</b>        |                     | <0.04×ØD1  | <2×ØD1     |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31 - 35     |   |            | <b>60</b>         | <b>70</b>           | <0.02×ØD1  | <2×ØD1     |
|          | Titan, Titanlegierung   | 36 - 37     |   | <b>120</b> | <b>125</b>        | <0.04×ØD1           | <2×ØD1     |            |



$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

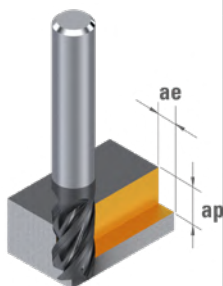
Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.30 - 0.70 | $\emptyset D_1$<br>0.80 - 1.40 | $\emptyset D_1$<br>1.50 - 1.90 | $\emptyset D_1$<br>2.00 - 3.00 | $\emptyset D_1$<br>4.00 - 6.00 | $\emptyset D_1$<br>8.00 - 10.00 | $\emptyset D_1$<br>12.00 - 16.00 |  |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|----------------------------------|--|
| 0.005 - 0.013                  | 0.016 - 0.029                  | 0.030 - 0.039                  | 0.040 - 0.061                  | 0.081 - 0.124                  | 0.156 - 0.169                   | 0.182 - 0.221                    |  |
| 0.004 - 0.012                  | 0.015 - 0.026                  | 0.028 - 0.035                  | 0.037 - 0.056                  | 0.075 - 0.111                  | 0.143 - 0.156                   | 0.169 - 0.208                    |  |
| 0.004 - 0.011                  | 0.014 - 0.024                  | 0.025 - 0.032                  | 0.034 - 0.051                  | 0.068 - 0.104                  | 0.130 - 0.143                   | 0.156 - 0.182                    |  |
| 0.004 - 0.011                  | 0.014 - 0.024                  | 0.025 - 0.032                  | 0.034 - 0.051                  | 0.068 - 0.104                  | 0.130 - 0.143                   | 0.156 - 0.182                    |  |
| 0.004 - 0.010                  | 0.012 - 0.021                  | 0.023 - 0.029                  | 0.030 - 0.046                  | 0.060 - 0.091                  | 0.117 - 0.130                   | 0.143 - 0.169                    |  |
| 0.005 - 0.015                  | 0.019 - 0.033                  | 0.035 - 0.045                  | 0.047 - 0.071                  | 0.094 - 0.143                  | 0.169 - 0.195                   | 0.221 - 0.260                    |  |
| 0.005 - 0.013                  | 0.016 - 0.028                  | 0.030 - 0.039                  | 0.041 - 0.061                  | 0.081 - 0.124                  | 0.156 - 0.169                   | 0.182 - 0.221                    |  |
| 0.007 - 0.019                  | 0.023 - 0.040                  | 0.043 - 0.055                  | 0.057 - 0.086                  | 0.114 - 0.176                  | 0.208 - 0.247                   | 0.260 - 0.312                    |  |
| 0.005 - 0.015                  | 0.019 - 0.033                  | 0.035 - 0.045                  | 0.047 - 0.071                  | 0.094 - 0.143                  | 0.169 - 0.195                   | 0.221 - 0.260                    |  |
| 0.005 - 0.013                  | 0.016 - 0.028                  | 0.030 - 0.039                  | 0.041 - 0.061                  | 0.081 - 0.124                  | 0.156 - 0.169                   | 0.182 - 0.221                    |  |
| 0.003 - 0.008                  | 0.009 - 0.017                  | 0.018 - 0.022                  | 0.024 - 0.035                  | 0.047 - 0.072                  | 0.091 - 0.104                   | 0.104 - 0.130                    |  |
| 0.005 - 0.013                  | 0.016 - 0.028                  | 0.030 - 0.039                  | 0.041 - 0.061                  | 0.081 - 0.124                  | 0.156 - 0.169                   | 0.182 - 0.221                    |  |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

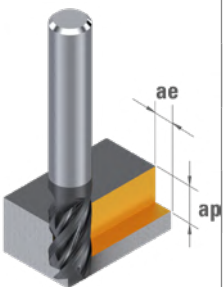
UMFANGSBEARBEITUNG / SCHRUPPEN

|   |   |                   | Ø D <sub>1</sub><br>0.30 - 1.50 |                     | Ø D <sub>1</sub><br>1.60 - 4.50 |                     | Ø D <sub>1</sub><br>4.60 - 12.00 |                     |
|---|---|-------------------|---------------------------------|---------------------|---------------------------------|---------------------|----------------------------------|---------------------|
|   |   |                   | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] |
| P | Unlegierter Stahl, Automaten Stahl  | VDI 3323<br>1 - 5 |                                 | 30 - 50             |                                 | 50 - 150            |                                  | 120 - 280           |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9             |                                 | 25 - 50             |                                 | 50 - 125            |                                  | 90 - 230            |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13           |                                 | 25 - 35             |                                 | 50 - 85             |                                  | 90 - 130            |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2         |                                 | 25 - 50             |                                 | 50 - 150            |                                  | 100 - 230           |
|   | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4         |                                 | 20 - 45             |                                 | 50 - 115            |                                  | 75 - 180            |
| K | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20           |                                 | 15 - 35             | 30 - 50                         | 40 - 90             | 50 - 150                         | 60 - 140            |
| N | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26                |                                 | 20 - 40             | 30 - 50                         | 50 - 105            | 50 - 150                         | 80 - 165            |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28           |                                 | 15 - 35             | 30 - 50                         | 40 - 90             | 50 - 150                         | 60 - 140            |
|   | Gold, Silber  | -                 |                                 | 20 - 45             | 30 - 50                         | 50 - 110            | 50 - 150                         | 75 - 170            |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35           |                                 |                     | 15 - 30                         |                     | 40 - 80                          | 60 - 120            |
|   | Titan, Titanlegierung   | 36 - 37           |                                 | 15 - 30             | 30 - 45                         | 35 - 80             | 50 - 110                         | 55 - 120            |



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|   |   |                   | Ø D <sub>1</sub><br>0.30 - 1.50 |                     | Ø D <sub>1</sub><br>1.60 - 4.50 |                     | Ø D <sub>1</sub><br>4.60 - 12.00 |                     |
|---|---|-------------------|---------------------------------|---------------------|---------------------------------|---------------------|----------------------------------|---------------------|
|   |   |                   | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] |
| P | Unlegierter Stahl, Automaten Stahl  | VDI 3323<br>1 - 5 |                                 | 30 - 50             |                                 | 50 - 150            |                                  | 150 - 350           |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9             |                                 | 30 - 50             |                                 | 50 - 150            |                                  | 110 - 290           |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13           |                                 | 30 - 40             |                                 | 50 - 105            |                                  | 110 - 160           |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2         |                                 | 30 - 50             |                                 | 50 - 150            |                                  | 130 - 290           |
|   | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4         |                                 | 25 - 50             |                                 | 50 - 150            |                                  | 90 - 230            |
| K | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20           |                                 | 20 - 45             | 30 - 50                         | 50 - 150            | 50 - 150                         | 80 - 180            |
| N | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26                |                                 | 25 - 50             | 30 - 50                         | 50 - 150            | 50 - 150                         | 100 - 210           |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28           |                                 | 20 - 45             | 30 - 50                         | 50 - 150            | 50 - 150                         | 80 - 180            |
|   | Gold, Silber  | -                 |                                 | 25 - 50             | 30 - 50                         | 50 - 150            | 50 - 150                         | 90 - 210            |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35           |                                 |                     | 20 - 40                         |                     | 50 - 135                         | 80 - 150            |
|   | Titan, Titanlegierung   | 36 - 37           |                                 | 20 - 40             | 30 - 50                         | 45 - 150            | 50 - 110                         | 70 - 150            |



$$n \text{ [U/min]} = \frac{Vc \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$Vf \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $fz \text{ [mm]}$

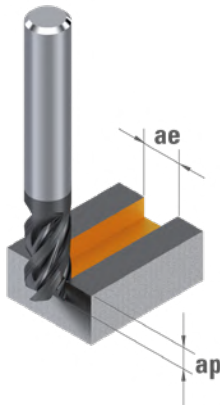
| ∅ D <sub>1</sub><br>0.30 - 0.50 |                    | ∅ D <sub>1</sub><br>0.50 - 0.80 |                    | ∅ D <sub>1</sub><br>0.80 - 1.60 |                    | ∅ D <sub>1</sub><br>1.60 - 3.00 |                    | ∅ D <sub>1</sub><br>3.00 - 5.00 |                    | ∅ D <sub>1</sub><br>*5.00 - 12.00 |                    |
|---------------------------------|--------------------|---------------------------------|--------------------|---------------------------------|--------------------|---------------------------------|--------------------|---------------------------------|--------------------|-----------------------------------|--------------------|
| fz                              | ae<br>ap<br>(mm)   | fz                              | ae<br>ap<br>(mm)   | fz                              | ae<br>ap<br>(mm)   | fz                              | ae<br>ap<br>(mm)   | fz                              | ae<br>ap<br>(mm)   | fz                                | ae<br>ap<br>(mm)   |
| 0.0001-0.0002                   | <0.30×∅<br><2.00×∅ | 0.0002-0.0004                   | <0.40×∅<br><2.00×∅ | 0.0006-0.002                    | <0.90×∅<br><2.00×∅ | 0.002-0.006                     | <0.90×∅<br><2.00×∅ | 0.004-0.010                     | <0.90×∅<br><2.00×∅ | 0.007-0.020                       | <0.30×∅<br><2.00×∅ |
| 0.0001-0.0003                   | <0.25×∅<br><2.00×∅ | 0.0003-0.0005                   | <0.40×∅<br><2.00×∅ | 0.0005-0.002                    | <0.90×∅<br><2.00×∅ | 0.002-0.006                     | <0.90×∅<br><2.00×∅ | 0.004-0.008                     | <0.90×∅<br><2.00×∅ | 0.006-0.018                       | <0.25×∅<br><2.00×∅ |
| 0.0001-0.0003                   | <0.25×∅<br><2.00×∅ | 0.0003-0.0005                   | <0.40×∅<br><2.00×∅ | 0.0005-0.002                    | <0.90×∅<br><2.00×∅ | 0.001-0.005                     | <0.90×∅<br><2.00×∅ | 0.004-0.008                     | <0.90×∅<br><2.00×∅ | 0.006-0.018                       | <0.25×∅<br><2.00×∅ |
| 0.0001-0.0003                   | <0.25×∅<br><2.00×∅ | 0.0003-0.0005                   | <0.40×∅<br><2.00×∅ | 0.0005-0.002                    | <0.90×∅<br><2.00×∅ | 0.001-0.005                     | <0.90×∅<br><2.00×∅ | 0.004-0.008                     | <0.90×∅<br><2.00×∅ | 0.006-0.018                       | <0.25×∅<br><2.00×∅ |
| 0.0001-0.0002                   | <0.20×∅<br><2.00×∅ | 0.0002-0.0005                   | <0.40×∅<br><2.00×∅ | 0.0004-0.02                     | <0.90×∅<br><2.00×∅ | 0.001-0.005                     | <0.90×∅<br><2.00×∅ | 0.003-0.008                     | <0.90×∅<br><2.00×∅ | 0.006-0.016                       | <0.20×∅<br><2.00×∅ |
| 0.0002-0.0003                   | <0.30×∅<br><2.00×∅ | 0.0003-0.0007                   | <0.40×∅<br><2.00×∅ | 0.0006-0.002                    | <0.90×∅<br><2.00×∅ | 0.002-0.007                     | <0.90×∅<br><2.00×∅ | 0.005-0.010                     | <0.90×∅<br><2.00×∅ | 0.008-0.022                       | <0.30×∅<br><2.00×∅ |
| 0.0002-0.0005                   | <0.30×∅<br><2.00×∅ | 0.0004-0.009                    | <0.40×∅<br><2.00×∅ | 0.0008-0.003                    | <0.90×∅<br><2.00×∅ | 0.003-0.009                     | <0.90×∅<br><2.00×∅ | 0.006-0.014                     | <0.90×∅<br><2.00×∅ | 0.011-0.030                       | <0.30×∅<br><2.00×∅ |
| 0.0002-0.0004                   | <0.30×∅<br><2.00×∅ | 0.0004-0.007                    | <0.40×∅<br><2.00×∅ | 0.0007-0.002                    | <0.90×∅<br><2.00×∅ | 0.002-0.008                     | <0.90×∅<br><2.00×∅ | 0.005-0.012                     | <0.90×∅<br><2.00×∅ | 0.008-0.024                       | <0.30×∅<br><2.00×∅ |
| 0.0002-0.0003                   | <0.30×∅<br><2.00×∅ | 0.0003-0.007                    | <0.40×∅<br><2.00×∅ | 0.0006-0.002                    | <0.90×∅<br><2.00×∅ | 0.002-0.007                     | <0.90×∅<br><2.00×∅ | 0.005-0.010                     | <0.90×∅<br><2.00×∅ | 0.008-0.022                       | <0.30×∅<br><2.00×∅ |
| 0.0001-0.0002                   | <0.15×∅<br><2.00×∅ | 0.0001-0.0003                   | <0.40×∅<br><2.00×∅ | 0.0003-0.001                    | <0.90×∅<br><2.00×∅ | 0.001-0.003                     | <0.90×∅<br><2.00×∅ | 0.002-0.004                     | <0.90×∅<br><2.00×∅ | 0.004-0.010                       | <0.15×∅<br><2.00×∅ |
| 0.0002-0.0004                   | <0.30×∅<br><2.00×∅ | 0.0004-0.007                    | <0.40×∅<br><2.00×∅ | 0.0007-0.002                    | <0.90×∅<br><2.00×∅ | 0.002-0.008                     | <0.90×∅<br><2.00×∅ | 0.005-0.010                     | <0.90×∅<br><2.00×∅ | 0.008-0.024                       | <0.30×∅<br><2.00×∅ |

| ∅ D <sub>1</sub><br>0.30 - 0.50 |                    | ∅ D <sub>1</sub><br>0.50 - 0.80 |                    | ∅ D <sub>1</sub><br>0.80 - 1.60 |                    | ∅ D <sub>1</sub><br>1.60 - 3.00 |                    | ∅ D <sub>1</sub><br>3.00 - 5.00 |                    | ∅ D <sub>1</sub><br>*5.00 - 12.00 |                    |
|---------------------------------|--------------------|---------------------------------|--------------------|---------------------------------|--------------------|---------------------------------|--------------------|---------------------------------|--------------------|-----------------------------------|--------------------|
| fz                              | ae<br>ap<br>(mm)   | fz                              | ae<br>ap<br>(mm)   | fz                              | ae<br>ap<br>(mm)   | fz                              | ae<br>ap<br>(mm)   | fz                              | ae<br>ap<br>(mm)   | fz                                | ae<br>ap<br>(mm)   |
| 0.0004-0.0007                   | <0.20×∅<br><2.00×∅ | 0.0007-0.002                    | <0.20×∅<br><2.00×∅ | 0.002-0.006                     | <0.20×∅<br><2.00×∅ | 0.005-0.013                     | <0.20×∅<br><2.00×∅ | 0.011-0.022                     | <0.20×∅<br><2.00×∅ | 0.016-0.046                       | <0.20×∅<br><2.00×∅ |
| 0.0003-0.0006                   | <0.15×∅<br><2.00×∅ | 0.0008-0.003                    | <0.15×∅<br><2.00×∅ | 0.002-0.006                     | <0.15×∅<br><2.00×∅ | 0.005-0.012                     | <0.15×∅<br><2.00×∅ | 0.010-0.019                     | <0.15×∅<br><2.00×∅ | 0.014-0.042                       | <0.15×∅<br><2.00×∅ |
| 0.0003-0.0006                   | <0.15×∅<br><2.00×∅ | 0.0007-0.002                    | <0.15×∅<br><2.00×∅ | 0.002-0.005                     | <0.15×∅<br><2.00×∅ | 0.004-0.011                     | <0.15×∅<br><2.00×∅ | 0.009-0.018                     | <0.15×∅<br><2.00×∅ | 0.014-0.040                       | <0.15×∅<br><2.00×∅ |
| 0.0003-0.0006                   | <0.15×∅<br><2.00×∅ | 0.0007-0.002                    | <0.15×∅<br><2.00×∅ | 0.002-0.005                     | <0.15×∅<br><2.00×∅ | 0.004-0.011                     | <0.15×∅<br><2.00×∅ | 0.009-0.018                     | <0.15×∅<br><2.00×∅ | 0.014-0.040                       | <0.15×∅<br><2.00×∅ |
| 0.0003-0.0006                   | <0.10×∅<br><2.00×∅ | 0.0007-0.002                    | <0.10×∅<br><2.00×∅ | 0.002-0.005                     | <0.10×∅<br><2.00×∅ | 0.004-0.010                     | <0.10×∅<br><2.00×∅ | 0.009-0.017                     | <0.10×∅<br><2.00×∅ | 0.013-0.036                       | <0.10×∅<br><2.00×∅ |
| 0.0004-0.0008                   | <0.20×∅<br><2.00×∅ | 0.0009-0.003                    | <0.20×∅<br><2.00×∅ | 0.002-0.007                     | <0.20×∅<br><2.00×∅ | 0.006-0.014                     | <0.20×∅<br><2.00×∅ | 0.012-0.024                     | <0.20×∅<br><2.00×∅ | 0.018-0.050                       | <0.20×∅<br><2.00×∅ |
| 0.0006-0.0012                   | <0.20×∅<br><2.00×∅ | 0.0014-0.005                    | <0.20×∅<br><2.00×∅ | 0.003-0.010                     | <0.20×∅<br><2.00×∅ | 0.009-0.022                     | <0.20×∅<br><2.00×∅ | 0.018-0.037                     | <0.20×∅<br><2.00×∅ | 0.027-0.078                       | <0.20×∅<br><2.00×∅ |
| 0.0005-0.0010                   | <0.20×∅<br><2.00×∅ | 0.0012-0.004                    | <0.20×∅<br><2.00×∅ | 0.003-0.009                     | <0.20×∅<br><2.00×∅ | 0.007-0.018                     | <0.20×∅<br><2.00×∅ | 0.015-0.030                     | <0.20×∅<br><2.00×∅ | 0.022-0.064                       | <0.20×∅<br><2.00×∅ |
| 0.0005-0.0009                   | <0.20×∅<br><2.00×∅ | 0.0011-0.004                    | <0.20×∅<br><2.00×∅ | 0.002-0.008                     | <0.20×∅<br><2.00×∅ | 0.007-0.017                     | <0.20×∅<br><2.00×∅ | 0.014-0.028                     | <0.20×∅<br><2.00×∅ | 0.021-0.060                       | <0.20×∅<br><2.00×∅ |
| 0.0002-0.0004                   | <0.08×∅<br><2.00×∅ | 0.0004-0.001                    | <0.08×∅<br><2.00×∅ | 0.001-0.003                     | <0.08×∅<br><2.00×∅ | 0.003-0.006                     | <0.08×∅<br><2.00×∅ | 0.005-0.011                     | <0.08×∅<br><2.00×∅ | 0.008-0.024                       | <0.08×∅<br><2.00×∅ |
| 0.0004-0.0009                   | <0.20×∅<br><2.00×∅ | 0.001-0.004                     | <0.20×∅<br><2.00×∅ | 0.002-0.007                     | <0.20×∅<br><2.00×∅ | 0.006-0.016                     | <0.20×∅<br><2.00×∅ | 0.013-0.026                     | <0.20×∅<br><2.00×∅ | 0.019-0.056                       | <0.20×∅<br><2.00×∅ |

\*D<sub>1</sub> > 5.00mm --> Erhöhen Sie die Schnittparameter, wenn Ihre Spindel und das Halten Ihres Werkstücks dies zulassen.

**NUTBEARBEITUNG**

|          |   |                   | Ø D <sub>1</sub><br>0.30 - 1.50 |                     | Ø D <sub>1</sub><br>1.60 - 4.50 |                     | Ø D <sub>1</sub><br>4.60 - 12.00 |                     |
|----------|---|-------------------|---------------------------------|---------------------|---------------------------------|---------------------|----------------------------------|---------------------|
|          |   |                   | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] |
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | VDI 3323<br>1 - 5 |                                 | 25 - 50             |                                 | 50 - 150            |                                  | 100 - 240           |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9             |                                 | 20 - 50             |                                 | 50 - 125            |                                  | 75 - 195            |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13           |                                 | 20 - 30             |                                 | 50 - 70             |                                  | 75 - 110            |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2         |                                 | 20 - 50             |                                 | 50 - 125            |                                  | 85 - 195            |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4         |                                 | 15 - 40             |                                 | 40 - 100            |                                  | 65 - 155            |
| <b>K</b> | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20           | 15 - 30                         | 25 - 50             | 35 - 80                         | 50 - 140            | 50 - 120                         | 95 - 215            |
| <b>N</b> | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26                | 20 - 35                         | 30 - 50             | 45 - 90                         | 50 - 150            | 70 - 140                         | 130 - 255           |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28           | 15 - 35                         | 30 - 50             | 35 - 80                         | 50 - 150            | 50 - 120                         | 110 - 240           |
|          | Gold, Silber  | -                 | 15 - 30                         | 30 - 50             | 40 - 95                         | 50 - 150            | 65 - 145                         | 135 - 270           |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31 - 35           |                                 | 15 - 25             |                                 | 30 - 65             |                                  | 50 - 100            |
|          | Titan, Titanlegierung   | 36 - 37           | 10 - 25                         | 25 - 35             | 30 - 65                         | 50 - 95             | 45 - 100                         | 100 - 145           |



**RAMPEN**

|          |   |                   | Ø D <sub>1</sub><br>0.30 - 1.50 |                     | Ø D <sub>1</sub><br>1.60 - 4.50 |                     | Ø D <sub>1</sub><br>4.60 - 12.00 |                     |
|----------|---|-------------------|---------------------------------|---------------------|---------------------------------|---------------------|----------------------------------|---------------------|
|          |   |                   | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] |
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | VDI 3323<br>1 - 5 |                                 | 25 - 50             |                                 | 50 - 125            |                                  | 100 - 190           |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9             |                                 | 20 - 40             |                                 | 50 - 100            |                                  | 75 - 155            |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13           |                                 | 20 - 25             |                                 | 50 - 60             |                                  | 75 - 90             |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2         |                                 | 20 - 40             |                                 | 50 - 100            |                                  | 85 - 155            |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4         |                                 | 15 - 30             |                                 | 40 - 80             |                                  | 65 - 120            |
| <b>K</b> | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20           | 15 - 30                         | 25 - 45             | 35 - 80                         | 50 - 110            | 50 - 120                         | 95 - 170            |
| <b>N</b> | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26                | 20 - 35                         | 30 - 50             | 45 - 90                         | 50 - 135            | 70 - 140                         | 130 - 205           |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28           | 15 - 35                         | 30 - 50             | 35 - 80                         | 50 - 125            | 50 - 120                         | 110 - 190           |
|          | Gold, Silber  | -                 | 15 - 30                         | 30 - 50             | 40 - 95                         | 50 - 145            | 65 - 145                         | 135 - 220           |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31 - 35           |                                 | 15 - 20             |                                 | 30 - 50             |                                  | 50 - 80             |
|          | Titan, Titanlegierung   | 36 - 37           | 10 - 25                         | 25 - 35             | 30 - 65                         | 50 - 75             | 45 - 100                         | 100 - 115           |



$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

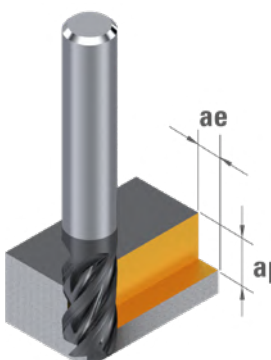
| $\emptyset D_1$<br>0.30 - 0.50 |               | $\emptyset D_1$<br>0.50 - 0.80 |               | $\emptyset D_1$<br>0.80 - 1.60 |               | $\emptyset D_1$<br>1.60 - 3.00 |               | $\emptyset D_1$<br>3.00 - 5.00 |               | $\emptyset D_1$<br>*5.00 - 12.00 |               |
|--------------------------------|---------------|--------------------------------|---------------|--------------------------------|---------------|--------------------------------|---------------|--------------------------------|---------------|----------------------------------|---------------|
| $f_z$                          | $a_p$<br>(mm) | $f_z$                          | $a_p$<br>(mm) | $f_z$                          | $a_p$<br>(mm) | $f_z$                          | $a_p$<br>(mm) | $f_z$                          | $a_p$<br>(mm) | $f_z$                            | $a_p$<br>(mm) |
| 0.0002 - 0.0004                | <0.50 × Ø     | 0.0007 - 0.0008                | <1.00 × Ø     | 0.0007 - 0.002                 | <2.00 × Ø     | 0.002 - 0.006                  | <2.00 × Ø     | 0.005 - 0.010                  | <2.00 × Ø     | 0.009 - 0.020                    | <1.00 × Ø     |
| 0.0002 - 0.0004                | <0.50 × Ø     | 0.0007 - 0.0008                | <1.00 × Ø     | 0.0006 - 0.002                 | <2.00 × Ø     | 0.002 - 0.006                  | <2.00 × Ø     | 0.005 - 0.010                  | <2.00 × Ø     | 0.008 - 0.018                    | <1.00 × Ø     |
| 0.0002 - 0.0004                | <0.50 × Ø     | 0.0007 - 0.0006                | <1.00 × Ø     | 0.0006 - 0.002                 | <2.00 × Ø     | 0.001 - 0.005                  | <2.00 × Ø     | 0.004 - 0.008                  | <2.00 × Ø     | 0.007 - 0.018                    | <1.00 × Ø     |
| 0.0002 - 0.0004                | <0.50 × Ø     | 0.0007 - 0.0006                | <1.00 × Ø     | 0.0006 - 0.002                 | <2.00 × Ø     | 0.001 - 0.005                  | <2.00 × Ø     | 0.004 - 0.008                  | <2.00 × Ø     | 0.007 - 0.018                    | <1.00 × Ø     |
| 0.0002 - 0.0004                | <0.25 × Ø     | 0.0004 - 0.0006                | <0.50 × Ø     | 0.0005 - 0.002                 | <1.00 × Ø     | 0.001 - 0.005                  | <1.00 × Ø     | 0.004 - 0.008                  | <1.00 × Ø     | 0.007 - 0.016                    | <0.25 × Ø     |
| 0.0002 - 0.0004                | <0.50 × Ø     | 0.0007 - 0.0008                | <1.00 × Ø     | 0.0007 - 0.003                 | <2.00 × Ø     | 0.002 - 0.007                  | <2.00 × Ø     | 0.006 - 0.012                  | <2.00 × Ø     | 0.010 - 0.022                    | <1.00 × Ø     |
| 0.0003 - 0.0006                | <0.50 × Ø     | 0.0007 - 0.0012                | <1.00 × Ø     | 0.001 - 0.003                  | <2.00 × Ø     | 0.003 - 0.009                  | <2.00 × Ø     | 0.008 - 0.016                  | <2.00 × Ø     | 0.013 - 0.030                    | <1.00 × Ø     |
| 0.0003 - 0.0006                | <0.50 × Ø     | 0.0007 - 0.0010                | <1.00 × Ø     | 0.0008 - 0.003                 | <2.00 × Ø     | 0.002 - 0.008                  | <2.00 × Ø     | 0.006 - 0.012                  | <2.00 × Ø     | 0.011 - 0.024                    | <1.00 × Ø     |
| 0.0002 - 0.0004                | <0.50 × Ø     | 0.0007 - 0.0008                | <1.00 × Ø     | 0.0007 - 0.003                 | <2.00 × Ø     | 0.003 - 0.009                  | <2.00 × Ø     | 0.006 - 0.012                  | <2.00 × Ø     | 0.010 - 0.022                    | <1.00 × Ø     |
| 0.0001 - 0.0002                | <0.50 × Ø     | 0.0002 - 0.0004                | <0.25 × Ø     | 0.0003 - 0.001                 | <0.50 × Ø     | 0.001 - 0.003                  | <1.00 × Ø     | 0.003 - 0.006                  | <1.00 × Ø     | 0.004 - 0.010                    | <0.25 × Ø     |
| 0.0003 - 0.0006                | <0.25 × Ø     | 0.0007 - 0.0010                | <1.00 × Ø     | 0.0008 - 0.003                 | <2.00 × Ø     | 0.002 - 0.008                  | <2.00 × Ø     | 0.006 - 0.012                  | <2.00 × Ø     | 0.011 - 0.024                    | <1.00 × Ø     |

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.30 - 0.50 |              | $\emptyset D_1$<br>0.50 - 0.80 |              | $\emptyset D_1$<br>0.80 - 1.60 |              | $\emptyset D_1$<br>1.60 - 3.00 |              | $\emptyset D_1$<br>3.00 - 5.00 |              | $\emptyset D_1$<br>*5.00 - 12.00 |              |
|--------------------------------|--------------|--------------------------------|--------------|--------------------------------|--------------|--------------------------------|--------------|--------------------------------|--------------|----------------------------------|--------------|
| $f_z$                          | $\alpha$ (°) | $f_z$                          | $\alpha$ (°) | $f_z$                          | $\alpha$ (°) | $f_z$                          | $\alpha$ (°) | $f_z$                          | $\alpha$ (°) | $f_z$                            | $\alpha$ (°) |
| 0.0002 - 0.0004                | <7.5°        | 0.0004 - 0.0008                | <10°         | 0.0007 - 0.002                 | <10°         | 0.002 - 0.005                  | <10°         | 0.004 - 0.008                  | <10°         | 0.007 - 0.020                    | <7.5°        |
| 0.0002 - 0.0004                | <7.5°        | 0.0003 - 0.0008                | <10°         | 0.0006 - 0.002                 | <10°         | 0.002 - 0.005                  | <10°         | 0.004 - 0.008                  | <10°         | 0.006 - 0.018                    | <7.5°        |
| 0.0002 - 0.0004                | <7.5°        | 0.0003 - 0.0007                | <10°         | 0.0006 - 0.002                 | <10°         | 0.002 - 0.004                  | <10°         | 0.004 - 0.008                  | <10°         | 0.006 - 0.018                    | <7.5°        |
| 0.0002 - 0.0004                | <7.5°        | 0.0003 - 0.0007                | <10°         | 0.0006 - 0.002                 | <10°         | 0.002 - 0.004                  | <10°         | 0.004 - 0.008                  | <10°         | 0.006 - 0.018                    | <7.5°        |
| 0.0002 - 0.0004                | <3.5°        | 0.0003 - 0.0007                | <5°          | 0.0006 - 0.002                 | <5°          | 0.001 - 0.004                  | <5°          | 0.003 - 0.006                  | <5°          | 0.006 - 0.016                    | <3.5°        |
| 0.0002 - 0.0004                | <10°         | 0.0004 - 0.0009                | <12.5°       | 0.0008 - 0.002                 | <12.5°       | 0.002 - 0.006                  | <12.5°       | 0.005 - 0.010                  | <12.5°       | 0.008 - 0.022                    | <10°         |
| 0.0003 - 0.0006                | <10°         | 0.0005 - 0.0013                | <12.5°       | 0.0011 - 0.003                 | <12.5°       | 0.003 - 0.008                  | <12.5°       | 0.006 - 0.012                  | <12.5°       | 0.011 - 0.030                    | <10°         |
| 0.0003 - 0.0006                | <10°         | 0.0004 - 0.0010                | <12.5°       | 0.0008 - 0.003                 | <12.5°       | 0.002 - 0.006                  | <12.5°       | 0.005 - 0.010                  | <12.5°       | 0.008 - 0.024                    | <10°         |
| 0.0002 - 0.0004                | <10°         | 0.0004 - 0.0009                | <12.5°       | 0.0008 - 0.002                 | <12.5°       | 0.002 - 0.006                  | <12.5°       | 0.005 - 0.010                  | <12.5°       | 0.008 - 0.022                    | <10°         |
| 0.0001 - 0.0002                | <2°          | 0.0002 - 0.0004                | <2.5°        | 0.0004 - 0.001                 | <2.5°        | 0.001 - 0.003                  | <2.5°        | 0.002 - 0.004                  | <2.5°        | 0.004 - 0.010                    | <2°          |
| 0.0003 - 0.0006                | <3.5°        | 0.0004 - 0.0010                | <5°          | 0.0008 - 0.003                 | <5°          | 0.002 - 0.006                  | <5°          | 0.005 - 0.010                  | <5°          | 0.008 - 0.024                    | <3.5°        |

\*D1 > 5.00mm --> Erhöhen Sie die Schnittparameter, wenn Ihre Spindel und das Halten Ihres Werkstücks dies zulassen.

UMFANGSBEARBEITUNG

|          |   | VDI 3323  |   | VHM<br>Vc [m/min] | TiAlN<br>Vc [m/min] | DIAMANT<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |       |
|----------|---|-----------|---|-------------------|---------------------|-----------------------|------------|------------|-------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |  |                   | <b>95</b>           |                       | <0.015×ØD1 | <1×L1      |       |
|          | Niedrig legierter Stahl < 800 N/mm²                                       | 6 - 9     |   |                   | <b>85</b>           |                       | <0.015×ØD1 | <1×L1      |       |
|          | Hochlegierter Stahl > 800 N/mm², ferritischer / martensitischer Edelstahl | 10 - 13   |   |                   | <b>65</b>           |                       | <0.010×ØD1 | <1×L1      |       |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm²                               | 14.1-14.2 |   |                   |                     | <b>65</b>             |            | <0.005×ØD1 | <1×L1 |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm²                        | 14.3-14.4 |   |                   |                     | <b>55</b>             |            | <0.005×ØD1 | <1×L1 |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16   |   |                   | <b>125</b>          | <b>125</b>            |            | <0.040×ØD1 | <1×L1 |
|          | Duktiles Gusseisen, Temperguss > 250 HB                                   | 17 - 20   |   |                   | <b>90</b>           | <b>90</b>             |            | <0.025×ØD1 | <1×L1 |
| <b>N</b> | Alu-Knetlegierung < 12% Si  | 21 - 22   |   |                   | <b>165</b>          |                       | <b>255</b> | <0.020×ØD1 | <1×L1 |
|          | Alu-Gusslegierung >12% Si   | 23 - 25   |   |                   | <b>125</b>          |                       | <b>200</b> | <0.025×ØD1 | <1×L1 |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb                                | 26        |   |                   | <b>125</b>          |                       | <b>200</b> | <0.025×ØD1 | <1×L1 |
|          | Kupferlegierung schwere Zerspanbarkeit                                    | 27 - 28   |   | <b>100</b>        |                     | <b>160</b>            | <0.015×ØD1 | <1×L1      |       |
|          | Kunststoff, Holz  | 29 - 30   |   | <b>110</b>        |                     | <b>175</b>            | <0.025×ØD1 | <1×L1      |       |
|          | Graphit   | -         |   | <b>110</b>        |                     | <b>200</b>            | <0.020×ØD1 | <1×L1      |       |
|          | Gold, Silber  | -         |   | <b>90</b>         |                     | <b>140</b>            | <0.020×ØD1 | <1×L1      |       |
| <b>S</b> | Titan, Titanlegierung   | 36 - 37   |   | <b>50</b>         | <b>70</b>           |                       | <0.015×ØD1 | <1×L1      |       |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

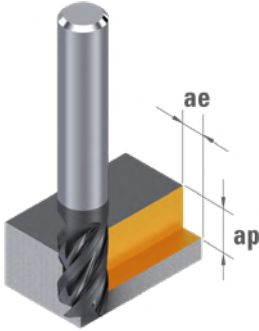
$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

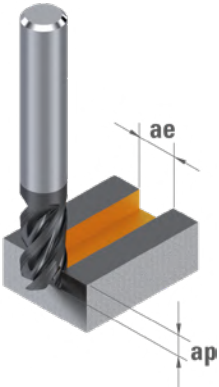
| $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>5.00 - 6.00 | $\varnothing D_1$<br>7.00 - 8.00 | $\varnothing D_1$<br>10.00 - 12.00 | $\varnothing D_1$<br>14.00 - 20.00 |  |
|----------------------------------|----------------------------------|----------------------------------|------------------------------------|------------------------------------|--|
| 0.015 - 0.020                    | 0.025 - 0.030                    | 0.035 - 0.040                    | 0.040 - 0.048                      | 0.042 - 0.060                      |  |
| 0.014 - 0.018                    | 0.023 - 0.028                    | 0.030 - 0.036                    | 0.036 - 0.043                      | 0.038 - 0.054                      |  |
| 0.012 - 0.016                    | 0.020 - 0.024                    | 0.030 - 0.032                    | 0.032 - 0.038                      | 0.034 - 0.048                      |  |
| 0.012 - 0.016                    | 0.020 - 0.024                    | 0.030 - 0.032                    | 0.032 - 0.038                      | 0.034 - 0.048                      |  |
| 0.011 - 0.014                    | 0.018 - 0.022                    | 0.025 - 0.028                    | 0.028 - 0.034                      | 0.029 - 0.042                      |  |
| 0.018 - 0.024                    | 0.030 - 0.036                    | 0.040 - 0.048                    | 0.048 - 0.058                      | 0.050 - 0.072                      |  |
| 0.015 - 0.020                    | 0.025 - 0.030                    | 0.035 - 0.040                    | 0.040 - 0.048                      | 0.042 - 0.060                      |  |
| 0.023 - 0.030                    | 0.038 - 0.046                    | 0.055 - 0.060                    | 0.060 - 0.072                      | 0.063 - 0.090                      |  |
| 0.020 - 0.026                    | 0.033 - 0.040                    | 0.045 - 0.052                    | 0.052 - 0.062                      | 0.055 - 0.078                      |  |
| 0.023 - 0.030                    | 0.038 - 0.046                    | 0.055 - 0.060                    | 0.060 - 0.072                      | 0.063 - 0.090                      |  |
| 0.018 - 0.024                    | 0.030 - 0.036                    | 0.040 - 0.048                    | 0.048 - 0.058                      | 0.050 - 0.072                      |  |
| 0.023 - 0.030                    | 0.038 - 0.046                    | 0.055 - 0.060                    | 0.060 - 0.072                      | 0.063 - 0.090                      |  |
| 0.030 - 0.040                    | 0.050 - 0.060                    | 0.070 - 0.080                    | 0.080 - 0.096                      | 0.084 - 0.120                      |  |
| 0.015 - 0.020                    | 0.025 - 0.030                    | 0.035 - 0.040                    | 0.040 - 0.048                      | 0.042 - 0.060                      |  |
| 0.015 - 0.020                    | 0.025 - 0.030                    | 0.035 - 0.040                    | 0.040 - 0.048                      | 0.042 - 0.060                      |  |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

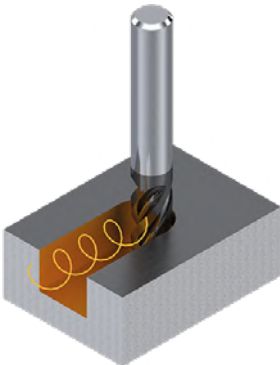
## UMFANGSBEARBEITUNG

|          |   | VDI<br>3323 |   | XIDUR<br>Vc [m/min] | ae<br>(mm)                | ap<br>(mm)             |
|----------|---|-------------|---|---------------------|---------------------------|------------------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5       |  | <b>150</b>          | $<0.40 \times \text{ØD1}$ | $<1 \times \text{ØD1}$ |
|          | Niedrig legierter Stahl $< 800 \text{ N/mm}^2$  | 6 - 9       |   | <b>125</b>          | $<0.30 \times \text{ØD1}$ | $<1 \times \text{ØD1}$ |
|          | Hochlegierter Stahl $> 800 \text{ N/mm}^2$ ,<br>ferritischer/ martensitischer Edelstahl | 10 - 13     |   | <b>100</b>          | $<0.25 \times \text{ØD1}$ | $<1 \times \text{ØD1}$ |
| <b>M</b> | Austenitischer rostfreier Stahl $< 700 \text{ N/mm}^2$                                  | 14.1-14.2   |   | <b>95</b>           | $<0.25 \times \text{ØD1}$ | $<1 \times \text{ØD1}$ |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>$> 700 \text{ N/mm}^2$                        | 14.3-14.4   |   | <b>65</b>           | $<0.2 \times \text{ØD1}$  | $<1 \times \text{ØD1}$ |
| <b>K</b> | Grauguss $< 250 \text{ HB}$   | 15 - 16     |   | <b>180</b>          | $<0.40 \times \text{ØD1}$ | $<1 \times \text{ØD1}$ |
|          | Duktilen Gusseisen, Temperguss $> 250 \text{ HB}$                                       | 17 - 20     |   | <b>130</b>          | $<0.35 \times \text{ØD1}$ | $<1 \times \text{ØD1}$ |
| <b>S</b> | Titan, Titanlegierung   | 36 - 37     |   | <b>70</b>           | $<0.40 \times \text{ØD1}$ | $<1 \times \text{ØD1}$ |

## NUTBEARBEITUNG

|          |   | VDI<br>3323 |  | XIDUR<br>Vc [m/min] | ae<br>(mm)            | ap<br>(mm)               |
|----------|---|-------------|--|---------------------|-----------------------|--------------------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5       |  | <b>115</b>          | $1 \times \text{ØD1}$ | $<1 \times \text{ØD1}$   |
|          | Niedrig legierter Stahl $< 800 \text{ N/mm}^2$  | 6 - 9       |  | <b>95</b>           | $1 \times \text{ØD1}$ | $<1 \times \text{ØD1}$   |
|          | Hochlegierter Stahl $> 800 \text{ N/mm}^2$ ,<br>ferritischer/ martensitischer Edelstahl | 10 - 13     |  | <b>75</b>           | $1 \times \text{ØD1}$ | $<0.8 \times \text{ØD1}$ |
| <b>M</b> | Austenitischer rostfreier Stahl $< 700 \text{ N/mm}^2$                                  | 14.1-14.2   |  | <b>70</b>           | $1 \times \text{ØD1}$ | $<1 \times \text{ØD1}$   |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>$> 700 \text{ N/mm}^2$                        | 14.3-14.4   |  | <b>50</b>           | $1 \times \text{ØD1}$ | $<0.8 \times \text{ØD1}$ |
| <b>K</b> | Grauguss $< 250 \text{ HB}$   | 15 - 16     |  | <b>135</b>          | $1 \times \text{ØD1}$ | $<1 \times \text{ØD1}$   |
|          | Duktilen Gusseisen, Temperguss $> 250 \text{ HB}$                                       | 17 - 20     |  | <b>95</b>           | $1 \times \text{ØD1}$ | $<1 \times \text{ØD1}$   |
| <b>S</b> | Titan, Titanlegierung   | 36 - 37     |  | <b>55</b>           | $1 \times \text{ØD1}$ | $<1 \times \text{ØD1}$   |

## TROCHOIDALE BEARBEITUNG

|          |   | VDI<br>3323 |   | XIDUR<br>Vc [m/min] | ae<br>(mm)                | ap<br>(mm)             |
|----------|---|-------------|---|---------------------|---------------------------|------------------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5       |  | <b>380</b>          | $<0.06 \times \text{ØD1}$ | $<1 \times \text{ØD1}$ |
|          | Niedrig legierter Stahl $< 800 \text{ N/mm}^2$  | 6 - 9       |   | <b>290</b>          | $<0.05 \times \text{ØD1}$ | $<1 \times \text{ØD1}$ |
|          | Hochlegierter Stahl $> 800 \text{ N/mm}^2$ ,<br>ferritischer/ martensitischer Edelstahl | 10 - 13     |   | <b>230</b>          | $<0.03 \times \text{ØD1}$ | $<1 \times \text{ØD1}$ |
| <b>M</b> | Austenitischer rostfreier Stahl $< 700 \text{ N/mm}^2$                                  | 14.1-14.2   |   | <b>190</b>          | $<0.03 \times \text{ØD1}$ | $<1 \times \text{ØD1}$ |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>$> 700 \text{ N/mm}^2$                        | 14.3-14.4   |   | <b>110</b>          | $<0.02 \times \text{ØD1}$ | $<1 \times \text{ØD1}$ |
| <b>K</b> | Grauguss $< 250 \text{ HB}$   | 15 - 16     |   | <b>450</b>          | $<0.08 \times \text{ØD1}$ | $<1 \times \text{ØD1}$ |
|          | Duktilen Gusseisen, Temperguss $> 250 \text{ HB}$                                       | 17 - 20     |   | <b>330</b>          | $<0.07 \times \text{ØD1}$ | $<1 \times \text{ØD1}$ |
| <b>S</b> | Titan, Titanlegierung   | 36 - 37     |   | <b>110</b>          | $<0.08 \times \text{ØD1}$ | $<1 \times \text{ØD1}$ |



$$n \text{ [U/min]} = \frac{Vc \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$Vf \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $fz$  [mm]

| $\varnothing D_1$<br>1.00 - 1.50 | $\varnothing D_1$<br>2.00 - 2.50 | $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>5.00 - 6.00 | $\varnothing D_1$<br>8.00 - 12.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|
| 0.010 - 0.014                    | 0.019 - 0.024                    | 0.029 - 0.038                    | 0.048 - 0.058                    | 0.062 - 0.094                     |
| 0.009 - 0.013                    | 0.018 - 0.022                    | 0.026 - 0.035                    | 0.044 - 0.053                    | 0.057 - 0.086                     |
| 0.008 - 0.012                    | 0.016 - 0.020                    | 0.024 - 0.032                    | 0.040 - 0.048                    | 0.052 - 0.078                     |
| 0.008 - 0.012                    | 0.016 - 0.020                    | 0.024 - 0.032                    | 0.040 - 0.048                    | 0.052 - 0.078                     |
| 0.007 - 0.011                    | 0.014 - 0.018                    | 0.022 - 0.029                    | 0.036 - 0.043                    | 0.047 - 0.070                     |
| 0.011 - 0.017                    | 0.022 - 0.028                    | 0.034 - 0.045                    | 0.056 - 0.067                    | 0.073 - 0.109                     |
| 0.010 - 0.014                    | 0.019 - 0.024                    | 0.029 - 0.038                    | 0.048 - 0.058                    | 0.062 - 0.094                     |
| 0.010 - 0.014                    | 0.019 - 0.024                    | 0.029 - 0.038                    | 0.048 - 0.058                    | 0.062 - 0.094                     |

Vorschub pro Zahn  $fz$  [mm]

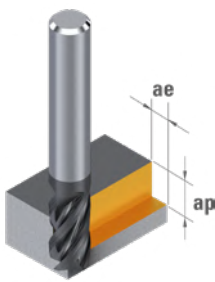
| $\varnothing D_1$<br>1.00 - 1.50 | $\varnothing D_1$<br>2.00 - 2.50 | $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>5.00 - 6.00 | $\varnothing D_1$<br>8.00 - 12.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|
| 0.006 - 0.008                    | 0.011 - 0.014                    | 0.017 - 0.023                    | 0.029 - 0.035                    | 0.038 - 0.055                     |
| 0.005 - 0.008                    | 0.011 - 0.013                    | 0.016 - 0.021                    | 0.026 - 0.032                    | 0.034 - 0.050                     |
| 0.005 - 0.007                    | 0.010 - 0.012                    | 0.014 - 0.019                    | 0.024 - 0.029                    | 0.032 - 0.045                     |
| 0.005 - 0.007                    | 0.010 - 0.012                    | 0.014 - 0.019                    | 0.024 - 0.029                    | 0.032 - 0.045                     |
| 0.004 - 0.007                    | 0.008 - 0.011                    | 0.013 - 0.017                    | 0.022 - 0.026                    | 0.028 - 0.040                     |
| 0.007 - 0.010                    | 0.013 - 0.017                    | 0.020 - 0.027                    | 0.034 - 0.040                    | 0.044 - 0.065                     |
| 0.006 - 0.008                    | 0.011 - 0.014                    | 0.017 - 0.023                    | 0.029 - 0.035                    | 0.038 - 0.055                     |
| 0.006 - 0.008                    | 0.011 - 0.014                    | 0.017 - 0.023                    | 0.029 - 0.035                    | 0.038 - 0.055                     |

Vorschub pro Zahn  $fz$  [mm]

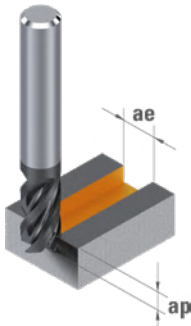
| $\varnothing D_1$<br>1.00 - 1.50 | $\varnothing D_1$<br>2.00 - 2.50 | $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>5.00 - 6.00 | $\varnothing D_1$<br>8.00 - 12.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|
| 0.013 - 0.019                    | 0.026 - 0.032                    | 0.039 - 0.052                    | 0.065 - 0.078                    | 0.084 - 0.126                     |
| 0.012 - 0.018                    | 0.024 - 0.030                    | 0.036 - 0.048                    | 0.059 - 0.071                    | 0.077 - 0.116                     |
| 0.011 - 0.016                    | 0.022 - 0.027                    | 0.032 - 0.043                    | 0.054 - 0.065                    | 0.070 - 0.105                     |
| 0.011 - 0.016                    | 0.022 - 0.027                    | 0.032 - 0.043                    | 0.054 - 0.065                    | 0.070 - 0.105                     |
| 0.010 - 0.015                    | 0.019 - 0.024                    | 0.029 - 0.039                    | 0.049 - 0.058                    | 0.063 - 0.095                     |
| 0.015 - 0.023                    | 0.030 - 0.038                    | 0.045 - 0.060                    | 0.076 - 0.091                    | 0.098 - 0.147                     |
| 0.013 - 0.019                    | 0.026 - 0.032                    | 0.039 - 0.052                    | 0.065 - 0.078                    | 0.084 - 0.126                     |
| 0.013 - 0.019                    | 0.026 - 0.032                    | 0.039 - 0.052                    | 0.065 - 0.078                    | 0.084 - 0.126                     |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

**UMFANGSBEARBEITUNG**

|          |             | VDI<br>3323 |   | VHM<br>Vc [m/min] | ae<br>(mm)               | ap<br>(mm)     |
|----------|-------------|-------------|---|-------------------|--------------------------|----------------|
| <b>H</b> | Schaumstoff | 30          |  | <b>400</b>        | $<0.8 \times \text{ØD1}$ | $<1 \times L1$ |

**NUTBEARBEITUNG**

|          |             | VDI<br>3323 |  | VHM<br>Vc [m/min] | ae<br>(mm)             | ap<br>(mm)        |
|----------|-------------|-------------|--|-------------------|------------------------|-------------------|
| <b>H</b> | Schaumstoff | 30          |  | <b>335</b>        | $<1 \times \text{ØD1}$ | $<0.80 \times L1$ |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>6.00 - 8.00 | $\varnothing D_1$<br>10.00 - 12.00 |
|----------------------------------|----------------------------------|------------------------------------|
| 0.070 - 0.100                    | 0.140 - 0.190                    | 0.240 - 0.250                      |

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>6.00 - 8.00 | $\varnothing D_1$<br>10.00 - 12.00 |
|----------------------------------|----------------------------------|------------------------------------|
| 0.060 - 0.090                    | 0.130 - 0.170                    | 0.220 - 0.230                      |

Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

## UMFANGSBEARBEITUNG

|          |   |           | VDI 3323 |            | VHM<br>Vc [m/min] | TiAlN<br>Vc [m/min] | DLC<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |
|----------|---|-----------|----------|------------|-------------------|---------------------|-------------------|------------|------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |          |            |                   | <b>135</b>          |                   | <0.3×ØD1   | <1×L1      |
|          | Niedrig legierter Stahl < 800 N/mm²                                       | 6 - 9     |          |            | <b>105</b>        |                     | <0.3×ØD1          | <1×L1      |            |
|          | Hochlegierter Stahl > 800 N/mm², ferritischer / martensitischer Edelstahl | 10 - 13   |          |            | <b>80</b>         |                     | <0.2×ØD1          | <1×L1      |            |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm²                               | 14.1-14.2 |          |            | <b>100</b>        |                     | <0.2×ØD1          | <1×L1      |            |
|          | Nickelfreier rostfreier Stahl/DUPLEX > 700 N/mm²                          | 14.3-14.4 |          |            | <b>80</b>         |                     | <0.2×ØD1          | <1×L1      |            |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16   |          |            | <b>180</b>        | <b>200</b>          | <0.4×ØD1          | <1×L1      |            |
|          | Duktiles Gusseisen, Temperguss > 250 HB                                   | 17 - 20   |          |            | <b>95</b>         | <b>130</b>          | <0.4×ØD1          | <1×L1      |            |
| <b>N</b> | Alu-Knetlegierung < 12% Si  | 21 - 22   |          |            | <b>320</b>        |                     | <b>170</b>        | <0.4×ØD1   | <1×L1      |
|          | Alu-Gusslegierung > 12% Si  | 23 - 25   |          |            | <b>265</b>        |                     | <b>400</b>        | <0.4×ØD1   | <1×L1      |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb                                | 26        |          |            | <b>155</b>        |                     |                   | <0.4×ØD1   | <1×L1      |
|          | Kupferlegierung schwere Zerspanbarkeit                                    | 27 - 28   |          | <b>135</b> |                   | <b>190</b>          | <0.4×ØD1          | <1×L1      |            |
|          | Kunststoff, Holz  | 29 - 30   |          | <b>215</b> |                   | <b>330</b>          | <0.4×ØD1          | <1×L1      |            |
|          | Gold, Silber  | -         |          | <b>180</b> |                   | <b>230</b>          | <0.4×ØD1          | <1×L1      |            |
| <b>S</b> | Titan, Titanlegierung   | 36 - 37   |          | <b>65</b>  |                   | <b>70</b>           | <0.3×ØD1          | <1×L1      |            |

## NUTBEARBEITUNG

|          |   |           | VDI 3323 |            | VHM<br>Vc [m/min] | TiAlN<br>Vc [m/min] | DLC<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |
|----------|---|-----------|----------|------------|-------------------|---------------------|-------------------|------------|------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |          |            |                   | <b>100</b>          |                   | 1×ØD1      | <1×ØD1     |
|          | Niedrig legierter Stahl < 800 N/mm²                                       | 6 - 9     |          |            | <b>85</b>         |                     | 1×ØD1             | <1×ØD1     |            |
|          | Hochlegierter Stahl > 800 N/mm², ferritischer / martensitischer Edelstahl | 10 - 13   |          |            | <b>55</b>         |                     | 1×ØD1             | <0.8×ØD1   |            |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm²                               | 14.1-14.2 |          |            | <b>75</b>         |                     | 1×ØD1             | <0.8×ØD1   |            |
|          | Nickelfreier rostfreier Stahl/DUPLEX > 700 N/mm²                          | 14.3-14.4 |          |            | <b>45</b>         |                     | 1×ØD1             | <0.7×ØD1   |            |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16   |          |            | <b>125</b>        | <b>145</b>          | 1×ØD1             | <1×ØD1     |            |
|          | Duktiles Gusseisen, Temperguss > 250 HB                                   | 17 - 20   |          |            | <b>65</b>         | <b>75</b>           | 1×ØD1             | <1×ØD1     |            |
| <b>N</b> | Alu-Knetlegierung < 12% Si  | 21 - 22   |          |            | <b>225</b>        |                     | <b>280</b>        | 1×ØD1      | <1×ØD1     |
|          | Alu-Gusslegierung > 12% Si  | 23 - 25   |          |            | <b>185</b>        |                     | <b>230</b>        | 1×ØD1      | <1×ØD1     |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb                                | 26        |          |            | <b>110</b>        |                     | <b>140</b>        | 1×ØD1      | <1×ØD1     |
|          | Kupferlegierung schwere Zerspanbarkeit                                    | 27 - 28   |          | <b>95</b>  |                   | <b>120</b>          | 1×ØD1             | <1×ØD1     |            |
|          | Kunststoff, Holz  | 29 - 30   |          | <b>150</b> |                   | <b>190</b>          | 1×ØD1             | <1×ØD1     |            |
|          | Gold, Silber  | -         |          | <b>125</b> |                   | <b>160</b>          | 1×ØD1             | <1×ØD1     |            |
| <b>S</b> | Titan, Titanlegierung   | 36 - 37   |          | <b>45</b>  |                   | <b>55</b>           | 1×ØD1             | <1×ØD1     |            |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>0.30 - 0.50 | $\varnothing D_1$<br>0.60 - 1.00 | $\varnothing D_1$<br>1.10 - 1.50 | $\varnothing D_1$<br>1.60 - 2.00 | $\varnothing D_1$<br>2.50 - 3.00 | $\varnothing D_1$<br>4.00 - 6.00 | $\varnothing D_1$<br>8.00 - 12.00 | $\varnothing D_1$<br>16.00 - 20.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|
| 0.002 - 0.005                    | 0.005 - 0.009                    | 0.010 - 0.014                    | 0.014 - 0.018                    | 0.023 - 0.027                    | 0.036 - 0.055                    | 0.065 - 0.085                     | 0.100 - 0.125                      |
| 0.002 - 0.004                    | 0.005 - 0.009                    | 0.009 - 0.013                    | 0.014 - 0.017                    | 0.021 - 0.026                    | 0.034 - 0.050                    | 0.060 - 0.080                     | 0.095 - 0.120                      |
| 0.002 - 0.004                    | 0.005 - 0.008                    | 0.009 - 0.012                    | 0.013 - 0.016                    | 0.020 - 0.024                    | 0.032 - 0.050                    | 0.060 - 0.075                     | 0.090 - 0.110                      |
| 0.002 - 0.004                    | 0.005 - 0.008                    | 0.009 - 0.012                    | 0.013 - 0.016                    | 0.020 - 0.024                    | 0.032 - 0.050                    | 0.060 - 0.075                     | 0.090 - 0.110                      |
| 0.002 - 0.004                    | 0.004 - 0.007                    | 0.008 - 0.011                    | 0.011 - 0.014                    | 0.018 - 0.021                    | 0.028 - 0.040                    | 0.050 - 0.065                     | 0.080 - 0.100                      |
| 0.003 - 0.006                    | 0.007 - 0.012                    | 0.013 - 0.018                    | 0.019 - 0.024                    | 0.030 - 0.036                    | 0.048 - 0.070                    | 0.085 - 0.115                     | 0.135 - 0.170                      |
| 0.002 - 0.005                    | 0.006 - 0.010                    | 0.011 - 0.015                    | 0.016 - 0.020                    | 0.025 - 0.030                    | 0.040 - 0.060                    | 0.070 - 0.095                     | 0.110 - 0.140                      |
| 0.004 - 0.008                    | 0.009 - 0.015                    | 0.017 - 0.023                    | 0.024 - 0.030                    | 0.038 - 0.045                    | 0.060 - 0.090                    | 0.110 - 0.145                     | 0.170 - 0.210                      |
| 0.003 - 0.007                    | 0.008 - 0.013                    | 0.014 - 0.020                    | 0.021 - 0.026                    | 0.033 - 0.039                    | 0.052 - 0.080                    | 0.095 - 0.125                     | 0.145 - 0.180                      |
| 0.004 - 0.008                    | 0.009 - 0.015                    | 0.017 - 0.023                    | 0.024 - 0.030                    | 0.038 - 0.045                    | 0.060 - 0.090                    | 0.110 - 0.145                     | 0.170 - 0.210                      |
| 0.003 - 0.006                    | 0.007 - 0.012                    | 0.013 - 0.018                    | 0.019 - 0.024                    | 0.030 - 0.036                    | 0.048 - 0.070                    | 0.085 - 0.115                     | 0.135 - 0.170                      |
| 0.004 - 0.008                    | 0.009 - 0.015                    | 0.017 - 0.023                    | 0.024 - 0.030                    | 0.038 - 0.045                    | 0.060 - 0.090                    | 0.110 - 0.145                     | 0.170 - 0.210                      |
| 0.002 - 0.005                    | 0.006 - 0.010                    | 0.011 - 0.015                    | 0.016 - 0.020                    | 0.025 - 0.030                    | 0.040 - 0.060                    | 0.070 - 0.095                     | 0.110 - 0.140                      |
| 0.002 - 0.005                    | 0.006 - 0.010                    | 0.011 - 0.015                    | 0.016 - 0.020                    | 0.025 - 0.030                    | 0.040 - 0.060                    | 0.070 - 0.095                     | 0.110 - 0.140                      |

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>0.30 - 0.50 | $\varnothing D_1$<br>0.60 - 1.00 | $\varnothing D_1$<br>1.10 - 1.50 | $\varnothing D_1$<br>1.60 - 2.00 | $\varnothing D_1$<br>2.50 - 3.00 | $\varnothing D_1$<br>4.00 - 6.00 | $\varnothing D_1$<br>8.00 - 12.00 | $\varnothing D_1$<br>16.00 - 20.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|
| 0.002 - 0.004                    | 0.004 - 0.007                    | 0.008 - 0.011                    | 0.011 - 0.014                    | 0.017 - 0.020                    | 0.028 - 0.040                    | 0.050 - 0.060                     | 0.080 - 0.090                      |
| 0.002 - 0.003                    | 0.004 - 0.007                    | 0.007 - 0.010                    | 0.011 - 0.013                    | 0.016 - 0.020                    | 0.026 - 0.040                    | 0.050 - 0.060                     | 0.070 - 0.090                      |
| 0.002 - 0.003                    | 0.004 - 0.006                    | 0.007 - 0.009                    | 0.010 - 0.012                    | 0.015 - 0.018                    | 0.024 - 0.040                    | 0.050 - 0.060                     | 0.070 - 0.080                      |
| 0.002 - 0.003                    | 0.004 - 0.006                    | 0.007 - 0.009                    | 0.010 - 0.012                    | 0.015 - 0.018                    | 0.024 - 0.040                    | 0.050 - 0.060                     | 0.070 - 0.080                      |
| 0.002 - 0.003                    | 0.003 - 0.005                    | 0.006 - 0.008                    | 0.008 - 0.011                    | 0.014 - 0.016                    | 0.022 - 0.030                    | 0.040 - 0.050                     | 0.060 - 0.080                      |
| 0.002 - 0.005                    | 0.005 - 0.009                    | 0.010 - 0.014                    | 0.014 - 0.018                    | 0.023 - 0.027                    | 0.036 - 0.055                    | 0.060 - 0.090                     | 0.100 - 0.130                      |
| 0.002 - 0.004                    | 0.005 - 0.008                    | 0.008 - 0.011                    | 0.012 - 0.015                    | 0.019 - 0.023                    | 0.030 - 0.045                    | 0.050 - 0.070                     | 0.080 - 0.110                      |
| 0.003 - 0.006                    | 0.007 - 0.011                    | 0.013 - 0.017                    | 0.018 - 0.023                    | 0.029 - 0.034                    | 0.046 - 0.070                    | 0.080 - 0.110                     | 0.130 - 0.160                      |
| 0.002 - 0.005                    | 0.006 - 0.010                    | 0.011 - 0.015                    | 0.016 - 0.020                    | 0.025 - 0.029                    | 0.040 - 0.060                    | 0.070 - 0.090                     | 0.110 - 0.140                      |
| 0.003 - 0.006                    | 0.007 - 0.011                    | 0.013 - 0.017                    | 0.018 - 0.023                    | 0.029 - 0.034                    | 0.046 - 0.070                    | 0.080 - 0.110                     | 0.130 - 0.160                      |
| 0.002 - 0.005                    | 0.005 - 0.009                    | 0.010 - 0.014                    | 0.014 - 0.018                    | 0.023 - 0.027                    | 0.036 - 0.055                    | 0.060 - 0.090                     | 0.100 - 0.130                      |
| 0.003 - 0.006                    | 0.007 - 0.011                    | 0.013 - 0.017                    | 0.018 - 0.023                    | 0.029 - 0.034                    | 0.046 - 0.070                    | 0.080 - 0.110                     | 0.130 - 0.160                      |
| 0.002 - 0.004                    | 0.005 - 0.008                    | 0.008 - 0.011                    | 0.012 - 0.015                    | 0.019 - 0.023                    | 0.030 - 0.045                    | 0.050 - 0.070                     | 0.080 - 0.110                      |
| 0.002 - 0.004                    | 0.005 - 0.008                    | 0.008 - 0.011                    | 0.012 - 0.015                    | 0.019 - 0.023                    | 0.030 - 0.045                    | 0.050 - 0.070                     | 0.080 - 0.110                      |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

**RAMPEN**

|          |  | VDI 3323  |           | VHM<br>Vc [m/min] | TiAlN<br>Vc [m/min] | DLC<br>Vc [m/min] | Rampen-<br>winkel $\alpha$ | ap<br>(mm) |
|----------|--|-----------|-----------|-------------------|---------------------|-------------------|----------------------------|------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl                                       | 1 - 5     |           |                   | <b>100</b>          |                   | <6°                        | <1×ØD1     |
|          | Niedrig legierter Stahl < 800 N/mm²                                      | 6 - 9     |           | <b>85</b>         |                     | <4°               | <1×ØD1                     |            |
|          | Hochlegierter Stahl > 800 N/mm², ferritischer/ martensitischer Edelstahl | 10 - 13   |           | <b>55</b>         |                     | <3°               | <0.8×ØD1                   |            |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm²                              | 14.1-14.2 |           | <b>75</b>         |                     | <3°               | <0.8×ØD1                   |            |
|          | Nickelfreier rostfreier Stahl/DUPLEX > 700N/mm²                          | 14.3-14.4 |           | <b>45</b>         |                     | <2°               | <0.7×ØD1                   |            |
| <b>K</b> | Grauguss < 250 HB  | 15 - 16   |           | <b>125</b>        | <b>145</b>          |                   | <7°                        | <1×ØD1     |
|          | Duktiles Gusseisen, Temperguss > 250 HB                                  | 17 - 20   |           | <b>65</b>         | <b>75</b>           |                   | <4°                        | <1×ØD1     |
| <b>N</b> | Alu-Knetlegierung < 12% Si   | 21 - 22   |           | <b>225</b>        |                     | <b>280</b>        | <6°                        | <1×ØD1     |
|          | Alu-Gusslegierung >12% Si  | 23 - 25   |           | <b>185</b>        |                     | <b>230</b>        | <4°                        | <1×ØD1     |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb                               | 26        |           | <b>110</b>        |                     | <b>140</b>        | <7°                        | <1×ØD1     |
|          | Kupferlegierung schwere Zerspanbarkeit                                   | 27 - 28   |           | <b>95</b>         |                     | <b>120</b>        | <4°                        | <1×ØD1     |
|          | Kunststoff, Holz   | 29 - 30   |           | <b>150</b>        |                     | <b>190</b>        | <6°                        | <1×ØD1     |
|          | Gold, Silber   | -         |           | <b>125</b>        |                     | <b>160</b>        | <3°                        | <1×ØD1     |
| <b>S</b> | Titan, Titanlegierung  | 36 - 37   | <b>45</b> | <b>55</b>         |                     | <2°               | <1×ØD1                     |            |

**UMFANGSBEARBEITUNG**

|          |  | VDI 3323  |           | VHMVc<br>[m/min] | TiAlN<br>Vc [m/min] | DLC<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |
|----------|--|-----------|-----------|------------------|---------------------|-------------------|------------|------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl                                       | 1 - 5     |           |                  | <b>125</b>          |                   | <0.06×ØD1  | <1×L1      |
|          | Niedrig legierter Stahl < 800 N/mm²                                      | 6 - 9     |           | <b>100</b>       |                     | <0.05×ØD1         | <1×L1      |            |
|          | Hochlegierter Stahl > 800 N/mm², ferritischer/ martensitischer Edelstahl | 10 - 13   |           | <b>90</b>        |                     | <0.04×ØD1         | <1×L1      |            |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm²                              | 14.1-14.2 |           | <b>110</b>       |                     | <0.04×ØD1         | <1×L1      |            |
|          | Nickelfreier rostfreier Stahl/DUPLEX > 700N/mm²                          | 14.3-14.4 |           | <b>90</b>        |                     | <0.03×ØD1         | <1×L1      |            |
| <b>K</b> | Grauguss < 250 HB  | 15 - 16   |           | <b>125</b>       | <b>125</b>          |                   | <0.12×ØD1  | <1×L1      |
|          | Duktiles Gusseisen, Temperguss > 250 HB                                  | 17 - 20   |           | <b>90</b>        | <b>90</b>           |                   | <0.06×ØD1  | <1×L1      |
| <b>N</b> | Kupferlegierung gute Zerspanbarkeit mit Pb                               | 26        |           | <b>180</b>       |                     | <b>225</b>        | <0.09×ØD1  | <1×L1      |
|          | Kupferlegierung schwere Zerspanbarkeit                                   | 27 - 28   |           | <b>150</b>       |                     | <b>190</b>        | <0.07×ØD1  | <1×L1      |
|          | Gold, Silber   | -         |           | <b>135</b>       |                     | <b>170</b>        | <0.07×ØD1  | <1×L1      |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung  | 31 - 35   |           | <b>45</b>        | <b>30</b>           |                   | <0.02×ØD1  | <1×L1      |
|          | Titan, Titanlegierung  | 36 - 37   | <b>50</b> | <b>70</b>        |                     | <0.06×ØD1         | <1×L1      |            |

$$n \text{ [U/min]} = \frac{Vc \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$Vf \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

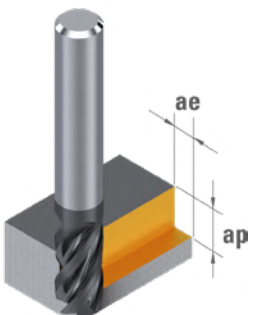
Vorschub pro Zahn  $fz$  [mm]

| $\emptyset D_1$<br>0.30 - 0.50 | $\emptyset D_1$<br>0.60 - 1.00 | $\emptyset D_1$<br>1.10 - 1.50 | $\emptyset D_1$<br>1.60 - 2.00 | $\emptyset D_1$<br>2.50 - 3.00 | $\emptyset D_1$<br>4.00 - 6.00 | $\emptyset D_1$<br>8.00 - 12.00 | $\emptyset D_1$<br>16.00 - 20.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|----------------------------------|
| 0.002 - 0.003                  | 0.003 - 0.006                  | 0.006 - 0.009                  | 0.009 - 0.011                  | 0.014 - 0.016                  | 0.022 - 0.030                  | 0.040 - 0.050                   | 0.060 - 0.070                    |
| 0.002 - 0.002                  | 0.003 - 0.006                  | 0.006 - 0.008                  | 0.009 - 0.010                  | 0.013 - 0.016                  | 0.020 - 0.030                  | 0.040 - 0.050                   | 0.060 - 0.070                    |
| 0.002 - 0.002                  | 0.003 - 0.005                  | 0.006 - 0.007                  | 0.008 - 0.010                  | 0.012 - 0.014                  | 0.020 - 0.030                  | 0.040 - 0.050                   | 0.060 - 0.065                    |
| 0.002 - 0.002                  | 0.003 - 0.005                  | 0.006 - 0.007                  | 0.008 - 0.010                  | 0.012 - 0.014                  | 0.020 - 0.030                  | 0.040 - 0.050                   | 0.060 - 0.065                    |
| 0.002 - 0.002                  | 0.002 - 0.004                  | 0.005 - 0.006                  | 0.006 - 0.009                  | 0.011 - 0.013                  | 0.018 - 0.025                  | 0.030 - 0.040                   | 0.050 - 0.065                    |
| 0.002 - 0.004                  | 0.004 - 0.007                  | 0.008 - 0.011                  | 0.011 - 0.014                  | 0.018 - 0.022                  | 0.028 - 0.045                  | 0.050 - 0.070                   | 0.080 - 0.105                    |
| 0.002 - 0.003                  | 0.004 - 0.006                  | 0.006 - 0.009                  | 0.010 - 0.012                  | 0.015 - 0.018                  | 0.024 - 0.035                  | 0.040 - 0.060                   | 0.060 - 0.090                    |
| 0.002 - 0.005                  | 0.006 - 0.009                  | 0.010 - 0.014                  | 0.014 - 0.018                  | 0.023 - 0.027                  | 0.036 - 0.055                  | 0.060 - 0.090                   | 0.100 - 0.130                    |
| 0.002 - 0.004                  | 0.005 - 0.008                  | 0.009 - 0.012                  | 0.013 - 0.016                  | 0.020 - 0.023                  | 0.032 - 0.050                  | 0.060 - 0.070                   | 0.090 - 0.110                    |
| 0.002 - 0.005                  | 0.006 - 0.009                  | 0.010 - 0.014                  | 0.014 - 0.018                  | 0.023 - 0.027                  | 0.036 - 0.055                  | 0.060 - 0.090                   | 0.100 - 0.130                    |
| 0.002 - 0.004                  | 0.004 - 0.007                  | 0.008 - 0.011                  | 0.011 - 0.014                  | 0.018 - 0.022                  | 0.028 - 0.045                  | 0.050 - 0.070                   | 0.080 - 0.105                    |
| 0.002 - 0.005                  | 0.006 - 0.009                  | 0.010 - 0.014                  | 0.014 - 0.018                  | 0.023 - 0.027                  | 0.036 - 0.055                  | 0.060 - 0.090                   | 0.100 - 0.130                    |
| 0.002 - 0.003                  | 0.004 - 0.006                  | 0.006 - 0.009                  | 0.010 - 0.012                  | 0.015 - 0.018                  | 0.024 - 0.035                  | 0.040 - 0.060                   | 0.060 - 0.090                    |
| 0.002 - 0.003                  | 0.004 - 0.006                  | 0.006 - 0.009                  | 0.010 - 0.012                  | 0.015 - 0.018                  | 0.024 - 0.035                  | 0.040 - 0.060                   | 0.060 - 0.090                    |

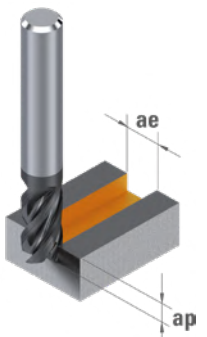
Vorschub pro Zahn  $fz$  [mm]

| $\emptyset D_1$<br>0.35 - 0.50 | $\emptyset D_1$<br>0.55 - 1.00 | $\emptyset D_1$<br>1.10 - 1.50 | $\emptyset D_1$<br>1.60 - 2.00 | $\emptyset D_1$<br>2.50 - 3.00 | $\emptyset D_1$<br>4.00 - 6.00 | $\emptyset D_1$<br>8.00 - 12.00 | $\emptyset D_1$<br>12.00 - 20.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|----------------------------------|
| 0.0028 - 0.0040                | 0.004 - 0.008                  | 0.009 - 0.012                  | 0.013 - 0.016                  | 0.020 - 0.024                  | 0.032 - 0.050                  | 0.060 - 0.080                   | 0.080 - 0.120                    |
| 0.0025 - 0.0036                | 0.004 - 0.007                  | 0.008 - 0.011                  | 0.012 - 0.014                  | 0.018 - 0.022                  | 0.028 - 0.045                  | 0.060 - 0.070                   | 0.080 - 0.110                    |
| 0.0022 - 0.0032                | 0.004 - 0.006                  | 0.007 - 0.010                  | 0.010 - 0.013                  | 0.016 - 0.019                  | 0.026 - 0.040                  | 0.050 - 0.060                   | 0.070 - 0.100                    |
| 0.0022 - 0.0032                | 0.004 - 0.006                  | 0.007 - 0.010                  | 0.010 - 0.013                  | 0.016 - 0.019                  | 0.026 - 0.040                  | 0.050 - 0.060                   | 0.070 - 0.100                    |
| 0.0020 - 0.0028                | 0.003 - 0.006                  | 0.006 - 0.008                  | 0.009 - 0.011                  | 0.014 - 0.017                  | 0.022 - 0.035                  | 0.040 - 0.060                   | 0.060 - 0.080                    |
| 0.0034 - 0.0048                | 0.005 - 0.010                  | 0.011 - 0.014                  | 0.015 - 0.019                  | 0.024 - 0.029                  | 0.038 - 0.060                  | 0.080 - 0.100                   | 0.100 - 0.140                    |
| 0.0028 - 0.0040                | 0.004 - 0.008                  | 0.009 - 0.012                  | 0.013 - 0.016                  | 0.020 - 0.024                  | 0.032 - 0.050                  | 0.060 - 0.080                   | 0.080 - 0.120                    |
| 0.0042 - 0.0060                | 0.007 - 0.012                  | 0.013 - 0.018                  | 0.006 - 0.008                  | 0.030 - 0.036                  | 0.048 - 0.070                  | 0.100 - 0.120                   | 0.130 - 0.180                    |
| 0.0034 - 0.0048                | 0.005 - 0.010                  | 0.011 - 0.014                  | 0.013 - 0.016                  | 0.024 - 0.029                  | 0.038 - 0.060                  | 0.080 - 0.100                   | 0.100 - 0.140                    |
| 0.0028 - 0.0040                | 0.004 - 0.008                  | 0.009 - 0.012                  | 0.019 - 0.024                  | 0.020 - 0.024                  | 0.032 - 0.050                  | 0.060 - 0.080                   | 0.080 - 0.120                    |
| 0.0014 - 0.0020                | 0.002 - 0.004                  | 0.004 - 0.006                  | 0.015 - 0.019                  | 0.010 - 0.012                  | 0.016 - 0.025                  | 0.030 - 0.040                   | 0.040 - 0.060                    |
| 0.0028 - 0.0040                | 0.004 - 0.008                  | 0.009 - 0.012                  | 0.013 - 0.016                  | 0.020 - 0.024                  | 0.032 - 0.050                  | 0.060 - 0.080                   | 0.080 - 0.120                    |


## UMFANGSBEARBEITUNG

|   |  | VDI 3323 |   | XIDUR Vc [m/min] | ae (mm)    | ap (mm) |
|---|--|----------|---|------------------|------------|---------|
| P | Hochlegierter Stahl > 800 N/mm <sup>2</sup> , ferritischer / martensitischer Edelstahl | 10 - 13  |  | 250              | <0.070×ØD1 | <1×L1   |
|   |  | 31- 35   |   | 150              | <0.040×ØD1 | <1×L1   |
| H | Gehärteter Stahl (50 à 55 HRC)   | 38       |   | 200              | <0.040×ØD1 | <1×L1   |
|   |  | 39       |   | 100              | <0.025×ØD1 | <1×L1   |

## NUTBEARBEITUNG

|   |  | VDI 3323 |   | XIDUR Vc [m/min] | ae (mm) | ap (mm)    |
|---|--|----------|---|------------------|---------|------------|
| P | Hochlegierter Stahl > 800 N/mm <sup>2</sup> , ferritischer / martensitischer Edelstahl | 10 - 13  |  | 40               | 1×ØD1   | <0.05×ØD1  |
|   |  | 31- 35   |   | 40               | 1×ØD1   | <0.03×ØD1  |
| H | Gehärteter Stahl (50 à 55 HRC)   | 38       |   | 40               | 1×ØD1   | <0.02×ØD1  |
|   |  | 39       |   | 15               | 1×ØD1   | <0.010×ØD1 |

## RAMPEN

|   |  | VDI 3323 |   | XIDUR Vc [m/min] | Tiefe (mm) | Rampenwinkel $\alpha$ |
|---|--|----------|---|------------------|------------|-----------------------|
| P | Hochlegierter Stahl > 800 N/mm <sup>2</sup> , ferritischer / martensitischer Edelstahl | 10 - 13  |  | 190              | <1×ØD1     | <2°                   |
|   |  | 31- 35   |   | 115              | <1×ØD1     | <3°                   |
| H | Gehärteter Stahl (50 à 55 HRC)   | 38       |   | 150              | <1×ØD1     | <3°                   |
|   |  | 39       |   | 75               | <1×ØD1     | <2°                   |



$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.40 - 0.60 | $\emptyset D_1$<br>0.70 - 1.00 | $\emptyset D_1$<br>1.50 - 2.00 | $\emptyset D_1$<br>2.50 - 3.00 | $\emptyset D_1$<br>4.00 - 6.00 | $\emptyset D_1$<br>8.00 - 10.00 | $\emptyset D_1$<br>12.00 - 16.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|----------------------------------|
| 0.003 - 0.004                  | 0.004 - 0.006                  | 0.010 - 0.013                  | 0.016 - 0.019                  | 0.026 - 0.038                  | 0.052 - 0.065                   | 0.075 - 0.090                    |
| 0.002 - 0.002                  | 0.003 - 0.004                  | 0.006 - 0.008                  | 0.010 - 0.012                  | 0.016 - 0.024                  | 0.032 - 0.040                   | 0.050 - 0.055                    |
| 0.0010 - 0.0014                | 0.002 - 0.002                  | 0.004 - 0.005                  | 0.006 - 0.007                  | 0.010 - 0.014                  | 0.020 - 0.025                   | 0.030 - 0.035                    |
| 0.0007 - 0.0011                | 0.001 - 0.002                  | 0.003 - 0.004                  | 0.004 - 0.005                  | 0.007 - 0.011                  | 0.014 - 0.020                   | 0.020 - 0.025                    |

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.40 - 0.60 | $\emptyset D_1$<br>0.70 - 1.00 | $\emptyset D_1$<br>1.50 - 2.00 | $\emptyset D_1$<br>2.50 - 3.00 | $\emptyset D_1$<br>4.00 - 6.00 | $\emptyset D_1$<br>8.00 - 10.00 | $\emptyset D_1$<br>12.00 - 16.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|----------------------------------|
| 0.0024 - 0.0032                | 0.003 - 0.005                  | 0.008 - 0.010                  | 0.013 - 0.015                  | 0.021 - 0.030                  | 0.042 - 0.052                   | 0.060 - 0.072                    |
| 0.0016 - 0.0016                | 0.002 - 0.003                  | 0.005 - 0.006                  | 0.008 - 0.010                  | 0.013 - 0.019                  | 0.026 - 0.032                   | 0.040 - 0.044                    |
| 0.0008 - 0.0011                | 0.002 - 0.002                  | 0.003 - 0.004                  | 0.005 - 0.006                  | 0.008 - 0.011                  | 0.016 - 0.020                   | 0.024 - 0.028                    |
| 0.0006 - 0.0009                | 0.001 - 0.002                  | 0.002 - 0.003                  | 0.003 - 0.004                  | 0.006 - 0.009                  | 0.011 - 0.016                   | 0.016 - 0.020                    |

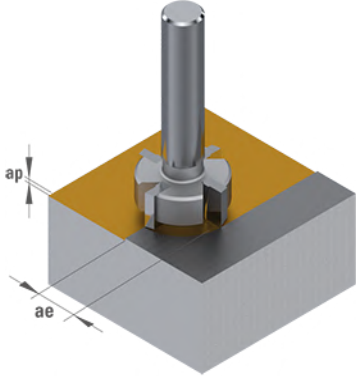
Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.40 - 0.60 | $\emptyset D_1$<br>0.70 - 1.00 | $\emptyset D_1$<br>1.50 - 2.00 | $\emptyset D_1$<br>2.50 - 3.00 | $\emptyset D_1$<br>4.00 - 6.00 | $\emptyset D_1$<br>8.00 - 10.00 | $\emptyset D_1$<br>12.00 - 16.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|----------------------------------|
| 0.0016 - 0.002                 | 0.003 - 0.004                  | 0.006 - 0.008                  | 0.010 - 0.012                  | 0.016 - 0.024                  | 0.032 - 0.040                   | 0.050 - 0.055                    |
| 0.0010 - 0.001                 | 0.002 - 0.002                  | 0.004 - 0.005                  | 0.006 - 0.007                  | 0.010 - 0.014                  | 0.020 - 0.025                   | 0.030 - 0.035                    |
| 0.0010 - 0.0014                | 0.0017 - 0.0024                | 0.004 - 0.005                  | 0.006 - 0.007                  | 0.010 - 0.014                  | 0.020 - 0.025                   | 0.030 - 0.035                    |
| 0.0007 - 0.0011                | 0.0012 - 0.0018                | 0.003 - 0.004                  | 0.004 - 0.005                  | 0.007 - 0.011                  | 0.014 - 0.020                   | 0.020 - 0.025                    |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

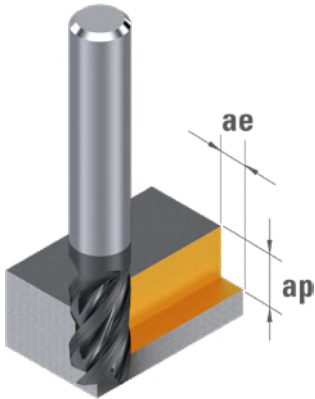
## DIXI 7800

### PLANFRÄSER

|          |   | VDI 3323 |   | VHM Vc [m/min] | ae (mm)                | ap (mm)         |
|----------|---|----------|---|----------------|------------------------|-----------------|
| <b>H</b> | Kunststoff gute Zerspanbarkeit (PVC expandiert)               | 29       |  | 750            | $<1 \times \text{ØD1}$ | $<1 \text{ mm}$ |
|          | Kunststoff moderiert Zerspanbarkeit (PETG, PPH, PC, PE-PP)    | 29       |   | 700            | $<1 \times \text{ØD1}$ | $<1 \text{ mm}$ |
|          | Kunststoff schwere Zerspanbarkeit (PVC kompakt, PMMA schwarz) | 29       |   | 650            | $<1 \times \text{ØD1}$ | $<1 \text{ mm}$ |

## DIXI 7210

### UMFANGSBEARBEITUNG

|          |   | VDI 3323  |  | VHM Vc [m/min] | CUTINOX Vc [m/min]       | ae (mm)                  | ap (mm)        |
|----------|---|-----------|--|----------------|--------------------------|--------------------------|----------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |  |                | 135                      | $<0.4 \times \text{ØD1}$ | $<1 \times L1$ |
|          | Niedrig legierter Stahl $< 800 \text{ N/mm}^2$  | 6 - 9     |  | 105            | $<0.4 \times \text{ØD1}$ | $<1 \times L1$           |                |
|          | Hochlegierter Stahl $> 800 \text{ N/mm}^2$ , ferritischer / martensitischer Edelstahl | 10 - 13   |  | 80             | $<0.2 \times \text{ØD1}$ | $<1 \times L1$           |                |
| <b>M</b> | Austenitischer rostfreier Stahl $< 700 \text{ N/mm}^2$                                | 14.1-14.2 |  | 100            | $<0.2 \times \text{ØD1}$ | $<1 \times L1$           |                |
|          | Nickelfreier rostfreier Stahl / DUPLEX $> 700 \text{ N/mm}^2$                         | 14.3-14.4 |  | 80             | $<0.2 \times \text{ØD1}$ | $<1 \times L1$           |                |
| <b>K</b> | Grauguss $< 250 \text{ HB}$   | 15 - 16   |  | 180            | 200                      | $<0.4 \times \text{ØD1}$ | $<1 \times L1$ |
|          | Duktiles Gusseisen, Temperguss $> 250 \text{ HB}$                                     | 17 - 20   |  | 95             | 130                      | $<0.4 \times \text{ØD1}$ | $<1 \times L1$ |
| <b>N</b> | Alu-Knetlegierung $< 12\% \text{ Si}$   | 21 - 22   |  | 320            |                          | $<0.4 \times \text{ØD1}$ | $<1 \times L1$ |
|          | Alu-Gusslegierung $> 12\% \text{ Si}$   | 23 - 25   |  | 260            |                          | $<0.4 \times \text{ØD1}$ | $<1 \times L1$ |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26        |  | 160            |                          | $<0.4 \times \text{ØD1}$ | $<1 \times L1$ |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28   | 140  |                | $<0.4 \times \text{ØD1}$ | $<1 \times L1$           |                |
|          | Gold, Silber  | -         | 180  |                | $<0.4 \times \text{ØD1}$ | $<1 \times L1$           |                |
| <b>S</b> | Titan, Titanlegierung   | 36 - 37   | 65   | 70             | $<0.3 \times \text{ØD1}$ | $<1 \times L1$           |                |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>12.00 - 20.00 | $\varnothing D_1$<br>25.00 - 35.00 |
|------------------------------------|------------------------------------|
| 0.040 - 0.060                      | 0.060 - 0.070                      |
| 0.030 - 0.050                      | 0.050 - 0.060                      |
| 0.030 - 0.040                      | 0.040 - 0.050                      |

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>5.00 - 6.00 | $\varnothing D_1$<br>7.00 - 8.00 | $\varnothing D_1$<br>10.00 - 12.00 |
|----------------------------------|----------------------------------|----------------------------------|------------------------------------|
| 0.032 - 0.044                    | 0.054 - 0.064                    | 0.076 - 0.086                    | 0.090 - 0.098                      |
| 0.031 - 0.040                    | 0.052 - 0.062                    | 0.072 - 0.082                    | 0.086 - 0.092                      |
| 0.029 - 0.038                    | 0.048 - 0.058                    | 0.068 - 0.076                    | 0.080 - 0.086                      |
| 0.029 - 0.038                    | 0.048 - 0.058                    | 0.068 - 0.076                    | 0.080 - 0.086                      |
| 0.025 - 0.034                    | 0.042 - 0.050                    | 0.058 - 0.068                    | 0.070 - 0.076                      |
| 0.043 - 0.058                    | 0.072 - 0.086                    | 0.100 - 0.116                    | 0.120 - 0.130                      |
| 0.036 - 0.048                    | 0.060 - 0.072                    | 0.084 - 0.096                    | 0.100 - 0.108                      |
| 0.054 - 0.072                    | 0.090 - 0.108                    | 0.126 - 0.144                    | 0.150 - 0.162                      |
| 0.047 - 0.062                    | 0.078 - 0.094                    | 0.110 - 0.124                    | 0.130 - 0.140                      |
| 0.054 - 0.072                    | 0.090 - 0.108                    | 0.126 - 0.144                    | 0.150 - 0.162                      |
| 0.040 - 0.052                    | 0.066 - 0.080                    | 0.092 - 0.106                    | 0.110 - 0.118                      |
| 0.040 - 0.052                    | 0.066 - 0.080                    | 0.092 - 0.106                    | 0.110 - 0.118                      |
| 0.036 - 0.048                    | 0.060 - 0.072                    | 0.084 - 0.096                    | 0.100 - 0.108                      |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

## NUTBEARBEITUNG

|   |   | VDI 3323  |  | VHM Vc [m/min] | CUTINOX Vc [m/min] | ae (mm)    | ap (mm)  |          |
|---|---|-----------|--|----------------|--------------------|------------|----------|----------|
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |  |                | <b>100</b>         | 1×ØD1      | <1.2×ØD1 |          |
|   | Niedrig legierter Stahl < 800 N/mm²                                       | 6 - 9     |  |                | <b>85</b>          | 1×ØD1      | <1×ØD1   |          |
|   | Hochlegierter Stahl > 800 N/mm², ferritischer / martensitischer Edelstahl | 10 - 13   |  |                | <b>55</b>          | 1×ØD1      | <0.8×ØD1 |          |
| M | Austenitischer rostfreier Stahl < 700 N/mm²                               | 14.1-14.2 |  |                | <b>75</b>          | 1×ØD1      | <1×ØD1   |          |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm²                        | 14.3-14.4 |  |                | <b>45</b>          | 1×ØD1      | <0.7×ØD1 |          |
| K | Grauguss < 250 HB   | 15 - 16   |  |                | <b>125</b>         | <b>145</b> | 1×ØD1    | <1.5×ØD1 |
|   | Duktiles Gusseisen, Temperguss > 250 HB                                   | 17 - 20   |  |                | <b>65</b>          | <b>75</b>  | 1×ØD1    | <1×ØD1   |
| N | Alu-Knetlegierung < 12% Si  | 21 - 22   |  |                | <b>230</b>         |            | 1×ØD1    | <1.5×ØD1 |
|   | Alu-Gusslegierung >12% Si   | 23 - 25   |  |                | <b>190</b>         |            | 1×ØD1    | <1×ØD1   |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb                                | 26        |  |                | <b>110</b>         |            | 1×ØD1    | <1.5×ØD1 |
| S | Kupferlegierung schwere Zerspanbarkeit                                    | 27 - 28   |  | <b>100</b>     |                    | 1×ØD1      | <1×ØD1   |          |
|   | Gold, Silber  | -         |  | <b>130</b>     |                    | 1×ØD1      | <1×ØD1   |          |
|   | Titan, Titanlegierung   | 36 - 37   |  | <b>45</b>      | <b>55</b>          | 1×ØD1      | <1×ØD1   |          |

## ZIRKULAR INTERPOLATION

|   |   | VDI 3323  |  | VHM Vc [m/min] | CUTINOX Vc [m/min] | Rampenwinkel $\alpha$ | ap (mm)  |          |
|---|---|-----------|--|----------------|--------------------|-----------------------|----------|----------|
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |  |                | <b>120</b>         | <6°                   | <1.2×ØD1 |          |
|   | Niedrig legierter Stahl < 800 N/mm²                                       | 6 - 9     |  |                | <b>95</b>          | <4°                   | <1×ØD1   |          |
|   | Hochlegierter Stahl > 800 N/mm², ferritischer / martensitischer Edelstahl | 10 - 13   |  |                | <b>70</b>          | <3°                   | <0.8×ØD1 |          |
| M | Austenitischer rostfreier Stahl < 700 N/mm²                               | 14.1-14.2 |  |                | <b>85</b>          | <3°                   | <1×ØD1   |          |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm²                        | 14.3-14.4 |  |                | <b>60</b>          | <2°                   | <0.7×ØD1 |          |
| K | Grauguss < 250 HB   | 15 - 16   |  |                | <b>150</b>         | <b>175</b>            | <8°      | <1.5×ØD1 |
|   | Duktiles Gusseisen, Temperguss > 250 HB                                   | 17 - 20   |  |                | <b>80</b>          | <b>100</b>            | <4°      | <1×ØD1   |
| N | Alu-Knetlegierung < 12% Si  | 21 - 22   |  |                | <b>270</b>         |                       | <6°      | <1.5×ØD1 |
|   | Alu-Gusslegierung >12% Si   | 23 - 25   |  |                | <b>220</b>         |                       | <4°      | <1×ØD1   |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb                                | 26        |  |                | <b>130</b>         |                       | <8°      | <1.5×ØD1 |
| S | Kupferlegierung schwere Zerspanbarkeit                                    | 27 - 28   |  | <b>120</b>     |                    | <4°                   | <1×ØD1   |          |
|   | Gold, Silber  | -         |  | <b>150</b>     |                    | <3°                   | <1×ØD1   |          |
|   | Titan, Titanlegierung   | 36 - 37   |  | <b>55</b>      |                    | <2°                   | <1×ØD1   |          |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

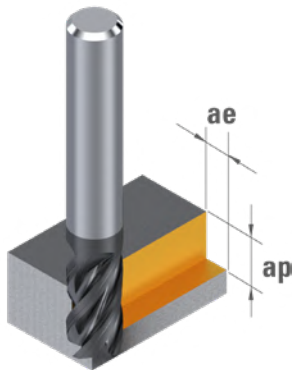
| $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>5.00 - 6.00 | $\varnothing D_1$<br>7.00 - 8.00 | $\varnothing D_1$<br>10.00 - 12.00 |
|----------------------------------|----------------------------------|----------------------------------|------------------------------------|
| 0.024 - 0.034                    | 0.040 - 0.048                    | 0.058 - 0.064                    | 0.068 - 0.074                      |
| 0.023 - 0.030                    | 0.040 - 0.046                    | 0.054 - 0.062                    | 0.064 - 0.070                      |
| 0.022 - 0.028                    | 0.036 - 0.044                    | 0.052 - 0.058                    | 0.060 - 0.064                      |
| 0.022 - 0.028                    | 0.036 - 0.044                    | 0.052 - 0.058                    | 0.060 - 0.064                      |
| 0.019 - 0.026                    | 0.032 - 0.038                    | 0.044 - 0.052                    | 0.052 - 0.058                      |
| 0.032 - 0.044                    | 0.054 - 0.064                    | 0.076 - 0.088                    | 0.090 - 0.098                      |
| 0.027 - 0.036                    | 0.046 - 0.054                    | 0.064 - 0.072                    | 0.076 - 0.082                      |
| 0.041 - 0.054                    | 0.068 - 0.082                    | 0.094 - 0.108                    | 0.112 - 0.122                      |
| 0.035 - 0.046                    | 0.058 - 0.070                    | 0.082 - 0.094                    | 0.098 - 0.106                      |
| 0.041 - 0.054                    | 0.068 - 0.082                    | 0.094 - 0.108                    | 0.112 - 0.122                      |
| 0.030 - 0.040                    | 0.050 - 0.060                    | 0.070 - 0.080                    | 0.082 - 0.088                      |
| 0.030 - 0.040                    | 0.050 - 0.060                    | 0.070 - 0.080                    | 0.082 - 0.088                      |
| 0.027 - 0.036                    | 0.046 - 0.054                    | 0.064 - 0.072                    | 0.076 - 0.082                      |

Vorschub pro Zahn  $f_z$  [mm]

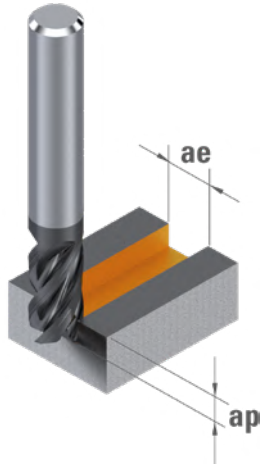
| $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>5.00 - 6.00 | $\varnothing D_1$<br>7.00 - 8.00 | $\varnothing D_1$<br>10.00 - 12.00 |
|----------------------------------|----------------------------------|----------------------------------|------------------------------------|
| 0.019 - 0.027                    | 0.032 - 0.038                    | 0.046 - 0.051                    | 0.054 - 0.059                      |
| 0.018 - 0.024                    | 0.032 - 0.037                    | 0.043 - 0.050                    | 0.051 - 0.056                      |
| 0.018 - 0.022                    | 0.029 - 0.035                    | 0.042 - 0.046                    | 0.048 - 0.051                      |
| 0.018 - 0.022                    | 0.029 - 0.035                    | 0.042 - 0.046                    | 0.048 - 0.051                      |
| 0.015 - 0.021                    | 0.026 - 0.030                    | 0.035 - 0.042                    | 0.042 - 0.046                      |
| 0.026 - 0.035                    | 0.043 - 0.051                    | 0.061 - 0.070                    | 0.072 - 0.078                      |
| 0.022 - 0.029                    | 0.037 - 0.043                    | 0.051 - 0.058                    | 0.061 - 0.066                      |
| 0.033 - 0.043                    | 0.054 - 0.066                    | 0.075 - 0.086                    | 0.090 - 0.098                      |
| 0.028 - 0.037                    | 0.046 - 0.056                    | 0.066 - 0.075                    | 0.078 - 0.085                      |
| 0.033 - 0.043                    | 0.054 - 0.066                    | 0.075 - 0.086                    | 0.090 - 0.098                      |
| 0.024 - 0.032                    | 0.040 - 0.048                    | 0.056 - 0.064                    | 0.066 - 0.070                      |
| 0.024 - 0.032                    | 0.040 - 0.048                    | 0.056 - 0.064                    | 0.066 - 0.070                      |
| 0.022 - 0.029                    | 0.037 - 0.043                    | 0.051 - 0.058                    | 0.061 - 0.066                      |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

## UMFANGSBEARBEITUNG

|          |   | VDI 3323              |   | VHM<br>Vc [m/min] | TiAlN<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |          |
|----------|---|-----------------------|---|-------------------|---------------------|------------|------------|----------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5                 |  |                   | <b>100</b>          | <0.3×ØD1   | <1×L1      |          |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9                 |   |                   | <b>80</b>           | <0.3×ØD1   | <1×L1      |          |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13               |   |                   | <b>50</b>           | <0.2×ØD1   | <1×L1      |          |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2             |   |                   |                     | <b>90</b>  | <0.2×ØD1   | <1×L1    |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16               |   |                   | <b>85</b>           | <b>100</b> | <0.4×ØD1   | <1×L1    |
|          | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20               |   |                   | <b>70</b>           | <b>85</b>  | <0.4×ØD1   | <1×L1    |
| <b>N</b> | Alu-Knetlegierung < 12% Si  | 21 - 22               |   |                   | <b>125</b>          |            | <0.4×ØD1   | <1×L1    |
|          | Alu-Gusslegierung >12% Si   | 23 - 25               |   |                   | <b>220</b>          |            | <0.4×ØD1   | <1×L1    |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26                    |   |                   | <b>40</b>           |            | <0.3×ØD1   | <1×L1    |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28               |   |                   | <b>150</b>          |            | <0.4×ØD1   | <1×L1    |
|          | Gold, Silber  | -                     |   |                   | <b>150</b>          |            | <0.4×ØD1   | <1×L1    |
|          | <b>S</b>  | Titan, Titanlegierung |   | 36 - 37           |                     | <b>150</b> |            | <0.4×ØD1 |

## NUTBEARBEITUNG

|          |   | VDI 3323              |   | VHM<br>Vc [m/min] | TiAlN<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |           |
|----------|---|-----------------------|---|-------------------|---------------------|------------|------------|-----------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5                 |  |                   |                     | 1×ØD1      | <1×ØD1     |           |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9                 |   |                   | <b>70</b>           | 1×ØD1      | <1×ØD1     |           |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13               |   |                   | <b>55</b>           | 1×ØD1      | <0.80×ØD1  |           |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2             |   |                   |                     | <b>35</b>  | 1×ØD1      | <0.80×ØD1 |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16               |   |                   | <b>60</b>           | <b>70</b>  | 1×ØD1      | <1×ØD1    |
|          | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20               |   |                   | <b>50</b>           | <b>60</b>  | 1×ØD1      | <1×ØD1    |
| <b>N</b> | Alu-Knetlegierung < 12% Si  | 21 - 22               |   |                   | <b>90</b>           |            | 1×ØD1      | <1×ØD1    |
|          | Alu-Gusslegierung >12% Si   | 23 - 25               |   |                   | <b>155</b>          |            | 1×ØD1      | <1×ØD1    |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26                    |   |                   | <b>30</b>           |            | 1×ØD1      | <1×ØD1    |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28               |   |                   | <b>105</b>          |            | 1×ØD1      | <1×ØD1    |
|          | Gold, Silber  | -                     |   |                   | <b>105</b>          |            | 1×ØD1      | <1×ØD1    |
|          | <b>S</b>  | Titan, Titanlegierung |   | 36 - 37           |                     | <b>105</b> |            | 1×ØD1     |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

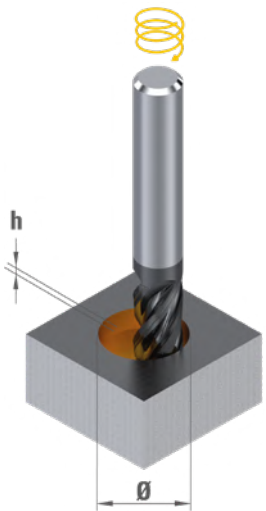
| $\emptyset D_1$<br>4.00 - 5.00 | $\emptyset D_1$<br>6.00 - 7.00 | $\emptyset D_1$<br>8.00 - 9.00 | $\emptyset D_1$<br>10.00 - 12.00 | $\emptyset D_1$<br>14.00 - 20.00 |  |
|--------------------------------|--------------------------------|--------------------------------|----------------------------------|----------------------------------|--|
| 0.018 - 0.023                  | 0.027 - 0.032                  | 0.036 - 0.040                  | 0.035 - 0.040                    | 0.050 - 0.070                    |  |
| 0.017 - 0.021                  | 0.026 - 0.030                  | 0.034 - 0.038                  | 0.035 - 0.040                    | 0.050 - 0.070                    |  |
| 0.016 - 0.020                  | 0.024 - 0.028                  | 0.032 - 0.036                  | 0.030 - 0.040                    | 0.040 - 0.060                    |  |
| 0.016 - 0.020                  | 0.024 - 0.028                  | 0.032 - 0.036                  | 0.030 - 0.040                    | 0.040 - 0.060                    |  |
| 0.024 - 0.030                  | 0.036 - 0.042                  | 0.048 - 0.054                  | 0.050 - 0.060                    | 0.070 - 0.100                    |  |
| 0.020 - 0.025                  | 0.030 - 0.035                  | 0.040 - 0.046                  | 0.040 - 0.050                    | 0.060 - 0.080                    |  |
| 0.036 - 0.045                  | 0.054 - 0.063                  | 0.072 - 0.082                  | 0.070 - 0.090                    | 0.100 - 0.140                    |  |
| 0.030 - 0.038                  | 0.045 - 0.053                  | 0.060 - 0.068                  | 0.060 - 0.070                    | 0.080 - 0.120                    |  |
| 0.030 - 0.038                  | 0.045 - 0.053                  | 0.060 - 0.068                  | 0.060 - 0.070                    | 0.080 - 0.120                    |  |
| 0.024 - 0.030                  | 0.036 - 0.042                  | 0.048 - 0.054                  | 0.050 - 0.060                    | 0.070 - 0.100                    |  |
| 0.024 - 0.030                  | 0.036 - 0.042                  | 0.048 - 0.054                  | 0.050 - 0.060                    | 0.070 - 0.100                    |  |
| 0.022 - 0.028                  | 0.033 - 0.039                  | 0.044 - 0.050                  | 0.045 - 0.050                    | 0.060 - 0.090                    |  |

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>4.00 - 5.00 | $\emptyset D_1$<br>6.00 - 7.00 | $\emptyset D_1$<br>8.00 - 9.00 | $\emptyset D_1$<br>10.00 - 12.00 | $\emptyset D_1$<br>14.00 - 20.00 |  |
|--------------------------------|--------------------------------|--------------------------------|----------------------------------|----------------------------------|--|
| 0.014 - 0.017                  | 0.020 - 0.024                  | 0.027 - 0.030                  | 0.026 - 0.030                    | 0.038 - 0.053                    |  |
| 0.013 - 0.016                  | 0.020 - 0.023                  | 0.026 - 0.029                  | 0.026 - 0.030                    | 0.038 - 0.053                    |  |
| 0.012 - 0.015                  | 0.018 - 0.021                  | 0.024 - 0.027                  | 0.023 - 0.030                    | 0.030 - 0.045                    |  |
| 0.012 - 0.015                  | 0.018 - 0.021                  | 0.024 - 0.027                  | 0.023 - 0.030                    | 0.030 - 0.045                    |  |
| 0.018 - 0.023                  | 0.027 - 0.032                  | 0.036 - 0.041                  | 0.038 - 0.045                    | 0.053 - 0.075                    |  |
| 0.015 - 0.019                  | 0.023 - 0.026                  | 0.030 - 0.035                  | 0.030 - 0.038                    | 0.045 - 0.060                    |  |
| 0.027 - 0.034                  | 0.041 - 0.047                  | 0.054 - 0.062                  | 0.053 - 0.068                    | 0.075 - 0.105                    |  |
| 0.023 - 0.029                  | 0.034 - 0.040                  | 0.045 - 0.051                  | 0.045 - 0.053                    | 0.060 - 0.090                    |  |
| 0.023 - 0.029                  | 0.034 - 0.040                  | 0.045 - 0.051                  | 0.045 - 0.053                    | 0.060 - 0.090                    |  |
| 0.018 - 0.023                  | 0.027 - 0.032                  | 0.036 - 0.041                  | 0.038 - 0.045                    | 0.053 - 0.075                    |  |
| 0.018 - 0.023                  | 0.027 - 0.032                  | 0.036 - 0.041                  | 0.038 - 0.045                    | 0.053 - 0.075                    |  |
| 0.017 - 0.021                  | 0.025 - 0.029                  | 0.033 - 0.038                  | 0.034 - 0.038                    | 0.045 - 0.068                    |  |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

ZIRKULAR INTERPOLATION

|          |  | VDI 3323              |  | VHM<br>Vc [m/min] | TiAlN<br>Vc [m/min] | Rampen-<br>winkel $\alpha$ | ap<br>(mm) |
|----------|--|-----------------------|--|-------------------|---------------------|----------------------------|------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl   | 1 - 5                 |  <p><math>h = \pi \times \varnothing \times \tan \alpha</math><br/><math>1.3 \times D_1 &lt; \varnothing &lt; 1.9 \times D_1</math></p> |                   | <b>70</b>           | <6°                        | <1×ØD1     |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>  | 6 - 9                 |  | <b>55</b>         | <4°                 | <1×ØD1                     |            |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer/ martensitischer Edelstahl | 10 - 13               |  | <b>35</b>         | <3°                 | <0.8×ØD1                   |            |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                  | 14.1-14.2             |  | <b>65</b>         | <3°                 | <0.8×ØD1                   |            |
| <b>K</b> | Grauguss < 250 HB  | 15 - 16               |  | <b>60</b>         | <b>70</b>           | <7°                        | <1×ØD1     |
|          | Duktiles Gusseisen, Temperguss > 250 HB  | 17 - 20               |  | <b>50</b>         | <b>60</b>           | <4°                        | <1×ØD1     |
| <b>N</b> | Alu-Knetlegierung < 12% Si   | 21 - 22               |  | <b>90</b>         |                     | <4°                        | <1×ØD1     |
|          | Alu-Gusslegierung >12% Si  | 23 - 25               |  | <b>155</b>        |                     | <6°                        | <1×ØD1     |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb   | 26                    |  | <b>30</b>         |                     | <2°                        | <1×ØD1     |
|          | Kupferlegierung schwere Zerspanbarkeit   | 27 - 28               |  | <b>105</b>        |                     | <7°                        | <1×ØD1     |
|          | Gold, Silber   | -                     |  | <b>105</b>        |                     | <4°                        | <1×ØD1     |
|          | <b>S</b>   | Titan, Titanlegierung |  | 36 - 37           | <b>105</b>          |                            | <3°        |



$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

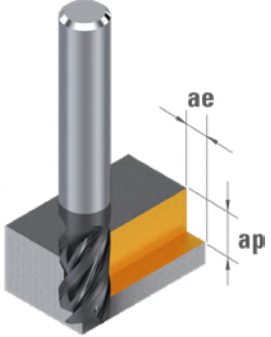
$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

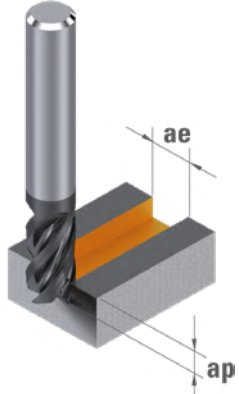
| $\varnothing D_1$<br>4.00 - 5.00 | $\varnothing D_1$<br>6.00 - 7.00 | $\varnothing D_1$<br>8.00 - 9.00 | $\varnothing D_1$<br>10.00 - 12.00 | $\varnothing D_1$<br>14.00 - 20.00 |  |
|----------------------------------|----------------------------------|----------------------------------|------------------------------------|------------------------------------|--|
| 0.011 - 0.014                    | 0.016 - 0.019                    | 0.022 - 0.024                    | 0.021 - 0.024                      | 0.030 - 0.042                      |  |
| 0.010 - 0.013                    | 0.016 - 0.018                    | 0.021 - 0.023                    | 0.021 - 0.024                      | 0.030 - 0.042                      |  |
| 0.010 - 0.012                    | 0.014 - 0.017                    | 0.019 - 0.022                    | 0.018 - 0.024                      | 0.024 - 0.036                      |  |
| 0.010 - 0.012                    | 0.014 - 0.017                    | 0.019 - 0.022                    | 0.018 - 0.024                      | 0.024 - 0.036                      |  |
| 0.012 - 0.015                    | 0.018 - 0.021                    | 0.024 - 0.028                    | 0.024 - 0.030                      | 0.036 - 0.048                      |  |
| 0.022 - 0.027                    | 0.033 - 0.038                    | 0.043 - 0.050                    | 0.042 - 0.054                      | 0.060 - 0.084                      |  |
| 0.018 - 0.023                    | 0.027 - 0.032                    | 0.036 - 0.041                    | 0.036 - 0.042                      | 0.048 - 0.072                      |  |
| 0.018 - 0.023                    | 0.027 - 0.032                    | 0.036 - 0.041                    | 0.036 - 0.042                      | 0.048 - 0.072                      |  |
| 0.014 - 0.018                    | 0.022 - 0.026                    | 0.029 - 0.033                    | 0.030 - 0.036                      | 0.042 - 0.060                      |  |
| 0.014 - 0.018                    | 0.022 - 0.026                    | 0.029 - 0.033                    | 0.030 - 0.036                      | 0.042 - 0.060                      |  |
| 0.014 - 0.017                    | 0.020 - 0.023                    | 0.026 - 0.030                    | 0.027 - 0.030                      | 0.036 - 0.054                      |  |
| 0.026 - 0.033                    | 0.039 - 0.046                    | 0.052 - 0.055                    | 0.057 - 0.066                      | 0.072 - 0.096                      |  |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.


**UMFANGSBEARBEITUNG**

|          |  | VDI 3323 |   | DIXI 7215 Vc [m/min] | DIXI 715-FC Vc [m/min] | ae (mm)  | ap (mm)  |
|----------|--|----------|---|----------------------|------------------------|----------|----------|
| <b>N</b> | Alu-Knetlegierung < 12% Si                 | 21 - 22  |  | <b>475</b>           | <b>620</b>             | <0.4×ØD1 | <1×L1    |
|          | Alu-Gusslegierung >12% Si                  | 23 - 25  |   | <b>200</b>           | <b>260</b>             | <1×ØD1   | <1.3×ØD1 |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb | 26       |   | <b>200</b>           | <b>260</b>             | <0.4×ØD1 | <1×L1    |
|          | Kupferlegierung schwere Zerspanbarkeit     | 27 - 28  |   | <b>140</b>           | <b>180</b>             | <0.4×ØD1 | <1×L1    |
|          | Gold, Silber                               | -        |   | <b>200</b>           | <b>325</b>             | <0.4×ØD1 | <1×L1    |

**NUTBEARBEITUNG**

|          |  | VDI 3323 |  | DIXI 7215 Vc [m/min] | DIXI 715-FC Vc [m/min] | ae (mm) | ap (mm)  |
|----------|--|----------|--|----------------------|------------------------|---------|----------|
| <b>N</b> | Alu-Knetlegierung < 12% Si                 | 21 - 22  |  | <b>380</b>           | <b>490</b>             | 1×ØD1   | <1.5×ØD1 |
|          | Alu-Gusslegierung >12% Si                  | 23 - 25  |  | <b>160</b>           | <b>210</b>             | 1×ØD1   | <1.3×ØD1 |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb | 26       |  | <b>160</b>           | <b>210</b>             | 1×ØD1   | <1.5×ØD1 |
|          | Kupferlegierung schwere Zerspanbarkeit     | 27 - 28  |  | <b>110</b>           | <b>150</b>             | 1×ØD1   | <1×ØD1   |
|          | Gold, Silber                               | -        |  | <b>200</b>           | <b>260</b>             | 1×ØD1   | <1×ØD1   |

**RAMPEN**

|          |  | VDI 3323 |   | DIXI 7215 Vc [m/min] | DIXI 715-FC Vc [m/min] | max. Tiefe (mm) | Rampenwinkel $\alpha$ |
|----------|--|----------|---|----------------------|------------------------|-----------------|-----------------------|
| <b>N</b> | Alu-Knetlegierung < 12% Si                 | 21 - 22  |  | <b>380</b>           | <b>490</b>             | <1×ØD1          | <1.5×ØD1              |
|          | Alu-Gusslegierung >12% Si                  | 23 - 25  |   | <b>160</b>           | <b>210</b>             | <1×ØD1          | <1.3×ØD1              |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb | 26       |   | <b>160</b>           | <b>210</b>             | <1×ØD1          | <1.5×ØD1              |
|          | Kupferlegierung schwere Zerspanbarkeit     | 27 - 28  |   | <b>110</b>           | <b>150</b>             | <1×ØD1          | <1×ØD1                |
|          | Gold, Silber                               | -        |   | <b>200</b>           | <b>260</b>             | <1×ØD1          | <1×ØD1                |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>4.00 - 6.00 | $\varnothing D_1$<br>8.00 - 10.00 | $\varnothing D_1$<br>12.00 - 16.00 |
|----------------------------------|-----------------------------------|------------------------------------|
| 0.058 - 0.086                    | 0.115 - 0.140                     | 0.170 - 0.230                      |
| 0.048 - 0.072                    | 0.095 - 0.120                     | 0.140 - 0.190                      |
| 0.048 - 0.072                    | 0.095 - 0.120                     | 0.140 - 0.190                      |
| 0.038 - 0.058                    | 0.075 - 0.100                     | 0.120 - 0.150                      |
| 0.038 - 0.058                    | 0.075 - 0.100                     | 0.120 - 0.150                      |

Vorschub pro Zahn  $f_z$  [mm]

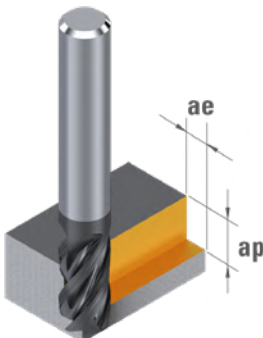
| $\varnothing D_1$<br>4.00 - 6.00 | $\varnothing D_1$<br>8.00 - 10.00 | $\varnothing D_1$<br>12.00 - 16.00 |
|----------------------------------|-----------------------------------|------------------------------------|
| 0.044 - 0.064                    | 0.085 - 0.110                     | 0.130 - 0.170                      |
| 0.036 - 0.054                    | 0.070 - 0.090                     | 0.110 - 0.140                      |
| 0.036 - 0.054                    | 0.070 - 0.090                     | 0.110 - 0.140                      |
| 0.029 - 0.044                    | 0.055 - 0.080                     | 0.090 - 0.110                      |
| 0.029 - 0.044                    | 0.055 - 0.080                     | 0.090 - 0.110                      |

Vorschub pro Zahn  $f_z$  [mm]

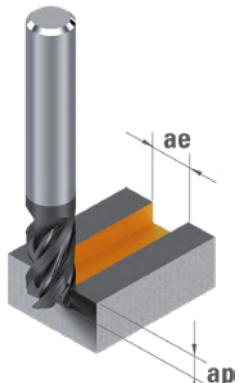
| $\varnothing D_1$<br>4.00 - 6.00 | $\varnothing D_1$<br>8.00 - 10.00 | $\varnothing D_1$<br>12.00 - 16.00 |
|----------------------------------|-----------------------------------|------------------------------------|
| 0.044 - 0.064                    | 0.085 - 0.110                     | 0.130 - 0.170                      |
| 0.036 - 0.054                    | 0.070 - 0.090                     | 0.110 - 0.140                      |
| 0.036 - 0.054                    | 0.070 - 0.090                     | 0.110 - 0.140                      |
| 0.029 - 0.044                    | 0.055 - 0.080                     | 0.090 - 0.110                      |
| 0.029 - 0.044                    | 0.055 - 0.080                     | 0.090 - 0.110                      |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.


## UMFANGSBEARBEITUNG

|   |   | VDI 3323 |   | VHM Vc [m/min] | ae (mm)                   | ap (mm)        |
|---|---|----------|---|----------------|---------------------------|----------------|
| N | Kunststoff gute Zerspanbarkeit (PVC expandiert)               | 21 - 22  |  | 400            | $<0.70 \times \text{ØD1}$ | $<1 \times L1$ |
|   | Kunststoff moderiert Zerspanbarkeit (PETG, PPH, PC, PE-PP)    | 23 - 25  |   | 300            | $<0.70 \times \text{ØD1}$ | $<1 \times L1$ |
|   | Kunststoff schwere Zerspanbarkeit (PVC kompakt, PMMA schwarz) | 26       |   | 250            | $<0.40 \times \text{ØD1}$ | $<1 \times L1$ |

## NUTBEARBEITUNG

|   |   | VDI 3323 |  | VHM Vc [m/min] | ae (mm)               | ap (mm)                  |
|---|---|----------|--|----------------|-----------------------|--------------------------|
| N | Kunststoff gute Zerspanbarkeit (PVC expandiert)               | 21 - 22  |  | 400            | $1 \times \text{ØD1}$ | $<1.5 \times \text{ØD1}$ |
|   | Kunststoff moderiert Zerspanbarkeit (PETG, PPH, PC, PE-PP)    | 23 - 25  |  | 300            | $1 \times \text{ØD1}$ | $<1.5 \times \text{ØD1}$ |
|   | Kunststoff schwere Zerspanbarkeit (PVC kompakt, PMMA schwarz) | 26       |  | 250            | $1 \times \text{ØD1}$ | $<1.5 \times \text{ØD1}$ |

## RAMPEN

|   |   | VDI 3323 |   | VHM Vc [m/min] | ae (mm)     | ap (mm)                  |
|---|---|----------|---|----------------|-------------|--------------------------|
| N | Kunststoff gute Zerspanbarkeit (PVC expandiert)               | 21 - 22  |  | 400            | $<12^\circ$ | $<1.5 \times \text{ØD1}$ |
|   | Kunststoff moderiert Zerspanbarkeit (PETG, PPH, PC, PE-PP)    | 23 - 25  |   | 300            | $<10^\circ$ | $<1.5 \times \text{ØD1}$ |
|   | Kunststoff schwere Zerspanbarkeit (PVC kompakt, PMMA schwarz) | 26       |   | 250            | $<8^\circ$  | $<1.5 \times \text{ØD1}$ |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>6.00 - 8.00 | $\varnothing D_1$<br>10.00 - 12.00 |
|----------------------------------|------------------------------------|
| 0.230 - 0.260                    | 0.290 - 0.310                      |
| 0.180 - 0.210                    | 0.230 - 0.250                      |
| 0.150 - 0.180                    | 0.190 - 0.210                      |

Vorschub pro Zahn  $f_z$  [mm]

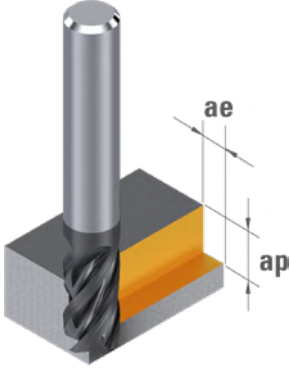
| $\varnothing D_1$<br>6.00 - 8.00 | $\varnothing D_1$<br>10.00 - 12.00 |
|----------------------------------|------------------------------------|
| 0.170 - 0.200                    | 0.220 - 0.230                      |
| 0.140 - 0.160                    | 0.180 - 0.190                      |
| 0.110 - 0.140                    | 0.150 - 0.160                      |

Vorschub pro Zahn  $f_z$  [mm]

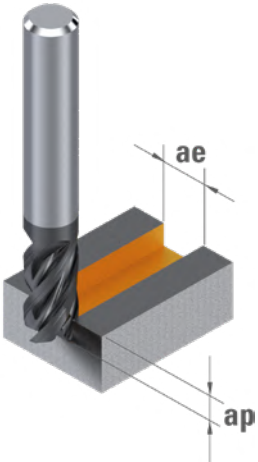
| $\varnothing D_1$<br>6.00 - 8.00 | $\varnothing D_1$<br>10.00 - 12.00 |
|----------------------------------|------------------------------------|
| 0.140 - 0.160                    | 0.180 - 0.200                      |
| 0.110 - 0.130                    | 0.140 - 0.160                      |
| 0.090 - 0.011                    | 0.120 - 0.140                      |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

## UMFANGSBEARBEITUNG

|          |  |           | VDI 3323  | C-TOP Vc [m/min] | ae (mm)    | ap (mm) |
|----------|--|-----------|---|------------------|------------|---------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl   | 1 - 5     |  | <b>140</b>       | < 0.40×ØD1 | <1×L1   |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>  | 6 - 9     |   | <b>125</b>       | < 0.35×ØD1 | <1×L1   |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> , ferritischer / martensitischer Edelstahl | 10 - 13   |   | <b>85</b>        | < 0.30×ØD1 | <1×L1   |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                | 14.1-14.2 |   | <b>95</b>        | < 0.30×ØD1 | <1×L1   |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                         | 14.3-14.4 |   | <b>65</b>        | < 0.25×ØD1 | <1×L1   |
| <b>K</b> | Grauguss < 250 HB  | 15 - 16   |   | <b>175</b>       | < 0.40×ØD1 | <1×L1   |
|          | Duktiles Gusseisen, Temperguss > 250 HB  | 17 - 20   |   | <b>110</b>       | < 0.40×ØD1 | <1×L1   |
| <b>N</b> | Kupferlegierung gute Zerspanbarkeit mit Pb   | 26        |   | <b>200</b>       | < 0.40×ØD1 | <1×L1   |
|          | Kupferlegierung schwere Zerspanbarkeit   | 27 - 28   |   | <b>170</b>       | < 0.40×ØD1 | <1×L1   |
|          | Gold, Silber   | -         |   | <b>150</b>       | < 0.40×ØD1 | <1×L1   |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung  | 31- 35    | <b>35</b>   | < 0.20×ØD1       | <1×L1      |         |
|          | Titan, Titanlegierung  | 36 - 37   | <b>65</b>   | < 0.40×ØD1       | <1×L1      |         |

## NUTBEARBEITUNG

|          |  |           | VDI 3323  | C-TOP Vc [m/min] | ae (mm)   | ap (mm)   |
|----------|--|-----------|---|------------------|-----------|-----------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl   | 1 - 5     |  | <b>110</b>       | 1×ØD1     | <1.50×ØD1 |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>  | 6 - 9     |   | <b>95</b>        | 1×ØD1     | <1.25×ØD1 |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> , ferritischer / martensitischer Edelstahl | 10 - 13   |   | <b>65</b>        | 1×ØD1     | <1×ØD1    |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                | 14.1-14.2 |   | <b>70</b>        | 1×ØD1     | <1×ØD1    |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                         | 14.3-14.4 |   | <b>50</b>        | 1×ØD1     | <0.80×ØD1 |
| <b>K</b> | Grauguss < 250 HB  | 15 - 16   |   | <b>130</b>       | 1×ØD1     | <1.50×ØD1 |
|          | Duktiles Gusseisen, Temperguss > 250 HB  | 17 - 20   |   | <b>85</b>        | 1×ØD1     | <1.25×ØD1 |
| <b>N</b> | Kupferlegierung gute Zerspanbarkeit mit Pb   | 26        |   | <b>150</b>       | 1×ØD1     | <1.50×ØD1 |
|          | Kupferlegierung schwere Zerspanbarkeit   | 27 - 28   |   | <b>130</b>       | 1×ØD1     | <1.50×ØD1 |
|          | Gold, Silber   | -         |   | <b>115</b>       | 1×ØD1     | <1.50×ØD1 |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung  | 31- 35    | <b>25</b>   | 1×ØD1            | <0.50×ØD1 |           |
|          | Titan, Titanlegierung  | 36 - 37   | <b>45</b>   | 1×ØD1            | <1×ØD1    |           |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

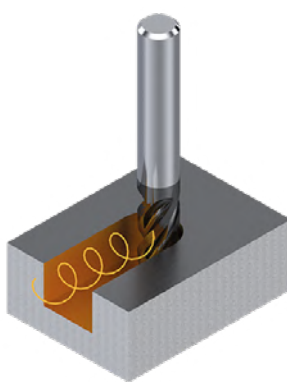
| $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>5.00 - 6.00 | $\varnothing D_1$<br>8.00 - 10.00 | $\varnothing D_1$<br>12.00 - 16.00 |
|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|
| 0.036 - 0.048                    | 0.060 - 0.070                    | 0.095 - 0.110                     | 0.115 - 0.135                      |
| 0.032 - 0.044                    | 0.055 - 0.065                    | 0.085 - 0.095                     | 0.105 - 0.120                      |
| 0.028 - 0.038                    | 0.050 - 0.060                    | 0.075 - 0.085                     | 0.090 - 0.110                      |
| 0.028 - 0.038                    | 0.050 - 0.060                    | 0.075 - 0.085                     | 0.090 - 0.110                      |
| 0.026 - 0.034                    | 0.040 - 0.050                    | 0.065 - 0.075                     | 0.080 - 0.095                      |
| 0.044 - 0.058                    | 0.070 - 0.085                    | 0.115 - 0.130                     | 0.140 - 0.160                      |
| 0.036 - 0.048                    | 0.060 - 0.070                    | 0.095 - 0.110                     | 0.115 - 0.135                      |
| 0.054 - 0.072                    | 0.090 - 0.110                    | 0.145 - 0.160                     | 0.175 - 0.200                      |
| 0.044 - 0.058                    | 0.070 - 0.085                    | 0.115 - 0.130                     | 0.140 - 0.160                      |
| 0.044 - 0.058                    | 0.070 - 0.085                    | 0.115 - 0.130                     | 0.140 - 0.160                      |
| 0.018 - 0.024                    | 0.030 - 0.035                    | 0.050 - 0.055                     | 0.060 - 0.065                      |
| 0.044 - 0.058                    | 0.070 - 0.085                    | 0.115 - 0.130                     | 0.140 - 0.160                      |

Vorschub pro Zahn  $f_z$  [mm]

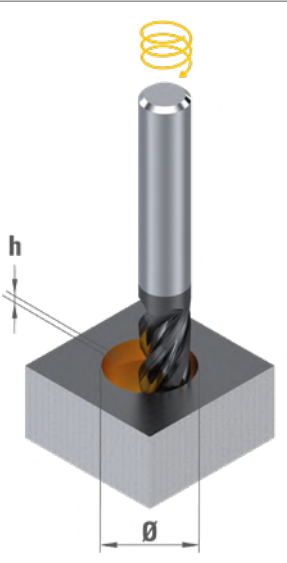
| $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>5.00 - 6.00 | $\varnothing D_1$<br>8.00 - 10.00 | $\varnothing D_1$<br>12.00 - 16.00 |
|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|
| 0.029 - 0.038                    | 0.048 - 0.056                    | 0.076 - 0.088                     | 0.090 - 0.110                      |
| 0.026 - 0.036                    | 0.044 - 0.052                    | 0.068 - 0.076                     | 0.085 - 0.095                      |
| 0.020 - 0.026                    | 0.036 - 0.042                    | 0.052 - 0.060                     | 0.065 - 0.075                      |
| 0.017 - 0.022                    | 0.030 - 0.036                    | 0.046 - 0.052                     | 0.055 - 0.065                      |
| 0.016 - 0.020                    | 0.024 - 0.030                    | 0.040 - 0.046                     | 0.050 - 0.055                      |
| 0.035 - 0.046                    | 0.056 - 0.068                    | 0.092 - 0.104                     | 0.110 - 0.130                      |
| 0.029 - 0.038                    | 0.048 - 0.056                    | 0.076 - 0.088                     | 0.090 - 0.110                      |
| 0.043 - 0.058                    | 0.072 - 0.088                    | 0.116 - 0.128                     | 0.140 - 0.160                      |
| 0.035 - 0.046                    | 0.056 - 0.068                    | 0.092 - 0.104                     | 0.110 - 0.130                      |
| 0.035 - 0.046                    | 0.056 - 0.068                    | 0.092 - 0.104                     | 0.110 - 0.130                      |
| 0.009 - 0.012                    | 0.016 - 0.018                    | 0.026 - 0.028                     | 0.030 - 0.035                      |
| 0.026 - 0.034                    | 0.042 - 0.052                    | 0.070 - 0.078                     | 0.085 - 0.095                      |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

## TROCHOIDALE BEARBEITUNG

|          |   | VDI 3323  |   | C-TOP<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |
|----------|---|-----------|---|---------------------|------------|------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |  | <b>420</b>          | <0.05×ØD1  | <1×L1      |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9     |   | <b>380</b>          | <0.04×ØD1  | <1×L1      |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13   |   | <b>260</b>          | <0.04×ØD1  | <1×L1      |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2 |   | <b>190</b>          | <0.04×ØD1  | <1×L1      |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4 |   | <b>130</b>          | <0.03×ØD1  | <1×L1      |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16   |   | <b>480</b>          | <0.05×ØD1  | <1×L1      |
|          | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20   |   | <b>300</b>          | <0.05×ØD1  | <1×L1      |
| <b>N</b> | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26        |   | <b>550</b>          | <0.05×ØD1  | <1×L1      |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28   |   | <b>470</b>          | <0.05×ØD1  | <1×L1      |
|          | Gold, Silber  | -         |   | <b>410</b>          | <0.05×ØD1  | <1×L1      |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31- 35    |   | <b>60</b>           | <0.03×ØD1  | <1×L1      |
|          | Titan, Titanlegierung   | 36 - 37   |   | <b>110</b>          | <0.05×ØD1  | <1×L1      |

## ZIRKULAR INTERPOLATION

|          |   | VDI 3323  |   | C-TOP<br>Vc [m/min] | Rampenwinkel<br>α | ap<br>(mm) |
|----------|---|-----------|---|---------------------|-------------------|------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |  | <b>120</b>          | <6°               | <1.2×L1    |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9     |   | <b>95</b>           | <4°               | <1×L1      |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13   |   | <b>70</b>           | <3°               | <0.8×L1    |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2 |   | <b>85</b>           | <3°               | <1×L1      |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4 |   | <b>60</b>           | <2°               | <0.7×L1    |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16   |   | <b>175</b>          | <8°               | <1.5×L1    |
|          | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20   |   | <b>100</b>          | <4°               | <1×L1      |
| <b>N</b> | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26        |   | <b>130</b>          | <8°               | <1.5×L1    |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28   |   | <b>120</b>          | <4°               | <1×L1      |
|          | Gold, Silber  | -         |   | <b>150</b>          | <3°               | <1×L1      |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31- 35    |   | <b>60</b>           | <1°               | <0.5×L1    |
|          | Titan, Titanlegierung   | 36 - 37   |   | <b>110</b>          | <2°               | <1×L1      |

$$h = \pi \times \varnothing \times \tan \alpha$$

$$1.3 \times D_1 < \varnothing < 1.9 \times D_1$$



$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>5.00 - 6.00 | $\varnothing D_1$<br>8.00 - 10.00 | $\varnothing D_1$<br>12.00 - 16.00 |
|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|
| 0.046 - 0.060                    | 0.080 - 0.090                    | 0.120 - 0.140                     | 0.140 - 0.170                      |
| 0.040 - 0.055                    | 0.070 - 0.080                    | 0.110 - 0.120                     | 0.130 - 0.150                      |
| 0.036 - 0.050                    | 0.060 - 0.070                    | 0.100 - 0.110                     | 0.120 - 0.130                      |
| 0.036 - 0.050                    | 0.060 - 0.070                    | 0.100 - 0.110                     | 0.120 - 0.130                      |
| 0.032 - 0.040                    | 0.050 - 0.060                    | 0.080 - 0.090                     | 0.100 - 0.120                      |
| 0.054 - 0.070                    | 0.090 - 0.110                    | 0.140 - 0.160                     | 0.170 - 0.200                      |
| 0.046 - 0.060                    | 0.080 - 0.090                    | 0.120 - 0.140                     | 0.140 - 0.170                      |
| 0.046 - 0.060                    | 0.080 - 0.090                    | 0.120 - 0.140                     | 0.140 - 0.170                      |
| 0.040 - 0.055                    | 0.070 - 0.080                    | 0.110 - 0.120                     | 0.130 - 0.150                      |
| 0.040 - 0.055                    | 0.070 - 0.080                    | 0.110 - 0.120                     | 0.130 - 0.150                      |
| 0.022 - 0.030                    | 0.040 - 0.050                    | 0.060 - 0.070                     | 0.070 - 0.080                      |
| 0.046 - 0.060                    | 0.080 - 0.090                    | 0.120 - 0.140                     | 0.140 - 0.170                      |

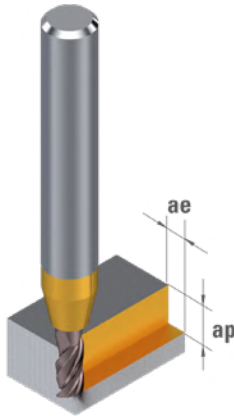
Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>5.00 - 6.00 | $\varnothing D_1$<br>8.00 - 10.00 | $\varnothing D_1$<br>12.00 - 16.00 |
|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|
| 0.022 - 0.030                    | 0.038 - 0.046                    | 0.060 - 0.070                     | 0.070 - 0.085                      |
| 0.020 - 0.028                    | 0.034 - 0.040                    | 0.055 - 0.060                     | 0.065 - 0.075                      |
| 0.018 - 0.024                    | 0.030 - 0.036                    | 0.050 - 0.055                     | 0.060 - 0.065                      |
| 0.018 - 0.024                    | 0.030 - 0.036                    | 0.050 - 0.055                     | 0.060 - 0.065                      |
| 0.016 - 0.022                    | 0.026 - 0.032                    | 0.040 - 0.045                     | 0.050 - 0.060                      |
| 0.028 - 0.036                    | 0.046 - 0.054                    | 0.070 - 0.080                     | 0.085 - 0.100                      |
| 0.022 - 0.030                    | 0.038 - 0.046                    | 0.060 - 0.070                     | 0.070 - 0.085                      |
| 0.022 - 0.030                    | 0.038 - 0.046                    | 0.060 - 0.070                     | 0.070 - 0.085                      |
| 0.020 - 0.028                    | 0.034 - 0.040                    | 0.055 - 0.060                     | 0.065 - 0.075                      |
| 0.020 - 0.028                    | 0.034 - 0.040                    | 0.055 - 0.060                     | 0.065 - 0.075                      |
| 0.012 - 0.016                    | 0.018 - 0.022                    | 0.030 - 0.035                     | 0.035 - 0.040                      |
| 0.022 - 0.030                    | 0.038 - 0.046                    | 0.060 - 0.070                     | 0.070 - 0.085                      |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

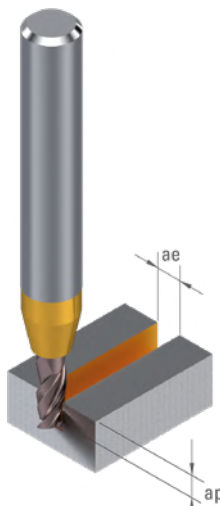
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|   |   |           | Ø D <sub>1</sub><br>0.30 - 0.70 |                     | Ø D <sub>1</sub><br>0.80 - 1.50 |                     | Ø D <sub>1</sub><br>1.60 - 5.00 |                     |
|---|---|-----------|---------------------------------|---------------------|---------------------------------|---------------------|---------------------------------|---------------------|
|   |   |           | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] |
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |                                 | 30 - 50             |                                 | 50 - 150            |                                 | 120 - 280           |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9     |                                 | 25 - 50             |                                 | 50 - 125            |                                 | 90 - 230            |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13   |                                 | 25 - 35             |                                 | 50 - 85             |                                 | 90 - 130            |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2 |                                 | 25 - 50             |                                 | 50 - 150            |                                 | 100 - 230           |
|   | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4 |                                 | 20 - 45             |                                 | 50 - 115            |                                 | 75 - 180            |
| K | Grauguss < 250 HB   | 15 - 16   | 20 - 40                         | 30 - 50             | 45 - 105                        | 50 - 150            | 70 - 165                        | 150 - 280           |
|   | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20   | 15 - 35                         | 30 - 50             | 40 - 90                         | 50 - 150            | 60 - 140                        | 110 - 250           |
| N | Kupferlegierung gute Zerspanbarkeit<br>mit Pb   | 26        | 20 - 40                         | 30 - 50             | 50 - 105                        | 50 - 150            | 80 - 165                        | 150 - 300           |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28   | 15 - 35                         | 30 - 50             | 40 - 90                         | 50 - 150            | 60 - 140                        | 130 - 280           |
|   | Gold, Silber  | -         | 20 - 45                         | 30 - 50             | 50 - 110                        | 50 - 150            | 75 - 170                        | 160 - 320           |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   |                                 | 15 - 30             |                                 | 40 - 80             |                                 | 60 - 120            |
|   | Titan, Titanlegierung   | 36 - 37   | 15 - 30                         | 30 - 45             | 35 - 80                         | 50 - 110            | 55 - 120                        | 120 - 170           |



NUTBEARBEITUNG

|   |   |           | Ø D <sub>1</sub><br>0.30 - 0.70 |                     | Ø D <sub>1</sub><br>0.80 - 1.50 |                     | Ø D <sub>1</sub><br>1.60 - 5.00 |                     |
|---|---|-----------|---------------------------------|---------------------|---------------------------------|---------------------|---------------------------------|---------------------|
|   |   |           | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] |
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |                                 | 25 - 50             |                                 | 50 - 150            |                                 | 100 - 240           |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9     |                                 | 20 - 50             |                                 | 50 - 125            |                                 | 75 - 195            |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13   |                                 | 20 - 30             |                                 | 50 - 70             |                                 | 75 - 110            |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2 |                                 | 20 - 50             |                                 | 50 - 125            |                                 | 85 - 195            |
|   | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4 |                                 | 15 - 40             |                                 | 40 - 100            |                                 | 65 - 155            |
| K | Grauguss < 250 HB   | 15 - 16   | 15 - 35                         | 30 - 50             | 40 - 90                         | 50 - 150            | 60 - 140                        | 130 - 240           |
|   | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20   | 15 - 30                         | 25 - 50             | 35 - 80                         | 50 - 140            | 50 - 120                        | 95 - 215            |
| N | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26        | 20 - 35                         | 30 - 50             | 45 - 90                         | 50 - 150            | 70 - 140                        | 130 - 255           |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28   | 15 - 35                         | 30 - 50             | 35 - 80                         | 50 - 150            | 50 - 120                        | 110 - 240           |
|   | Gold, Silber  | -         | 15 - 30                         | 30 - 50             | 40 - 95                         | 50 - 150            | 65 - 145                        | 135 - 270           |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   |                                 | 15 - 25             |                                 | 30 - 65             |                                 | 50 - 100            |
|   | Titan, Titanlegierung   | 36 - 37   | 10 - 25                         | 25 - 35             | 30 - 65                         | 50 - 95             | 45 - 100                        | 100 - 145           |



$$n \text{ [U/min]} = \frac{Vc \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$Vf \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $fz$  [mm]

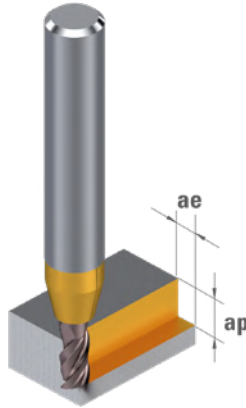
| $\emptyset D_1$<br>0.30 - 0.50 |                        | $\emptyset D_1$<br>0.50 - 0.80 |                        | $\emptyset D_1$<br>0.80 - 1.60 |                        | $\emptyset D_1$<br>1.60 - 3.00 |                        | $\emptyset D_1$<br>3.00 - 5.00 |                        |
|--------------------------------|------------------------|--------------------------------|------------------------|--------------------------------|------------------------|--------------------------------|------------------------|--------------------------------|------------------------|
| fz                             | ae<br>ap<br>(mm)       | fz                             | ae<br>ap<br>(mm)       | fz                             | ae<br>ap<br>(mm)       | fz                             | ae<br>ap<br>(mm)       | fz                             | ae<br>ap<br>(mm)       |
| 0.002 - 0.004                  | <0.90 × ∅<br><1.50 × ∅ | 0.003 - 0.006                  | <0.90 × ∅<br><1.50 × ∅ | 0.005 - 0.012                  | <0.90 × ∅<br><1.50 × ∅ | 0.010 - 0.022                  | <0.90 × ∅<br><1.50 × ∅ | 0.018 - 0.036                  | <0.90 × ∅<br><1.50 × ∅ |
| 0.002 - 0.003                  | <0.90 × ∅<br><1.50 × ∅ | 0.003 - 0.005                  | <0.90 × ∅<br><1.50 × ∅ | 0.004 - 0.010                  | <0.90 × ∅<br><1.50 × ∅ | 0.009 - 0.019                  | <0.90 × ∅<br><1.50 × ∅ | 0.016 - 0.032                  | <0.90 × ∅<br><1.50 × ∅ |
| 0.002 - 0.003                  | <0.90 × ∅<br><1.50 × ∅ | 0.003 - 0.005                  | <0.90 × ∅<br><1.50 × ∅ | 0.004 - 0.010                  | <0.90 × ∅<br><1.50 × ∅ | 0.008 - 0.018                  | <0.90 × ∅<br><1.50 × ∅ | 0.015 - 0.030                  | <0.90 × ∅<br><1.50 × ∅ |
| 0.002 - 0.003                  | <0.90 × ∅<br><1.50 × ∅ | 0.003 - 0.005                  | <0.90 × ∅<br><1.50 × ∅ | 0.004 - 0.010                  | <0.90 × ∅<br><1.50 × ∅ | 0.008 - 0.018                  | <0.90 × ∅<br><1.50 × ∅ | 0.015 - 0.030                  | <0.90 × ∅<br><1.50 × ∅ |
| 0.001 - 0.003                  | <0.90 × ∅<br><1.50 × ∅ | 0.002 - 0.005                  | <0.90 × ∅<br><1.50 × ∅ | 0.004 - 0.009                  | <0.90 × ∅<br><1.50 × ∅ | 0.008 - 0.017                  | <0.90 × ∅<br><1.50 × ∅ | 0.014 - 0.028                  | <0.90 × ∅<br><1.50 × ∅ |
| 0.002 - 0.005                  | <0.90 × ∅<br><1.50 × ∅ | 0.004 - 0.007                  | <0.90 × ∅<br><1.50 × ∅ | 0.006 - 0.015                  | <0.90 × ∅<br><1.50 × ∅ | 0.012 - 0.028                  | <0.90 × ∅<br><1.50 × ∅ | 0.023 - 0.046                  | <0.90 × ∅<br><1.50 × ∅ |
| 0.002 - 0.004                  | <0.90 × ∅<br><1.50 × ∅ | 0.003 - 0.006                  | <0.90 × ∅<br><1.50 × ∅ | 0.005 - 0.013                  | <0.90 × ∅<br><1.50 × ∅ | 0.011 - 0.024                  | <0.90 × ∅<br><1.50 × ∅ | 0.020 - 0.040                  | <0.90 × ∅<br><1.50 × ∅ |
| 0.003 - 0.005                  | <0.90 × ∅<br><1.50 × ∅ | 0.005 - 0.009                  | <0.90 × ∅<br><1.50 × ∅ | 0.007 - 0.017                  | <0.90 × ∅<br><1.50 × ∅ | 0.014 - 0.032                  | <0.90 × ∅<br><1.50 × ∅ | 0.027 - 0.054                  | <0.90 × ∅<br><1.50 × ∅ |
| 0.002 - 0.004                  | <0.90 × ∅<br><1.50 × ∅ | 0.004 - 0.007                  | <0.90 × ∅<br><1.50 × ∅ | 0.006 - 0.014                  | <0.90 × ∅<br><1.50 × ∅ | 0.012 - 0.026                  | <0.90 × ∅<br><1.50 × ∅ | 0.022 - 0.044                  | <0.90 × ∅<br><1.50 × ∅ |
| 0.002 - 0.004                  | <0.90 × ∅<br><1.50 × ∅ | 0.003 - 0.006                  | <0.90 × ∅<br><1.50 × ∅ | 0.005 - 0.013                  | <0.90 × ∅<br><1.50 × ∅ | 0.011 - 0.024                  | <0.90 × ∅<br><1.50 × ∅ | 0.020 - 0.040                  | <0.90 × ∅<br><1.50 × ∅ |
| 0.001 - 0.002                  | <0.90 × ∅<br><1.50 × ∅ | 0.002 - 0.003                  | <0.90 × ∅<br><1.50 × ∅ | 0.002 - 0.006                  | <0.90 × ∅<br><1.50 × ∅ | 0.005 - 0.011                  | <0.90 × ∅<br><1.50 × ∅ | 0.009 - 0.018                  | <0.90 × ∅<br><1.50 × ∅ |
| 0.002 - 0.004                  | <0.90 × ∅<br><1.50 × ∅ | 0.004 - 0.007                  | <0.90 × ∅<br><1.50 × ∅ | 0.006 - 0.014                  | <0.90 × ∅<br><1.50 × ∅ | 0.012 - 0.026                  | <0.90 × ∅<br><1.50 × ∅ | 0.022 - 0.044                  | <0.90 × ∅<br><1.50 × ∅ |

Vorschub pro Zahn  $fz$  [mm]

| $\emptyset D_1$<br>0.30 - 0.50 |            | $\emptyset D_1$<br>0.50 - 0.80 |            | $\emptyset D_1$<br>0.80 - 1.60 |            | $\emptyset D_1$<br>1.60 - 3.00 |            | $\emptyset D_1$<br>3.00 - 5.00 |            |
|--------------------------------|------------|--------------------------------|------------|--------------------------------|------------|--------------------------------|------------|--------------------------------|------------|
| fz                             | ap<br>(mm) | fz                             | ap<br>(mm) | fz                             | ap<br>(mm) | fz                             | ap<br>(mm) | fz                             | ap<br>(mm) |
| 0.0015 - 0.0030                | <0.50 × ∅  | 0.003 - 0.005                  | <1.00 × ∅  | 0.004 - 0.010                  | <1.50 × ∅  | 0.008 - 0.018                  | <1.50 × ∅  | 0.015 - 0.030                  | <1.50 × ∅  |
| 0.0014 - 0.0028                | <0.50 × ∅  | 0.002 - 0.004                  | <1.00 × ∅  | 0.004 - 0.009                  | <1.50 × ∅  | 0.007 - 0.017                  | <1.50 × ∅  | 0.014 - 0.028                  | <1.50 × ∅  |
| 0.0013 - 0.0026                | <0.50 × ∅  | 0.002 - 0.004                  | <1.00 × ∅  | 0.003 - 0.008                  | <1.50 × ∅  | 0.007 - 0.016                  | <1.50 × ∅  | 0.013 - 0.026                  | <1.50 × ∅  |
| 0.0013 - 0.0026                | <0.50 × ∅  | 0.002 - 0.004                  | <1.00 × ∅  | 0.003 - 0.008                  | <1.50 × ∅  | 0.007 - 0.016                  | <1.50 × ∅  | 0.013 - 0.026                  | <1.50 × ∅  |
| 0.0012 - 0.0024                | <0.25 × ∅  | 0.002 - 0.004                  | <0.50 × ∅  | 0.003 - 0.008                  | <1.00 × ∅  | 0.007 - 0.015                  | <1.00 × ∅  | 0.012 - 0.024                  | <1.00 × ∅  |
| 0.0020 - 0.0040                | <0.50 × ∅  | 0.003 - 0.006                  | <1.00 × ∅  | 0.005 - 0.013                  | <1.50 × ∅  | 0.011 - 0.024                  | <1.50 × ∅  | 0.020 - 0.040                  | <1.50 × ∅  |
| 0.0017 - 0.0034                | <0.50 × ∅  | 0.003 - 0.005                  | <1.00 × ∅  | 0.004 - 0.011                  | <1.50 × ∅  | 0.009 - 0.020                  | <1.50 × ∅  | 0.017 - 0.034                  | <1.50 × ∅  |
| 0.0023 - 0.0046                | <0.50 × ∅  | 0.004 - 0.007                  | <1.00 × ∅  | 0.006 - 0.015                  | <1.50 × ∅  | 0.012 - 0.028                  | <1.50 × ∅  | 0.023 - 0.046                  | <1.50 × ∅  |
| 0.0018 - 0.0036                | <0.50 × ∅  | 0.003 - 0.006                  | <1.00 × ∅  | 0.005 - 0.012                  | <1.50 × ∅  | 0.010 - 0.022                  | <1.50 × ∅  | 0.018 - 0.036                  | <1.50 × ∅  |
| 0.0017 - 0.0034                | <0.50 × ∅  | 0.003 - 0.005                  | <1.00 × ∅  | 0.004 - 0.011                  | <1.50 × ∅  | 0.009 - 0.020                  | <1.50 × ∅  | 0.017 - 0.034                  | <1.50 × ∅  |
| 0.0008 - 0.0016                | <0.50 × ∅  | 0.001 - 0.002                  | <0.25 × ∅  | 0.002 - 0.005                  | <0.50 × ∅  | 0.004 - 0.009                  | <1.00 × ∅  | 0.008 - 0.016                  | <1.00 × ∅  |
| 0.0018 - 0.0036                | <0.25 × ∅  | 0.003 - 0.006                  | <1.00 × ∅  | 0.005 - 0.012                  | <1.50 × ∅  | 0.010 - 0.022                  | <1.50 × ∅  | 0.018 - 0.036                  | <1.50 × ∅  |

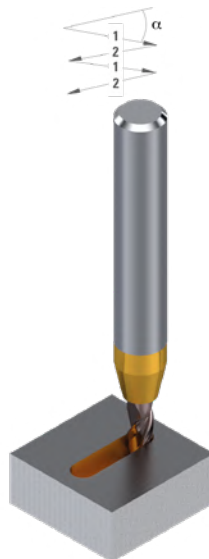
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|   |   |                   | $\varnothing D_1$<br>0.30 - 0.70 |                     | $\varnothing D_1$<br>0.80 - 1.50 |                     | $\varnothing D_1$<br>1.60 - 5.00 |                     |
|---|---|-------------------|----------------------------------|---------------------|----------------------------------|---------------------|----------------------------------|---------------------|
|   |   |                   | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] |
| P | Unlegierter Stahl, Automaten Stahl  | VDI 3323<br>1 - 5 |                                  | 30 - 50             |                                  | 50 - 150            |                                  | 150 - 350           |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9             |                                  | 30 - 50             |                                  | 50 - 150            |                                  | 110 - 290           |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13           |                                  | 30 - 40             |                                  | 50 - 105            |                                  | 110 - 160           |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2         |                                  | 30 - 50             |                                  | 50 - 150            |                                  | 130 - 290           |
|   | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4         |                                  | 25 - 50             |                                  | 50 - 150            |                                  | 90 - 230            |
| K | Grauguss < 250 HB   | 15 - 16           | 25 - 50                          | 30 - 50             | 50 - 150                         | 50 - 150            | 90 - 210                         | 190 - 350           |
|   | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20           | 20 - 45                          | 30 - 50             | 50 - 150                         | 50 - 150            | 80 - 180                         | 140 - 310           |
| N | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26                | 25 - 50                          | 30 - 50             | 50 - 150                         | 50 - 150            | 100 - 210                        | 190 - 380           |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28           | 20 - 45                          | 30 - 50             | 50 - 150                         | 50 - 150            | 80 - 180                         | 160 - 350           |
|   | Gold, Silber  | -                 | 25 - 50                          | 30 - 50             | 50 - 150                         | 50 - 150            | 90 - 210                         | 200 - 400           |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35           |                                  | 20 - 40             |                                  | 50 - 135            |                                  | 80 - 150            |
|   | Titan, Titanlegierung   | 36 - 37           | 20 - 40                          | 30 - 50             | 45 - 150                         | 50 - 110            | 70 - 150                         | 150 - 210           |



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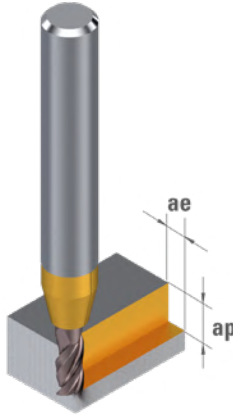
|   |   |                   | $\varnothing D_1$<br>0.30 - 0.70 |                     | $\varnothing D_1$<br>0.80 - 1.50 |                     | $\varnothing D_1$<br>1.60 - 5.00 |                     |
|---|---|-------------------|----------------------------------|---------------------|----------------------------------|---------------------|----------------------------------|---------------------|
|   |   |                   | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] |
| P | Unlegierter Stahl, Automaten Stahl  | VDI 3323<br>1 - 5 |                                  | 25 - 50             |                                  | 50 - 125            |                                  | 100 - 190           |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9             |                                  | 20 - 40             |                                  | 50 - 100            |                                  | 75 - 155            |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13           |                                  | 20 - 25             |                                  | 50 - 60             |                                  | 75 - 90             |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2         |                                  | 20 - 40             |                                  | 50 - 100            |                                  | 85 - 155            |
|   | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4         |                                  | 15 - 30             |                                  | 40 - 80             |                                  | 65 - 120            |
| K | Grauguss < 250 HB   | 15 - 16           | 15 - 35                          | 30 - 50             | 40 - 90                          | 50 - 125            | 60 - 140                         | 130 - 190           |
|   | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20           | 15 - 30                          | 25 - 45             | 35 - 80                          | 50 - 110            | 50 - 120                         | 95 - 170            |
| N | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26                | 20 - 35                          | 30 - 50             | 45 - 90                          | 50 - 135            | 70 - 140                         | 130 - 205           |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28           | 15 - 35                          | 30 - 50             | 35 - 80                          | 50 - 125            | 50 - 120                         | 110 - 190           |
|   | Gold, Silber  | -                 | 15 - 30                          | 30 - 50             | 40 - 95                          | 50 - 145            | 65 - 145                         | 135 - 220           |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35           |                                  | 15 - 20             |                                  | 30 - 50             |                                  | 50 - 80             |
|   | Titan, Titanlegierung   | 36 - 37           | 10 - 25                          | 25 - 35             | 30 - 65                          | 50 - 75             | 45 - 100                         | 100 - 115           |





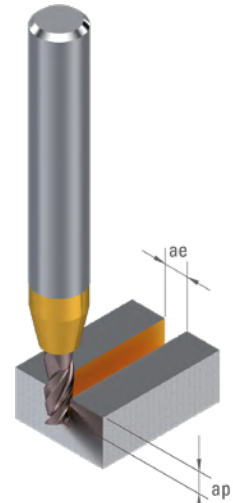
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|   |   |                   | Ø D <sub>1</sub><br>0.30 - 1.50 |                     | Ø D <sub>1</sub><br>1.60 - 4.50 |                     | Ø D <sub>1</sub><br>4.60 - 10.00 |                     |
|---|---|-------------------|---------------------------------|---------------------|---------------------------------|---------------------|----------------------------------|---------------------|
|   |   |                   | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] |
| P | Unlegierter Stahl, Automaten Stahl  | VDI 3323<br>1 - 5 |                                 | 30 - 50             |                                 | 50 - 150            |                                  | 120 - 280           |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9             |                                 | 25 - 50             |                                 | 50 - 125            |                                  | 90 - 230            |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13           |                                 | 25 - 35             |                                 | 50 - 85             |                                  | 90 - 130            |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2         |                                 | 25 - 50             |                                 | 50 - 150            |                                  | 100 - 230           |
|   | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4         |                                 | 20 - 45             |                                 | 50 - 115            |                                  | 75 - 180            |
| K | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20           | 15 - 35                         | 30 - 50             | 40 - 90                         | 50 - 150            | 60 - 140                         | 110 - 250           |
| N | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26                | 20 - 40                         | 30 - 50             | 50 - 105                        | 50 - 150            | 80 - 165                         | 150 - 300           |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28           | 15 - 35                         | 30 - 50             | 40 - 90                         | 50 - 150            | 60 - 140                         | 130 - 280           |
|   | Gold, Silber  | -                 | 20 - 45                         | 30 - 50             | 50 - 110                        | 50 - 150            | 75 - 170                         | 160 - 320           |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35           |                                 | 15 - 30             |                                 | 40 - 80             |                                  | 60 - 120            |
|   | Titan, Titanlegierung   | 36 - 37           | 15 - 30                         | 30 - 45             | 35 - 80                         | 50 - 110            | 55 - 120                         | 120 - 170           |



NUTBEARBEITUNG

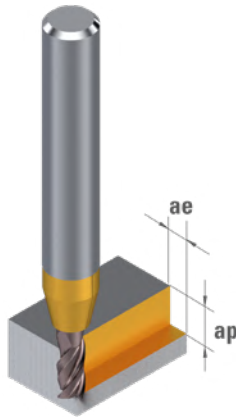
|   |   |                   | Ø D <sub>1</sub><br>0.30 - 1.50 |                     | Ø D <sub>1</sub><br>1.60 - 4.50 |                     | Ø D <sub>1</sub><br>4.60 - 10.00 |                     |
|---|---|-------------------|---------------------------------|---------------------|---------------------------------|---------------------|----------------------------------|---------------------|
|   |   |                   | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] |
| P | Unlegierter Stahl, Automaten Stahl  | VDI 3323<br>1 - 5 |                                 | 25 - 50             |                                 | 50 - 150            |                                  | 100 - 240           |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9             |                                 | 20 - 50             |                                 | 50 - 125            |                                  | 75 - 195            |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13           |                                 | 20 - 30             |                                 | 50 - 70             |                                  | 75 - 110            |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2         |                                 | 20 - 50             |                                 | 50 - 125            |                                  | 85 - 195            |
|   | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4         |                                 | 15 - 40             |                                 | 40 - 100            |                                  | 65 - 155            |
| K | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20           | 15 - 30                         | 25 - 50             | 35 - 80                         | 50 - 140            | 50 - 120                         | 95 - 215            |
| N | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26                | 20 - 35                         | 30 - 50             | 45 - 90                         | 50 - 150            | 70 - 140                         | 130 - 255           |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28           | 15 - 35                         | 30 - 50             | 35 - 80                         | 50 - 150            | 50 - 120                         | 110 - 240           |
|   | Gold, Silber  | -                 | 15 - 30                         | 30 - 50             | 40 - 95                         | 50 - 150            | 65 - 145                         | 135 - 270           |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35           |                                 | 15 - 25             |                                 | 30 - 65             |                                  | 50 - 100            |
|   | Titan, Titanlegierung   | 36 - 37           | 10 - 25                         | 25 - 35             | 30 - 65                         | 50 - 95             | 45 - 100                         | 100 - 145           |





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|   |   |           | Ø D <sub>1</sub><br>0.30 - 1.50 |                     | Ø D <sub>1</sub><br>1.60 - 4.50 |                     | Ø D <sub>1</sub><br>4.60 - 10.00 |                     |
|---|---|-----------|---------------------------------|---------------------|---------------------------------|---------------------|----------------------------------|---------------------|
|   |   |           | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] |
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |                                 | 30 - 50             |                                 | 50 - 150            |                                  | 150 - 350           |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9     |                                 | 30 - 50             |                                 | 50 - 150            |                                  | 110 - 290           |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13   |                                 | 30 - 40             |                                 | 50 - 105            |                                  | 110 - 160           |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2 |                                 | 30 - 50             |                                 | 50 - 150            |                                  | 130 - 290           |
|   | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4 |                                 | 25 - 50             |                                 | 50 - 150            |                                  | 90 - 230            |
| K | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20   | 20 - 45                         | 30 - 50             | 50 - 150                        | 50 - 150            | 80 - 180                         | 140 - 310           |
| N | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26        | 25 - 50                         | 30 - 50             | 50 - 150                        | 50 - 150            | 100 - 210                        | 190 - 380           |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28   | 20 - 45                         | 30 - 50             | 50 - 150                        | 50 - 150            | 80 - 180                         | 160 - 350           |
|   | Gold, Silber  | -         | 25 - 50                         | 30 - 50             | 50 - 150                        | 50 - 150            | 90 - 210                         | 200 - 400           |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   |                                 | 20 - 40             |                                 | 50 - 135            |                                  | 80 - 150            |
|   | Titan, Titanlegierung   | 36 - 37   | 20 - 40                         | 30 - 50             | 45 - 150                        | 50 - 110            | 70 - 150                         | 150 - 210           |



RAMPEN

|   |   |           | Ø D <sub>1</sub><br>0.30 - 1.50 |                     | Ø D <sub>1</sub><br>1.60 - 4.50 |                     | Ø D <sub>1</sub><br>4.60 - 10.00 |                     |
|---|---|-----------|---------------------------------|---------------------|---------------------------------|---------------------|----------------------------------|---------------------|
|   |   |           | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] |
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |                                 | 25 - 50             |                                 | 50 - 125            |                                  | 100 - 190           |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9     |                                 | 20 - 40             |                                 | 50 - 100            |                                  | 75 - 155            |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13   |                                 | 20 - 25             |                                 | 50 - 60             |                                  | 75 - 90             |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2 |                                 | 20 - 40             |                                 | 50 - 100            |                                  | 85 - 155            |
|   | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4 |                                 | 15 - 30             |                                 | 40 - 80             |                                  | 65 - 120            |
| K | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20   | 15 - 30                         | 25 - 45             | 35 - 80                         | 50 - 110            | 50 - 120                         | 95 - 170            |
| N | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26        | 20 - 35                         | 30 - 50             | 45 - 90                         | 50 - 135            | 70 - 140                         | 130 - 205           |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28   | 15 - 35                         | 30 - 50             | 35 - 80                         | 50 - 125            | 50 - 120                         | 110 - 190           |
|   | Gold, Silber  | -         | 15 - 30                         | 30 - 50             | 40 - 95                         | 50 - 145            | 65 - 145                         | 135 - 220           |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   |                                 | 15 - 20             |                                 | 30 - 50             |                                  | 50 - 80             |
|   | Titan, Titanlegierung   | 36 - 37   | 10 - 25                         | 25 - 35             | 30 - 65                         | 50 - 75             | 45 - 100                         | 100 - 115           |





$$n \text{ [U/min]} = \frac{Vc \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$Vf \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

### Vorschub pro Zahn $fz$ [mm]

| $\emptyset D_1$<br>0.30 - 0.50 |  | $\emptyset D_1$<br>0.50 - 0.80 |  | $\emptyset D_1$<br>0.80 - 1.60 |  | $\emptyset D_1$<br>1.60 - 3.00 |  | $\emptyset D_1$<br>3.00 - 5.00 |  | $\emptyset D_1$<br>*5.00 - 10.00 |  |
|--------------------------------|--|--------------------------------|--|--------------------------------|--|--------------------------------|--|--------------------------------|--|----------------------------------|--|
| fz                             | ae<br>ap<br>(mm)                           | fz                             | ae<br>ap<br>(mm)                           | fz                             | ae<br>ap<br>(mm)                           | fz                             | ae<br>ap<br>(mm)                           | fz                             | ae<br>ap<br>(mm)                           | fz                               | ae<br>ap<br>(mm)                           |
| 0.002 - 0.004                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.003 - 0.006                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.005 - 0.012                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.010 - 0.022                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.018 - 0.036                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.030 - 0.060                    | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ |
| 0.002 - 0.003                  | <0.15 × $\emptyset$<br><2.00 × $\emptyset$ | 0.003 - 0.005                  | <0.15 × $\emptyset$<br><2.00 × $\emptyset$ | 0.004 - 0.010                  | <0.15 × $\emptyset$<br><2.00 × $\emptyset$ | 0.009 - 0.019                  | <0.15 × $\emptyset$<br><2.00 × $\emptyset$ | 0.016 - 0.032                  | <0.15 × $\emptyset$<br><2.00 × $\emptyset$ | 0.027 - 0.054                    | <0.15 × $\emptyset$<br><2.00 × $\emptyset$ |
| 0.002 - 0.003                  | <0.15 × $\emptyset$<br><2.00 × $\emptyset$ | 0.003 - 0.005                  | <0.15 × $\emptyset$<br><2.00 × $\emptyset$ | 0.004 - 0.010                  | <0.15 × $\emptyset$<br><2.00 × $\emptyset$ | 0.008 - 0.018                  | <0.15 × $\emptyset$<br><2.00 × $\emptyset$ | 0.015 - 0.030                  | <0.15 × $\emptyset$<br><2.00 × $\emptyset$ | 0.026 - 0.052                    | <0.15 × $\emptyset$<br><2.00 × $\emptyset$ |
| 0.002 - 0.003                  | <0.15 × $\emptyset$<br><2.00 × $\emptyset$ | 0.003 - 0.005                  | <0.15 × $\emptyset$<br><2.00 × $\emptyset$ | 0.004 - 0.010                  | <0.15 × $\emptyset$<br><2.00 × $\emptyset$ | 0.008 - 0.018                  | <0.15 × $\emptyset$<br><2.00 × $\emptyset$ | 0.015 - 0.030                  | <0.15 × $\emptyset$<br><2.00 × $\emptyset$ | 0.026 - 0.052                    | <0.15 × $\emptyset$<br><2.00 × $\emptyset$ |
| 0.001 - 0.003                  | <0.10 × $\emptyset$<br><2.00 × $\emptyset$ | 0.002 - 0.005                  | <0.10 × $\emptyset$<br><2.00 × $\emptyset$ | 0.004 - 0.009                  | <0.10 × $\emptyset$<br><2.00 × $\emptyset$ | 0.008 - 0.017                  | <0.10 × $\emptyset$<br><2.00 × $\emptyset$ | 0.014 - 0.028                  | <0.10 × $\emptyset$<br><2.00 × $\emptyset$ | 0.024 - 0.048                    | <0.10 × $\emptyset$<br><2.00 × $\emptyset$ |
| 0.002 - 0.004                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.003 - 0.006                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.005 - 0.013                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.011 - 0.024                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.020 - 0.040                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.033 - 0.066                    | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ |
| 0.003 - 0.005                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.005 - 0.009                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.007 - 0.017                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.014 - 0.032                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.027 - 0.054                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.045 - 0.090                    | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ |
| 0.002 - 0.004                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.004 - 0.007                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.006 - 0.014                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.012 - 0.026                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.022 - 0.044                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.036 - 0.072                    | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ |
| 0.002 - 0.004                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.003 - 0.006                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.005 - 0.013                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.011 - 0.024                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.020 - 0.040                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.033 - 0.066                    | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ |
| 0.001 - 0.002                  | <0.08 × $\emptyset$<br><2.00 × $\emptyset$ | 0.002 - 0.003                  | <0.08 × $\emptyset$<br><2.00 × $\emptyset$ | 0.002 - 0.006                  | <0.08 × $\emptyset$<br><2.00 × $\emptyset$ | 0.005 - 0.011                  | <0.08 × $\emptyset$<br><2.00 × $\emptyset$ | 0.009 - 0.018                  | <0.08 × $\emptyset$<br><2.00 × $\emptyset$ | 0.015 - 0.030                    | <0.08 × $\emptyset$<br><2.00 × $\emptyset$ |
| 0.002 - 0.004                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.004 - 0.007                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.006 - 0.014                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.012 - 0.026                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.022 - 0.044                  | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ | 0.036 - 0.072                    | <0.20 × $\emptyset$<br><2.00 × $\emptyset$ |

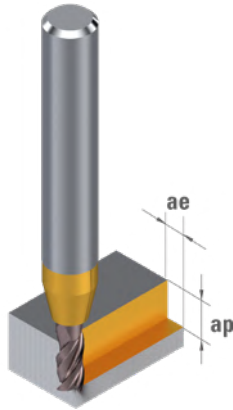
### Vorschub pro Zahn $fz$ [mm]

| $\emptyset D_1$<br>0.30 - 0.50 |              | $\emptyset D_1$<br>0.50 - 0.80 |              | $\emptyset D_1$<br>0.80 - 1.60 |              | $\emptyset D_1$<br>1.60 - 3.00 |              | $\emptyset D_1$<br>3.00 - 5.00 |              | $\emptyset D_1$<br>*5.00 - 10.00 |              |
|--------------------------------|--------------|--------------------------------|--------------|--------------------------------|--------------|--------------------------------|--------------|--------------------------------|--------------|----------------------------------|--------------|
| fz                             | $\alpha$ (°) | fz                             | $\alpha$ (°) | fz                             | $\alpha$ (°) | fz                             | $\alpha$ (°) | fz                             | $\alpha$ (°) | fz                               | $\alpha$ (°) |
| 0.0010 - 0.0020                | <30°         | 0.002 - 0.003                  | <30°         | 0.003 - 0.006                  | <30°         | 0.005 - 0.012                  | <30°         | 0.010 - 0.020                  | <30°         | 0.025 - 0.048                    | <20°         |
| 0.0009 - 0.0018                | <30°         | 0.001 - 0.003                  | <30°         | 0.002 - 0.006                  | <30°         | 0.005 - 0.011                  | <30°         | 0.009 - 0.018                  | <30°         | 0.023 - 0.044                    | <20°         |
| 0.0008 - 0.0016                | <30°         | 0.001 - 0.003                  | <30°         | 0.002 - 0.005                  | <30°         | 0.004 - 0.010                  | <30°         | 0.008 - 0.016                  | <30°         | 0.021 - 0.040                    | <20°         |
| 0.0008 - 0.0016                | <30°         | 0.001 - 0.003                  | <30°         | 0.002 - 0.005                  | <30°         | 0.004 - 0.010                  | <30°         | 0.008 - 0.016                  | <30°         | 0.021 - 0.040                    | <15°         |
| 0.0008 - 0.0016                | <15°         | 0.001 - 0.003                  | <15°         | 0.002 - 0.005                  | <15°         | 0.004 - 0.010                  | <15°         | 0.008 - 0.016                  | <15°         | 0.020 - 0.038                    | <10°         |
| 0.0011 - 0.0022                | <30°         | 0.002 - 0.003                  | <30°         | 0.003 - 0.007                  | <30°         | 0.006 - 0.013                  | <30°         | 0.011 - 0.022                  | <30°         | 0.028 - 0.052                    | <20°         |
| 0.0015 - 0.0030                | <35°         | 0.002 - 0.005                  | <35°         | 0.004 - 0.010                  | <35°         | 0.008 - 0.018                  | <35°         | 0.015 - 0.030                  | <35°         | 0.038 - 0.072                    | <25°         |
| 0.0012 - 0.0024                | <35°         | 0.002 - 0.004                  | <35°         | 0.003 - 0.008                  | <35°         | 0.006 - 0.014                  | <35°         | 0.012 - 0.024                  | <35°         | 0.030 - 0.058                    | <25°         |
| 0.0011 - 0.0022                | <35°         | 0.002 - 0.003                  | <35°         | 0.003 - 0.007                  | <35°         | 0.006 - 0.013                  | <35°         | 0.011 - 0.022                  | <35°         | 0.028 - 0.052                    | <25°         |
| 0.0005 - 0.0010                | <8°          | 0.001 - 0.002                  | <8°          | 0.001 - 0.003                  | <8°          | 0.003 - 0.006                  | <8°          | 0.005 - 0.010                  | <8°          | 0.013 - 0.024                    | <5°          |
| 0.0012 - 0.0024                | <15°         | 0.002 - 0.004                  | <15°         | 0.003 - 0.008                  | <15°         | 0.006 - 0.014                  | <15°         | 0.012 - 0.024                  | <15°         | 0.030 - 0.058                    | <15°         |

\*D1 > 5.00mm --> Erhöhen Sie die Schnittparameter, wenn Ihre Spindel und das Halten Ihres Werkstücks dies zulassen.

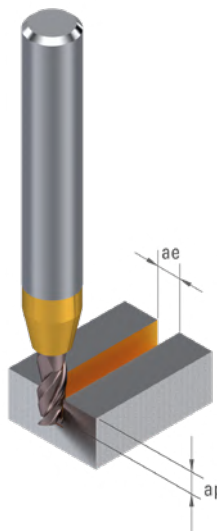
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|          |   | VDI 3323  | $\varnothing D_1$<br>0.30 - 1.50 |                     | $\varnothing D_1$<br>1.60 - 4.50 |                     | $\varnothing D_1$<br>4.60 - 10.00 |                     |
|----------|---|-----------|----------------------------------|---------------------|----------------------------------|---------------------|-----------------------------------|---------------------|
|          |   |           | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                 | C-TOP<br>Vc [m/min] |
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |                                  | 30 - 50             |                                  | 50 - 150            |                                   | 120 - 280           |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9     |                                  | 25 - 50             |                                  | 50 - 125            |                                   | 90 - 230            |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13   |                                  | 25 - 35             |                                  | 50 - 85             |                                   | 90 - 130            |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2 |                                  | 25 - 50             |                                  | 50 - 150            |                                   | 100 - 230           |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4 |                                  | 20 - 45             |                                  | 50 - 115            |                                   | 75 - 180            |
| <b>K</b> | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20   |                                  | 15 - 35             |                                  | 40 - 90             |                                   | 60 - 140            |
| <b>N</b> | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26        |                                  | 20 - 40             |                                  | 50 - 105            |                                   | 80 - 165            |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28   |                                  | 15 - 35             |                                  | 40 - 90             |                                   | 60 - 140            |
| <b>S</b> | Gold, Silber  | -         |                                  | 20 - 45             |                                  | 50 - 110            |                                   | 75 - 170            |
|          | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   |                                  | 15 - 30             |                                  | 40 - 80             |                                   | 60 - 120            |
|          | Titan, Titanlegierung   | 36 - 37   |                                  | 15 - 30             |                                  | 35 - 80             |                                   | 50 - 110            |



NUTBEARBEITUNG

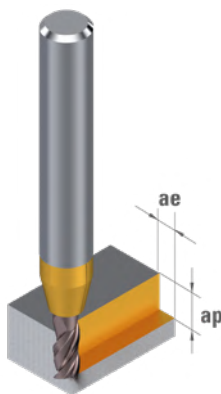
|          |   | VDI 3323  | $\varnothing D_1$<br>0.30 - 1.50 |                     | $\varnothing D_1$<br>1.60 - 4.50 |                     | $\varnothing D_1$<br>4.60 - 10.00 |                     |
|----------|---|-----------|----------------------------------|---------------------|----------------------------------|---------------------|-----------------------------------|---------------------|
|          |   |           | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                 | C-TOP<br>Vc [m/min] |
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |                                  | 25 - 50             |                                  | 50 - 150            |                                   | 100 - 240           |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9     |                                  | 20 - 50             |                                  | 50 - 125            |                                   | 75 - 195            |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13   |                                  | 20 - 30             |                                  | 50 - 70             |                                   | 75 - 110            |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2 |                                  | 20 - 50             |                                  | 50 - 125            |                                   | 85 - 195            |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4 |                                  | 15 - 40             |                                  | 40 - 100            |                                   | 65 - 155            |
| <b>K</b> | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20   |                                  | 15 - 30             |                                  | 35 - 80             |                                   | 50 - 120            |
| <b>N</b> | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26        |                                  | 20 - 35             |                                  | 45 - 90             |                                   | 70 - 140            |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28   |                                  | 15 - 35             |                                  | 35 - 80             |                                   | 50 - 120            |
| <b>S</b> | Gold, Silber  | -         |                                  | 15 - 30             |                                  | 40 - 95             |                                   | 65 - 145            |
|          | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   |                                  | 15 - 25             |                                  | 30 - 65             |                                   | 50 - 100            |
|          | Titan, Titanlegierung   | 36 - 37   |                                  | 10 - 25             |                                  | 30 - 65             |                                   | 45 - 100            |





UMFANGSBEARBEITUNG / SCHLICHTEN

|   |   |           | Ø D <sub>1</sub><br>0.30 - 1.50 |                     | Ø D <sub>1</sub><br>1.60 - 4.50 |                     | Ø D <sub>1</sub><br>4.60 - 10.00 |                        |          |
|---|---|-----------|---------------------------------|---------------------|---------------------------------|---------------------|----------------------------------|------------------------|----------|
|   |   |           | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min]    |          |
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |                                 | 30 - 50             |                                 | 50 - 150            |                                  | 150 - 350              |          |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9     |                                 | 30 - 50             |                                 | 50 - 150            |                                  | 110 - 290              |          |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13   |                                 | 30 - 40             |                                 | 50 - 105            |                                  | 110 - 160              |          |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2 |                                 | 30 - 50             |                                 | 50 - 150            |                                  | 130 - 290              |          |
|   | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4 |                                 | 25 - 50             |                                 | 50 - 150            |                                  | 90 - 230               |          |
| K | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20   |                                 | 20 - 45             | 30 - 50                         | 50 - 150            | 50 - 150                         | 80 - 180<br>140 - 310  |          |
| N | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26        |                                 | 25 - 50             | 30 - 50                         | 50 - 150            | 50 - 150                         | 100 - 210<br>190 - 380 |          |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28   |                                 | 20 - 45             | 30 - 50                         | 50 - 150            | 50 - 150                         | 80 - 180<br>160 - 350  |          |
|   | Gold, Silber  | -         |                                 | 25 - 50             | 30 - 50                         | 50 - 150            | 50 - 150                         | 90 - 210<br>200 - 400  |          |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   |                                 |                     | 20 - 40                         |                     | 50 - 135                         |                        | 80 - 150 |
|   | Titan, Titanlegierung   | 36 - 37   |                                 | 20 - 40             | 30 - 50                         | 45 - 150            | 50 - 110                         | 70 - 150<br>150 - 210  |          |



RAMPEN

|   |   |           | Ø D <sub>1</sub><br>0.30 - 1.50 |                     | Ø D <sub>1</sub><br>1.60 - 4.50 |                     | Ø D <sub>1</sub><br>4.60 - 10.00 |                       |          |
|---|---|-----------|---------------------------------|---------------------|---------------------------------|---------------------|----------------------------------|-----------------------|----------|
|   |   |           | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min]   |          |
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |                                 | 25 - 50             |                                 | 50 - 150            |                                  | 100 - 240             |          |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9     |                                 | 20 - 50             |                                 | 50 - 125            |                                  | 75 - 195              |          |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13   |                                 | 20 - 30             |                                 | 50 - 70             |                                  | 75 - 110              |          |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2 |                                 | 20 - 50             |                                 | 50 - 125            |                                  | 85 - 195              |          |
|   | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4 |                                 | 15 - 40             |                                 | 40 - 100            |                                  | 65 - 155              |          |
| K | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20   |                                 | 15 - 30             | 25 - 50                         | 35 - 80             | 50 - 140                         | 50 - 120<br>95 - 215  |          |
| N | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26        |                                 | 20 - 35             | 30 - 50                         | 45 - 90             | 50 - 150                         | 70 - 140<br>130 - 255 |          |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28   |                                 | 15 - 35             | 30 - 50                         | 35 - 80             | 50 - 150                         | 50 - 120<br>110 - 240 |          |
|   | Gold, Silber  | -         |                                 | 15 - 30             | 30 - 50                         | 40 - 95             | 50 - 150                         | 65 - 145<br>135 - 270 |          |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   |                                 |                     | 15 - 25                         |                     | 30 - 65                          |                       | 50 - 100 |
|   | Titan, Titanlegierung   | 36 - 37   |                                 | 10 - 25             | 25 - 35                         | 30 - 65             | 50 - 95                          | 45 - 100<br>100 - 145 |          |



$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>0.30 - 0.50 |  | $\varnothing D_1$<br>0.50 - 0.80 |  | $\varnothing D_1$<br>0.80 - 1.60 |  | $\varnothing D_1$<br>1.60 - 3.00 |  | $\varnothing D_1$<br>3.00 - 5.00 |  | $\varnothing D_1$<br>*5.00 - 10.00 |  |
|----------------------------------|--|----------------------------------|--|----------------------------------|--|----------------------------------|--|----------------------------------|--|------------------------------------|--|
| fz                               | ae<br>ap<br>(mm)                             | fz                               | ae<br>ap<br>(mm)                             | fz                               | ae<br>ap<br>(mm)                             | fz                               | ae<br>ap<br>(mm)                             | fz                               | ae<br>ap<br>(mm)                             | fz                                 | ae<br>ap<br>(mm)                             |
| 0.0005-0.0009                    | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.0009-0.003                     | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.002-0.008                      | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.006-0.016                      | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.014-0.027                      | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.020-0.048                        | <0.20× $\varnothing$<br><2.00× $\varnothing$ |
| 0.0004-0.0008                    | <0.15× $\varnothing$<br><2.00× $\varnothing$ | 0.0008-0.003                     | <0.15× $\varnothing$<br><2.00× $\varnothing$ | 0.002-0.007                      | <0.15× $\varnothing$<br><2.00× $\varnothing$ | 0.006-0.015                      | <0.15× $\varnothing$<br><2.00× $\varnothing$ | 0.012-0.024                      | <0.15× $\varnothing$<br><2.00× $\varnothing$ | 0.018-0.044                        | <0.15× $\varnothing$<br><2.00× $\varnothing$ |
| 0.0004-0.0008                    | <0.15× $\varnothing$<br><2.00× $\varnothing$ | 0.0007-0.002                     | <0.15× $\varnothing$<br><2.00× $\varnothing$ | 0.002-0.007                      | <0.15× $\varnothing$<br><2.00× $\varnothing$ | 0.005-0.014                      | <0.15× $\varnothing$<br><2.00× $\varnothing$ | 0.011-0.023                      | <0.15× $\varnothing$<br><2.00× $\varnothing$ | 0.017-0.040                        | <0.15× $\varnothing$<br><2.00× $\varnothing$ |
| 0.0004-0.0008                    | <0.15× $\varnothing$<br><2.00× $\varnothing$ | 0.0007-0.002                     | <0.15× $\varnothing$<br><2.00× $\varnothing$ | 0.002-0.007                      | <0.15× $\varnothing$<br><2.00× $\varnothing$ | 0.005-0.014                      | <0.15× $\varnothing$<br><2.00× $\varnothing$ | 0.011-0.023                      | <0.15× $\varnothing$<br><2.00× $\varnothing$ | 0.017-0.040                        | <0.15× $\varnothing$<br><2.00× $\varnothing$ |
| 0.0004-0.0007                    | <0.10× $\varnothing$<br><2.00× $\varnothing$ | 0.0007-0.002                     | <0.10× $\varnothing$<br><2.00× $\varnothing$ | 0.002-0.006                      | <0.10× $\varnothing$<br><2.00× $\varnothing$ | 0.005-0.013                      | <0.10× $\varnothing$<br><2.00× $\varnothing$ | 0.011-0.022                      | <0.10× $\varnothing$<br><2.00× $\varnothing$ | 0.016-0.038                        | <0.10× $\varnothing$<br><2.00× $\varnothing$ |
| 0.0005-0.0010                    | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.0009-0.003                     | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.003-0.008                      | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.007-0.018                      | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.015-0.030                      | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.022-0.052                        | <0.20× $\varnothing$<br><2.00× $\varnothing$ |
| 0.0008-0.0015                    | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.0014-0.005                     | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.004-0.013                      | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.011-0.028                      | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.023-0.046                      | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.034-0.082                        | <0.20× $\varnothing$<br><2.00× $\varnothing$ |
| 0.0006-0.0013                    | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.0012-0.004                     | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.003-0.011                      | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.009-0.023                      | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.019-0.038                      | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.028-0.068                        | <0.20× $\varnothing$<br><2.00× $\varnothing$ |
| 0.0006-0.0012                    | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.0011-0.004                     | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.003-0.010                      | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.008-0.021                      | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.018-0.035                      | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.026-0.062                        | <0.20× $\varnothing$<br><2.00× $\varnothing$ |
| 0.0002-0.0005                    | <0.08× $\varnothing$<br><2.00× $\varnothing$ | 0.0004-0.001                     | <0.08× $\varnothing$<br><2.00× $\varnothing$ | 0.001-0.004                      | <0.08× $\varnothing$<br><2.00× $\varnothing$ | 0.003-0.008                      | <0.08× $\varnothing$<br><2.00× $\varnothing$ | 0.007-0.014                      | <0.08× $\varnothing$<br><2.00× $\varnothing$ | 0.010-0.024                        | <0.08× $\varnothing$<br><2.00× $\varnothing$ |
| 0.0005-0.0011                    | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.001-0.003                      | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.003-0.009                      | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.007-0.019                      | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.016-0.031                      | <0.20× $\varnothing$<br><2.00× $\varnothing$ | 0.023-0.056                        | <0.20× $\varnothing$<br><2.00× $\varnothing$ |

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>0.30 - 0.50 |              | $\varnothing D_1$<br>0.50 - 0.80 |              | $\varnothing D_1$<br>0.80 - 1.60 |              | $\varnothing D_1$<br>1.60 - 3.00 |              | $\varnothing D_1$<br>3.00 - 5.00 |              | $\varnothing D_1$<br>*5.00 - 10.00 |              |
|----------------------------------|--------------|----------------------------------|--------------|----------------------------------|--------------|----------------------------------|--------------|----------------------------------|--------------|------------------------------------|--------------|
| fz                               | $\alpha$ (°) | fz                               | $\alpha$ (°) | fz                               | $\alpha$ (°) | fz                               | $\alpha$ (°) | fz                               | $\alpha$ (°) | fz                                 | $\alpha$ (°) |
| 0.0003-0.0006                    | <10°         | 0.0005-0.0012                    | <10°         | 0.001-0.003                      | <10°         | 0.003-0.007                      | <10°         | 0.006-0.012                      | <10°         | 0.010-0.024                        | <7.5°        |
| 0.0003-0.0006                    | <10°         | 0.0005-0.0010                    | <10°         | 0.0009-0.003                     | <10°         | 0.002-0.006                      | <10°         | 0.005-0.010                      | <10°         | 0.009-0.022                        | <7.5°        |
| 0.0003-0.0006                    | <10°         | 0.0004-0.0010                    | <10°         | 0.0008-0.003                     | <10°         | 0.002-0.006                      | <10°         | 0.005-0.010                      | <10°         | 0.009-0.020                        | <7.5°        |
| 0.0003-0.0006                    | <10°         | 0.0004-0.0010                    | <10°         | 0.0008-0.003                     | <10°         | 0.002-0.006                      | <10°         | 0.005-0.010                      | <10°         | 0.009-0.020                        | <7.5°        |
| 0.0002-0.0004                    | <5°          | 0.0004-0.0009                    | <5°          | 0.0008-0.003                     | <5°          | 0.002-0.006                      | <5°          | 0.005-0.010                      | <5°          | 0.008-0.020                        | <3.5°        |
| 0.0003-0.0006                    | <12.5°       | 0.0006-0.0013                    | <12.5°       | 0.0011-0.004                     | <12.5°       | 0.003-0.008                      | <12.5°       | 0.007-0.014                      | <12.5°       | 0.011-0.026                        | <10°         |
| 0.0005-0.0010                    | <12.5°       | 0.0008-0.0017                    | <12.5°       | 0.0014-0.005                     | <12.5°       | 0.004-0.011                      | <12.5°       | 0.009-0.018                      | <12.5°       | 0.015-0.036                        | <10°         |
| 0.0004-0.0008                    | <12.5°       | 0.0006-0.0014                    | <12.5°       | 0.0012-0.004                     | <12.5°       | 0.003-0.009                      | <12.5°       | 0.007-0.014                      | <12.5°       | 0.012-0.028                        | <10°         |
| 0.0003-0.0006                    | <12.5°       | 0.0006-0.0013                    | <12.5°       | 0.0011-0.004                     | <12.5°       | 0.003-0.008                      | <12.5°       | 0.007-0.014                      | <12.5°       | 0.011-0.026                        | <10°         |
| 0.0002-0.0004                    | <2.5°        | 0.0003-0.0006                    | <2.5°        | 0.0005-0.002                     | <2.5°        | 0.001-0.004                      | <2.5°        | 0.003-0.006                      | <2.5°        | 0.005-0.012                        | <2°          |
| 0.0004-0.0008                    | <5°          | 0.0006-0.0014                    | <5°          | 0.0012-0.004                     | <5°          | 0.003-0.009                      | <5°          | 0.007-0.014                      | <5°          | 0.012-0.028                        | <3.5°        |

\*D1 > 5.00mm --> Erhöhen Sie die Schnittparameter, wenn Ihre Spindel und das Halten Ihres Werkstücks dies zulassen.

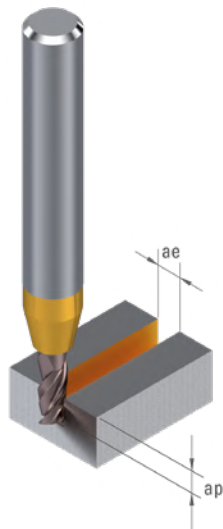
RAMPEN

|          |   | VDI 3323  | $\varnothing D_1$<br>0.30 - 1.50 |                     | $\varnothing D_1$<br>1.60 - 4.50 |                     | $\varnothing D_1$<br>4.60 - 10.00 |                     |
|----------|---|-----------|----------------------------------|---------------------|----------------------------------|---------------------|-----------------------------------|---------------------|
|          |   |           | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                 | C-TOP<br>Vc [m/min] |
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |                                  | 25 - 50             |                                  | 50 - 125            |                                   | 100 - 190           |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9     |                                  | 20 - 40             |                                  | 50 - 100            |                                   | 75 - 155            |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13   |                                  | 20 - 25             |                                  | 50 - 60             |                                   | 75 - 90             |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2 |                                  | 20 - 40             |                                  | 50 - 100            |                                   | 85 - 155            |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4 |                                  | 15 - 30             |                                  | 40 - 80             |                                   | 65 - 120            |
| <b>K</b> | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20   | 15 - 30                          | 25 - 45             | 35 - 80                          | 50 - 110            | 50 - 120                          | 95 - 170            |
| <b>N</b> | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26        | 20 - 35                          | 30 - 50             | 45 - 90                          | 50 - 135            | 70 - 140                          | 130 - 205           |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28   | 15 - 30                          | 30 - 50             | 35 - 80                          | 50 - 125            | 50 - 120                          | 110 - 190           |
|          | Gold, Silber  | -         | 15 - 35                          | 30 - 50             | 40 - 95                          | 50 - 145            | 65 - 145                          | 135 - 220           |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   |                                  | 15 - 20             |                                  | 30 - 50             |                                   | 50 - 80             |
|          | Titan, Titanlegierung   | 36 - 37   | 10 - 25                          | 25 - 35             | 30 - 65                          | 50 - 75             | 45 - 100                          | 100 - 115           |



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|          |   | VDI 3323  | $\varnothing D_1$<br>0.30 - 1.50 |                     | $\varnothing D_1$<br>1.60 - 4.50 |                     | $\varnothing D_1$<br>4.60 - 10.00 |                     |
|----------|---|-----------|----------------------------------|---------------------|----------------------------------|---------------------|-----------------------------------|---------------------|
|          |   |           | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                 | C-TOP<br>Vc [m/min] |
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |                                  | 25 - 50             |                                  | 50 - 150            |                                   | 100 - 240           |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9     |                                  | 20 - 50             |                                  | 50 - 125            |                                   | 75 - 195            |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13   |                                  | 20 - 30             |                                  | 50 - 70             |                                   | 75 - 110            |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2 |                                  | 20 - 50             |                                  | 50 - 125            |                                   | 85 - 195            |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4 |                                  | 15 - 40             |                                  | 40 - 100            |                                   | 65 - 155            |
| <b>K</b> | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20   | 15 - 30                          | 25 - 50             | 35 - 80                          | 50 - 140            | 50 - 120                          | 95 - 215            |
| <b>N</b> | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26        | 20 - 35                          | 30 - 50             | 45 - 90                          | 50 - 150            | 70 - 140                          | 130 - 255           |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28   | 15 - 35                          | 30 - 50             | 35 - 80                          | 50 - 150            | 50 - 120                          | 110 - 240           |
|          | Gold, Silber  | -         | 15 - 30                          | 30 - 50             | 40 - 95                          | 50 - 150            | 65 - 145                          | 135 - 270           |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   |                                  | 15 - 25             |                                  | 30 - 65             |                                   | 50 - 100            |
|          | Titan, Titanlegierung   | 36 - 37   | 10 - 25                          | 25 - 35             | 30 - 65                          | 50 - 95             | 45 - 100                          | 100 - 145           |



$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.30 - 0.50 |              | $\emptyset D_1$<br>0.50 - 0.80 |              | $\emptyset D_1$<br>0.80 - 1.60 |              | $\emptyset D_1$<br>1.60 - 3.00 |              | $\emptyset D_1$<br>3.00 - 5.00 |              | $\emptyset D_1$<br>*5.00 - 10.00 |              |
|--------------------------------|--------------|--------------------------------|--------------|--------------------------------|--------------|--------------------------------|--------------|--------------------------------|--------------|----------------------------------|--------------|
| $f_z$                          | $\alpha$ (°) | $f_z$                          | $\alpha$ (°) | $f_z$                          | $\alpha$ (°) | $f_z$                          | $\alpha$ (°) | $f_z$                          | $\alpha$ (°) | $f_z$                            | $\alpha$ (°) |
| 0.0017-0.0034                  | <25°         | 0.003-0.005                    | <25°         | 0.005-0.011                    | <25°         | 0.009-0.021                    | <25°         | 0.017-0.034                    | <25°         | 0.025-0.048                      | <20°         |
| 0.0015-0.0030                  | <25°         | 0.003-0.005                    | <25°         | 0.004-0.010                    | <25°         | 0.008-0.018                    | <25°         | 0.015-0.030                    | <25°         | 0.023-0.044                      | <20°         |
| 0.0015-0.0030                  | <25°         | 0.002-0.005                    | <25°         | 0.004-0.009                    | <25°         | 0.008-0.017                    | <25°         | 0.015-0.030                    | <25°         | 0.021-0.040                      | <20°         |
| 0.0015-0.0030                  | <20°         | 0.002-0.005                    | <20°         | 0.004-0.009                    | <20°         | 0.008-0.017                    | <20°         | 0.015-0.030                    | <20°         | 0.021-0.040                      | <15°         |
| 0.0014-0.0028                  | <15°         | 0.002-0.004                    | <15°         | 0.004-0.009                    | <15°         | 0.007-0.016                    | <15°         | 0.014-0.028                    | <15°         | 0.020-0.038                      | <10°         |
| 0.0019-0.0038                  | <25°         | 0.003-0.006                    | <25°         | 0.005-0.012                    | <25°         | 0.010-0.023                    | <25°         | 0.019-0.038                    | <25°         | 0.028-0.052                      | <20°         |
| 0.0026-0.0052                  | <30°         | 0.004-0.008                    | <30°         | 0.007-0.016                    | <30°         | 0.014-0.031                    | <30°         | 0.026-0.052                    | <30°         | 0.038-0.072                      | <25°         |
| 0.0021-0.0042                  | <30°         | 0.003-0.007                    | <30°         | 0.005-0.013                    | <30°         | 0.011-0.025                    | <30°         | 0.021-0.042                    | <30°         | 0.030-0.058                      | <25°         |
| 0.0019-0.0038                  | <30°         | 0.003-0.006                    | <30°         | 0.005-0.012                    | <30°         | 0.010-0.023                    | <30°         | 0.019-0.038                    | <30°         | 0.028-0.052                      | <25°         |
| 0.0009-0.0018                  | <10°         | 0.001-0.003                    | <10°         | 0.002-0.005                    | <10°         | 0.005-0.010                    | <10°         | 0.009-0.018                    | <10°         | 0.013-0.024                      | <5°          |
| 0.0021-0.0042                  | <20°         | 0.003-0.007                    | <20°         | 0.005-0.013                    | <20°         | 0.011-0.025                    | <20°         | 0.021-0.042                    | <20°         | 0.030-0.058                      | <15°         |

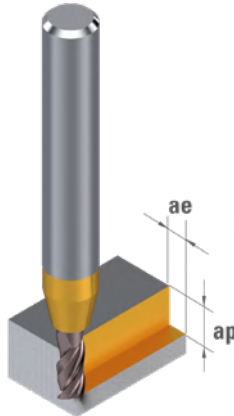
Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.30 - 0.50 |            | $\emptyset D_1$<br>0.50 - 0.80 |            | $\emptyset D_1$<br>0.80 - 1.60 |            | $\emptyset D_1$<br>1.60 - 3.00 |            | $\emptyset D_1$<br>3.00 - 5.00 |            | $\emptyset D_1$<br>*5.00 - 10.00 |            |
|--------------------------------|------------|--------------------------------|------------|--------------------------------|------------|--------------------------------|------------|--------------------------------|------------|----------------------------------|------------|
| $f_z$                          | $a_p$ (mm) | $f_z$                          | $a_p$ (mm) | $f_z$                          | $a_p$ (mm) | $f_z$                          | $a_p$ (mm) | $f_z$                          | $a_p$ (mm) | $f_z$                            | $a_p$ (mm) |
| 0.0015-0.0030                  | <0.50 × Ø  | 0.003-0.005                    | <1.00 × Ø  | 0.004-0.010                    | <2.00 × Ø  | 0.008-0.018                    | <2.00 × Ø  | 0.015-0.030                    | <0.50 × Ø  | 0.025-0.048                      | <0.50 × Ø  |
| 0.0014-0.0028                  | <0.50 × Ø  | 0.002-0.004                    | <1.00 × Ø  | 0.004-0.009                    | <2.00 × Ø  | 0.007-0.017                    | <2.00 × Ø  | 0.014-0.028                    | <0.50 × Ø  | 0.023-0.044                      | <0.50 × Ø  |
| 0.0013-0.0026                  | <0.50 × Ø  | 0.002-0.004                    | <1.00 × Ø  | 0.003-0.008                    | <2.00 × Ø  | 0.007-0.016                    | <2.00 × Ø  | 0.013-0.026                    | <0.50 × Ø  | 0.021-0.040                      | <0.50 × Ø  |
| 0.0013-0.0026                  | <0.50 × Ø  | 0.002-0.004                    | <1.00 × Ø  | 0.003-0.008                    | <2.00 × Ø  | 0.007-0.016                    | <2.00 × Ø  | 0.013-0.026                    | <0.50 × Ø  | 0.021-0.040                      | <0.50 × Ø  |
| 0.0012-0.0024                  | <0.50 × Ø  | 0.002-0.004                    | <1.00 × Ø  | 0.003-0.008                    | <1.50 × Ø  | 0.007-0.015                    | <1.00 × Ø  | 0.012-0.024                    | <0.50 × Ø  | 0.020-0.038                      | <0.50 × Ø  |
| 0.0017-0.0034                  | <0.50 × Ø  | 0.003-0.005                    | <1.00 × Ø  | 0.004-0.011                    | <2.00 × Ø  | 0.009-0.020                    | <2.00 × Ø  | 0.017-0.034                    | <0.50 × Ø  | 0.028-0.052                      | <0.50 × Ø  |
| 0.0023-0.0046                  | <0.50 × Ø  | 0.004-0.007                    | <1.00 × Ø  | 0.006-0.015                    | <2.00 × Ø  | 0.009-0.020                    | <2.00 × Ø  | 0.017-0.034                    | <0.50 × Ø  | 0.038-0.072                      | <0.50 × Ø  |
| 0.0018-0.0036                  | <0.50 × Ø  | 0.003-0.006                    | <1.00 × Ø  | 0.005-0.012                    | <2.00 × Ø  | 0.004-0.009                    | <2.00 × Ø  | 0.008-0.016                    | <0.50 × Ø  | 0.030-0.058                      | <0.50 × Ø  |
| 0.0017-0.0034                  | <0.25 × Ø  | 0.003-0.005                    | <1.00 × Ø  | 0.004-0.011                    | <2.00 × Ø  | 0.010-0.022                    | <2.00 × Ø  | 0.018-0.036                    | <0.50 × Ø  | 0.028-0.052                      | <0.50 × Ø  |
| 0.0008-0.0016                  | <0.25 × Ø  | 0.001-0.002                    | <0.50 × Ø  | 0.002-0.005                    | <1.00 × Ø  | 0.004-0.009                    | <1.00 × Ø  | 0.008-0.016                    | <0.50 × Ø  | 0.013-0.024                      | <0.50 × Ø  |
| 0.0018-0.0036                  | <0.50 × Ø  | 0.003-0.006                    | <1.00 × Ø  | 0.005-0.012                    | <2.00 × Ø  | 0.010-0.022                    | <2.00 × Ø  | 0.018-0.036                    | <0.50 × Ø  | 0.030-0.058                      | <0.50 × Ø  |

\*D1 > 5.00mm --> Erhöhen Sie die Schnittparameter, wenn Ihre Spindel und das Halten Ihres Werkstücks dies zulassen.

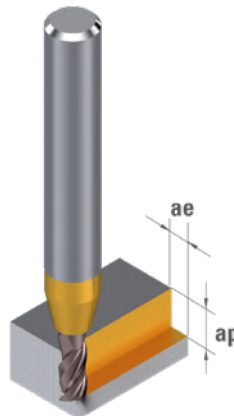
UMFANGSBEARBEITUNG / SCHRUPPEN

|   |  | VDI 3323  | Ø D <sub>1</sub><br>0.30 - 1.50 |                     | Ø D <sub>1</sub><br>1.60 - 4.50 |                     | Ø D <sub>1</sub><br>4.60 - 10.00 |                     |
|---|--|-----------|---------------------------------|---------------------|---------------------------------|---------------------|----------------------------------|---------------------|
|   |  |           | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] |
| P | Unlegierter Stahl, Automaten Stahl   | 1 - 5     |                                 | 30 - 50             |                                 | 50 - 150            |                                  | 120 - 180           |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>  | 6 - 9     |                                 | 25 - 50             |                                 | 50 - 150            |                                  | 90 - 230            |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer/ martensitischer Edelstahl | 10 - 13   |                                 | 25 - 35             |                                 | 50 - 85             |                                  | 90 - 130            |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                  | 14.1-14.2 |                                 | 25 - 50             |                                 | 50 - 150            |                                  | 100 - 230           |
|   | Nickelfreier rostfreier Stahl/ DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4 |                                 | 20 - 45             |                                 | 50 - 115            |                                  | 75 - 180            |
| K | Duktiles Gusseisen, Temperguss > 250 HB  | 17 - 20   | 15 - 35                         | 30 - 50             | 40 - 90                         | 50 - 150            | 60 - 140                         | 110 - 250           |
| N | Kupferlegierung gute Zerspanbarkeit mit Pb   | 26        | 20 - 40                         | 30 - 50             | 50 - 105                        | 50 - 150            | 80 - 165                         | 150 - 300           |
|   | Kupferlegierung schwere Zerspanbarkeit   | 27 - 28   | 15 - 35                         | 30 - 50             | 40 - 90                         | 50 - 150            | 60 - 140                         | 130 - 280           |
|   | Gold, Silber   | -         | 20 - 45                         | 30 - 50             | 50 - 110                        | 50 - 150            | 75 - 170                         | 160 - 320           |
| S | Spezielle Nickel-Kobalt-Legierung  | 31 - 35   |                                 | 15 - 30             |                                 | 40 - 80             |                                  | 60 - 120            |
|   | Titan, Titanlegierung  | 36 - 37   | 15 - 30                         | 30 - 45             | 35 - 80                         | 50 - 110            | 55 - 120                         | 120 - 170           |



UMFANGSBEARBEITUNG / SCHLICHTEN

|   |  | VDI 3323  | Ø D <sub>1</sub><br>0.30 - 1.50 |                     | Ø D <sub>1</sub><br>1.60 - 4.50 |                     | Ø D <sub>1</sub><br>4.60 - 10.00 |                     |
|---|--|-----------|---------------------------------|---------------------|---------------------------------|---------------------|----------------------------------|---------------------|
|   |  |           | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] |
| P | Unlegierter Stahl, Automaten Stahl   | 1 - 5     |                                 | 30 - 50             |                                 | 50 - 150            |                                  | 150 - 350           |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>  | 6 - 9     |                                 | 30 - 50             |                                 | 50 - 150            |                                  | 110 - 290           |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer/ martensitischer Edelstahl | 10 - 13   |                                 | 30 - 40             |                                 | 50 - 105            |                                  | 110 - 160           |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                  | 14.1-14.2 |                                 | 30 - 50             |                                 | 50 - 150            |                                  | 130 - 290           |
|   | Nickelfreier rostfreier Stahl/ DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4 |                                 | 25 - 50             |                                 | 50 - 150            |                                  | 90 - 230            |
| K | Duktiles Gusseisen, Temperguss > 250 HB  | 17 - 20   | 20 - 45                         | 30 - 50             | 50 - 150                        | 50 - 150            | 80 - 180                         | 140 - 310           |
| N | Kupferlegierung gute Zerspanbarkeit mit Pb   | 26        | 25 - 50                         | 30 - 50             | 50 - 150                        | 50 - 150            | 100 - 210                        | 190 - 380           |
|   | Kupferlegierung schwere Zerspanbarkeit   | 27 - 28   | 20 - 45                         | 30 - 50             | 50 - 150                        | 50 - 150            | 80 - 180                         | 160 - 350           |
|   | Gold, Silber   | -         | 25 - 50                         | 30 - 50             | 50 - 150                        | 50 - 150            | 90 - 210                         | 200 - 400           |
| S | Spezielle Nickel-Kobalt-Legierung  | 31 - 35   |                                 | 20 - 40             |                                 | 50 - 135            |                                  | 80 - 150            |
|   | Titan, Titanlegierung  | 36 - 37   | 20 - 40                         | 30 - 50             | 45 - 150                        | 50 - 110            | 70 - 150                         | 150 - 210           |







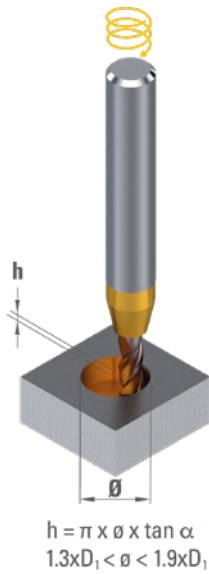
**BOHREN**

|          |   |                   | Ø D <sub>1</sub><br>0.30 - 1.50 |                     | Ø D <sub>1</sub><br>1.60 - 4.50 |                     | Ø D <sub>1</sub><br>4.60 - 10.00 |                     |
|----------|---|-------------------|---------------------------------|---------------------|---------------------------------|---------------------|----------------------------------|---------------------|
|          |   |                   | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] |
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | VDI 3323<br>1 - 5 |                                 | 25 - 50             |                                 | 50 - 125            |                                  | 100 - 190           |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9             |                                 | 20 - 40             |                                 | 50 - 100            |                                  | 75 - 155            |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13           |                                 | 20 - 25             |                                 | 50 - 60             |                                  | 75 - 90             |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2         |                                 | 20 - 40             |                                 | 50 - 100            |                                  | 85 - 155            |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4         |                                 | 15 - 30             |                                 | 40 - 80             |                                  | 65 - 120            |
| <b>K</b> | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20           | 15 - 30                         | 25 - 45             | 35 - 80                         | 50 - 110            | 50 - 120                         | 95 - 170            |
| <b>N</b> | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26                | 20 - 35                         | 30 - 50             | 45 - 90                         | 50 - 135            | 70 - 140                         | 130 - 205           |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28           | 15 - 30                         | 30 - 50             | 35 - 80                         | 50 - 125            | 50 - 120                         | 110 - 190           |
|          | Gold, Silber  | -                 | 15 - 35                         | 30 - 50             | 40 - 95                         | 50 - 145            | 65 - 145                         | 135 - 220           |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31 - 35           |                                 | 15 - 20             |                                 | 30 - 50             |                                  | 50 - 80             |
|          | Titan, Titanlegierung   | 36 - 37           | 10 - 25                         | 25 - 30             | 30 - 65                         | 50 - 75             | 45 - 100                         | 100 - 115           |



**ZIRKULAR INTERPOLATION**

|          |   |                   | Ø D <sub>1</sub><br>0.30 - 1.50 |                     | Ø D <sub>1</sub><br>1.60 - 4.50 |                     | Ø D <sub>1</sub><br>4.60 - 10.00 |                     |
|----------|---|-------------------|---------------------------------|---------------------|---------------------------------|---------------------|----------------------------------|---------------------|
|          |   |                   | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]               | C-TOP<br>Vc [m/min] | VHM<br>Vc [m/min]                | C-TOP<br>Vc [m/min] |
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | VDI 3323<br>1 - 5 |                                 | 25 - 50             |                                 | 50 - 125            |                                  | 100 - 190           |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9             |                                 | 20 - 40             |                                 | 50 - 100            |                                  | 75 - 155            |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13           |                                 | 20 - 25             |                                 | 50 - 60             |                                  | 75 - 90             |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2         |                                 | 20 - 40             |                                 | 50 - 100            |                                  | 85 - 155            |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4         |                                 | 15 - 30             |                                 | 40 - 80             |                                  | 65 - 120            |
| <b>K</b> | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20           | 15 - 30                         | 25 - 45             | 35 - 80                         | 50 - 110            | 50 - 120                         | 95 - 170            |
| <b>N</b> | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26                | 20 - 35                         | 30 - 50             | 45 - 90                         | 50 - 135            | 70 - 140                         | 130 - 205           |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28           | 15 - 30                         | 30 - 50             | 35 - 80                         | 50 - 125            | 50 - 120                         | 110 - 190           |
|          | Gold, Silber  | -                 | 15 - 35                         | 30 - 50             | 40 - 95                         | 50 - 145            | 65 - 145                         | 135 - 220           |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31 - 35           |                                 | 15 - 20             |                                 | 30 - 50             |                                  | 50 - 80             |
|          | Titan, Titanlegierung   | 36 - 37           | 10 - 25                         | 25 - 35             | 30 - 65                         | 50 - 75             | 45 - 100                         | 100 - 115           |



$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn **fz [mm]**

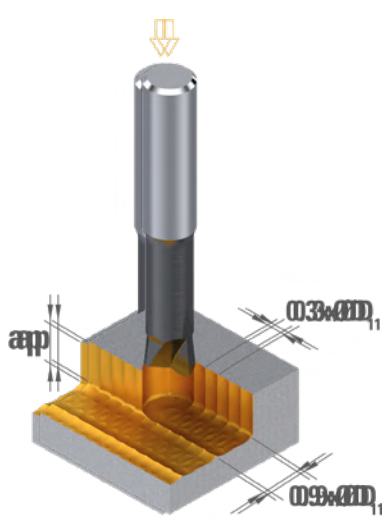
| Ø D <sub>1</sub><br>0.30 - 0.50 |            | Ø D <sub>1</sub><br>0.50 - 0.80 |            | Ø D <sub>1</sub><br>0.80 - 1.60 |            | Ø D <sub>1</sub><br>1.60 - 3.00 |            | Ø D <sub>1</sub><br>3.00 - 5.00 |            | Ø D <sub>1</sub><br>*5.00 - 10.00 |            |
|---------------------------------|------------|---------------------------------|------------|---------------------------------|------------|---------------------------------|------------|---------------------------------|------------|-----------------------------------|------------|
| fz                              | ap<br>(mm) | fz                              | ap<br>(mm) | fz                              | ap<br>(mm) | fz                              | ap<br>(mm) | fz                              | ap<br>(mm) | fz                                | ap<br>(mm) |
| 0.0008 - 0.0016                 | <0.75×Ø    | 0.0014 - 0.0026                 | <1.00×Ø    | 0.0022 - 0.0052                 | <1.25×Ø    | 0.0035 - 0.008                  | <1.25×Ø    | 0.006 - 0.012                   | <1.25×Ø    | 0.007 - 0.016                     | <1.25×Ø    |
| 0.0008 - 0.0016                 | <0.50×Ø    | 0.0012 - 0.0024                 | <0.75×Ø    | 0.0020 - 0.0048                 | <1.00×Ø    | 0.0035 - 0.008                  | <1.00×Ø    | 0.005 - 0.010                   | <1.00×Ø    | 0.005 - 0.014                     | <1.00×Ø    |
| 0.0007 - 0.0014                 | <0.50×Ø    | 0.0012 - 0.0022                 | <0.75×Ø    | 0.0018 - 0.0044                 | <1.00×Ø    | 0.0030 - 0.007                  | <1.00×Ø    | 0.005 - 0.010                   | <1.00×Ø    | 0.004 - 0.010                     | <1.00×Ø    |
| 0.0005 - 0.0010                 | <0.25×Ø    | 0.0008 - 0.0016                 | <0.50×Ø    | 0.0014 - 0.0032                 | <0.75×Ø    | 0.0025 - 0.005                  | <0.75×Ø    | 0.004 - 0.008                   | <0.75×Ø    | 0.004 - 0.010                     | <0.75×Ø    |
| 0.0005 - 0.0010                 | <0.25×Ø    | 0.0008 - 0.0016                 | <0.50×Ø    | 0.0014 - 0.0032                 | <0.75×Ø    | 0.0025 - 0.005                  | <0.75×Ø    | 0.004 - 0.008                   | <0.75×Ø    | 0.004 - 0.010                     | <0.75×Ø    |
| 0.0007 - 0.0014                 | <0.75×Ø    | 0.0012 - 0.0022                 | <1.00×Ø    | 0.0018 - 0.0044                 | <1.25×Ø    | 0.0030 - 0.007                  | <1.25×Ø    | 0.005 - 0.010                   | <1.25×Ø    | 0.006 - 0.014                     | <1.25×Ø    |
| 0.0009 - 0.0018                 | <1×Ø       | 0.0016 - 0.0030                 | <1.25×Ø    | 0.0026 - 0.0060                 | <1.5×Ø     | 0.0045 - 0.010                  | <1.5×Ø     | 0.007 - 0.014                   | <1.5×Ø     | 0.008 - 0.018                     | <1.5×Ø     |
| 0.0008 - 0.0016                 | <0.75×Ø    | 0.0012 - 0.0024                 | <1×Ø       | 0.0020 - 0.0048                 | <1.25×Ø    | 0.0035 - 0.008                  | <1.25×Ø    | 0.005 - 0.010                   | <1.25×Ø    | 0.006 - 0.014                     | <1.25×Ø    |
| 0.0007 - 0.0014                 | <0.75×Ø    | 0.0012 - 0.0022                 | <1×Ø       | 0.0018 - 0.0044                 | <1.25×Ø    | 0.0030 - 0.007                  | <1.25×Ø    | 0.005 - 0.010                   | <1.25×Ø    | 0.006 - 0.014                     | <1.25×Ø    |
| 0.0003 - 0.006                  | <0×ØD1     | 0.0006 - 0.0010                 | <0.25×Ø    | 0.0008 - 0.0020                 | <0.5×Ø     | 0.0015 - 0.003                  | <0.5×Ø     | 0.002 - 0.004                   | <0.5×Ø     | 0.003 - 0.006                     | <0.5×Ø     |
| 0.0006 - 0.0012                 | <0.5×Ø     | 0.0001 - 0.0020                 | <0.75×Ø    | 0.0016 - 0.0040                 | <1×Ø       | 0.0030 - 0.006                  | <1×Ø       | 0.005 - 0.010                   | <1×Ø       | 0.005 - 0.012                     | <1×Ø       |

Vorschub pro Zahn **fz [mm]**


| Ø D <sub>1</sub><br>0.30 - 0.50 |       | Ø D <sub>1</sub><br>0.50 - 0.80 |       | Ø D <sub>1</sub><br>0.80 - 1.60 |       | Ø D <sub>1</sub><br>1.60 - 3.00 |       | Ø D <sub>1</sub><br>3.00 - 5.00 |       | Ø D <sub>1</sub><br>*5.00 - 10.00 |       |
|---------------------------------|-------|---------------------------------|-------|---------------------------------|-------|---------------------------------|-------|---------------------------------|-------|-----------------------------------|-------|
| fz                              | α (°) | fz                              | α (°) | fz                              | α (°) | fz                              | α (°) | fz                              | α (°) | fz                                | α (°) |
| 0.0017 - 0.0034                 | <20°  | 0.003 - 0.005                   | <25°  | 0.005 - 0.011                   | <25°  | 0.009 - 0.021                   | <25°  | 0.017 - 0.034                   | <25°  | 0.025 - 0.048                     | <20°  |
| 0.0015 - 0.0030                 | <20°  | 0.003 - 0.005                   | <25°  | 0.004 - 0.010                   | <25°  | 0.008 - 0.018                   | <25°  | 0.015 - 0.030                   | <25°  | 0.023 - 0.044                     | <20°  |
| 0.0015 - 0.0030                 | <20°  | 0.002 - 0.005                   | <25°  | 0.004 - 0.009                   | <25°  | 0.008 - 0.017                   | <25°  | 0.015 - 0.030                   | <25°  | 0.021 - 0.040                     | <20°  |
| 0.0015 - 0.0030                 | <15°  | 0.002 - 0.005                   | <20°  | 0.004 - 0.009                   | <20°  | 0.008 - 0.017                   | <20°  | 0.015 - 0.030                   | <20°  | 0.021 - 0.040                     | <15°  |
| 0.0014 - 0.0028                 | <10°  | 0.002 - 0.004                   | <15°  | 0.004 - 0.009                   | <15°  | 0.007 - 0.016                   | <15°  | 0.014 - 0.028                   | <15°  | 0.020 - 0.038                     | <10°  |
| 0.0022 - 0.0044                 | <20°  | 0.003 - 0.006                   | <25°  | 0.005 - 0.012                   | <25°  | 0.010 - 0.023                   | <25°  | 0.019 - 0.038                   | <25°  | 0.028 - 0.052                     | <20°  |
| 0.0026 - 0.0052                 | <25°  | 0.004 - 0.008                   | <30°  | 0.007 - 0.016                   | <30°  | 0.014 - 0.031                   | <30°  | 0.026 - 0.052                   | <30°  | 0.038 - 0.072                     | <25°  |
| 0.0021 - 0.0042                 | <25°  | 0.003 - 0.007                   | <30°  | 0.005 - 0.013                   | <30°  | 0.011 - 0.025                   | <30°  | 0.021 - 0.042                   | <30°  | 0.030 - 0.058                     | <25°  |
| 0.0019 - 0.0038                 | <25°  | 0.003 - 0.006                   | <30°  | 0.005 - 0.012                   | <30°  | 0.010 - 0.023                   | <30°  | 0.019 - 0.038                   | <30°  | 0.028 - 0.052                     | <25°  |
| 0.0009 - 0.0018                 | <5°   | 0.001 - 0.003                   | <10°  | 0.002 - 0.005                   | <10°  | 0.005 - 0.010                   | <10°  | 0.009 - 0.018                   | <10°  | 0.013 - 0.024                     | <5°   |
| 0.0021 - 0.0042                 | <15°  | 0.003 - 0.007                   | <20°  | 0.005 - 0.013                   | <20°  | 0.011 - 0.025                   | <20°  | 0.021 - 0.042                   | <20°  | 0.030 - 0.058                     | <15°  |

\*D1 > 5.00mm --> Erhöhen Sie die Schnittparameter, wenn Ihre Spindel und das Halten Ihres Werkstücks dies zulassen.

## TAUCHFRÄSEN

|   |   | VDI<br>3323 |  | XIDUR<br>Vc [m/min] | ap<br>[mm] |
|---|---|-------------|--|---------------------|------------|
| P | Unlegierter Stahl, Automaten Stahl                      | 1 - 5       |  | <b>175</b>          | <1×ØD1     |
|   | Niedrig legierter Stahl < 800 N/ mm <sup>2</sup>        | 6 - 9       | <b>140</b>   | <1×ØD1              |            |
|   | martensitischer Edelstahl                               | 12 - 13     | <b>80</b>  | <0.8×ØD1            |            |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup> | 14.1 - 14.4 | <b>60</b>  | <1×ØD1              |            |
| K | Grauguss < 250 HB                                       | 15 - 16     | <b>110</b>   | <1×ØD1              |            |
|   | Duktiles Gusseisen, Temperguss > 250 HB                 | 17 - 20     | <b>70</b>  | <1×ØD1              |            |
| N | Alu-Knetlegierung < 12% Si                              | 21 - 22     | <b>300</b>   | <1×ØD1              |            |
|   | Alu-Gusslegierung >12% Si                               | 23 - 25     | <b>250</b>   | <1×ØD1              |            |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb              | 26 - 28     | <b>280</b>   | <1×ØD1              |            |
| S | Spezielle Nickel-Kobalt-Legierung                       | 31 - 35     | <b>80</b>  | <0.8×ØD1            |            |
|   | Titan, Titanlegierung                                   | 36 - 37     | <b>70</b>  | <0.8×ØD1            |            |
| H | Gehärteter Stahl > 45 HRC, Hartguss                     | 38 - 41     | <b>50</b>  | <0.8×ØD1            |            |

## RAMPEN

|   |   | VDI<br>3323 |  | XIDUR<br>Vc [m/min] | α<br>[°] |
|---|---|-------------|--|---------------------|----------|
| P | Unlegierter Stahl, Automaten Stahl                      | 1 - 5       |  | <b>200</b>          | 0.75     |
|   | Niedrig legierter Stahl < 800 N/ mm <sup>2</sup>        | 6 - 9       | <b>150</b>   | 0.75                |          |
|   | martensitischer Edelstahl                               | 12 - 13     | <b>110</b>   | 0.50                |          |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup> | 14.1 - 14.4 | <b>80</b>  | 0.50                |          |
| K | Grauguss < 250 HB                                       | 15 - 16     | <b>150</b>   | 0.75                |          |
|   | Duktiles Gusseisen, Temperguss > 250 HB                 | 17 - 20     | <b>100</b>   | 0.75                |          |
| N | Alu-Knetlegierung < 12% Si                              | 21 - 22     | <b>350</b>   | 1.20                |          |
|   | Alu-Gusslegierung >12% Si                               | 23 - 25     | <b>300</b>   | 1.00                |          |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb              | 26 - 28     | <b>330</b>   | 1.20                |          |
| S | Spezielle Nickel-Kobalt-Legierung                       | 31 - 35     | <b>60</b>  | 0.50                |          |
|   | Titan, Titanlegierung                                   | 36 - 37     | <b>80</b>  | 0.50                |          |
| H | Gehärteter Stahl > 45 HRC, Hartguss                     | 38 - 41     | <b>200</b>   | 0.75                |          |

$$n \text{ [U/min]} = \frac{Vc \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$Vf \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $fz$  [mm]

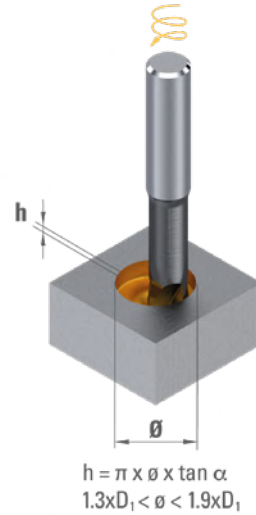
| $\emptyset D_1$<br>0.50 | $\emptyset D_1$<br>0.80 | $\emptyset D_1$<br>1.00 | $\emptyset D_1$<br>1.50 | $\emptyset D_1$<br>2.00 | $\emptyset D_1$<br>3.00 | $\emptyset D_1$<br>4.00 | $\emptyset D_1$<br>5.00 | $\emptyset D_1$<br>6.00 | $\emptyset D_1$<br>8.00 | $\emptyset D_1$<br>10.00 | $\emptyset D_1$<br>12.00 |
|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|--------------------------|
| 0.004                   | 0.021                   | 0.026                   | 0.040                   | 0.053                   | 0.079                   | 0.106                   | 0.132                   | 0.158                   | 0.211                   | 0.264                    | 0.317                    |
| 0.003                   | 0.019                   | 0.024                   | 0.036                   | 0.048                   | 0.072                   | 0.096                   | 0.120                   | 0.144                   | 0.192                   | 0.240                    | 0.288                    |
| 0.003                   | 0.015                   | 0.019                   | 0.029                   | 0.038                   | 0.058                   | 0.077                   | 0.096                   | 0.115                   | 0.154                   | 0.192                    | 0.230                    |
| 0.003                   | 0.015                   | 0.019                   | 0.029                   | 0.038                   | 0.058                   | 0.077                   | 0.096                   | 0.115                   | 0.154                   | 0.192                    | 0.230                    |
| 0.004                   | 0.015                   | 0.019                   | 0.029                   | 0.038                   | 0.058                   | 0.077                   | 0.096                   | 0.115                   | 0.154                   | 0.192                    | 0.230                    |
| 0.003                   | 0.012                   | 0.014                   | 0.022                   | 0.029                   | 0.043                   | 0.058                   | 0.072                   | 0.086                   | 0.115                   | 0.144                    | 0.173                    |
| 0.006                   | 0.032                   | 0.039                   | 0.060                   | 0.080                   | 0.119                   | 0.159                   | 0.198                   | 0.237                   | 0.317                   | 0.396                    | 0.476                    |
| 0.004                   | 0.021                   | 0.026                   | 0.040                   | 0.053                   | 0.079                   | 0.106                   | 0.132                   | 0.158                   | 0.211                   | 0.264                    | 0.317                    |
| 0.006                   | 0.032                   | 0.039                   | 0.060                   | 0.080                   | 0.119                   | 0.159                   | 0.198                   | 0.237                   | 0.317                   | 0.396                    | 0.476                    |
| 0.002                   | 0.012                   | 0.014                   | 0.022                   | 0.029                   | 0.043                   | 0.058                   | 0.072                   | 0.086                   | 0.115                   | 0.144                    | 0.173                    |
| 0.003                   | 0.013                   | 0.017                   | 0.025                   | 0.034                   | 0.050                   | 0.067                   | 0.084                   | 0.101                   | 0.134                   | 0.168                    | 0.202                    |
| 0.003                   | 0.006                   | 0.008                   | 0.012                   | 0.016                   | 0.024                   | 0.032                   | 0.040                   | 0.048                   | 0.064                   | 0.080                    | 0.096                    |

Vorschub pro Zahn  $fz$  [mm]

| $\emptyset D_1$<br>0.50 | $\emptyset D_1$<br>0.80 | $\emptyset D_1$<br>1.00 | $\emptyset D_1$<br>1.50 | $\emptyset D_1$<br>2.00 | $\emptyset D_1$<br>3.00 | $\emptyset D_1$<br>4.00 | $\emptyset D_1$<br>5.00 | $\emptyset D_1$<br>6.00 | $\emptyset D_1$<br>8.00 | $\emptyset D_1$<br>10.00 | $\emptyset D_1$<br>12.00 |
|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|--------------------------|
| 0.013                   | 0.021                   | 0.026                   | 0.040                   | 0.053                   | 0.079                   | 0.106                   | 0.132                   | 0.158                   | 0.211                   | 0.264                    | 0.317                    |
| 0.012                   | 0.019                   | 0.024                   | 0.036                   | 0.048                   | 0.072                   | 0.096                   | 0.120                   | 0.144                   | 0.192                   | 0.240                    | 0.288                    |
| 0.010                   | 0.015                   | 0.019                   | 0.029                   | 0.038                   | 0.058                   | 0.077                   | 0.096                   | 0.115                   | 0.154                   | 0.192                    | 0.230                    |
| 0.010                   | 0.015                   | 0.019                   | 0.029                   | 0.038                   | 0.058                   | 0.077                   | 0.096                   | 0.115                   | 0.154                   | 0.192                    | 0.230                    |
| 0.010                   | 0.015                   | 0.019                   | 0.029                   | 0.038                   | 0.058                   | 0.077                   | 0.096                   | 0.115                   | 0.154                   | 0.192                    | 0.230                    |
| 0.007                   | 0.012                   | 0.014                   | 0.022                   | 0.029                   | 0.043                   | 0.058                   | 0.072                   | 0.086                   | 0.115                   | 0.144                    | 0.173                    |
| 0.020                   | 0.032                   | 0.039                   | 0.060                   | 0.080                   | 0.119                   | 0.159                   | 0.198                   | 0.237                   | 0.317                   | 0.396                    | 0.476                    |
| 0.013                   | 0.021                   | 0.026                   | 0.040                   | 0.053                   | 0.079                   | 0.106                   | 0.132                   | 0.158                   | 0.211                   | 0.264                    | 0.317                    |
| 0.020                   | 0.032                   | 0.039                   | 0.060                   | 0.080                   | 0.119                   | 0.159                   | 0.198                   | 0.237                   | 0.317                   | 0.396                    | 0.476                    |
| 0.007                   | 0.012                   | 0.014                   | 0.022                   | 0.029                   | 0.043                   | 0.058                   | 0.072                   | 0.086                   | 0.115                   | 0.144                    | 0.173                    |
| 0.008                   | 0.013                   | 0.017                   | 0.025                   | 0.034                   | 0.050                   | 0.067                   | 0.084                   | 0.101                   | 0.134                   | 0.168                    | 0.202                    |
| 0.004                   | 0.006                   | 0.008                   | 0.012                   | 0.016                   | 0.024                   | 0.032                   | 0.040                   | 0.048                   | 0.064                   | 0.080                    | 0.096                    |

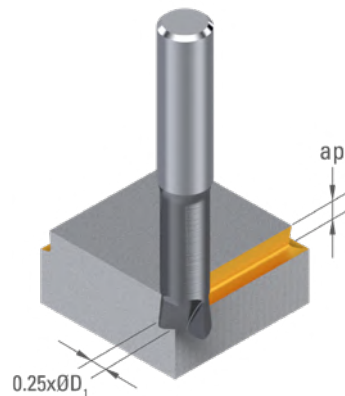
ZIRKULAR INTERPOLATION

|   |   | VDI 3323     | XIDUR Vc [m/min] | $\alpha$ [°] |
|---|---|--------------|------------------|--------------|
| P | Unlegierter Stahl, Automaten Stahl                      | 1 - 5        | 250              | 0.75°        |
|   | Niedrig legierter Stahl < 800 N/ mm <sup>2</sup>        | 6 - 9        | 200              | 0.75°        |
|   | martensitischer Edelstahl                               | 12 - 13      | 150              | 0.50°        |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup> | 14.1 - 14.42 | 110              | 0.50°        |
| K | Grauguss < 250 HB                                       | 15 - 16      | 150              | 0.75°        |
|   | Duktiles Gusseisen, Temperguss > 250 HB                 | 17 - 20      | 100              | 0.75°        |
| N | Alu-Knetlegierung < 12% Si                              | 21 - 22      | 400              | 1.20°        |
|   | Alu-Gusslegierung >12% Si                               | 23 - 25      | 350              | 1.00°        |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb              | 26 - 28      | 380              | 1.20°        |
| S | Spezielle Nickel-Kobalt-Legierung                       | 31 - 35      | 80               | 0.50°        |
|   | Titan, Titanlegierung                                   | 36 - 37      | 100              | 0.50°        |
| H | Gehärteter Stahl > 45 HRC, Hartguss                     | 38 - 41      | 200              | 0.75°        |



UMFANGSBEARBEITUNG

|   |   | VDI 3323     | XIDUR Vc [m/min] | ap [mm]   |
|---|---|--------------|------------------|-----------|
| P | Unlegierter Stahl, Automaten Stahl                      | 1 - 5        | 250              | <0.50×ØD1 |
|   | Niedrig legierter Stahl < 800 N/ mm <sup>2</sup>        | 6 - 9        | 200              | <0.50×ØD1 |
|   | martensitischer Edelstahl                               | 12 - 13      | 150              | <0.40×ØD1 |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup> | 14.1 - 14.42 | 110              | <0.40×ØD1 |
| K | Grauguss < 250 HB                                       | 15 - 16      | 150              | <0.50×ØD1 |
|   | Duktiles Gusseisen, Temperguss > 250 HB                 | 17 - 20      | 100              | <0.50×ØD1 |
| N | Alu-Knetlegierung < 12% Si                              | 21 - 22      | 400              | <0.50×ØD1 |
|   | Alu-Gusslegierung >12% Si                               | 23 - 25      | 300              | <0.50×ØD1 |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb              | 26 - 28      | 350              | <0.50×ØD1 |
| S | Spezielle Nickel-Kobalt-Legierung                       | 31 - 35      | 80               | <0.40×ØD1 |
|   | Titan, Titanlegierung                                   | 36 - 37      | 100              | <0.40×ØD1 |
| H | Gehärteter Stahl > 45 HRC, Hartguss                     | 38 - 41      | 200              | <0.40×ØD1 |



$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

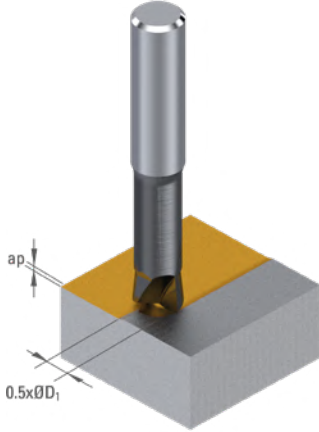
Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.50 | $\emptyset D_1$<br>0.80 | $\emptyset D_1$<br>1.00 | $\emptyset D_1$<br>1.50 | $\emptyset D_1$<br>2.00 | $\emptyset D_1$<br>3.00 | $\emptyset D_1$<br>4.00 | $\emptyset D_1$<br>5.00 | $\emptyset D_1$<br>6.00 | $\emptyset D_1$<br>8.00 | $\emptyset D_1$<br>10.00 | $\emptyset D_1$<br>12.00 |
|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|--------------------------|
| 0.018                   | 0.028                   | 0.035                   | 0.053                   | 0.070                   | 0.106                   | 0.141                   | 0.176                   | 0.211                   | 0.282                   | 0.352                    | 0.422                    |
| 0.016                   | 0.026                   | 0.032                   | 0.048                   | 0.064                   | 0.096                   | 0.128                   | 0.160                   | 0.192                   | 0.256                   | 0.320                    | 0.384                    |
| 0.013                   | 0.020                   | 0.026                   | 0.038                   | 0.051                   | 0.077                   | 0.102                   | 0.128                   | 0.154                   | 0.205                   | 0.256                    | 0.307                    |
| 0.013                   | 0.020                   | 0.026                   | 0.038                   | 0.051                   | 0.077                   | 0.102                   | 0.128                   | 0.154                   | 0.205                   | 0.256                    | 0.307                    |
| 0.013                   | 0.020                   | 0.026                   | 0.038                   | 0.051                   | 0.077                   | 0.102                   | 0.128                   | 0.154                   | 0.205                   | 0.256                    | 0.307                    |
| 0.010                   | 0.015                   | 0.019                   | 0.029                   | 0.038                   | 0.058                   | 0.077                   | 0.096                   | 0.115                   | 0.154                   | 0.192                    | 0.230                    |
| 0.027                   | 0.042                   | 0.053                   | 0.080                   | 0.105                   | 0.159                   | 0.212                   | 0.264                   | 0.317                   | 0.423                   | 0.528                    | 0.633                    |
| 0.018                   | 0.028                   | 0.035                   | 0.053                   | 0.070                   | 0.106                   | 0.141                   | 0.176                   | 0.211                   | 0.282                   | 0.352                    | 0.422                    |
| 0.027                   | 0.042                   | 0.053                   | 0.080                   | 0.105                   | 0.159                   | 0.212                   | 0.264                   | 0.317                   | 0.423                   | 0.528                    | 0.633                    |
| 0.008                   | 0.012                   | 0.015                   | 0.023                   | 0.030                   | 0.046                   | 0.061                   | 0.076                   | 0.091                   | 0.122                   | 0.152                    | 0.182                    |
| 0.011                   | 0.018                   | 0.022                   | 0.034                   | 0.045                   | 0.067                   | 0.090                   | 0.112                   | 0.134                   | 0.179                   | 0.224                    | 0.269                    |
| 0.005                   | 0.008                   | 0.010                   | 0.014                   | 0.019                   | 0.029                   | 0.038                   | 0.048                   | 0.058                   | 0.077                   | 0.096                    | 0.115                    |

Vorschub pro Zahn  $f_z$  [mm]

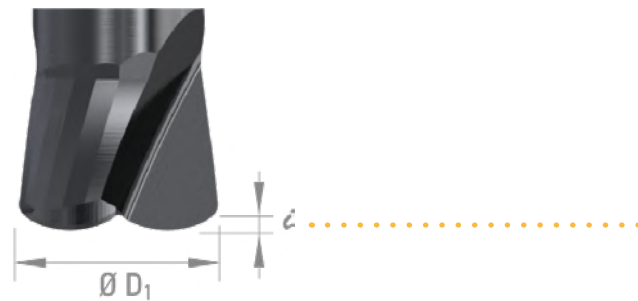
| $\emptyset D_1$<br>0.50 | $\emptyset D_1$<br>0.80 | $\emptyset D_1$<br>1.00 | $\emptyset D_1$<br>1.50 | $\emptyset D_1$<br>2.00 | $\emptyset D_1$<br>3.00 | $\emptyset D_1$<br>4.00 | $\emptyset D_1$<br>5.00 | $\emptyset D_1$<br>6.00 | $\emptyset D_1$<br>8.00 | $\emptyset D_1$<br>10.00 | $\emptyset D_1$<br>12.00 |
|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|--------------------------|
| 0.010                   | 0.017                   | 0.021                   | 0.031                   | 0.042                   | 0.062                   | 0.083                   | 0.104                   | 0.125                   | 0.166                   | 0.208                    | 0.250                    |
| 0.010                   | 0.015                   | 0.019                   | 0.029                   | 0.038                   | 0.058                   | 0.077                   | 0.096                   | 0.115                   | 0.154                   | 0.192                    | 0.230                    |
| 0.008                   | 0.013                   | 0.016                   | 0.024                   | 0.032                   | 0.048                   | 0.064                   | 0.080                   | 0.096                   | 0.128                   | 0.160                    | 0.192                    |
| 0.008                   | 0.013                   | 0.016                   | 0.024                   | 0.032                   | 0.048                   | 0.064                   | 0.080                   | 0.096                   | 0.128                   | 0.160                    | 0.192                    |
| 0.008                   | 0.013                   | 0.016                   | 0.024                   | 0.032                   | 0.048                   | 0.064                   | 0.080                   | 0.096                   | 0.128                   | 0.160                    | 0.192                    |
| 0.006                   | 0.009                   | 0.011                   | 0.017                   | 0.022                   | 0.034                   | 0.045                   | 0.056                   | 0.067                   | 0.090                   | 0.112                    | 0.134                    |
| 0.012                   | 0.020                   | 0.025                   | 0.037                   | 0.050                   | 0.074                   | 0.100                   | 0.125                   | 0.150                   | 0.199                   | 0.250                    | 0.300                    |
| 0.010                   | 0.017                   | 0.021                   | 0.031                   | 0.042                   | 0.062                   | 0.083                   | 0.104                   | 0.125                   | 0.166                   | 0.208                    | 0.250                    |
| 0.012                   | 0.020                   | 0.025                   | 0.037                   | 0.050                   | 0.074                   | 0.100                   | 0.125                   | 0.150                   | 0.199                   | 0.250                    | 0.300                    |
| 0.006                   | 0.009                   | 0.011                   | 0.017                   | 0.022                   | 0.034                   | 0.045                   | 0.056                   | 0.067                   | 0.090                   | 0.112                    | 0.134                    |
| 0.007                   | 0.011                   | 0.014                   | 0.020                   | 0.027                   | 0.041                   | 0.054                   | 0.068                   | 0.082                   | 0.109                   | 0.136                    | 0.163                    |
| 0.005                   | 0.008                   | 0.010                   | 0.014                   | 0.019                   | 0.029                   | 0.038                   | 0.048                   | 0.058                   | 0.077                   | 0.096                    | 0.115                    |

PLANFRÄSEN

|   |   | VDI 3323     |  | XIDUR Vc [m/min] | ap [mm] |
|---|---|--------------|--|------------------|---------|
| P | Unlegierter Stahl, Automaten Stahl          | 1 - 5        |  | 250              | <1x ε   |
|   | Niedrig legierter Stahl < 800 N/ mm²        | 6 - 9        |  | 200              | <1x ε   |
|   | martensitischer Edelstahl                   | 12 - 13      |  | 150              | <0.8x ε |
| M | Austenitischer rostfreier Stahl < 700 N/mm² | 14.1 - 14.42 |  | 110              | <0.8x ε |
| K | Grauguss < 250 HB                           | 15 - 16      |  | 150              | <1x ε   |
|   | Duktiles Gusseisen, Temperguss > 250 HB     | 17 - 20      |  | 100              | <1x ε   |
| N | Alu-Knetlegierung < 12% Si                  | 21 - 22      |  | 400              | <1x ε   |
|   | Alu-Gusslegierung >12% Si                   | 23 - 25      |  | 300              | <1x ε   |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26 - 28      |  | 350              | <1x ε   |
| S | Spezielle Nickel-Kobalt-Legierung           | 31 - 35      |  | 80               | <0.5x ε |
|   | Titan, Titanlegierung                       | 36 - 37      | 100  | <0.5x ε          |         |
| H | Gehärteter Stahl > 45 HRC, Hartguss         | 38 - 41      | 200  | <0.8x ε          |         |

Dieses Werkzeug hat keinen Mittenschnitt.

Der Wert ε, bezogen auf den Durchmesser des Werkzeugs, ist ein **Maximum**.





$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f_z \text{ [mm]} \times Z$$

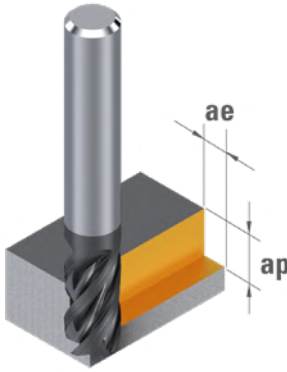
Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.50 | $\emptyset D_1$<br>0.80 | $\emptyset D_1$<br>1.00 | $\emptyset D_1$<br>1.50 | $\emptyset D_1$<br>2.00 | $\emptyset D_1$<br>3.00 | $\emptyset D_1$<br>4.00 | $\emptyset D_1$<br>5.00 | $\emptyset D_1$<br>6.00 | $\emptyset D_1$<br>8.00 | $\emptyset D_1$<br>10.00 | $\emptyset D_1$<br>12.00 |
|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|--------------------------|
| 0.022                   | 0.035                   | 0.044                   | 0.066                   | 0.088                   | 0.132                   | 0.176                   | 0.220                   | 0.264                   | 0.352                   | 0.440                    | 0.528                    |
| 0.020                   | 0.032                   | 0.040                   | 0.060                   | 0.080                   | 0.120                   | 0.160                   | 0.200                   | 0.240                   | 0.320                   | 0.400                    | 0.480                    |
| 0.016                   | 0.026                   | 0.032                   | 0.048                   | 0.064                   | 0.096                   | 0.128                   | 0.160                   | 0.192                   | 0.256                   | 0.320                    | 0.384                    |
| 0.016                   | 0.026                   | 0.032                   | 0.048                   | 0.064                   | 0.096                   | 0.128                   | 0.160                   | 0.192                   | 0.256                   | 0.320                    | 0.384                    |
| 0.016                   | 0.026                   | 0.032                   | 0.048                   | 0.064                   | 0.096                   | 0.128                   | 0.160                   | 0.192                   | 0.256                   | 0.320                    | 0.384                    |
| 0.012                   | 0.019                   | 0.024                   | 0.036                   | 0.048                   | 0.072                   | 0.096                   | 0.120                   | 0.144                   | 0.192                   | 0.240                    | 0.288                    |
| 0.026                   | 0.042                   | 0.053                   | 0.079                   | 0.106                   | 0.158                   | 0.211                   | 0.264                   | 0.317                   | 0.422                   | 0.528                    | 0.634                    |
| 0.022                   | 0.035                   | 0.044                   | 0.066                   | 0.088                   | 0.132                   | 0.176                   | 0.220                   | 0.264                   | 0.352                   | 0.440                    | 0.528                    |
| 0.026                   | 0.042                   | 0.053                   | 0.079                   | 0.106                   | 0.158                   | 0.211                   | 0.264                   | 0.317                   | 0.422                   | 0.528                    | 0.634                    |
| 0.010                   | 0.015                   | 0.019                   | 0.029                   | 0.038                   | 0.058                   | 0.077                   | 0.096                   | 0.115                   | 0.154                   | 0.192                    | 0.230                    |
| 0.014                   | 0.022                   | 0.028                   | 0.042                   | 0.056                   | 0.084                   | 0.112                   | 0.140                   | 0.168                   | 0.224                   | 0.280                    | 0.336                    |
| 0.006                   | 0.010                   | 0.012                   | 0.018                   | 0.024                   | 0.036                   | 0.048                   | 0.060                   | 0.072                   | 0.096                   | 0.120                    | 0.144                    |
| <b>0.025</b>            | <b>0.04</b>             | <b>0.05</b>             | <b>0.10</b>             | <b>0.15</b>             | <b>0.20</b>             | <b>0.25</b>             | <b>0.30</b>             | <b>0.35</b>             | <b>0.40</b>             | <b>0.45</b>              | <b>0.50</b>              |
| Der Wert $\epsilon$     |                         |                         |                         |                         |                         |                         |                         |                         |                         |                          |                          |

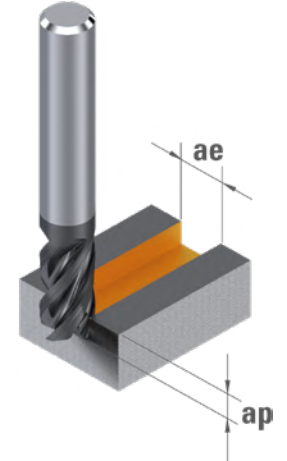
Laden Sie die Schnittbedingungen (pdf + xls) und die dxf-Profile herunter.  
auf [www.dixipolytool.com](http://www.dixipolytool.com)



## UMFANGSBEARBEITUNG

|          |   | VDI<br>3323 |   | VHM<br>Vc [m/min] | C-TOP<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |        |
|----------|---|-------------|---|-------------------|---------------------|------------|------------|--------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5       |  |                   | <b>150</b>          | <0.4×D1    | <2×ØD1     |        |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9       |   |                   | <b>125</b>          | <0.3×D1    | <2×ØD1     |        |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13     |   |                   | <b>85</b>           | <0.3×D1    | <2×ØD1     |        |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2   |   |                   |                     | <b>95</b>  | <0.3×D1    | <2×ØD1 |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4   |   |                   |                     | <b>65</b>  | <0.25×D1   | <2×ØD1 |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16     |   |                   | <b>170</b>          | <b>180</b> | <0.4×D1    | <2×ØD1 |
|          | Duktilen Gusseisen, Temperguss > 250 HB   | 17 - 20     |   |                   | <b>95</b>           | <b>130</b> | <0.3×D1    | <2×ØD1 |
| <b>N</b> | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26          |   |                   | <b>110</b>          |            | <0.4×D1    | <2×ØD1 |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28     |   |                   | <b>95</b>           |            | <0.4×D1    | <2×ØD1 |
|          | Gold, Silber  | -           |   |                   | <b>165</b>          |            | <0.4×D1    | <2×ØD1 |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31- 35      |   |                   | <b>35</b>           | <b>45</b>  | <0.15×D1   | <2×ØD1 |
|          | Titan, Titanlegierung   | 36 - 37     |   |                   | <b>60</b>           | <b>70</b>  | <0.3×D1    | <2×ØD1 |

## NUTBEARBEITUNG

|          |   | VDI<br>3323 |   | VHM<br>Vc [m/min] | C-TOP<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |          |
|----------|---|-------------|---|-------------------|---------------------|------------|------------|----------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5       |  |                   | <b>115</b>          | 1×ØD1      | <2×ØD1     |          |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9       |   |                   | <b>95</b>           | 1×ØD1      | <1.5×ØD1   |          |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13     |   |                   | <b>65</b>           | 1×ØD1      | <1×ØD1     |          |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2   |   |                   |                     | <b>70</b>  | 1×ØD1      | <1×ØD1   |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>> 700 N/mm <sup>2</sup>                         | 14.3-14.4   |   |                   |                     | <b>50</b>  | 1×ØD1      | <0.8×ØD1 |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16     |   |                   | <b>100</b>          | <b>135</b> | 1×ØD1      | <2×ØD1   |
|          | Duktilen Gusseisen, Temperguss > 250 HB   | 17 - 20     |   |                   | <b>30</b>           | <b>95</b>  | 1×ØD1      | <1×ØD1   |
| <b>N</b> | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26          |   |                   | <b>110</b>          |            | 1×ØD1      | <2×ØD1   |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28     |   |                   | <b>95</b>           |            | 1×ØD1      | <1.5×ØD1 |
|          | Gold, Silber  | -           |   |                   | <b>165</b>          |            | 1×ØD1      | <1×ØD1   |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31- 35      |   |                   | <b>30</b>           | <b>35</b>  | 1×ØD1      | <0.2×ØD1 |
|          | Titan, Titanlegierung   | 36 - 37     |   |                   | <b>50</b>           | <b>60</b>  | 1×ØD1      | <1×ØD1   |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.40 - 0.80 | $\emptyset D_1$<br>0.90 - 1.40 | $\emptyset D_1$<br>1.50 - 1.90 | $\emptyset D_1$<br>2.00 - 2.50 | $\emptyset D_1$<br>3.00 - 4.00 | $\emptyset D_1$<br>6.00 - 8.00 | $\emptyset D_1$<br>10.00 - 12.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|----------------------------------|
| 0.004 - 0.009                  | 0.010 - 0.015                  | 0.016 - 0.021                  | 0.022 - 0.027                  | 0.032 - 0.044                  | 0.065 - 0.090                  | 0.110 - 0.130                    |
| 0.004 - 0.008                  | 0.009 - 0.014                  | 0.015 - 0.019                  | 0.020 - 0.025                  | 0.030 - 0.040                  | 0.060 - 0.080                  | 0.100 - 0.120                    |
| 0.004 - 0.007                  | 0.008 - 0.013                  | 0.014 - 0.017                  | 0.018 - 0.023                  | 0.027 - 0.036                  | 0.055 - 0.070                  | 0.090 - 0.110                    |
| 0.004 - 0.007                  | 0.008 - 0.013                  | 0.014 - 0.017                  | 0.018 - 0.023                  | 0.027 - 0.036                  | 0.055 - 0.070                  | 0.090 - 0.110                    |
| 0.003 - 0.006                  | 0.007 - 0.011                  | 0.012 - 0.015                  | 0.016 - 0.020                  | 0.024 - 0.032                  | 0.050 - 0.060                  | 0.080 - 0.100                    |
| 0.005 - 0.010                  | 0.011 - 0.018                  | 0.019 - 0.024                  | 0.025 - 0.032                  | 0.038 - 0.050                  | 0.075 - 0.100                  | 0.130 - 0.150                    |
| 0.004 - 0.009                  | 0.010 - 0.015                  | 0.016 - 0.021                  | 0.022 - 0.027                  | 0.032 - 0.044                  | 0.065 - 0.090                  | 0.110 - 0.130                    |
| 0.006 - 0.012                  | 0.014 - 0.021                  | 0.023 - 0.029                  | 0.031 - 0.038                  | 0.046 - 0.062                  | 0.090 - 0.120                  | 0.150 - 0.180                    |
| 0.005 - 0.010                  | 0.011 - 0.018                  | 0.019 - 0.024                  | 0.025 - 0.032                  | 0.038 - 0.050                  | 0.075 - 0.100                  | 0.130 - 0.150                    |
| 0.004 - 0.009                  | 0.010 - 0.015                  | 0.016 - 0.021                  | 0.022 - 0.027                  | 0.032 - 0.044                  | 0.065 - 0.090                  | 0.110 - 0.130                    |
| 0.003 - 0.005                  | 0.006 - 0.009                  | 0.009 - 0.012                  | 0.013 - 0.016                  | 0.019 - 0.026                  | 0.040 - 0.050                  | 0.060 - 0.080                    |
| 0.004 - 0.009                  | 0.010 - 0.015                  | 0.016 - 0.021                  | 0.022 - 0.027                  | 0.032 - 0.044                  | 0.065 - 0.090                  | 0.110 - 0.130                    |

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.40 - 0.80 | $\emptyset D_1$<br>0.90 - 1.40 | $\emptyset D_1$<br>1.50 - 1.90 | $\emptyset D_1$<br>2.00 - 2.50 | $\emptyset D_1$<br>3.00 - 4.00 | $\emptyset D_1$<br>6.00 - 8.00 | $\emptyset D_1$<br>10.00 - 12.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|----------------------------------|
| 0.003 - 0.006                  | 0.007 - 0.010                  | 0.010 - 0.014                  | 0.014 - 0.018                  | 0.021 - 0.028                  | 0.040 - 0.060                  | 0.070 - 0.085                    |
| 0.003 - 0.005                  | 0.006 - 0.009                  | 0.010 - 0.012                  | 0.013 - 0.016                  | 0.020 - 0.026                  | 0.040 - 0.050                  | 0.065 - 0.080                    |
| 0.003 - 0.005                  | 0.005 - 0.008                  | 0.009 - 0.011                  | 0.012 - 0.015                  | 0.018 - 0.024                  | 0.035 - 0.050                  | 0.060 - 0.070                    |
| 0.003 - 0.005                  | 0.005 - 0.008                  | 0.009 - 0.011                  | 0.012 - 0.015                  | 0.018 - 0.024                  | 0.035 - 0.050                  | 0.060 - 0.070                    |
| 0.002 - 0.004                  | 0.005 - 0.007                  | 0.008 - 0.010                  | 0.010 - 0.013                  | 0.016 - 0.020                  | 0.035 - 0.040                  | 0.050 - 0.065                    |
| 0.003 - 0.007                  | 0.007 - 0.012                  | 0.012 - 0.016                  | 0.016 - 0.021                  | 0.025 - 0.032                  | 0.050 - 0.070                  | 0.085 - 0.100                    |
| 0.003 - 0.006                  | 0.007 - 0.010                  | 0.010 - 0.014                  | 0.014 - 0.018                  | 0.021 - 0.028                  | 0.040 - 0.060                  | 0.070 - 0.085                    |
| 0.004 - 0.008                  | 0.009 - 0.014                  | 0.015 - 0.019                  | 0.020 - 0.025                  | 0.030 - 0.040                  | 0.060 - 0.080                  | 0.100 - 0.115                    |
| 0.003 - 0.007                  | 0.007 - 0.012                  | 0.012 - 0.016                  | 0.016 - 0.021                  | 0.025 - 0.032                  | 0.050 - 0.070                  | 0.085 - 0.100                    |
| 0.003 - 0.006                  | 0.007 - 0.010                  | 0.010 - 0.014                  | 0.014 - 0.018                  | 0.021 - 0.028                  | 0.040 - 0.060                  | 0.070 - 0.085                    |
| 0.002 - 0.003                  | 0.004 - 0.006                  | 0.006 - 0.008                  | 0.008 - 0.010                  | 0.012 - 0.016                  | 0.025 - 0.030                  | 0.040 - 0.050                    |
| 0.003 - 0.006                  | 0.007 - 0.010                  | 0.010 - 0.014                  | 0.014 - 0.018                  | 0.021 - 0.028                  | 0.040 - 0.060                  | 0.070 - 0.085                    |

Werte basieren auf der Verwendung mit Minimalmengenschmierung. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

## ZIRKULAR INTERPOLATION

|          |   | VDI 3323  |  | VHM Vc [m/min] | C-TOP Vc [m/min] | Rampenwinkel $\alpha$ | Tiefe (mm) |
|----------|---|-----------|--|----------------|------------------|-----------------------|------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     | <p><math>h = \pi \times \varnothing \times \tan \alpha</math><br/><math>1.3 \times D_1 &lt; \varnothing &lt; 1.9 \times D_1</math></p> |                | <b>115</b>       | <30°                  | <1.5×ØD1   |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>                                       | 6 - 9     |  | <b>95</b>      | <30°             | <1.25×ØD1             |            |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> , ferritischer/ martensitischer Edelstahl | 10 - 13   |  | <b>65</b>      | <30°             | <1×ØD1                |            |
| <b>M</b> | Austenitischer rostfreier Stahl <700 N/mm <sup>2</sup>                                | 14.1-14.2 |  | <b>70</b>      | <15°             | <1×ØD1                |            |
|          | Nickelfreier rostfreier Stahl/ DUPLEX >700 N/mm <sup>2</sup>                          | 14.3-14.4 |  | <b>50</b>      | <10°             | <1×ØD1                |            |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16   |  | <b>100</b>     | <b>135</b>       | <30°                  | <1.5×ØD1   |
|          | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20   |  | <b>70</b>      | <b>95</b>        | <30°                  | <1.5×ØD1   |
| <b>N</b> | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26        |  | <b>110</b>     |                  | <35°                  | <1.5×ØD1   |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28   |  | <b>95</b>      |                  | <25°                  | <1.25×ØD1  |
|          | Gold, Silber  | -         |  | <b>165</b>     |                  | <25°                  | <1.25×ØD1  |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   | <b>30</b>  | <b>35</b>      | <5°              | <0.5×ØD1              |            |
|          | Titan, Titanlegierung   | 36 - 37   | <b>50</b>  | <b>60</b>      | <10°             | <1×ØD1                |            |

## TROCHOIDALE BEARBEITUNG

|          |   | VDI 3323  |            | VHM Vc [m/min] | C-TOP Vc [m/min] | ae (mm)   | ap (mm) |
|----------|---|-----------|------------|----------------|------------------|-----------|---------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |            |                | <b>450</b>       | <0.05×ØD1 | <2×ØD1  |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>                                       | 6 - 9     |            | <b>375</b>     | <0.04×ØD1        | <2×ØD1    |         |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> , ferritischer/ martensitischer Edelstahl | 10 - 13   |            | <b>255</b>     | <0.04×ØD1        | <2×ØD1    |         |
| <b>M</b> | Austenitischer rostfreier Stahl <700 N/mm <sup>2</sup>                                | 14.1-14.2 |            | <b>190</b>     | <0.04×ØD1        | <2×ØD1    |         |
|          | Nickelfreier rostfreier Stahl/ DUPLEX >700 N/mm <sup>2</sup>                          | 14.3-14.4 |            | <b>130</b>     | <0.04×ØD1        | <2×ØD1    |         |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16   |            | <b>470</b>     | <b>495</b>       | <0.06×ØD1 | <2×ØD1  |
|          | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20   |            | <b>260</b>     | <b>360</b>       | <0.04×ØD1 | <2×ØD1  |
| <b>N</b> | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26        |            | <b>305</b>     |                  | <0.06×ØD1 | <2×ØD1  |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28   |            | <b>260</b>     |                  | <0.04×ØD1 | <2×ØD1  |
|          | Gold, Silber  | -         |            | <b>455</b>     |                  | <0.04×ØD1 | <2×ØD1  |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   | <b>55</b>  | <b>80</b>      | <0.02×ØD1        | <2×ØD1    |         |
|          | Titan, Titanlegierung   | 36 - 37   | <b>105</b> | <b>125</b>     | <0.04×ØD1        | <2×ØD1    |         |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$


Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.40 - 0.80 | $\emptyset D_1$<br>0.90 - 1.40 | $\emptyset D_1$<br>1.50 - 1.90 | $\emptyset D_1$<br>2.00 - 2.50 | $\emptyset D_1$<br>3.00 - 4.00 | $\emptyset D_1$<br>6.00 - 8.00 | $\emptyset D_1$<br>10.00 - 12.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|----------------------------------|
| 0.002 - 0.005                  | 0.006 - 0.008                  | 0.008 - 0.011                  | 0.011 - 0.014                  | 0.017 - 0.022                  | 0.032 - 0.048                  | 0.056 - 0.068                    |
| 0.002 - 0.004                  | 0.005 - 0.007                  | 0.008 - 0.010                  | 0.010 - 0.013                  | 0.016 - 0.021                  | 0.032 - 0.040                  | 0.052 - 0.064                    |
| 0.002 - 0.004                  | 0.004 - 0.006                  | 0.007 - 0.009                  | 0.010 - 0.012                  | 0.014 - 0.019                  | 0.028 - 0.040                  | 0.048 - 0.056                    |
| 0.002 - 0.004                  | 0.004 - 0.006                  | 0.007 - 0.009                  | 0.010 - 0.012                  | 0.014 - 0.019                  | 0.028 - 0.040                  | 0.048 - 0.056                    |
| 0.002 - 0.003                  | 0.004 - 0.006                  | 0.006 - 0.008                  | 0.008 - 0.010                  | 0.013 - 0.016                  | 0.028 - 0.032                  | 0.040 - 0.052                    |
| 0.002 - 0.006                  | 0.006 - 0.010                  | 0.010 - 0.013                  | 0.013 - 0.017                  | 0.020 - 0.026                  | 0.040 - 0.056                  | 0.068 - 0.080                    |
| 0.002 - 0.005                  | 0.006 - 0.008                  | 0.008 - 0.011                  | 0.011 - 0.014                  | 0.017 - 0.022                  | 0.032 - 0.048                  | 0.056 - 0.068                    |
| 0.003 - 0.006                  | 0.007 - 0.011                  | 0.012 - 0.015                  | 0.016 - 0.020                  | 0.024 - 0.032                  | 0.048 - 0.064                  | 0.080 - 0.092                    |
| 0.002 - 0.006                  | 0.006 - 0.010                  | 0.010 - 0.013                  | 0.013 - 0.017                  | 0.020 - 0.026                  | 0.040 - 0.056                  | 0.068 - 0.080                    |
| 0.002 - 0.005                  | 0.006 - 0.008                  | 0.008 - 0.011                  | 0.011 - 0.014                  | 0.017 - 0.022                  | 0.032 - 0.048                  | 0.056 - 0.068                    |
| 0.002 - 0.002                  | 0.003 - 0.005                  | 0.005 - 0.006                  | 0.006 - 0.008                  | 0.010 - 0.013                  | 0.020 - 0.024                  | 0.032 - 0.040                    |
| 0.002 - 0.005                  | 0.006 - 0.008                  | 0.008 - 0.011                  | 0.011 - 0.014                  | 0.017 - 0.022                  | 0.032 - 0.048                  | 0.056 - 0.068                    |

Vorschub pro Zahn  $f_z$  [mm]

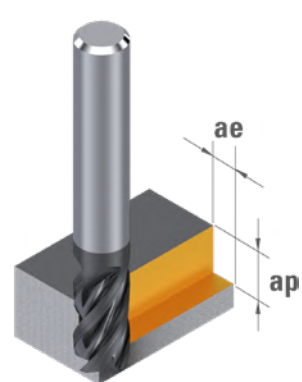
| $\emptyset D_1$<br>0.40 - 0.80 | $\emptyset D_1$<br>0.90 - 1.40 | $\emptyset D_1$<br>1.50 - 1.90 | $\emptyset D_1$<br>2.00 - 2.50 | $\emptyset D_1$<br>3.00 - 4.00 | $\emptyset D_1$<br>6.00 - 8.00 | $\emptyset D_1$<br>10.00 - 12.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|----------------------------------|
| 0.007 - 0.016                  | 0.020 - 0.031                  | 0.033 - 0.041                  | 0.044 - 0.055                  | 0.066 - 0.088                  | 0.130 - 0.170                  | 0.200 - 0.240                    |
| 0.006 - 0.015                  | 0.018 - 0.028                  | 0.030 - 0.038                  | 0.040 - 0.050                  | 0.060 - 0.080                  | 0.120 - 0.160                  | 0.180 - 0.220                    |
| 0.006 - 0.013                  | 0.016 - 0.025                  | 0.027 - 0.035                  | 0.036 - 0.046                  | 0.055 - 0.072                  | 0.110 - 0.150                  | 0.170 - 0.200                    |
| 0.006 - 0.013                  | 0.016 - 0.025                  | 0.027 - 0.035                  | 0.036 - 0.046                  | 0.055 - 0.072                  | 0.110 - 0.150                  | 0.170 - 0.200                    |
| 0.005 - 0.012                  | 0.015 - 0.023                  | 0.025 - 0.031                  | 0.033 - 0.041                  | 0.049 - 0.066                  | 0.100 - 0.130                  | 0.150 - 0.180                    |
| 0.008 - 0.019                  | 0.023 - 0.036                  | 0.038 - 0.048                  | 0.051 - 0.064                  | 0.076 - 0.102                  | 0.155 - 0.200                  | 0.240 - 0.280                    |
| 0.007 - 0.016                  | 0.020 - 0.031                  | 0.033 - 0.041                  | 0.044 - 0.055                  | 0.066 - 0.088                  | 0.130 - 0.170                  | 0.200 - 0.240                    |
| 0.010 - 0.023                  | 0.028 - 0.043                  | 0.046 - 0.059                  | 0.062 - 0.077                  | 0.093 - 0.124                  | 0.185 - 0.250                  | 0.290 - 0.340                    |
| 0.008 - 0.019                  | 0.023 - 0.036                  | 0.038 - 0.048                  | 0.051 - 0.064                  | 0.076 - 0.102                  | 0.155 - 0.200                  | 0.240 - 0.280                    |
| 0.007 - 0.016                  | 0.020 - 0.031                  | 0.033 - 0.041                  | 0.044 - 0.055                  | 0.066 - 0.088                  | 0.130 - 0.170                  | 0.200 - 0.240                    |
| 0.004 - 0.009                  | 0.011 - 0.018                  | 0.019 - 0.024                  | 0.025 - 0.032                  | 0.038 - 0.050                  | 0.075 - 0.100                  | 0.120 - 0.140                    |
| 0.007 - 0.016                  | 0.020 - 0.031                  | 0.033 - 0.041                  | 0.044 - 0.055                  | 0.066 - 0.088                  | 0.130 - 0.170                  | 0.200 - 0.240                    |

**BOHREN**

|          |   | VDI 3323  |   | VHM<br>Vc [m/min] | C-TOP<br>Vc [m/min] | Lochtiefe<br>(mm) |           |
|----------|---|-----------|---|-------------------|---------------------|-------------------|-----------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |  |                   | <b>115</b>          | <1.25×ØD1         |           |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9     |   |                   | <b>95</b>           | <1×ØD1            |           |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13   |   |                   | <b>65</b>           | <1×ØD1            |           |
| <b>M</b> | Austenitischer rostfreier Stahl <700 N/mm <sup>2</sup>                                    | 14.1-14.2 |   |                   | <b>70</b>           | <0.25×ØD1         |           |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>>700 N/mm <sup>2</sup>                          | 14.3-14.4 |   |                   | <b>50</b>           | <0.25×ØD1         |           |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16   |   |                   | <b>100</b>          | <b>135</b>        | <1.5×ØD1  |
|          | Duktilen Gusseisen, Temperguss > 250 HB   | 17 - 20   |   |                   | <b>70</b>           | <b>95</b>         | <1.5×ØD1  |
| <b>N</b> | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26        |   |                   | <b>110</b>          |                   | <1.25×ØD1 |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28   |   |                   | <b>95</b>           |                   | <1×ØD1    |
|          | Gold, Silber  | -         |   |                   | <b>165</b>          |                   | <1×ØD1    |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31- 35    |   | <b>30</b>         | <b>35</b>           | <0.5×ØD1          |           |
|          | Titan, Titanlegierung   | 36 - 37   |   | <b>60</b>         | <b>55</b>           | <0.2×ØD1          |           |

**DIXI 7253 - 7254 - 7264 - 7264-3D - 7265**

**UMFANGSBEARBEITUNG**

|          |   | VDI 3323  |  | CUTINOX<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |
|----------|---|-----------|--|-----------------------|------------|------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |  | <b>160</b>            | <0.4×ØD1   | <1×L1      |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9     |  | <b>140</b>            | <0.3×ØD1   | <1×L1      |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13   |  | <b>100</b>            | <0.3×ØD1   | <1×L1      |
| <b>M</b> | Austenitischer rostfreier Stahl <700 N/mm <sup>2</sup>                                    | 14.1-14.2 |  | <b>95</b>             | <0.3×ØD1   | <1×L1      |
|          | Nickelfreier rostfreier Stahl / DUPLEX<br>>700 N/mm <sup>2</sup>                          | 14.3-14.4 |  | <b>85</b>             | <0.25×ØD1  | <1×L1      |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16   |  | <b>180</b>            | <0.4×ØD1   | <1×L1      |
|          | Duktilen Gusseisen, Temperguss > 250 HB   | 17 - 20   |  | <b>150</b>            | <0.3×ØD1   | <1×L1      |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31- 35    |  | <b>35</b>             | <0.15×ØD1  | <1×L1      |
|          | Titan, Titanlegierung   | 36 - 37   |  | <b>65</b>             | <0.4×ØD1   | <1×L1      |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.40 - 0.80 | $\emptyset D_1$<br>0.90 - 1.40 | $\emptyset D_1$<br>1.50 - 1.90 | $\emptyset D_1$<br>2.00 - 2.50 | $\emptyset D_1$<br>3.00 - 4.00 | $\emptyset D_1$<br>6.00 - 8.00 | $\emptyset D_1$<br>10.00 - 12.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|----------------------------------|
| 0.001 - 0.003                  | 0.004 - 0.005                  | 0.005 - 0.007                  | 0.007 - 0.008                  | 0.010 - 0.013                  | 0.020 - 0.030                  | 0.035 - 0.040                    |
| 0.001 - 0.002                  | 0.003 - 0.004                  | 0.005 - 0.006                  | 0.006 - 0.008                  | 0.010 - 0.013                  | 0.020 - 0.025                  | 0.030 - 0.040                    |
| 0.001 - 0.002                  | 0.002 - 0.004                  | 0.004 - 0.005                  | 0.006 - 0.007                  | 0.008 - 0.011                  | 0.016 - 0.025                  | 0.030 - 0.035                    |
| 0.001 - 0.002                  | 0.002 - 0.004                  | 0.004 - 0.005                  | 0.006 - 0.007                  | 0.008 - 0.011                  | 0.016 - 0.025                  | 0.030 - 0.035                    |
| 0.001 - 0.002                  | 0.002 - 0.004                  | 0.004 - 0.005                  | 0.005 - 0.006                  | 0.008 - 0.010                  | 0.016 - 0.020                  | 0.025 - 0.030                    |
| 0.001 - 0.004                  | 0.004 - 0.006                  | 0.006 - 0.008                  | 0.008 - 0.010                  | 0.012 - 0.016                  | 0.024 - 0.035                  | 0.040 - 0.050                    |
| 0.001 - 0.003                  | 0.004 - 0.005                  | 0.005 - 0.007                  | 0.007 - 0.008                  | 0.010 - 0.013                  | 0.020 - 0.030                  | 0.035 - 0.040                    |
| 0.002 - 0.004                  | 0.004 - 0.007                  | 0.007 - 0.009                  | 0.010 - 0.012                  | 0.014 - 0.019                  | 0.028 - 0.040                  | 0.050 - 0.055                    |
| 0.001 - 0.004                  | 0.004 - 0.006                  | 0.006 - 0.008                  | 0.008 - 0.010                  | 0.012 - 0.016                  | 0.024 - 0.035                  | 0.040 - 0.050                    |
| 0.001 - 0.003                  | 0.004 - 0.005                  | 0.005 - 0.007                  | 0.007 - 0.008                  | 0.010 - 0.013                  | 0.020 - 0.030                  | 0.035 - 0.040                    |
| 0.001 - 0.001                  | 0.002 - 0.003                  | 0.003 - 0.004                  | 0.004 - 0.005                  | 0.006 - 0.008                  | 0.012 - 0.015                  | 0.020 - 0.025                    |
| 0.001 - 0.003                  | 0.004 - 0.005                  | 0.005 - 0.007                  | 0.007 - 0.008                  | 0.010 - 0.013                  | 0.020 - 0.030                  | 0.035 - 0.040                    |

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>1.50 - 2.00 | $\emptyset D_1$<br>3.00 - 5.00 | $\emptyset D_1$<br>6.00 - 8.00 | $\emptyset D_1$<br>10.00 - 12.00 | $\emptyset D_1$<br>16.00 - 20.00 |
|--------------------------------|--------------------------------|--------------------------------|----------------------------------|----------------------------------|
| 0.013 - 0.018                  | 0.026 - 0.045                  | 0.050 - 0.070                  | 0.090 - 0.105                    | 0.125 - 0.155                    |
| 0.012 - 0.016                  | 0.024 - 0.040                  | 0.050 - 0.060                  | 0.080 - 0.095                    | 0.110 - 0.140                    |
| 0.011 - 0.014                  | 0.022 - 0.035                  | 0.040 - 0.060                  | 0.070 - 0.085                    | 0.100 - 0.125                    |
| 0.011 - 0.014                  | 0.022 - 0.035                  | 0.040 - 0.060                  | 0.070 - 0.085                    | 0.100 - 0.125                    |
| 0.010 - 0.013                  | 0.020 - 0.030                  | 0.040 - 0.050                  | 0.065 - 0.075                    | 0.090 - 0.110                    |
| 0.016 - 0.021                  | 0.032 - 0.050                  | 0.060 - 0.080                  | 0.105 - 0.125                    | 0.145 - 0.180                    |
| 0.013 - 0.018                  | 0.026 - 0.045                  | 0.050 - 0.070                  | 0.090 - 0.105                    | 0.125 - 0.155                    |
| 0.007 - 0.010                  | 0.014 - 0.025                  | 0.030 - 0.040                  | 0.050 - 0.060                    | 0.065 - 0.085                    |
| 0.014 - 0.019                  | 0.028 - 0.050                  | 0.060 - 0.080                  | 0.095 - 0.115                    | 0.135 - 0.170                    |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

## NUTBEARBEITUNG

|   |  |           | VDI 3323 | CUTINOX Vc [m/min] | ae (mm) | ap (mm)  |
|---|--|-----------|----------|--------------------|---------|----------|
| P | Unlegierter Stahl, Automaten Stahl   | 1 - 5     |          | 110                | 1×ØD1   | <1×ØD1   |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>  | 6 - 9     |          | 100                | 1×ØD1   | <1×ØD1   |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> , ferritischer / martensitischer Edelstahl | 10 - 13   |          | 70                 | 1×ØD1   | <1×ØD1   |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                | 14.1-14.2 |          | 65                 | 1×ØD1   | <0.8×ØD1 |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                         | 14.3-14.4 |          | 60                 | 1×ØD1   | <0.5×ØD1 |
| K | Grauguss < 250 HB  | 15 - 16   |          | 125                | 1×ØD1   | <1×ØD1   |
|   | Duktiles Gusseisen, Temperguss > 250 HB  | 17 - 20   |          | 105                | 1×ØD1   | <1×ØD1   |
| S | Spezielle Nickel-Kobalt-Legierung  | 31- 35    |          | 25                 | 1×ØD1   | <0.3×ØD1 |
|   | Titan, Titanlegierung  | 36 - 37   |          | 45                 | 1×ØD1   | <0.5×ØD1 |

## TROCHOIDALE BEARBEITUNG

|   |  |           | VDI 3323 | CUTINOX Vc [m/min] | ae (mm)   | ap (mm) |
|---|--|-----------|----------|--------------------|-----------|---------|
| P | Unlegierter Stahl, Automaten Stahl   | 1 - 5     |          | 320                | <0.04×ØD1 | <1×L1   |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>  | 6 - 9     |          | 280                | <0.03×ØD1 | <1×L1   |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> , ferritischer / martensitischer Edelstahl | 10 - 13   |          | 200                | <0.03×ØD1 | <1×L1   |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                | 14.1-14.2 |          | 165                | <0.03×ØD1 | <1×L1   |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                         | 14.3-14.4 |          | 150                | <0.03×ØD1 | <1×L1   |
| K | Grauguss < 250 HB  | 15 - 16   |          | 450                | <0.04×ØD1 | <1×L1   |
|   | Duktiles Gusseisen, Temperguss > 250 HB  | 17 - 20   |          | 375                | <0.03×ØD1 | <1×L1   |
| S | Spezielle Nickel-Kobalt-Legierung  | 31- 35    |          | 55                 | <0.02×ØD1 | <1×L1   |
|   | Titan, Titanlegierung  | 36 - 37   |          | 100                | <0.04×ØD1 | <1×L1   |

## RAMPEN

|   |  |           | VDI 3323 | CUTINOX Vc [m/min] | Rampenwinkel $\alpha$ | ap (mm) |
|---|--|-----------|----------|--------------------|-----------------------|---------|
| P | Unlegierter Stahl, Automaten Stahl   | 1 - 5     |          | 135                | <8°                   | <1×L1   |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>  | 6 - 9     |          | 120                | <6°                   | <1×L1   |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> , ferritischer / martensitischer Edelstahl | 10 - 13   |          | 85                 | <5°                   | <1×L1   |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                | 14.1-14.2 |          | 80                 | <5°                   | <1×L1   |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                         | 14.3-14.4 |          | 70                 | <5°                   | <1×L1   |
| K | Grauguss < 250 HB  | 15 - 16   |          | 155                | <10°                  | <1×L1   |
|   | Duktiles Gusseisen, Temperguss > 250 HB  | 17 - 20   |          | 130                | <6°                   | <1×L1   |
| S | Spezielle Nickel-Kobalt-Legierung  | 31- 35    |          | 30                 | <3°                   | <1×L1   |
|   | Titan, Titanlegierung  | 36 - 37   |          | 55                 | <4°                   | <1×L1   |



$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>1.50 - 2.00 | $\emptyset D_1$<br>3.00 - 5.00 | $\emptyset D_1$<br>6.00 - 8.00 | $\emptyset D_1$<br>10.00 - 12.00 | $\emptyset D_1$<br>16.00 - 20.00 |
|--------------------------------|--------------------------------|--------------------------------|----------------------------------|----------------------------------|
| 0.008 - 0.011                  | 0.016 - 0.025                  | 0.030 - 0.040                  | 0.055 - 0.065                    | 0.075 - 0.095                    |
| 0.007 - 0.010                  | 0.014 - 0.025                  | 0.030 - 0.040                  | 0.050 - 0.055                    | 0.065 - 0.085                    |
| 0.007 - 0.008                  | 0.014 - 0.020                  | 0.020 - 0.040                  | 0.040 - 0.050                    | 0.060 - 0.075                    |
| 0.007 - 0.008                  | 0.014 - 0.020                  | 0.020 - 0.040                  | 0.040 - 0.050                    | 0.060 - 0.075                    |
| 0.006 - 0.008                  | 0.012 - 0.020                  | 0.020 - 0.030                  | 0.040 - 0.045                    | 0.055 - 0.065                    |
| 0.010 - 0.013                  | 0.020 - 0.030                  | 0.040 - 0.050                  | 0.065 - 0.075                    | 0.085 - 0.110                    |
| 0.008 - 0.011                  | 0.016 - 0.025                  | 0.030 - 0.040                  | 0.055 - 0.065                    | 0.075 - 0.095                    |
| 0.004 - 0.006                  | 0.008 - 0.015                  | 0.020 - 0.020                  | 0.030 - 0.035                    | 0.040 - 0.050                    |
| 0.008 - 0.011                  | 0.016 - 0.030                  | 0.036 - 0.048                  | 0.055 - 0.070                    | 0.080 - 0.100                    |

Vorschub pro Zahn  $f_z$  [mm]

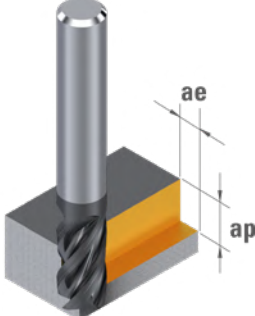
| $\emptyset D_1$<br>1.50 - 2.00 | $\emptyset D_1$<br>3.00 - 5.00 | $\emptyset D_1$<br>6.00 - 8.00 | $\emptyset D_1$<br>10.00 - 12.00 | $\emptyset D_1$<br>16.00 - 20.00 |
|--------------------------------|--------------------------------|--------------------------------|----------------------------------|----------------------------------|
| 0.018 - 0.024                  | 0.036 - 0.060                  | 0.070 - 0.100                  | 0.120 - 0.145                    | 0.170 - 0.210                    |
| 0.016 - 0.022                  | 0.032 - 0.055                  | 0.060 - 0.090                  | 0.110 - 0.130                    | 0.150 - 0.190                    |
| 0.014 - 0.019                  | 0.028 - 0.050                  | 0.060 - 0.080                  | 0.095 - 0.115                    | 0.135 - 0.170                    |
| 0.014 - 0.019                  | 0.028 - 0.050                  | 0.060 - 0.080                  | 0.095 - 0.115                    | 0.135 - 0.170                    |
| 0.013 - 0.017                  | 0.026 - 0.040                  | 0.050 - 0.070                  | 0.085 - 0.100                    | 0.120 - 0.145                    |
| 0.022 - 0.029                  | 0.044 - 0.070                  | 0.090 - 0.120                  | 0.145 - 0.175                    | 0.200 - 0.250                    |
| 0.018 - 0.024                  | 0.036 - 0.060                  | 0.070 - 0.100                  | 0.120 - 0.145                    | 0.170 - 0.210                    |
| 0.009 - 0.012                  | 0.018 - 0.030                  | 0.040 - 0.050                  | 0.060 - 0.070                    | 0.085 - 0.105                    |
| 0.018 - 0.024                  | 0.036 - 0.060                  | 0.070 - 0.100                  | 0.120 - 0.145                    | 0.170 - 0.210                    |

Vorschub pro Zahn  $f_z$  [mm]

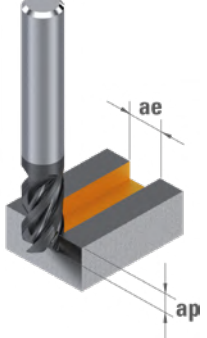
| $\emptyset D_1$<br>1.50 - 2.00 | $\emptyset D_1$<br>3.00 - 5.00 | $\emptyset D_1$<br>6.00 - 8.00 | $\emptyset D_1$<br>10.00 - 12.00 | $\emptyset D_1$<br>16.00 - 20.00 |
|--------------------------------|--------------------------------|--------------------------------|----------------------------------|----------------------------------|
| 0.007 - 0.010                  | 0.014 - 0.025                  | 0.030 - 0.040                  | 0.050 - 0.060                    | 0.065 - 0.085                    |
| 0.011 - 0.014                  | 0.022 - 0.035                  | 0.040 - 0.060                  | 0.070 - 0.085                    | 0.100 - 0.125                    |
| 0.010 - 0.013                  | 0.020 - 0.030                  | 0.040 - 0.050                  | 0.065 - 0.075                    | 0.090 - 0.110                    |
| 0.010 - 0.013                  | 0.020 - 0.030                  | 0.040 - 0.050                  | 0.065 - 0.075                    | 0.090 - 0.110                    |
| 0.008 - 0.011                  | 0.016 - 0.030                  | 0.030 - 0.040                  | 0.055 - 0.065                    | 0.080 - 0.100                    |
| 0.014 - 0.019                  | 0.028 - 0.050                  | 0.060 - 0.080                  | 0.095 - 0.115                    | 0.135 - 0.170                    |
| 0.012 - 0.016                  | 0.024 - 0.040                  | 0.050 - 0.060                  | 0.080 - 0.095                    | 0.110 - 0.140                    |
| 0.006 - 0.008                  | 0.012 - 0.020                  | 0.020 - 0.030                  | 0.040 - 0.050                    | 0.055 - 0.070                    |
| 0.013 - 0.018                  | 0.026 - 0.045                  | 0.050 - 0.070                  | 0.090 - 0.105                    | 0.125 - 0.155                    |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

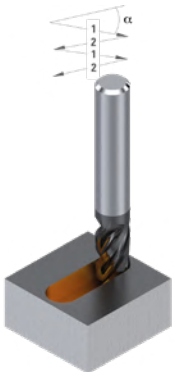
## UMFANGSBEARBEITUNG

|   |                                    | VDI<br>3323 |   | XIDUR<br>Vc [m/min] | ae<br>(mm)                | ap<br>(mm)     |
|---|------------------------------------|-------------|---|---------------------|---------------------------|----------------|
| P | Unlegierter Stahl, Automaten Stahl | 1 - 5       |  | <b>240</b>          | $<0.07 \times \text{ØD1}$ | $<1 \times L1$ |
|   | Spezielle Nickel-Kobalt-Legierung  | 31-35       |   | <b>65</b>           | $<0.04 \times \text{ØD1}$ | $<1 \times L1$ |
| H | Gehärteter Stahl (55 à 65 HRC)     | 38          |   | <b>200</b>          | $<0.03 \times \text{ØD1}$ | $<1 \times L1$ |
|   | Gehärteter Stahl (55 à 65 HRC)     | 39          |   | <b>120</b>          | $<0.02 \times \text{ØD1}$ | $<1 \times L1$ |

## NUTBEARBEITUNG

|   |                                    | VDI<br>3323 |   | XIDUR<br>Vc [m/min] | ae<br>(mm)            | ap<br>(mm)                |
|---|------------------------------------|-------------|---|---------------------|-----------------------|---------------------------|
| P | Unlegierter Stahl, Automaten Stahl | 1 - 5       |  | <b>200</b>          | $1 \times \text{ØD1}$ | $<0.05 \times \text{ØD1}$ |
|   | Spezielle Nickel-Kobalt-Legierung  | 31-35       |   | <b>55</b>           | $1 \times \text{ØD1}$ | $<0.04 \times \text{ØD1}$ |
| H | Gehärteter Stahl (55 à 65 HRC)     | 38          |   | <b>165</b>          | $1 \times \text{ØD1}$ | $<0.04 \times \text{ØD1}$ |
|   | Gehärteter Stahl (55 à 65 HRC)     | 39          |   | <b>100</b>          | $1 \times \text{ØD1}$ | $<0.02 \times \text{ØD1}$ |

## RAMPEN

|   |                                    | VDI<br>3323 |   | XIDUR<br>Vc [m/min] | Tiefe<br>(mm)            | Rampen-<br>winkel $\alpha$ |
|---|------------------------------------|-------------|---|---------------------|--------------------------|----------------------------|
| P | Unlegierter Stahl, Automaten Stahl | 1 - 5       |  | <b>180</b>          | $<1 \times \text{ØD1}$   | $<5^\circ$                 |
|   | Spezielle Nickel-Kobalt-Legierung  | 31-35       |   | <b>50</b>           | $<0.5 \times \text{ØD1}$ | $<3^\circ$                 |
| H | Gehärteter Stahl (55 à 65 HRC)     | 38          |   | <b>150</b>          | $<1 \times \text{ØD1}$   | $<3^\circ$                 |
|   | Gehärteter Stahl (55 à 65 HRC)     | 39          |   | <b>90</b>           | $<0.8 \times \text{ØD1}$ | $<2^\circ$                 |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>5.00 - 6.00 | $\varnothing D_1$<br>8.00 - 12.00 |
|----------------------------------|----------------------------------|-----------------------------------|
| 0.060 - 0.080                    | 0.100 - 0.120                    | 0.160 - 0.240                     |
| 0.039 - 0.052                    | 0.065 - 0.078                    | 0.105 - 0.160                     |
| 0.039 - 0.052                    | 0.065 - 0.078                    | 0.105 - 0.160                     |
| 0.012 - 0.016                    | 0.020 - 0.024                    | 0.030 - 0.050                     |

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>5.00 - 6.00 | $\varnothing D_1$<br>8.00 - 12.00 |
|----------------------------------|----------------------------------|-----------------------------------|
| 0.054 - 0.072                    | 0.090 - 0.108                    | 0.145 - 0.220                     |
| 0.035 - 0.047                    | 0.058 - 0.07                     | 0.095 - 0.140                     |
| 0.035 - 0.047                    | 0.058 - 0.07                     | 0.095 - 0.140                     |
| 0.011 - 0.014                    | 0.018 - 0.022                    | 0.025 - 0.050                     |

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>5.00 - 6.00 | $\varnothing D_1$<br>8.00 - 12.00 |
|----------------------------------|----------------------------------|-----------------------------------|
| 0.054 - 0.072                    | 0.090 - 0.108                    | 0.145 - 0.220                     |
| 0.035 - 0.047                    | 0.058 - 0.07                     | 0.095 - 0.140                     |
| 0.035 - 0.047                    | 0.058 - 0.07                     | 0.095 - 0.140                     |
| 0.011 - 0.014                    | 0.018 - 0.022                    | 0.025 - 0.050                     |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

## UMFANGSBEARBEITUNG

|   |   | VDI 3323              |  | VHM<br>Vc [m/min] | TiAIN<br>Vc [m/min] | DICUT<br>Vc [m/min] | DIAMANT<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |       |
|---|---|-----------------------|--|-------------------|---------------------|---------------------|-----------------------|------------|------------|-------|
| P | Unlegierter Stahl, Automaten Stahl              | 1 - 5                 |  |                   | 150                 |                     |                       | <0.3×ØD1   | <1×L1      |       |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup> | 6 - 9                 |  |                   | 125                 |                     |                       | <0.25×ØD1  | <1×L1      |       |
| K | Grauguss < 250 HB                               | 15 - 16               |  |                   | 170                 | 180                 |                       | <0.4×ØD1   | <1×L1      |       |
|   | Duktiles Gusseisen, Temperguss > 250 HB         | 17 - 20               |  |                   | 105                 | 130                 |                       | <0.3×ØD1   | <1×L1      |       |
| N | Alu-Knetlegierung < 12% Si                      | 21 - 22               |  |                   | 175                 |                     |                       | 245        | <0.4×ØD1   | <1×L1 |
|   | Alu-Gusslegierung >12% Si                       | 23 - 25               |  |                   | 150                 |                     |                       | 200        | <0.4×ØD1   | <1×L1 |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb      | 26                    |  |                   | 110                 |                     | 130                   | 150        | <0.4×ØD1   | <1×L1 |
|   | Kupferlegierung schwere Zerspanbarkeit          | 27 - 28               |  |                   | 95                  | 115                 | 115                   | 130        | <0.3×ØD1   | <1×L1 |
|   | Graphit   | -                     |  |                   |                     |                     |                       | 200        | <0.3×ØD1   | <1×L1 |
|   | Gold, Silber                                    | -                     |  |                   | 165                 |                     |                       | 230        | <0.3×ØD1   | <1×L1 |
|   | S   | Titan, Titanlegierung |  | 36 - 37           |                     | 60                  | 70                    |            | <0.3×ØD1   | <1×L1 |

## NUTBEARBEITUNG

|   |   | VDI 3323              |  | VHM<br>Vc [m/min] | TiAIN<br>Vc [m/min] | DICUT<br>Vc [m/min] | DIAMANT<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |           |
|---|---|-----------------------|--|-------------------|---------------------|---------------------|-----------------------|------------|------------|-----------|
| P | Unlegierter Stahl, Automaten Stahl              | 1 - 5                 |  |                   | 115                 |                     |                       | <1×ØD1     | <0.25×ØD1  |           |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup> | 6 - 9                 |  |                   | 95                  |                     |                       | <1×ØD1     | <0.2×ØD1   |           |
| K | Grauguss < 250 HB                               | 15 - 16               |  |                   | 100                 | 135                 |                       | <1×ØD1     | <0.5×ØD1   |           |
|   | Duktiles Gusseisen, Temperguss > 250 HB         | 17 - 20               |  |                   | 85                  | 95                  |                       | <1×ØD1     | <0.25×ØD1  |           |
| N | Alu-Knetlegierung < 12% Si                      | 21 - 22               |  |                   | 130                 |                     |                       | 180        | <1×ØD1     | <1×ØD1    |
|   | Alu-Gusslegierung >12% Si                       | 23 - 25               |  |                   | 115                 |                     |                       | 160        | <1×ØD1     | <1×ØD1    |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb      | 26                    |  |                   | 85                  |                     | 100                   | 120        | <1×ØD1     | <1×ØD1    |
|   | Kupferlegierung schwere Zerspanbarkeit          | 27 - 28               |  |                   | 70                  | 85                  | 85                    | 100        | <1×ØD1     | <0.25×ØD1 |
|   | Graphit   | -                     |  |                   |                     |                     |                       | 160        | <1×ØD1     | <0.25×ØD1 |
|   | Gold, Silber                                    | -                     |  |                   | 125                 |                     |                       | 175        | <1×ØD1     | <0.25×ØD1 |
|   | S   | Titan, Titanlegierung |  | 36 - 37           |                     | 55                  | 60                    |            | <1×ØD1     | <0.25×ØD1 |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

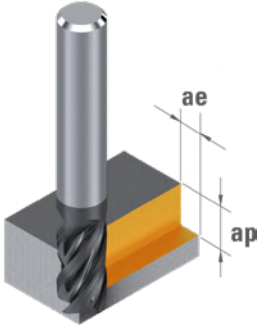
| $\varnothing D_1$<br>1.00 - 3.00 | $\varnothing D_1$<br>4.00 - 6.00 | $\varnothing D_1$<br>8.00 - 12.00 | $\varnothing D_1$<br>16.00 - 20.00 |
|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|
| 0.012 - 0.036                    | 0.048 - 0.070                    | 0.090 - 0.120                     | 0.130 - 0.140                      |
| 0.011 - 0.033                    | 0.044 - 0.065                    | 0.080 - 0.110                     | 0.120 - 0.130                      |
| 0.014 - 0.042                    | 0.056 - 0.085                    | 0.100 - 0.130                     | 0.160 - 0.170                      |
| 0.012 - 0.036                    | 0.048 - 0.070                    | 0.090 - 0.120                     | 0.130 - 0.140                      |
| 0.019 - 0.057                    | 0.076 - 0.115                    | 0.140 - 0.180                     | 0.210 - 0.230                      |
| 0.017 - 0.051                    | 0.068 - 0.100                    | 0.120 - 0.160                     | 0.190 - 0.200                      |
| 0.017 - 0.051                    | 0.068 - 0.100                    | 0.120 - 0.160                     | 0.190 - 0.200                      |
| 0.014 - 0.042                    | 0.056 - 0.085                    | 0.100 - 0.130                     | 0.160 - 0.170                      |
| 0.013 - 0.038                    | 0.050 - 0.075                    | 0.090 - 0.120                     | 0.140 - 0.150                      |
| 0.012 - 0.036                    | 0.048 - 0.070                    | 0.090 - 0.120                     | 0.130 - 0.140                      |
| 0.014 - 0.042                    | 0.056 - 0.085                    | 0.100 - 0.130                     | 0.160 - 0.170                      |

Vorschub pro Zahn  $f_z$  [mm]

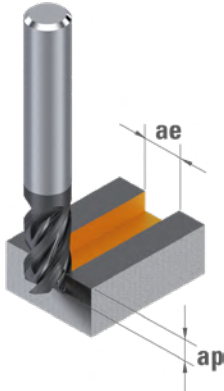
| $\varnothing D_1$<br>1.00 - 3.00 | $\varnothing D_1$<br>4.00 - 6.00 | $\varnothing D_1$<br>8.00 - 12.00 | $\varnothing D_1$<br>16.00 - 20.00 |
|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|
| 0.007 - 0.022                    | 0.028 - 0.040                    | 0.055 - 0.070                     | 0.080 - 0.085                      |
| 0.007 - 0.020                    | 0.026 - 0.040                    | 0.050 - 0.065                     | 0.070 - 0.080                      |
| 0.008 - 0.025                    | 0.034 - 0.050                    | 0.060 - 0.080                     | 0.095 - 0.100                      |
| 0.007 - 0.022                    | 0.028 - 0.040                    | 0.055 - 0.070                     | 0.080 - 0.085                      |
| 0.011 - 0.034                    | 0.046 - 0.070                    | 0.085 - 0.110                     | 0.125 - 0.140                      |
| 0.010 - 0.031                    | 0.040 - 0.060                    | 0.070 - 0.095                     | 0.115 - 0.120                      |
| 0.010 - 0.031                    | 0.040 - 0.060                    | 0.070 - 0.095                     | 0.115 - 0.120                      |
| 0.008 - 0.025                    | 0.034 - 0.050                    | 0.060 - 0.080                     | 0.095 - 0.100                      |
| 0.008 - 0.023                    | 0.030 - 0.045                    | 0.055 - 0.070                     | 0.085 - 0.090                      |
| 0.007 - 0.022                    | 0.028 - 0.040                    | 0.055 - 0.070                     | 0.080 - 0.085                      |
| 0.008 - 0.025                    | 0.034 - 0.050                    | 0.060 - 0.080                     | 0.095 - 0.100                      |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

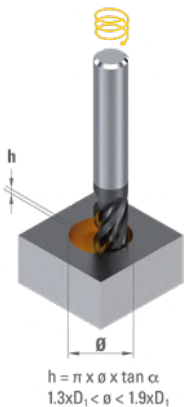
## UMFANGSBEARBEITUNG

|   |  | VDI 3323 |   | DIXI 7563<br>DIXI 7565<br>Vc [m/min] | DIXI 7563-FC<br>DIXI 7565-FC<br>Vc [m/min] | ae (mm)    | ap (mm)     |
|---|--|----------|---|--------------------------------------|--|------------|-------------|
| N | Alu-Knetlegierung < 12% Si                 | 21 - 22  |  | 385                                  | 550  | 0.45 × ØD1 | < 0.95 × L1 |
|   | Alu-Gusslegierung > 12% Si                 | 23 - 25  |   | 175                                  | 250  | 0.35 × ØD1 | < 0.95 × L1 |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26       |   | 175                                  | 250  | 0.45 × ØD1 | < 0.95 × L1 |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27 - 28  |   | 120                                  | 175  | 0.3 × ØD1  | < 0.95 × L1 |
|   | Gold, Silber                               | -        |   | 210                                  | 300  | 0.45 × ØD1 | < 0.95 × L1 |

## NUTBEARBEITUNG

|   |  | VDI 3323 |  | DIXI 7563<br>DIXI 7565<br>Vc [m/min] | DIXI 7563-FC<br>DIXI 7565-FC<br>Vc [m/min] | ae (mm) | ap (mm)     |
|---|--|----------|--|--------------------------------------|--|---------|-------------|
| N | Alu-Knetlegierung < 12% Si                 | 21 - 22  |  | 315                                  | 450  | 1 × ØD1 | < 1.2 × ØD1 |
|   | Alu-Gusslegierung > 12% Si                 | 23 - 25  |  | 140                                  | 200  | 1 × ØD1 | < 1 × ØD1   |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26       |  | 140                                  | 200  | 1 × ØD1 | < 1.2 × ØD1 |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27 - 28  |  | 100                                  | 140  | 1 × ØD1 | < 1 × ØD1   |
|   | Gold, Silber                               | -        |  | 175                                  | 250  | 1 × ØD1 | < 1 × ØD1   |

## ZIRKULAR INTERPOLATION

|   |  | VDI 3323 |  | DIXI 7563<br>DIXI 7565<br>Vc [m/min] | DIXI 7563-FC<br>DIXI 7565-FC<br>Vc [m/min] | Rampenwinkel $\alpha$ | ap (mm)     |
|---|--|----------|--|--------------------------------------|--|-----------------------|-------------|
| N | Alu-Knetlegierung < 12% Si                 | 21 - 22  |  <p><math>h = \pi \times \varnothing \times \tan \alpha</math><br/><math>1.3 \times D_1 &lt; \varnothing &lt; 1.9 \times D_1</math></p> | 315                                  | 450  | < 10°                 | < 1.2 × ØD1 |
|   | Alu-Gusslegierung > 12% Si                 | 23 - 25  |  | 140                                  | 200  | < 8°                  | < 1 × ØD1   |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26       |  | 140                                  | 200  | < 10°                 | < 1.2 × ØD1 |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27 - 28  |  | 100                                  | 140  | < 5°                  | < 1 × ØD1   |
|   | Gold, Silber                               | -        |  | 175                                  | 250  | < 5°                  | < 1 × ØD1   |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>4.00 - 6.00 | $\varnothing D_1$<br>8.00 - 10.00 | $\varnothing D_1$<br>12.00 - 16.00 |
|----------------------------------|-----------------------------------|------------------------------------|
| 0.050 - 0.080                    | 0.100 - 0.120                     | 0.140 - 0.240                      |
| 0.040 - 0.060                    | 0.080 - 0.090                     | 0.110 - 0.190                      |
| 0.050 - 0.070                    | 0.080 - 0.110                     | 0.130 - 0.210                      |
| 0.040 - 0.060                    | 0.070 - 0.080                     | 0.100 - 0.170                      |
| 0.030 - 0.050                    | 0.060 - 0.070                     | 0.080 - 0.140                      |

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>4.00 - 6.00 | $\varnothing D_1$<br>8.00 - 10.00 | $\varnothing D_1$<br>12.00 - 16.00 |
|----------------------------------|-----------------------------------|------------------------------------|
| 0.040 - 0.060                    | 0.070 - 0.080                     | 0.100 - 0.170                      |
| 0.030 - 0.040                    | 0.060 - 0.060                     | 0.080 - 0.130                      |
| 0.040 - 0.050                    | 0.006 - 0.080                     | 0.090 - 0.150                      |
| 0.030 - 0.040                    | 0.050 - 0.060                     | 0.070 - 0.120                      |
| 0.020 - 0.040                    | 0.040 - 0.050                     | 0.060 - 0.100                      |

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>4.00 - 6.00 | $\varnothing D_1$<br>8.00 - 10.00 | $\varnothing D_1$<br>12.00 - 16.00 |
|----------------------------------|-----------------------------------|------------------------------------|
| 0.030 - 0.050                    | 0.060 - 0.060                     | 0.080 - 0.140                      |
| 0.020 - 0.030                    | 0.050 - 0.050                     | 0.060 - 0.100                      |
| 0.030 - 0.040                    | 0.050 - 0.060                     | 0.070 - 0.120                      |
| 0.020 - 0.030                    | 0.040 - 0.050                     | 0.060 - 0.100                      |
| 0.020 - 0.030                    | 0.030 - 0.040                     | 0.050 - 0.080                      |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

|          |   | VDI 3323  |  | VHM<br>Vc [m/min] | DICUT<br>Vc [m/min] | TiAlN<br>Vc [m/min] | DIAMANT<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |           |
|----------|---|-----------|--|-------------------|---------------------|---------------------|-----------------------|------------|------------|-----------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |  |                   |                     | <b>175</b>          |                       | <0.5×ØD1   | <0.12×ØD1  |           |
|          | Niedrig legierter Stahl < 800 N/mm²                                       | 6 - 9     |  |                   |                     | <b>150</b>          |                       | <0.5×ØD1   | <0.1×ØD1   |           |
|          | Hochlegierter Stahl > 800 N/mm², ferritischer / martensitischer Edelstahl | 10 - 13   |  |                   |                     | <b>125</b>          |                       | <0.5×ØD1   | <0.08×ØD1  |           |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm²                               | 14.1-14.2 |  |                   |                     | <b>110</b>          |                       | <0.5×ØD1   | <0.08×ØD1  |           |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm²                        | 14.3-14.4 |  |                   |                     | <b>100</b>          |                       | <0.5×ØD1   | <0.06×ØD1  |           |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16   |  |                   | <b>225</b>          |                     | <b>250</b>            |            | <0.5×ØD1   | <0.16×ØD1 |
|          | Duktiles Gusseisen, Temperguss > 250 HB                                   | 17 - 20   |  |                   | <b>185</b>          |                     | <b>205</b>            |            | <0.5×ØD1   | <0.12×ØD1 |
| <b>N</b> | Alu-Knetlegierung < 12% Si  | 21 - 22   |  |                   |                     |                     |                       |            | <0.5×ØD1   | <0.16×ØD1 |
|          | Alu-Gusslegierung >12% Si   | 23 - 25   |  |                   |                     |                     |                       |            | <0.5×ØD1   | <0.14×ØD1 |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb                                | 26        |  |                   | <b>325</b>          | <b>300</b>          |                       |            | <0.5×ØD1   | <0.16×ØD1 |
|          | Kupferlegierung schwere Zerspanbarkeit                                    | 27 - 28   |  |                   | <b>185</b>          | <b>300</b>          |                       |            | <0.5×ØD1   | <0.12×ØD1 |
|          | Kunststoff, Holz  | 29 - 30   |  |                   | <b>250</b>          |                     |                       |            | <0.5×ØD1   | <0.2×ØD1  |
|          | Gold, Silber  | -         |  |                   |                     |                     |                       | <b>250</b> | <0.5×ØD1   | <0.2×ØD1  |
|          | Spezielle Nickel-Kobalt-Legierung   | -         |  |                   | <b>185</b>          |                     |                       |            | <0.5×ØD1   | <0.12×ØD1 |
|          | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   |  |                   |                     |                     |                       | <b>55</b>  | <0.5×ØD1   | <0.04×ØD1 |
| <b>S</b> | Titan, Titanlegierung   | 36 - 37   |  | <b>70</b>         |                     | <b>75</b>           |                       | <0.5×ØD1   | <0.1×ØD1   |           |

DIXI 7047-8D / DIXI 7047-12D ⇒ (ap & ae) -25 %  
 DIXI 7047-15D / DIXI 7047-18D ⇒ (ap & ae) -50 %



$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>0.20 - 0.60 | $\varnothing D_1$<br>0.70 - 1.00 | $\varnothing D_1$<br>1.10 - 1.50 | $\varnothing D_1$<br>1.60 - 3.00 | $\varnothing D_1$<br>4.00 - 5.00 | $\varnothing D_1$<br>6.00 - 8.00 | $\varnothing D_1$<br>10.00 - 12.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|------------------------------------|
| 0.0020 - 0.006                   | 0.007 - 0.010                    | 0.011 - 0.015                    | 0.016 - 0.030                    | 0.040 - 0.050                    | 0.060 - 0.080                    | 0.100 - 0.120                      |
| 0.0018 - 0.005                   | 0.006 - 0.009                    | 0.010 - 0.014                    | 0.014 - 0.027                    | 0.036 - 0.045                    | 0.050 - 0.070                    | 0.090 - 0.110                      |
| 0.0016 - 0.005                   | 0.006 - 0.008                    | 0.009 - 0.012                    | 0.013 - 0.024                    | 0.032 - 0.040                    | 0.050 - 0.060                    | 0.080 - 0.100                      |
| 0.0016 - 0.005                   | 0.006 - 0.008                    | 0.009 - 0.012                    | 0.013 - 0.024                    | 0.032 - 0.040                    | 0.050 - 0.060                    | 0.080 - 0.100                      |
| 0.0014 - 0.004                   | 0.005 - 0.007                    | 0.008 - 0.011                    | 0.011 - 0.021                    | 0.028 - 0.035                    | 0.040 - 0.060                    | 0.070 - 0.080                      |
| 0.0024 - 0.007                   | 0.008 - 0.012                    | 0.013 - 0.018                    | 0.019 - 0.036                    | 0.048 - 0.060                    | 0.070 - 0.100                    | 0.120 - 0.140                      |
| 0.0020 - 0.006                   | 0.007 - 0.010                    | 0.011 - 0.015                    | 0.016 - 0.030                    | 0.040 - 0.050                    | 0.060 - 0.080                    | 0.100 - 0.120                      |
| 0.0030 - 0.009                   | 0.011 - 0.015                    | 0.017 - 0.023                    | 0.024 - 0.045                    | 0.060 - 0.075                    | 0.090 - 0.120                    | 0.150 - 0.180                      |
| 0.0026 - 0.008                   | 0.009 - 0.013                    | 0.014 - 0.020                    | 0.021 - 0.039                    | 0.052 - 0.065                    | 0.080 - 0.100                    | 0.130 - 0.160                      |
| 0.0030 - 0.009                   | 0.011 - 0.015                    | 0.017 - 0.023                    | 0.024 - 0.045                    | 0.060 - 0.075                    | 0.090 - 0.120                    | 0.150 - 0.180                      |
| 0.0024 - 0.007                   | 0.008 - 0.012                    | 0.013 - 0.018                    | 0.019 - 0.036                    | 0.048 - 0.060                    | 0.070 - 0.100                    | 0.120 - 0.140                      |
| 0.0030 - 0.009                   | 0.011 - 0.015                    | 0.017 - 0.023                    | 0.024 - 0.045                    | 0.060 - 0.075                    | 0.090 - 0.120                    | 0.150 - 0.180                      |
| 0.0040 - 0.012                   | 0.014 - 0.020                    | 0.022 - 0.030                    | 0.032 - 0.060                    | 0.080 - 0.100                    | 0.120 - 0.160                    | 0.200 - 0.240                      |
| 0.0026 - 0.008                   | 0.009 - 0.013                    | 0.014 - 0.020                    | 0.021 - 0.039                    | 0.052 - 0.065                    | 0.080 - 0.100                    | 0.130 - 0.160                      |
| 0.0010 - 0.003                   | 0.004 - 0.005                    | 0.006 - 0.008                    | 0.008 - 0.015                    | 0.020 - 0.025                    | 0.030 - 0.040                    | 0.050 - 0.060                      |
| 0.0020 - 0.006                   | 0.007 - 0.010                    | 0.011 - 0.015                    | 0.016 - 0.030                    | 0.040 - 0.050                    | 0.060 - 0.080                    | 0.100 - 0.120                      |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

|          |  | VDI 3323  |  | VHM<br>Vc [m/min] | DICUT<br>Vc [m/min] | TiAIN<br>Vc [m/min] | DIAMANT<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |
|----------|--|-----------|--|-------------------|---------------------|---------------------|-----------------------|------------|------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl                                       | 1 - 5     |  |                   |                     | <b>175</b>          |                       | <0.50×ØD1  | <0.15×ØD1  |
|          | Niedrig legierter Stahl < 800 N/mm²                                      | 6 - 9     |  |                   |                     | <b>150</b>          |                       | <0.50×ØD1  | <0.12×ØD1  |
|          | Hochlegierter Stahl > 800 N/mm², ferritischer/ martensitischer Edelstahl | 10 - 13   |  |                   |                     | <b>125</b>          |                       | <0.50×ØD1  | <0.10×ØD1  |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm²                              | 14.1-14.2 |  |                   |                     | <b>110</b>          |                       | <0.50×ØD1  | <0.10×ØD1  |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm²                       | 14.3-14.4 |  |                   |                     | <b>100</b>          |                       | <0.50×ØD1  | <0.08×ØD1  |
| <b>K</b> | Grauguss < 250 HB  | 15 - 16   |  |                   | <b>225</b>          | <b>250</b>          |                       | <0.50× ØD1 | <0.20×ØD1  |
|          | Duktiles Gusseisen, Temperguss > 250 HB                                  | 17 - 20   |  |                   | <b>185</b>          | <b>205</b>          |                       | <0.50×ØD1  | <0.15×ØD1  |
| <b>N</b> | Alu-Knetlegierung < 12% Si   | 21 - 22   |  |                   | <b>325</b>          |                     |                       | <0.50×ØD1  | <0.20×ØD1  |
|          | Alu-Gusslegierung >12% Si  | 23 - 25   |  |                   | <b>275</b>          |                     |                       | <0.50×ØD1  | <0.18×ØD1  |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb                               | 26        |  |                   | <b>325</b>          | <b>300</b>          |                       | <0.50×ØD1  | <0.20×ØD1  |
|          | Kupferlegierung schwere Zerspanbarkeit                                   | 27 - 28   |  |                   | <b>185</b>          | <b>300</b>          |                       | <0.50×ØD1  | <0.15×ØD1  |
|          | Kunststoff, Holz   | 29 - 30   |  |                   | <b>250</b>          |                     |                       | <0.50× ØD1 | <0.25×ØD1  |
|          | Gold, Silber   | -         |  |                   |                     |                     | <b>250</b>            | <0.50×ØD1  | <0.25×ØD1  |
|          | Spezielle Nickel-Kobalt-Legierung  | -         |  |                   | <b>200</b>          |                     |                       | <0.50×ØD1  | <0.10×ØD1  |
|          | Spezielle Nickel-Kobalt-Legierung  | 31 - 35   |  |                   |                     | <b>55</b>           | <0.25×ØD1             | <0.05×ØD1  |            |
| <b>S</b> | Titan, Titanlegierung  | 36 - 37   |  | <b>70</b>         |                     | <b>75</b>           | <0.50×ØD1             | <0.12×ØD1  |            |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

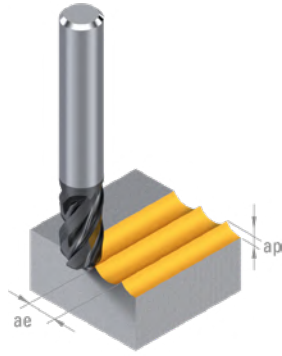
$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

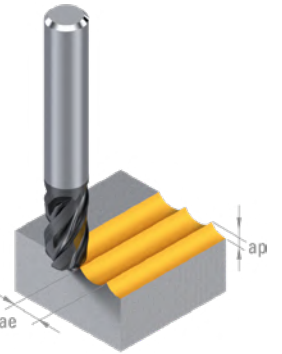
| $\emptyset D_1$<br>0.06 - 0.20 | $\emptyset D_1$<br>0.30 - 0.60 | $\emptyset D_1$<br>0.70 - 1.50 | $\emptyset D_1$<br>1.60 - 2.50 | $\emptyset D_1$<br>3.00 - 6.00 | $\emptyset D_1$<br>7.00 - 10.00 | $\emptyset D_1$<br>12.00 - 20.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|----------------------------------|
| 0.0005 - 0.0020                | 0.003 - 0.006                  | 0.007 - 0.015                  | 0.016 - 0.025                  | 0.030 - 0.060                  | 0.070 - 0.100                   | 0.120 - 0.200                    |
| 0.0004 - 0.0018                | 0.003 - 0.005                  | 0.006 - 0.014                  | 0.014 - 0.023                  | 0.028 - 0.055                  | 0.060 - 0.090                   | 0.110 - 0.180                    |
| 0.0004 - 0.0016                | 0.002 - 0.005                  | 0.006 - 0.012                  | 0.013 - 0.020                  | 0.024 - 0.050                  | 0.060 - 0.080                   | 0.100 - 0.160                    |
| 0.0004 - 0.0016                | 0.002 - 0.005                  | 0.006 - 0.012                  | 0.013 - 0.020                  | 0.024 - 0.050                  | 0.060 - 0.080                   | 0.100 - 0.160                    |
| 0.0003 - 0.0014                | 0.002 - 0.004                  | 0.005 - 0.011                  | 0.011 - 0.018                  | 0.022 - 0.040                  | 0.050 - 0.070                   | 0.080 - 0.140                    |
| 0.0006 - 0.0024                | 0.004 - 0.007                  | 0.008 - 0.018                  | 0.019 - 0.030                  | 0.036 - 0.070                  | 0.080 - 0.120                   | 0.140 - 0.240                    |
| 0.0005 - 0.0020                | 0.003 - 0.006                  | 0.007 - 0.015                  | 0.016 - 0.025                  | 0.030 - 0.060                  | 0.070 - 0.100                   | 0.120 - 0.200                    |
| 0.0007 - 0.0030                | 0.005 - 0.009                  | 0.011 - 0.023                  | 0.024 - 0.038                  | 0.046 - 0.090                  | 0.110 - 0.150                   | 0.180 - 0.300                    |
| 0.0006 - 0.0026                | 0.004 - 0.008                  | 0.009 - 0.020                  | 0.021 - 0.033                  | 0.040 - 0.080                  | 0.090 - 0.130                   | 0.160 - 0.260                    |
| 0.0007 - 0.0030                | 0.005 - 0.009                  | 0.011 - 0.023                  | 0.024 - 0.038                  | 0.046 - 0.090                  | 0.110 - 0.150                   | 0.180 - 0.300                    |
| 0.0006 - 0.0024                | 0.004 - 0.007                  | 0.008 - 0.018                  | 0.019 - 0.030                  | 0.036 - 0.070                  | 0.080 - 0.120                   | 0.140 - 0.240                    |
| 0.0007 - 0.0030                | 0.005 - 0.009                  | 0.011 - 0.023                  | 0.024 - 0.038                  | 0.046 - 0.090                  | 0.110 - 0.150                   | 0.180 - 0.300                    |
| 0.0010 - 0.0040                | 0.006 - 0.012                  | 0.014 - 0.030                  | 0.032 - 0.050                  | 0.060 - 0.120                  | 0.140 - 0.200                   | 0.240 - 0.400                    |
| 0.0006 - 0.0026                | 0.004 - 0.008                  | 0.009 - 0.020                  | 0.021 - 0.033                  | 0.040 - 0.080                  | 0.090 - 0.130                   | 0.160 - 0.260                    |
| 0.0002 - 0.0010                | 0.002 - 0.003                  | 0.004 - 0.008                  | 0.008 - 0.013                  | 0.016 - 0.030                  | 0.040 - 0.050                   | 0.060 - 0.100                    |
| 0.0005 - 0.0020                | 0.003 - 0.006                  | 0.007 - 0.015                  | 0.016 - 0.025                  | 0.030 - 0.060                  | 0.070 - 0.100                   | 0.120 - 0.200                    |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

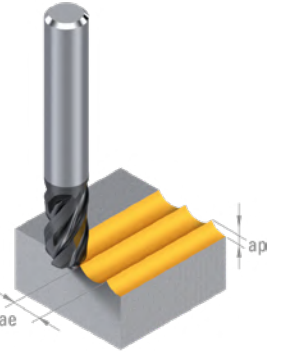
## DIXI 7532 - 7542 - 7532-3D

|          |   | VDI<br>3323 |  | XIDUR<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |
|----------|---|-------------|--|---------------------|------------|------------|
| <b>P</b> | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13     |  | <b>240</b>          | <0.3×ØD1   | <0.07×ØD1  |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31- 35      |  | <b>65</b>           | <0.3×ØD1   | <0.04×ØD1  |
| <b>H</b> | Gehärteter Stahl (50 à 55 HRC)  | 38          |  | <b>200</b>          | <0.3×ØD1   | <0.03×ØD1  |
|          | Gehärteter Stahl (55 à 65 HRC)  | 39          |  | <b>120</b>          | <0.2×ØD1   | <0.02×ØD1  |

## DIXI 7532-5D - 8D

|          |   | VDI<br>3323 |  | XIDUR<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |
|----------|---|-------------|--|---------------------|------------|------------|
| <b>P</b> | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13     |  | <b>240</b>          | <0.3×ØD1   | <0.07×ØD1  |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31- 35      |  | <b>65</b>           | <0.3×ØD1   | <0.04×ØD1  |
| <b>H</b> | Gehärteter Stahl (50 à 55 HRC)  | 38          |  | <b>200</b>          | <0.3×ØD1   | <0.03×ØD1  |
|          | Gehärteter Stahl (55 à 65 HRC)  | 39          |  | <b>120</b>          | <0.2×ØD1   | <0.02×ØD1  |

## DIXI 7532-10D - 12D - 15D

|          |   | VDI<br>3323 |  | XIDUR<br>Vc [m/min] | ae<br>(mm) | ap<br>(mm) |
|----------|---|-------------|--|---------------------|------------|------------|
| <b>P</b> | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13     |  | <b>240</b>          | <0.3×ØD1   | <0.07×ØD1  |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31- 35      |  | <b>65</b>           | <0.3×ØD1   | <0.04×ØD1  |
| <b>H</b> | Gehärteter Stahl (50 à 55 HRC)  | 38          |  | <b>200</b>          | <0.3×ØD1   | <0.03×ØD1  |
|          | Gehärteter Stahl (55 à 65 HRC)  | 39          |  | <b>120</b>          | <0.2×ØD1   | <0.02×ØD1  |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.20 - 0.40 | $\emptyset D_1$<br>0.50 - 0.70 | $\emptyset D_1$<br>0.80 - 1.00 | $\emptyset D_1$<br>1.50 - 3.00 | $\emptyset D_1$<br>4.00 - 6.00 | $\emptyset D_1$<br>8.00 - 12.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|
| 0.004 - 0.008                  | 0.010 - 0.014                  | 0.016 - 0.020                  | 0.030 - 0.060                  | 0.080 - 0.120                  | 0.160 - 0.180                   |
| 0.004 - 0.007                  | 0.009 - 0.013                  | 0.014 - 0.018                  | 0.027 - 0.054                  | 0.072 - 0.108                  | 0.144 - 0.162                   |
| 0.004 - 0.007                  | 0.009 - 0.013                  | 0.014 - 0.018                  | 0.027 - 0.054                  | 0.072 - 0.108                  | 0.144 - 0.162                   |
| 0.002 - 0.004                  | 0.005 - 0.007                  | 0.008 - 0.010                  | 0.015 - 0.030                  | 0.040 - 0.060                  | 0.080 - 0.090                   |

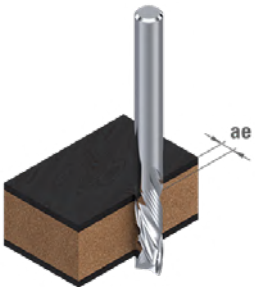
Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.20 - 0.40 | $\emptyset D_1$<br>0.50 - 0.70 | $\emptyset D_1$<br>0.80 - 1.00 | $\emptyset D_1$<br>1.50 - 3.00 | $\emptyset D_1$<br>4.00 - 6.00 | $\emptyset D_1$<br>8.00 - 12.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|
| 0.003 - 0.006                  | 0.008 - 0.011                  | 0.013 - 0.016                  | 0.024 - 0.048                  | 0.064 - 0.096                  | 0.130 - 0.145                   |
| 0.003 - 0.006                  | 0.007 - 0.010                  | 0.011 - 0.014                  | 0.022 - 0.043                  | 0.058 - 0.086                  | 0.115 - 0.130                   |
| 0.003 - 0.006                  | 0.007 - 0.010                  | 0.011 - 0.014                  | 0.022 - 0.043                  | 0.058 - 0.086                  | 0.115 - 0.130                   |
| 0.002 - 0.003                  | 0.004 - 0.006                  | 0.006 - 0.008                  | 0.012 - 0.024                  | 0.032 - 0.048                  | 0.065 - 0.070                   |

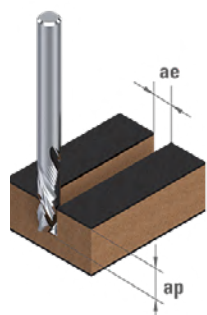
Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.20 - 0.40 | $\emptyset D_1$<br>0.50 - 0.70 | $\emptyset D_1$<br>0.80 - 1.00 | $\emptyset D_1$<br>1.50 - 3.00 | $\emptyset D_1$<br>4.00 - 6.00 | $\emptyset D_1$<br>8.00 - 12.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|
| 0.002 - 0.005                  | 0.006 - 0.009                  | 0.010 - 0.013                  | 0.019 - 0.038                  | 0.051 - 0.077                  | 0.105 - 0.115                   |
| 0.002 - 0.005                  | 0.006 - 0.008                  | 0.009 - 0.011                  | 0.018 - 0.034                  | 0.046 - 0.069                  | 0.090 - 0.105                   |
| 0.002 - 0.005                  | 0.006 - 0.008                  | 0.009 - 0.011                  | 0.018 - 0.034                  | 0.046 - 0.069                  | 0.090 - 0.105                   |
| 0.001 - 0.002                  | 0.003 - 0.005                  | 0.005 - 0.006                  | 0.010 - 0.019                  | 0.026 - 0.038                  | 0.050 - 0.055                   |


## UMFANGSBEARBEITUNG

|   |            | VDI 3323 |   | VHM Vc [m/min] | ae (mm)  |
|---|------------|----------|---|----------------|----------|
| N | Kunststoff | 29       |  | 400            | <0.4×ØD1 |
|   | Holz       | 30       |   | 350            | <0.6×ØD1 |

## NUTBEARBEITUNG

|   |            | VDI 3323 |  | VHM Vc [m/min] | ae (mm) | ap (mm)  |
|---|------------|----------|--|----------------|---------|----------|
| N | Kunststoff | 29       |  | 350            | 1×ØD1   | <1.5×ØD1 |
|   | Holz       | 30       |  | 325            | 1×ØD1   | <2×ØD1   |

## RAMPEN

|   |            | VDI 3323 |   | VHM Vc [m/min] | Rampenwinkel $\alpha$ | Tiefe (mm) |
|---|------------|----------|---|----------------|-----------------------|------------|
| N | Kunststoff | 29       |  | 350            | <10°                  | <1.5×ØD1   |
|   | Holz       | 30       |   | 325            | <15°                  | <2×ØD1     |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>6.00 - 8.00 | $\varnothing D_1$<br>10.00 - 12.00 |
|----------------------------------|------------------------------------|
| 0.085 - 0.105                    | 0.120 - 0.130                      |
| 0.070 - 0.090                    | 0.100 - 0.110                      |

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>6.00 - 8.00 | $\varnothing D_1$<br>10.00 - 12.00 |
|----------------------------------|------------------------------------|
| 0.070 - 0.085                    | 0.095 - 0.105                      |
| 0.055 - 0.070                    | 0.080 - 0.090                      |

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>6.00 - 8.00 | $\varnothing D_1$<br>10.00 - 12.00 |
|----------------------------------|------------------------------------|
| 0.045 - 0.055                    | 0.060 - 0.065                      |
| 0.035 - 0.045                    | 0.050 - 0.055                      |

Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.





## ÜBERSICHT GRAVIERSTICHEL

288



## 1/2 GRAVIERSTICHEL

292



## 2/3 GRAVIERSTICHEL

293



## 2/3 GRAVIERSTICHEL

294



## DIAMANT &amp; PKD GRAVIERSTICHEL

467



## SPIRALISIERTE GRAVIERSTICHEL

295



## VORGESCHLIFFENE AUSFÜHRUNG

296



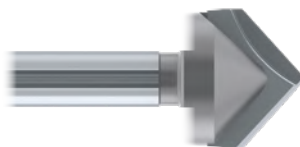
## KANTENFRÄSER

297



## MULTIFUNKTIONSFRÄSER

302



## V-NUTENFRÄSER

304



## SCHNITTBEDINGUNGEN

306

# ÜBERSICHT GRAVIERSTICHEL

✓ = Artikel ab Lager

\* nicht für eisenhaltig Werkstoff

| 1/2 GRAVIERSTICHEL                                  |  | Seite |   | <input type="checkbox"/> VHM | <input type="checkbox"/> DINAC | <input type="checkbox"/> DLC* |
|---|--|-------|---|------------------------------|--------------------------------|-------------------------------|
| <b>DIXI 7017</b><br>$\delta = 30^\circ - 120^\circ$ |  | 292   | D = 3.00-4.00<br>D <sub>1</sub> = 0.05-0.20 | ✓                            | ✓                              | ✓*                            |

| 2/3 GRAVIERSTICHEL                                 |  |     |  |   |   |  |
|--|--|-----|--|---|---|--|
| <b>DIXI 7027</b><br>$\delta = 35^\circ - 60^\circ$ |  | 293 | D = 3.00<br>D <sub>1</sub> = 0.05-0.15 | ✓ | ✓ |  |

| 3/4 GRAVIERSTICHEL                                 |  |     |   |   |   |  |
|--|--|-----|---|---|---|--|
| <b>DIXI 7007</b><br>$\delta = 30^\circ - 90^\circ$ |  | 294 | D = 3.00<br>D <sub>1</sub> = 0.05-0.20<br>R 0.05 - R 0.20 | ✓ | ✓ |  |

| SPIRALISIERTE GRAVIERSTICHEL |  |     |   |   |  |  |
|------------------------------|--|-----|---|---|--|--|
| <b>DIXI 7025</b>             |  | 295 | D = 3.00-4.00<br>D <sub>1</sub> = 0.10-0.15 | ✓ |  |  |

| VORGESCHLIFFENE AUSFÜHRUNG |  |     |   |   |  |  |
|----------------------------|--|-----|---|---|--|--|
| <b>DIXI 7012</b>           |  | 296 | D = 3.00-8.00<br>D <sub>1</sub> = 1.00-2.60 | ✓ |  |  |
| <b>DIXI 1016</b>           |  | 296 | D = 2.00-8.00                               | ✓ |  |  |
| <b>DIXI 7020</b>           |  | 296 | D = 2.00-10.00                              | ✓ |  |  |
| <b>DIXI 7024</b>           |  | 296 | D = 3.00-6.00                               | ✓ |  |  |

| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |

|              |                    |                |                        |           |               |              |                           |                                  |             |                    |                |                          |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
| ☉            | ☉                  | ○              | ○                      | ○         | ☉             | ○            | ☉                         | ☉                                | ☉           | ○                  | ○              |                          |

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|---|---|---|---|---|---|---|---|---|---|---|---|--|
| ☉ | ☉ | ☉ | ☉ | ○ | ☉ | ☉ | ☉ | ○ | ☉ | ○ | ☉ |  |
|---|---|---|---|---|---|---|---|---|---|---|---|--|

|   |   |   |   |   |   |   |   |   |   |   |   |   |
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| ○ | ☉ | ☉ | ☉ | ○ | ○ | ☉ | ☉ | ○ | ☉ | ☉ | ☉ | ○ |
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|  |  |  |  | ☉ | ☉ | ○ | ○ |  | ○ |  |  |  |
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○ gut      ☉ ausgezeichnet

| <b>KANTENFRÄSER</b>                |  | Seite |  |  |  |  |
|------------------------------------|--|-------|--|--|--|--|
| <b>DIXI 7623</b><br>Ø 0.50 - 12.00 |  | 297   |  |  |  |  |
| <b>DIXI 7625</b><br>δ = 60° - 120° |  | 298   |  |  |  |  |
| <b>DIXI 7624</b><br>Ø 0.20 - 5.70  |  | 299   |  |  |  |  |
| <b>DIXI 7656</b><br>R 0.10 - 1.00  |  | 300   |  |  |  |  |
| <b>DIXI 7658</b><br>R 1.00 - 6.00  |  | 301   |  |  |  |  |

| <b>MULTIFUNKTIONFRÄSER</b>         |  |     |  |  |  |  |
|------------------------------------|--|-----|--|--|--|--|
| <b>DIXI 7632</b><br>Ø 0.10 - 12.00 |  | 302 |  |  |  |  |

| <b>V-NUTENFRÄSER</b>               |  |     |  |  |  |  |
|------------------------------------|--|-----|--|--|--|--|
| <b>DIXI 7626</b><br>δ = 60° - 160° |  | 303 |  |  |  |  |
| <b>DIXI 7627</b><br>δ = 45° - 92°  |  | 304 |  |  |  |  |
| <b>DIXI 7628</b><br>δ = 92° - 135° |  | 305 |  |  |  |  |

| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |

| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
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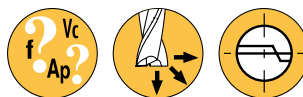
|   |   |   |   |   |   |   |   |   |   |   |   |  |
|---|---|---|---|---|---|---|---|---|---|---|---|--|
| ☉ | ○ | ○ | ○ | ☉ | ☉ | ☉ | ☉ | ○ | ☉ | ○ | ☉ |  |
| ○ |   |   |   |   | ☉ | ○ | ☉ |   | ☉ |   |   |  |
| ☉ | ○ | ○ | ○ | ☉ | ☉ | ☉ | ☉ | ○ | ☉ | ○ | ☉ |  |
| ☉ | ○ | ○ | ○ | ☉ | ☉ | ☉ | ☉ | ○ | ☉ | ○ | ☉ |  |
| ☉ | ○ | ○ | ○ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ○ | ☉ |  |

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|---|---|---|---|---|---|---|---|---|---|---|---|--|
| ○ | ○ | ○ | ○ | ☉ | ☉ | ○ | ○ | ○ | ○ | ○ | ○ |  |
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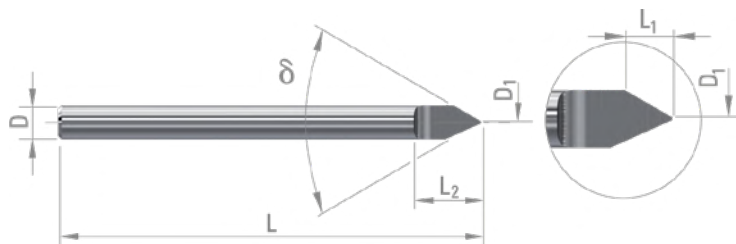
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# DIXI 7017



P.306

## 1/2 GRAVIERSTICHEL FERTIGGESCHLIFFENE AUSFÜHRUNG



- 1/2 Gravierstichel, fertiggeschliffene Ausführung.
- Für die allgemeine Gravur. Leicht nachschleifbar.
- DINAC-Beschichtung verbessert die Standzeit in Eisen und NE-Metallen.
- Die DLC-Beschichtung verbessert die Standzeit in NE-Werkstoffen.

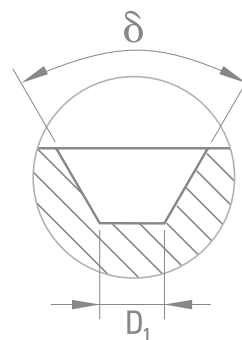
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| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |   |   |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|---|---|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLIX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |   |   |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |   |   |
| Empfehlungen           | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗                 | ⊗ | ⊗ | ⊗ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ○        | ○  | ○                | ○  | ○                  | ○  | ○ | ○ |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |  |
| Empfehlungen           | ⊗                       | ⊗  | ○                       | ○  | ○  | ⊗                 | ⊗                      | ⊗  |              |         | ⊗          |      | ○                       | ○  | ○     | ○                        | ○  |                  |    |                  |    |  |  |

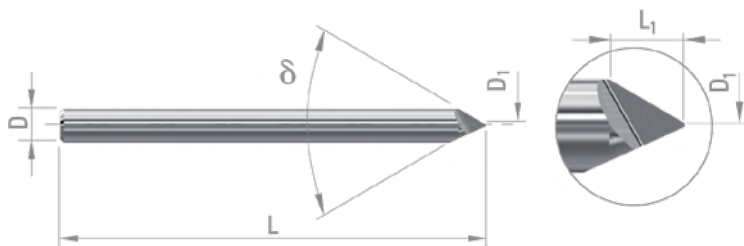
| δ    | L <sub>1</sub> | L <sub>2</sub> | D <sub>h6</sub> | L  | D <sub>1±0.01</sub> | VHM    | DINAC  | DLC *  |
|------|----------------|----------------|-----------------|----|---------------------|--------|--------|--------|
| 30°  | 4.00           | 4.00           | 3               | 38 | 0.05                | 961336 | 962814 | 961337 |
|      |                |                |                 |    | 0.10                | 961338 | 962813 | 961339 |
|      |                |                |                 |    | 0.15                | 961340 | 962812 | 961342 |
|      |                |                |                 |    | 0.20                | 961341 | 962116 | 961343 |
| 50°  | 3.00           | 6.00           | 3               | 38 | 0.05                | 961326 | 961327 |        |
|      |                |                |                 |    | 0.08                | 961328 | 961333 |        |
|      |                |                |                 |    | 0.10                | 961329 | 961332 |        |
|      |                |                |                 |    | 0.15                | 961330 | 961334 |        |
|      |                |                |                 |    | 0.20                | 961331 | 961335 |        |
| 60°  | 2.40           | 6.00           | 3               | 38 | 0.05                | 43536  | 959712 |        |
|      |                |                |                 |    | 0.08                | 972400 | 972401 |        |
|      |                |                |                 |    | 0.10                | 40939  | 959713 |        |
|      |                |                |                 |    | 0.15                | 953721 | 960610 |        |
|      |                |                |                 |    | 0.20                | 954292 | 960611 |        |
| 60°  | 3.30           | 8.00           | 4               | 50 | 0.05                | 43537  | 959714 |        |
|      |                |                |                 |    | 0.10                | 45813  | 959716 |        |
|      |                |                |                 |    | 0.20                | 45814  | 959717 |        |
| 90°  | 1.45           | 8.00           | 3               | 38 | 0.05                | 961246 | 961248 |        |
|      |                |                |                 |    | 0.10                | 961247 | 961249 |        |
| 120° | 0.84           | 8.00           | 3               | 38 | 0.05                | 961322 | 961323 |        |
|      |                |                |                 |    | 0.10                | 961324 | 961325 |        |

\* nicht für eisenhaltige Werkstoffe





2/3 GRAVIERSTICHEL  
FERTIGGESCHLIFFENE AUSFÜHRUNG



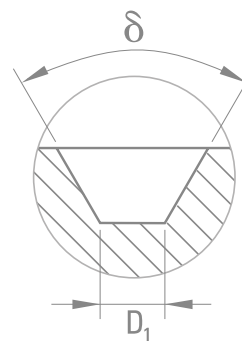
- 2/3 Gravierstichel, fertiggeschliffene Ausführung.
- Bessere Stabilität im Vergleich zu einem 1/2-Schliff.
- DINAC-Beschichtung verbessert die Standzeit in Eisen und NE-Metallen.

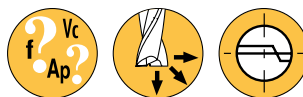
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| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |                                      |    | M    |      |          |                  | K  |                    |    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|--------------------------------------|----|------|------|----------|------------------|----|--------------------|----|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl | Aust. Rostfreier Stahl (DUPLEX / PH) |    |      |      | Grauguss | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12                                   | 13 | 14.1 | 14.2 | 14.3     | 14.4             | 15 | 16                 | 17 | 18 | 19 | 20 |
| Empfehlungen           | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗              | ⊗                | ⊗                                    | ⊗  | ⊗    | ⊗    | ○        | ○                | ○  | ○                  | ○  | ○  | ○  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen           | ⊗                       | ⊗  | ⊗                       | ⊗  | ⊗  | ⊗                 | ⊗                      | ⊗  | ⊗            |         |            | ○    | ○                       | ○  | ○     | ○                        | ⊗  | ⊗                |    |                  |    |  |

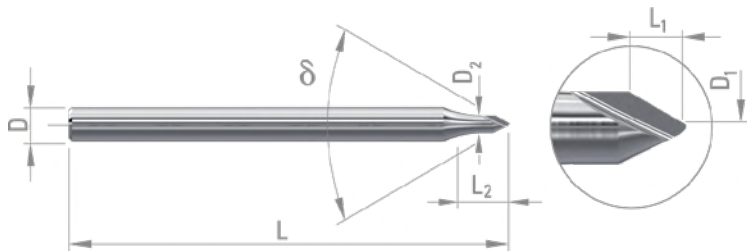
| δ   | L <sub>1</sub> | D <sub>h5</sub> | L  | D <sub>1±0.01</sub> | VHM    | DINAC  |
|-----|----------------|-----------------|----|---------------------|--------|--------|
| 35° | 4.60           | 3               | 38 | 0.05                | 326662 | 326682 |
|     |                |                 |    | 0.07                | 326663 | 326683 |
|     |                |                 |    | 0.08                | 326664 | 326684 |
|     |                |                 |    | 0.10                | 326665 | 326685 |
| 40° | 3.90           | 3               | 38 | 0.05                | 326666 | 326686 |
|     |                |                 |    | 0.07                | 326667 | 326687 |
|     |                |                 |    | 0.08                | 326668 | 326688 |
|     |                |                 |    | 0.10                | 326669 | 326689 |
|     |                |                 |    | 0.15                | 326670 | 326690 |
| 50° | 3.10           | 3               | 38 | 0.05                | 326671 | 326691 |
|     |                |                 |    | 0.07                | 326672 | 326692 |
|     |                |                 |    | 0.08                | 326673 | 326693 |
|     |                |                 |    | 0.10                | 326674 | 326694 |
|     |                |                 |    | 0.15                | 326675 | 326695 |
| 60° | 2.50           | 3               | 38 | 0.05                | 326676 | 326696 |
|     |                |                 |    | 0.06                | 326677 | 326697 |
|     |                |                 |    | 0.07                | 326678 | 326698 |
|     |                |                 |    | 0.08                | 326679 | 326699 |
|     |                |                 |    | 0.10                | 326680 | 326700 |
|     |                |                 |    | 0.15                | 326681 | 326701 |





P.306

3/4 GRAVIERSTICHEL  
FERTIGGESCHLIFFENE AUSFÜHRUNG



- 3/4 Gravierstichel, fertiggeschliffene Ausführung.
- Bessere Stabilität im Vergleich zur halbierten Ausführung.
- DINAC-Beschichtung verbessert die Standzeit in Eisen und NE-Metallen.

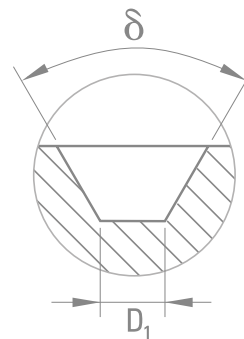
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| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |   |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|---|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |   |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |   |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ○        | ○  | ○                | ○  | ○                  | ○  | ○ |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |   |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|---|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |   |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |   |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ○                 | ○                      | ○  | ○            | ○       | ○          | ○    | ○                       | ○  | ○     | ○                        | ○  | ○  | ○                | ○  | ○                | ○ |

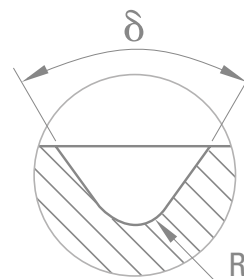
δ    L<sub>1</sub>    L<sub>2</sub>    D<sub>2</sub>    D<sub>h6</sub>    L    D<sub>1±0.01</sub>    VHM    DINAC

|     |      |      |      |   |    |      |        |        |
|-----|------|------|------|---|----|------|--------|--------|
| 30° | 2.50 | 3.40 | 1.50 | 3 | 38 | 0.05 | 976370 | 976374 |
|     |      |      |      |   |    | 0.08 | 976371 | 976375 |
|     |      |      |      |   |    | 0.10 | 976372 | 976376 |
|     |      |      |      |   |    | 0.15 | 976373 | 976377 |
| 35° | 2.00 | 3.40 | 1.50 | 3 | 38 | 0.05 | 65846  | 959722 |
|     |      |      |      |   |    | 0.08 | 961244 | 961245 |
|     |      |      |      |   |    | 0.10 | 65848  | 959724 |
|     |      |      |      |   |    | 0.15 | 65850  | 959725 |
| 40° | 1.70 | 3.20 | 1.50 | 3 | 38 | 0.05 | 961225 | 961238 |
|     |      |      |      |   |    | 0.08 | 961242 | 961243 |
|     |      |      |      |   |    | 0.10 | 961226 | 961239 |
|     |      |      |      |   |    | 0.15 | 961227 | 961240 |
| 50° | 1.40 | 2.30 | 1.50 | 3 | 38 | 0.05 | 976258 | 976264 |
|     |      |      |      |   |    | 0.08 | 976260 | 976265 |
|     |      |      |      |   |    | 0.10 | 976261 | 976266 |
|     |      |      |      |   |    | 0.15 | 976263 | 976267 |
| 60° | 1.10 | 2.30 | 1.50 | 3 | 38 | 0.05 | 976361 | 976365 |
|     |      |      |      |   |    | 0.08 | 976362 | 976366 |
|     |      |      |      |   |    | 0.10 | 976363 | 976367 |
|     |      |      |      |   |    | 0.15 | 976364 | 976368 |
| 90° | 0.60 | 2.30 | 1.50 | 3 | 38 | 0.10 | 414120 | 414121 |
|     |      |      |      |   |    | 0.15 | 414122 | 414123 |



δ    L<sub>1</sub>    L<sub>2</sub>    D<sub>2</sub>    D<sub>h6</sub>    L    R<sub>±0.01</sub>    VHM    DINAC

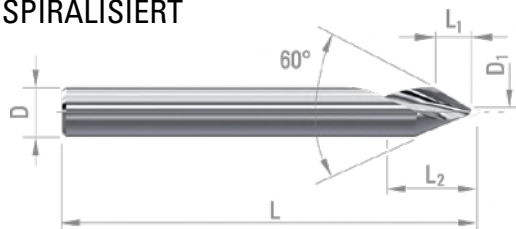
|     |      |      |      |   |    |      |       |        |
|-----|------|------|------|---|----|------|-------|--------|
| 35° | 1.90 | 3.40 | 1.50 | 3 | 38 | 0.05 | 51736 | 959718 |
|     |      |      |      |   |    | 0.10 | 51625 | 959719 |
|     |      |      |      |   |    | 0.15 | 51734 | 959720 |
|     |      |      |      |   |    | 0.20 | 51735 | 959721 |







**GRAVIERSTICHEL, 60°  
FERTIGGESCHLIFFENE AUSFÜHRUNG  
SPIRALISIERT**



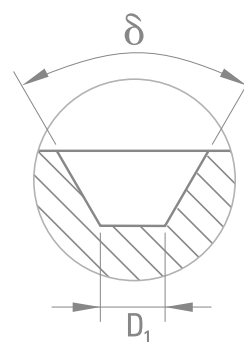
- Gravierstichel, 60°, fertiggeschliffene Ausführung, spiralisiert. Werkzeuge entwickelt für die Tiefengravur von weichen Materialien.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |                  |    |    |                                      |      |      |      | ⊙        | ⊙  |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ○                       | ○  | ○  | ○                 | ○                      | ○  | ○            |         |            |      |                         |    |       |                          |    |                  |    |                  |    |

| $D_{1 \pm 0.02}$ | $L_1$ | $L_2$ | $D_{h5}$ | L  | VHM   |
|------------------|-------|-------|----------|----|-------|
| 0.10             | 2.50  | 9     | 3        | 38 | 43624 |
| 0.15             | 3.30  | 12    | 4        | 50 | 45812 |



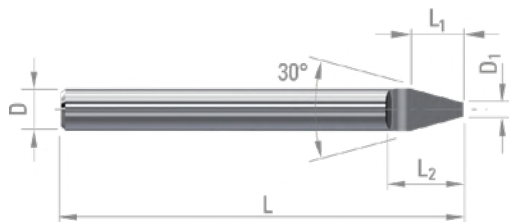
## DIXI 7012

### 1/2 GRAVIERSTICHEL, 30° VORGESCHLIFFENE AUSFÜHRUNG

| $D_1$ | $L_1$ | $L_2$ | $D_{h5}$ | L  | VHM   |
|-------|-------|-------|----------|----|-------|
| *1.00 | 3.70  | 4     | 3        | 38 | 35505 |
| *1.30 | 5.00  | 5     | 4        | 50 | 35666 |
| *2.00 | 7.50  | 8     | 6        | 57 | 35506 |
| *2.60 | 10.00 | 10    | 8        | 63 | 35668 |

\* nicht schneidend

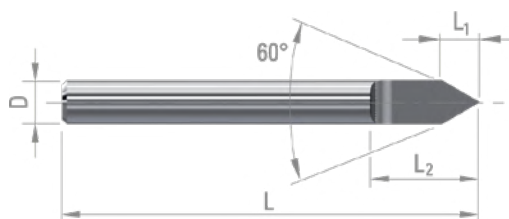
- 1/2 Gravierstichel, 30°, vorgeschliffene Ausführung. Diese Werkzeuge müssen entsprechend der Form und dem zu bearbeitenden Material geschliffen werden.



## DIXI 7016

### GRAVIERSTICHEL, 60° VORGESCHLIFFENE AUSFÜHRUNG

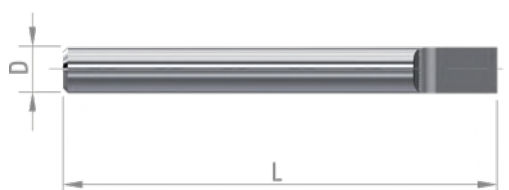
| $D_{h5}$ | $L_1$ | $L_2$ | L  | VHM   |
|----------|-------|-------|----|-------|
| 2        | 1.70  | 4     | 25 | 32852 |
| 3        | 2.60  | 6     | 38 | 23585 |
| 4        | 3.50  | 8     | 50 | 23586 |
| 5        | 4.30  | 10    | 50 | 35082 |
| 6        | 5.20  | 12    | 57 | 29726 |
| 8        | 6.90  | 14    | 63 | 29727 |



## DIXI 7020

### GRAVIERSTICHEL, 180° VORGESCHLIFFENE AUSFÜHRUNG

| $D_{h5}$ | $L_1$ | L  | VHM   |
|----------|-------|----|-------|
| 2        | 3     | 25 | 35671 |
| 3        | 4     | 38 | 35672 |
| 4        | 5     | 50 | 35673 |
| 5        | 6     | 50 | 35674 |
| 6        | 8     | 57 | 35675 |
| 8        | 10    | 63 | 35676 |
| 10       | 12    | 72 | 35677 |

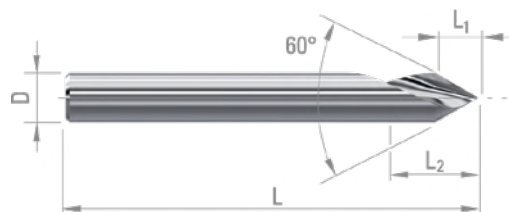


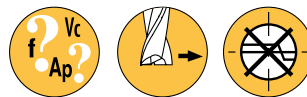
## DIXI 7024

### GRAVIERSTICHEL, 60° VORGESCHLIFFENE AUSFÜHRUNG SPIRALISIERT

| $D_{h5}$ | $L_1$ | $L_2$ | L  | VHM   |
|----------|-------|-------|----|-------|
| 3        | 2.60  | 9     | 38 | 35678 |
| 4        | 3.50  | 12    | 50 | 35679 |
| 6        | 5.20  | 15    | 50 | 35680 |

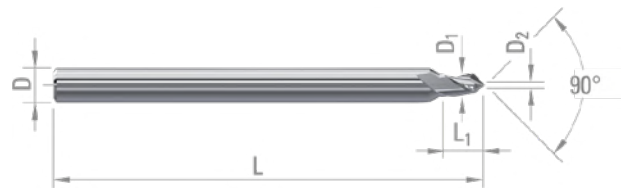
- Gravierstichel, 60°, vorgeschliffene Ausführung, spiralisiert. Diese Werkzeuge müssen entsprechend der Form und dem zu bearbeitenden Material geschliffen werden.





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**KANTENFRÄSER**



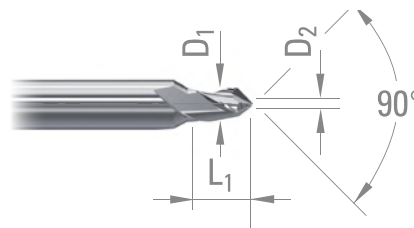
- Kantenfräser 90°. Werkzeuge angepasst an alle Arten von Materialien.
- TiAIN-Beschichtung verbessert die Standzeit in Stahl.

○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen           | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗ | ○                 | ○ | ○ | ○ | ○              | ○                | ○  | ○  | ○    | ○                                    | ○    | ○        | ⊗  | ⊗                | ○  | ○                  | ○  | ○  |

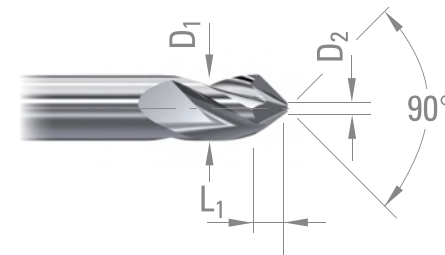
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊗                       | ⊗  | ⊗                       | ⊗  | ⊗  | ⊗                 | ⊗                      | ⊗  | ⊗            |         | ○          | ○    | ○                       | ○  |       | ⊗                        | ⊗  |                  |    |                  |    |

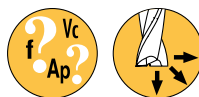
| D <sub>1 e8</sub><br>Ø<2.00 - 0/-0.01<br>Ø<3.00 - 0/-0.02 | L <sub>1</sub> | D <sub>2 ± 0.05</sub> | D <sub>h5</sub> | L  | VHM    | TiAIN  |
|---|----------------|-----------------------|-----------------|----|--------|--------|
| *0.50   | 1.50           | 0.05                  | 3               | 38 | 983778 |        |
| *0.80   | 1.50           | 0.08                  | 3               | 38 | 956868 | 956870 |
| *1.00   | 2.00           | 0.10                  | 3               | 38 | 956867 | 956869 |
| *2.00   | 3.00           | 0.20                  | 3               | 38 | 956865 | 956866 |
| *3.00   | 5.00           | 0.30                  | 3               | 38 | 956861 | 956862 |
| *4.00   | 6.00           | 0.40                  | 4               | 50 | 956863 | 956864 |



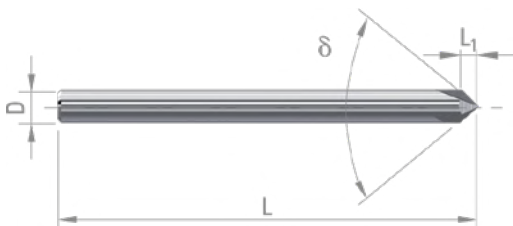
\* schneidend

| D <sub>1 h5</sub> | L <sub>1</sub> | D <sub>2 ± 0.05</sub> | D <sub>h5</sub> | L  | VHM   | TiAIN  |
|-------------------|----------------|-----------------------|-----------------|----|-------|--------|
| 5.00              | 2.25           | 0.50                  | 5               | 50 | 49019 | 952294 |
| 6.00              | 2.70           | 0.60                  | 6               | 57 | 49020 | 63603  |
| 8.00              | 3.60           | 0.80                  | 8               | 63 | 49021 | 950927 |
| 10.00             | 4.50           | 1.00                  | 10              | 72 | 49022 | 63604  |
| 12.00             | 5.40           | 1.20                  | 12              | 73 | 49023 | 952295 |





KANTENFRÄSER

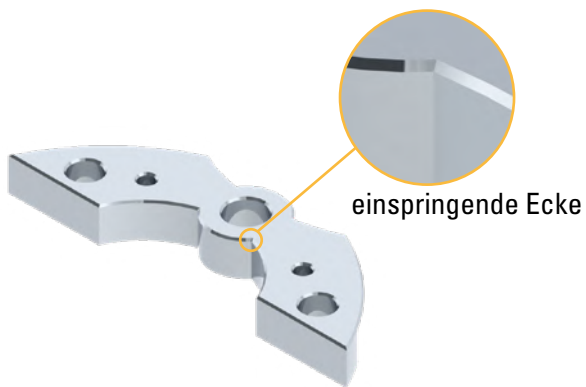


○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEx/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ |                   |   |   |   |                |    |                  |    |                                    |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      |                         |    |       |                          |    |                  |    |                  |    |

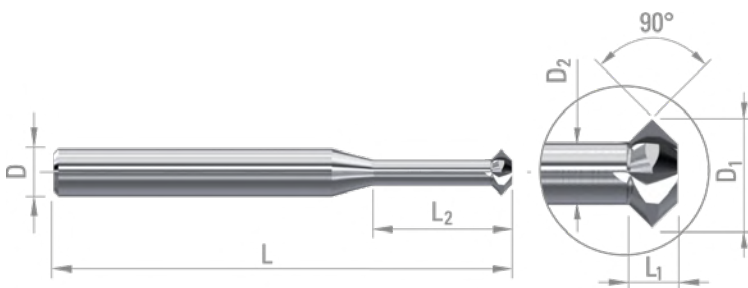
| δ    | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    |
|------|----------------|-----------------|----|--------|
| 60°  | 2.60           | 3               | 38 | 310782 |
| 90°  | 1.50           | 3               | 38 | 306130 |
| 120° | 0.90           | 3               | 38 | 312243 |





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SENKFRÄSER DOPPELSEITIG



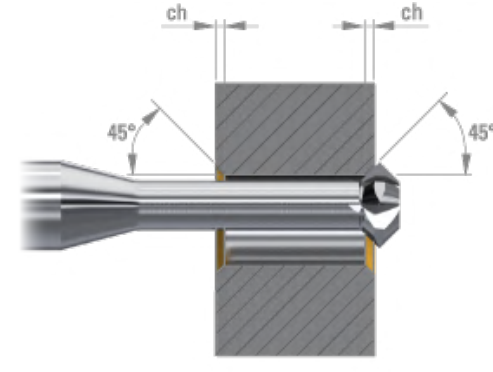
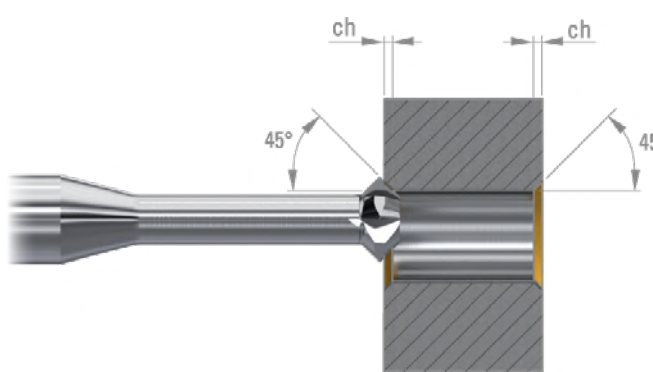
- Kantenfräser, doppelfase entwickelt für Vorund Rückwärtsfasen.

○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗ | ○                 | ○ | ○ | ○ | ○              | ○                | ○  | ○  | ○                                    | ○    | ○    | ○    | ⊗        | ⊗  | ○                | ○  | ○                  | ○  |

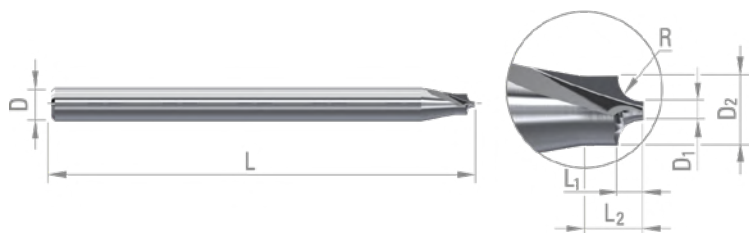
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊗                       | ⊗  | ⊗                       | ⊗  | ⊗  | ⊗                 | ⊗                      | ⊗  | ⊗            |         | ○          | ○    | ○                       | ○  |       | ⊗                        | ⊗  |                  |    |                  |    |

| D <sub>10/-0.02</sub> | L <sub>1</sub> | D <sub>2</sub> | L <sub>2</sub> | ch   | D <sub>h5</sub> | L  | Z | VHM    |
|-----------------------|----------------|----------------|----------------|------|-----------------|----|---|--------|
| 0.20                  | 0.11           | 0.12           | 0.40           | 0.04 | 3               | 38 | 1 | 997990 |
| 0.25                  | 0.13           | 0.15           | 0.50           | 0.05 | 3               | 38 | 1 | 997991 |
| 0.30                  | 0.15           | 0.18           | 0.60           | 0.06 | 3               | 38 | 1 | 997992 |
| 0.40                  | 0.19           | 0.24           | 0.80           | 0.08 | 3               | 38 | 1 | 997993 |
| 0.50                  | 0.23           | 0.30           | 1.00           | 0.10 | 3               | 38 | 1 | 997994 |
| 0.60                  | 0.31           | 0.36           | 1.20           | 0.12 | 3               | 38 | 3 | 997995 |
| 0.70                  | 0.35           | 0.42           | 1.40           | 0.14 | 3               | 38 | 3 | 997996 |
| 0.80                  | 0.40           | 0.48           | 1.60           | 0.16 | 3               | 38 | 3 | 997997 |
| 0.90                  | 0.44           | 0.54           | 1.80           | 0.18 | 3               | 38 | 3 | 997998 |
| 1.00                  | 0.49           | 0.60           | 2.00           | 0.20 | 3               | 38 | 3 | 997999 |
| 1.20                  | 0.60           | 0.70           | 2.40           | 0.25 | 3               | 38 | 4 | 998000 |
| 1.30                  | 0.67           | 0.70           | 2.60           | 0.30 | 3               | 38 | 4 | 998001 |
| 1.80                  | 0.92           | 1.00           | 5.40           | 0.40 | 3               | 38 | 4 | 998002 |
| 2.80                  | 1.36           | 1.60           | 8.40           | 0.60 | 3               | 38 | 4 | 998003 |
| 3.70                  | 1.80           | 2.10           | 11.10          | 0.80 | 6               | 57 | 4 | 998004 |
| 5.70                  | 2.68           | 3.30           | 17.10          | 1.20 | 6               | 57 | 4 | 998005 |





VIERTELKREIS-KANTENFRÄSER



- Viertelkreis-Kantenfräser. Für alle Arten von Materialien geeignet.
- TiAIN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

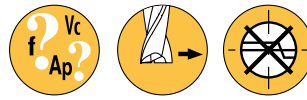
○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                    | ○    | ○    | ○    | ⊙        | ⊙  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ○          | ○    | ○                       | ○  |       | ⊙                        | ⊙  |                  |    |                  |    |

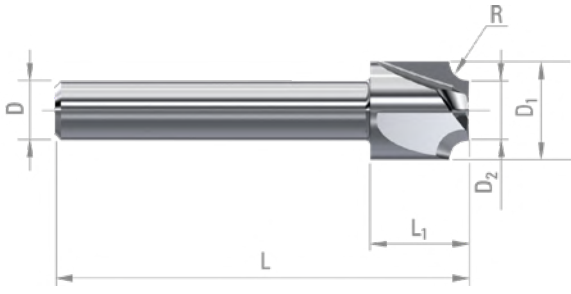
| R <sub>±0.02</sub> | D <sub>1</sub> <sup>*</sup> | L <sub>1</sub> | D <sub>2</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | VHM    | TiAIN  |
|--------------------|-----------------------------|----------------|----------------|----------------|-----------------|----|--------|--------|
| 0.10               | 0.50                        | 0.12           | 0.74           | 0.80           | 3               | 38 | 969577 | 969578 |
| 0.15               | 0.50                        | 0.18           | 0.86           | 0.80           | 3               | 38 | 969586 | 969597 |
| 0.20               | 0.50                        | 0.24           | 0.98           | 0.80           | 3               | 38 | 969587 | 969598 |
| 0.25               | 0.50                        | 0.30           | 1.10           | 1.00           | 3               | 38 | 969588 | 969599 |
| 0.30               | 0.50                        | 0.36           | 1.22           | 1.00           | 3               | 38 | 969589 | 969600 |
| 0.40               | 0.50                        | 0.48           | 1.46           | 1.00           | 3               | 38 | 969590 | 969601 |
| 0.50               | 0.50                        | 0.60           | 1.70           | 1.50           | 3               | 38 | 969591 | 969602 |
| 0.60               | 0.50                        | 0.70           | 1.90           | 1.50           | 3               | 38 | 969592 | 969603 |
| 0.70               | 0.50                        | 0.80           | 2.10           | 1.50           | 3               | 38 | 969593 | 969604 |
| 0.80               | 0.80                        | 0.90           | 2.60           | 2.0            | 3               | 38 | 969594 | 969605 |
| 0.90               | 0.80                        | 1.00           | 2.80           | 2.0            | 3               | 38 | 969595 | 969606 |
| 1.00               | 0.80                        | 1.10           | -              | -              | 3               | 38 | 969596 | 969607 |

\* nicht schneidend



P.308

VIERTELKREIS-KANTENFRÄSER



- Viertelkreis-Kantenfräser. Für alle Arten von Materialien geeignet.

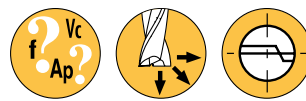
○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen           | ⊗                 | ⊗ | ⊗ | ⊗ | ○ | ○                 | ○ | ○ | ○ | ○              | ○                | ○  | ○  | ○    | ○                                    | ○    | ○        | ⊗  | ⊗                | ○  | ○                  | ○  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊗                       | ⊗  | ○                       | ○  | ○  | ⊗                 | ○                      | ○  | ○            |         | ⊗          | ⊗    | ○                       | ○  | ○     | ⊗                        | ⊗  |                  |    |                  |    |

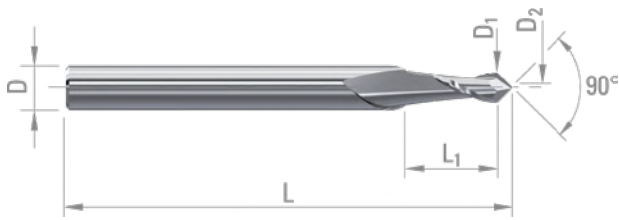
| $R_{\pm 0.02}$ | $D_{1 h5}$ | $L_1$ | $D_2^*$ | $L_2$ | $D_{h5}$ | L  | VHM    |
|----------------|------------|-------|---------|-------|----------|----|--------|
| 1              | 10         | 1     | 8       | 10    | 6        | 42 | 381167 |
| 2              | 10         | 2     | 6       | 10    | 6        | 42 | 381168 |
| 3              | 12         | 3     | 6       | 10    | 8        | 42 | 381169 |
| 4              | 12         | 4     | 4       | 10    | 8        | 42 | 381170 |
| 5              | 16         | 5     | 6       | 10    | 8        | 42 | 381171 |
| 6              | 16         | 6     | 4       | 10    | 8        | 42 | 381172 |
| 6              | 20         | 6     | 8       | 10    | 8        | 42 | 381173 |

\* nicht schneidend



P.310

MULTIFUNKTIONSFRÄSER



- Multifunktionsfräser, für allgemeine Bearbeitungen (NC-Anbohren, Bohren, Senken, Fasen, Gravieren).
- Die CUTINOX-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen.

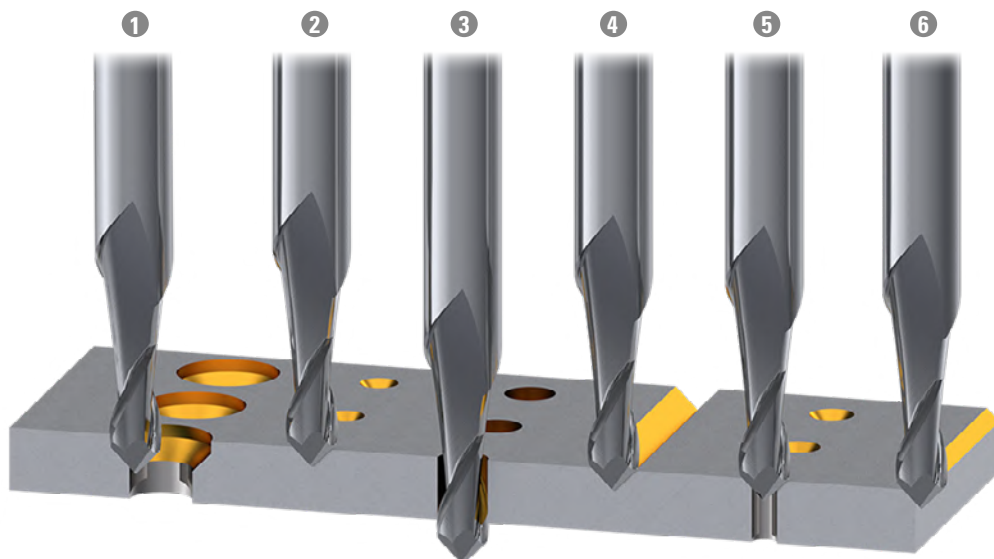
○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ⊙        | ○  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ○                       | ○  | ○  | ○                 | ○                      | ○  | ○            |         |            |      | ○                       | ○  |       | ○                        | ○  |                  |    |                  |    |

| D <sub>1e8</sub> | L <sub>1</sub> | D <sub>2</sub> | D <sub>h5</sub> | L  | VHM    | CUTINOX |
|------------------|----------------|----------------|-----------------|----|--------|---------|
| 0.10             | 0.20           | 0.01           | 3               | 38 | 333883 | 333907  |
| 0.20             | 0.40           | 0.02           | 3               | 38 | 333884 | 333908  |
| 0.30             | 0.60           | 0.03           | 3               | 38 | 333885 | 333909  |
| 0.40             | 0.80           | 0.04           | 3               | 38 | 333886 | 333910  |
| 0.50             | 1.00           | 0.05           | 3               | 38 | 333887 | 333911  |
| 0.60             | 1.20           | 0.06           | 3               | 38 | 333888 | 333912  |
| 0.70             | 1.40           | 0.07           | 3               | 38 | 333889 | 333913  |
| 0.80             | 1.60           | 0.08           | 3               | 38 | 333890 | 333914  |
| 0.90             | 1.80           | 0.09           | 3               | 38 | 333891 | 333915  |
| 1.00             | 2.00           | 0.10           | 3               | 38 | 333892 | 333916  |
| 1.10             | 2.20           | 0.11           | 3               | 38 | 333893 | 333917  |
| 1.20             | 2.40           | 0.12           | 3               | 38 | 333894 | 333918  |

| D <sub>1e8</sub> | L <sub>1</sub> | D <sub>2</sub> | D <sub>h5</sub> | L  | VHM    | CUTINOX |
|------------------|----------------|----------------|-----------------|----|--------|---------|
| 1.30             | 2.60           | 0.13           | 3               | 38 | 333895 | 333919  |
| 1.40             | 2.80           | 0.14           | 3               | 38 | 333896 | 333920  |
| 1.50             | 3.00           | 0.15           | 3               | 38 | 333897 | 333921  |
| 2.00             | 4.00           | 0.20           | 3               | 38 | 333898 | 333922  |
| 2.50             | 5.00           | 0.25           | 3               | 38 | 333899 | 333923  |
| 3.00             | 6.00           | 0.30           | 4               | 50 | 333900 | 333924  |
| 4.00             | 8.00           | 0.40           | 5               | 50 | 333901 | 333925  |
| 5.00             | 10.00          | 0.50           | 6               | 50 | 333902 | 333926  |
| 6.00             | 12.00          | 0.60           | 8               | 60 | 333903 | 333927  |
| 8.00             | 16.00          | 0.80           | 10              | 70 | 333904 | 333928  |
| 10.00            | 18.00          | 1.00           | 12              | 70 | 333905 | 333929  |
| 12.00            | 20.00          | 1.20           | 12              | 70 | 333906 | 333930  |

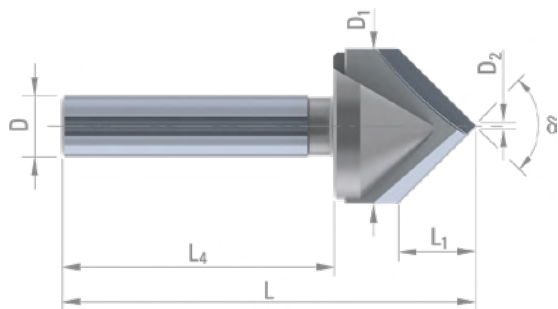


- ① Senken
- ② NC-Anbohren
- ③ Bohren
- ④ Gravieren
- ⑤ ⑥ Fasen





KANTENFRÄSER MIT GELÖTETEN EINSÄTZEN



- Kantenfräser mit gelöteten Einsätzen, für Kunststoff-Fasendarbeiten, speziell für POS-Anwendungen.
- Das Werkzeug ermöglicht eine gratfreie Bearbeitung.

○ gut    ⊙ ausgezeichnet

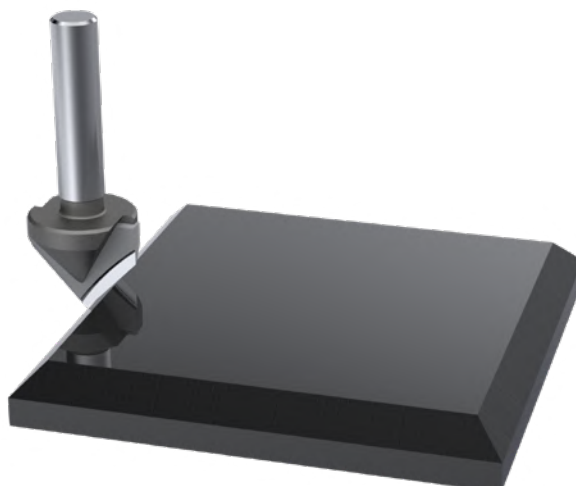
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |                  |    |    |                                      |      |      |      |          |    |                  |    |                    |    |

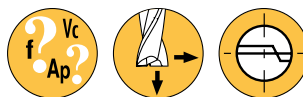
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |                  |    |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|------------------|----|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl | Hartes Gusseisen |    |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39               | 40 | 41 |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         | ⊙          | ⊙    |                         |    |       |                          |    |                  |                  |    |    |

| δ    | D <sub>1 h6</sub> | L <sub>1</sub> | L <sub>4</sub> | D <sub>h6</sub> | D <sub>2</sub> <sup>*</sup> ±0.05 | L  | VHM neu | VHM geschärft |
|------|-------------------|----------------|----------------|-----------------|-----------------------------------|----|---------|---------------|
| 60°  | 20                | 17.0           | 35             | 8               | 0.30                              | 60 | 381111  | 381120        |
| 90°  | 20                | 9.8            | 35             | 8               | 0.30                              | 53 | 381112  | 381121        |
| 100° | 20                | 8.2            | 35             | 8               | 0.30                              | 51 | 381113  | 381122        |
| 110° | 20                | 6.8            | 35             | 8               | 0.30                              | 50 | 381114  | 381123        |
| 120° | 20                | 5.6            | 35             | 8               | 0.30                              | 49 | 381115  | 381124        |
| 130° | 20                | 4.5            | 35             | 8               | 0.30                              | 48 | 381116  | 381125        |
| 140° | 20                | 3.5            | 35             | 8               | 0.30                              | 47 | 381117  | 381126        |
| 150° | 20                | 2.6            | 35             | 8               | 0.30                              | 46 | 381118  | 381127        |
| 160° | 20                | 1.7            | 35             | 8               | 0.30                              | 45 | 381119  | 381128        |

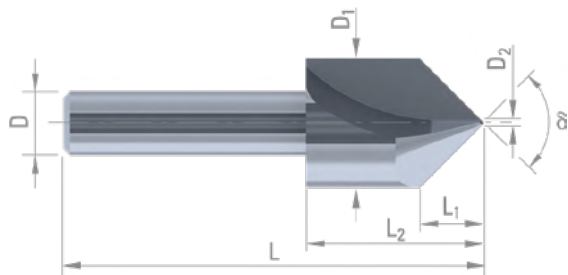
\* nicht schneidend

Schnittbedingungen **n = 15'000 - 18'000 [U/min]**  
**Vf = 1'000 - 1'500 [mm/min]**





FALZ- UND NUTENFRÄSER  
VHM MONOBLOCK



- V-Nutenfräser. Zum Falten und Nuten von Kunststoffen, speziell für POS-Anwendungen.

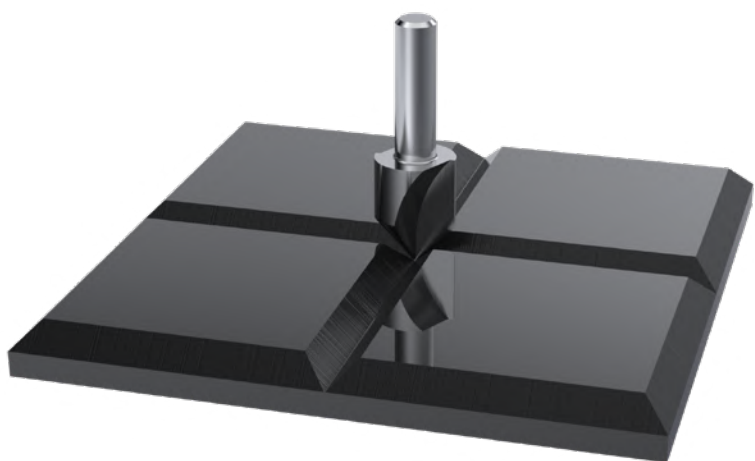
○ gut    ⊙ ausgezeichnet

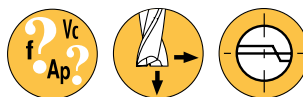
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                    |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         | ⊙          | ⊙    |                         |    |       |                          |    |                  |    |                  |    |

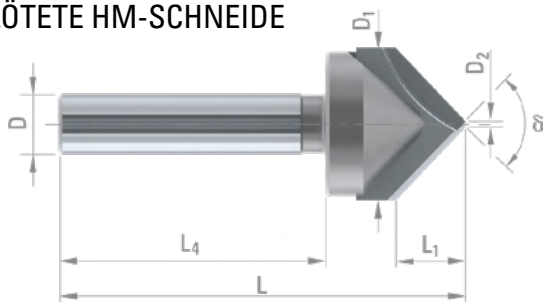
| δ   | D <sub>1h5</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | D <sub>2±0.05</sub> | L  | VHM    |
|-----|------------------|----------------|----------------|-----------------|---------------------|----|--------|
| 45° | 16               | 19.0           | 22             | 8               | 0.20                | 50 | 381129 |
| 90° | 8                | 3.9            | 22             | 8               | 0.20                | 50 | 381130 |
| 90° | 12               | 5.9            | 22             | 6               | 0.20                | 50 | 420802 |
| 90° | 12               | 5.9            | 22             | 12              | 0.20                | 50 | 381131 |
| 90° | 16               | 7.9            | 22             | 8               | 0.20                | 50 | 381132 |
| 90° | 16               | 7.9            | 22             | 16              | 0.20                | 50 | 381133 |
| 90° | 22               | 10.9           | 22             | 20              | 0.20                | 50 | 381134 |
| 90° | 24               | 11.9           | 22             | 20              | 0.20                | 50 | 381135 |
| 92° | 12               | 5.6            | 22             | 12              | 0.20                | 50 | 381136 |

Schnittbedingungen **n = 15'000 - 18'000 [U/min]**  
**Vf = 2'000 [mm/min]**





FALZ- UND NUTENFRÄSER  
GELÖTETE HM-SCHNEIDE



- V-Nutenfräser. Zum Falten und Nuten von Kunststoffen, speziell für POS-Anwendungen.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |                  |    |    |                                      |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         | ⊙          | ⊙    |                         |    |       |                          |    |                  |    |                  |    |

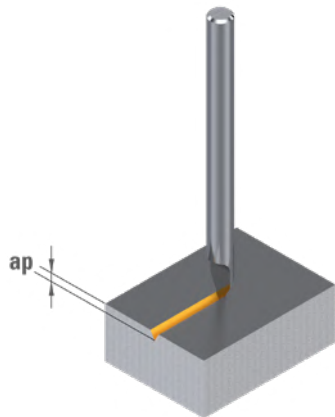
| δ    | D <sub>1 h6</sub> | L <sub>1</sub> | L <sub>4</sub> | D <sub>h6</sub> | D <sub>2 ±0.05</sub> | L  | VHM neu | VHM geschärft |
|------|-------------------|----------------|----------------|-----------------|----------------------|----|---------|---------------|
| 92°  | 20                | 9.50           | 35             | 8               | 3                    | 53 | 380752  | 380759        |
| 135° | 20                | 4.00           | 35             | 8               | 2                    | 47 | 380758  | 380760        |

Schnittbedingungen **n = 15'000 - 18'000 [U/min]**  
**Vf = 2'000 - 4'000 [mm/min]**



**GRAVIEREN**

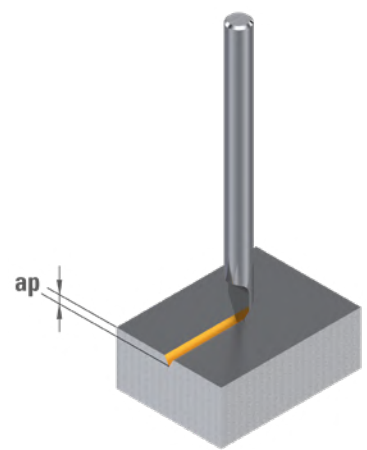
|          |  | VDI 3323  | D <sub>1</sub> Ø0.05-0.10 D <sub>2</sub> Ø0.15-0.50 |                  |                |             |             |
|----------|--|-----------|---|------------------|----------------|-------------|-------------|
|          |  |           | VHM Vc [m/min]                                      | DINAC Vc [m/min] | DLC Vc [m/min] | ap (mm)     | ap (mm)     |
| <b>P</b> | Unlegierter Stahl, Automaten Stahl   | 1 - 5     | 20 - 35'000   | 20 - 35'000      |                | 0.05 - 0.30 | 0.10 - 0.42 |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>  | 6 - 9     |   | 20 - 35'000      |                | 0.05 - 0.25 | 0.10 - 0.34 |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> , ferritischer / martensitischer Edelstahl | 10 - 13   |   | 20 - 35'000      |                | 0.05 - 0.20 | 0.10 - 0.26 |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                | 14.1-14.2 |   | 20 - 35'000      |                | 0.05 - 0.20 | 0.10 - 0.34 |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                         | 14.3-14.4 |   | 20 - 35'000      |                | 0.05 - 0.25 | 0.10 - 0.30 |
| <b>K</b> | Grauguss < 250 HB  | 15 - 16   | 20 - 35'000   | 20 - 35'000      |                | 0.05 - 0.45 | 0.10 - 0.45 |
|          | Duktiles Gusseisen, Temperguss > 250 HB  | 17 - 20   | 20 - 35'000   | 20 - 35'000      |                | 0.05 - 0.40 | 0.10 - 0.45 |
| <b>N</b> | Alu-Knetlegierung < 12% Si   | 21 - 22   | 20 - 35'000   | 20 - 35'000      | 20 - 35'000    | 0.05 - 0.60 | 0.10 - 0.45 |
|          | Alu-Gusslegierung > 12% Si   | 23 - 25   | 20 - 35'000   | 20 - 35'000      | 20 - 35'000    | 0.05 - 0.45 | 0.10 - 0.50 |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb   | 26        | 20 - 35'000   | 20 - 35'000      | 20 - 35'000    | 0.05 - 0.45 | 0.10 - 0.45 |
|          | Kupferlegierung schwere Zerspanbarkeit   | 27 - 28   | 20 - 35'000   | 20 - 35'000      | 20 - 35'000    | 0.05 - 0.40 | 0.10 - 0.45 |
|          | Kunststoff, Holz   | 29 - 30   | 20 - 35'000   | 20 - 35'000      | 20 - 35'000    | 0.05 - 0.45 | 0.10 - 0.45 |
|          | Gold, Silber   | -         | 20 - 35'000   | 20 - 35'000      | 20 - 35'000    | 0.05 - 0.40 | 0.10 - 0.45 |
|          |  |           |   |                  |                |             |             |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung  | 31 - 35   |   | 15 - 25'000      |                |             | 0.04 - 0.10 |
|          | Titan, Titanlegierung  | 36 - 37   | 20 - 35'000   | 20 - 35'000      | 20 - 35'000    | 0.05 - 0.35 | 0.10 - 0.45 |
| <b>H</b> | Gehärteter Stahl > 45 HRC, Hartguss  | 38 - 41   |   | 20 - 35'000      |                |             | 0.02 - 0.06 |



**DIXI 7625**

**GRAVIEREN**

|          |  | VDI 3323 | VHM Vc [m/min] | ap (mm) |
|----------|--|----------|----------------|---------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl         | 1 - 5    | 20 - 35'000    | <0.05   |
| <b>N</b> | Unlegierter Stahl, Automaten Stahl         | 21 - 22  | 20 - 35'000    | <0.05   |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb | 26       | 20 - 35'000    | <0.05   |
|          | Kupferlegierung schwere Zerspanbarkeit     | 27 - 28  | 20 - 35'000    | <0.05   |
|          | Gold, Silber                               | -        | 20 - 35'000    | <0.05   |



$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub  $V_f$  [mm/min]

| $\varnothing D_1$<br>0.05 - 0.10 | $\varnothing D_1$<br>0.15 - 0.50 |  |
|----------------------------------|----------------------------------|--|
| 50 - 250                         | 80 - 350                         |  |
| 50 - 200                         | 60 - 275                         |  |
| 50 - 150                         | 50 - 200                         |  |
| 50 - 200                         | 60 - 275                         |  |
| 50 - 200                         | 50 - 250                         |  |
| 50 - 400                         | 110 - 450                        |  |
| 50 - 300                         | 90 - 450                         |  |
| 50 - 400                         | 110 - 450                        |  |
| 50 - 300                         | 90 - 450                         |  |
| 50 - 500                         | 150 - 450                        |  |
| 50 - 400                         | 110 - 450                        |  |
| 50 - 400                         | 110 - 450                        |  |
| 50 - 300                         | 90 - 450                         |  |
|                                  | 20 - 100                         |  |
| 50 - 300                         | 80 - 375                         |  |
|                                  | 10 - 50                          |  |

Vorschub  $V_f$  [mm/min]

| $\varnothing D_1$<br>0.05 - 0.10 |  |
|----------------------------------|--|
| 50 - 200                         |  |
| 50 - 250                         |  |
| 50 - 250                         |  |
| 50 - 250                         |  |
| 50 - 250                         |  |

FASEN

|   |  | VDI 3323 |  | VHM Vc [m/min] | ap (mm) |
|---|--|----------|--|----------------|---------|
| P | Unlegierter Stahl, Automaten Stahl         | 1 - 5    |  | 20 - 35'000    | <0.10   |
|   | Unlegierter Stahl, Automaten Stahl         | 21 - 22  |  | 20 - 35'000    | <0.15   |
| N | Kupferlegierung gute Zerspanbarkeit mit Pb | 26       |  | 20 - 35'000    | <0.10   |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27 - 28  |  | 20 - 35'000    | <0.10   |
|   | Gold, Silber                               | -        |  | 20 - 35'000    | <0.10   |

DIXI 7623 - 7624 - 7656 - 7658

FASEN

|   |  | VDI 3323  |  | VHM Vc [m/min] | TiAlN Vc [m/min] | ae (mm)   | ap (mm)   |           |
|---|--|-----------|--|----------------|------------------|-----------|-----------|-----------|
| P | Unlegierter Stahl, Automaten Stahl                                       | 1 - 5     |  | 85             | 120              | <0.5×ØD1  | <0.5×ØD1  |           |
|   | Niedrig legierter Stahl < 800 N/mm²                                      | 6 - 9     |  |                | 105              | <0.5×ØD1  | <0.5×ØD1  |           |
|   | Hochlegierter Stahl > 800 N/mm², ferritischer/ martensitischer Edelstahl | 10 - 13   |  |                | 95               | <0.5×ØD1  | <0.5×ØD1  |           |
| M | Austenitischer rostfreier Stahl < 700 N/mm²                              | 14.1-14.2 |  |                | 80               | <0.5×ØD1  | <0.5×ØD1  |           |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm²                       | 14.3-14.4 |  |                | 55               | <0.25×ØD1 | <0.25×ØD1 |           |
| K | Grauguss < 250 HB  | 15 - 16   |  |                | 85               | 100       | <0.5×ØD1  | <0.5×ØD1  |
|   | Duktiles Gusseisen, Temperguss > 250 HB                                  | 17 - 20   |  |                | 55               | 80        | <0.5×ØD1  | <0.5×ØD1  |
| N | Alu-Knetlegierung < 12% Si   | 21 - 22   |  |                | 220              |           | <0.75×ØD1 | <0.75×ØD1 |
|   | Alu-Gusslegierung >12% Si  | 23 - 25   |  |                | 150              |           | <0.75×ØD1 | <0.75×ØD1 |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb                               | 26        |  |                | 150              |           | <0.75×ØD1 | <0.75×ØD1 |
|   | Kupferlegierung schwere Zerspanbarkeit                                   | 27 - 28   |  | 130            |                  | <0.5×ØD1  | <0.5×ØD1  |           |
|   | Kunststoff, Holz   | 29 - 30   |  | 250            |                  | <0.75×ØD1 | <0.75×ØD1 |           |
|   | Gold, Silber   | -         |  | 150            |                  | <0.5×ØD1  | <0.5×ØD1  |           |
| S | Spezielle Nickel-Kobalt-Legierung  | 31 - 35   |  |                | 35               | <0.25×ØD1 | <0.25×ØD1 |           |
|   | Titan, Titanlegierung  | 36 - 37   |  | 40             | 70               | <0.5×ØD1  | <0.5×ØD1  |           |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub  $V_f$  [mm/min]

| $\emptyset D_1$<br>0.05 - 0.10 |  |
|--------------------------------|--|
| 80 - 250                       |  |
| 80 - 250                       |  |
| 80 - 250                       |  |
| 80 - 250                       |  |
| 80 - 250                       |  |

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.20 - 0.30 | $\emptyset D_1$<br>0.40 - 0.70 | $\emptyset D_1$<br>0.80 - 1.00 | $\emptyset D_1$<br>1.20 - 3.00 | $\emptyset D_1$<br>4.00 - 5.00 | $\emptyset D_1$<br>6.00 - 8.00 | $\emptyset D_1$<br>10.00 - 12.00 | $\emptyset D_1$<br>16.00 - 20.00 |  |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|----------------------------------|----------------------------------|--|
| 0.002 - 0.003                  | 0.004 - 0.007                  | 0.008 - 0.010                  | 0.012 - 0.030                  | 0.040 - 0.050                  | 0.060 - 0.080                  | 0.090 - 0.100                    | 0.120 - 0.160                    |  |
| 0.001 - 0.003                  | 0.004 - 0.006                  | 0.007 - 0.009                  | 0.011 - 0.027                  | 0.036 - 0.045                  | 0.054 - 0.070                  | 0.080 - 0.090                    | 0.100 - 0.150                    |  |
| 0.001 - 0.002                  | 0.003 - 0.006                  | 0.006 - 0.008                  | 0.010 - 0.024                  | 0.032 - 0.040                  | 0.048 - 0.065                  | 0.070 - 0.080                    | 0.090 - 0.130                    |  |
| 0.001 - 0.002                  | 0.003 - 0.006                  | 0.006 - 0.008                  | 0.010 - 0.024                  | 0.032 - 0.040                  | 0.048 - 0.065                  | 0.070 - 0.080                    | 0.090 - 0.130                    |  |
| 0.001 - 0.002                  | 0.003 - 0.005                  | 0.006 - 0.007                  | 0.008 - 0.021                  | 0.028 - 0.035                  | 0.042 - 0.055                  | 0.060 - 0.070                    | 0.080 - 0.110                    |  |
| 0.002 - 0.004                  | 0.005 - 0.008                  | 0.010 - 0.012                  | 0.014 - 0.036                  | 0.048 - 0.060                  | 0.072 - 0.095                  | 0.110 - 0.120                    | 0.140 - 0.190                    |  |
| 0.002 - 0.003                  | 0.004 - 0.007                  | 0.008 - 0.010                  | 0.012 - 0.030                  | 0.040 - 0.050                  | 0.060 - 0.080                  | 0.090 - 0.100                    | 0.120 - 0.160                    |  |
| 0.002 - 0.005                  | 0.006 - 0.011                  | 0.012 - 0.015                  | 0.018 - 0.045                  | 0.060 - 0.075                  | 0.090 - 0.120                  | 0.140 - 0.140                    | 0.170 - 0.240                    |  |
| 0.002 - 0.004                  | 0.005 - 0.009                  | 0.010 - 0.013                  | 0.016 - 0.039                  | 0.052 - 0.065                  | 0.078 - 0.105                  | 0.120 - 0.120                    | 0.150 - 0.210                    |  |
| 0.002 - 0.005                  | 0.006 - 0.011                  | 0.012 - 0.015                  | 0.018 - 0.045                  | 0.060 - 0.075                  | 0.090 - 0.120                  | 0.140 - 0.140                    | 0.170 - 0.240                    |  |
| 0.002 - 0.004                  | 0.005 - 0.008                  | 0.010 - 0.012                  | 0.014 - 0.036                  | 0.048 - 0.060                  | 0.072 - 0.095                  | 0.110 - 0.120                    | 0.170 - 0.240                    |  |
| 0.002 - 0.005                  | 0.006 - 0.011                  | 0.012 - 0.015                  | 0.018 - 0.045                  | 0.060 - 0.075                  | 0.090 - 0.120                  | 0.140 - 0.140                    | 0.150 - 0.210                    |  |
| 0.002 - 0.003                  | 0.004 - 0.007                  | 0.008 - 0.010                  | 0.012 - 0.030                  | 0.040 - 0.050                  | 0.060 - 0.080                  | 0.090 - 0.100                    | 0.090 - 0.100                    |  |
| 0.001 - 0.002                  | 0.002 - 0.004                  | 0.004 - 0.005                  | 0.006 - 0.015                  | 0.020 - 0.025                  | 0.030 - 0.040                  | 0.050 - 0.050                    | 0.050 - 0.050                    |  |
| 0.002 - 0.003                  | 0.004 - 0.007                  | 0.008 - 0.010                  | 0.012 - 0.030                  | 0.040 - 0.050                  | 0.060 - 0.080                  | 0.090 - 0.100                    | 0.090 - 0.100                    |  |

Werte basieren auf der Verwendung von Schneidöl und Emulsionsöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

**BOHREN - NC-ANBOHREN**

|          |   | VDI<br>3323 | VHM<br>Vc [m/min] | CUTINOX<br>Vc [m/min] |
|----------|---|-------------|-------------------|-----------------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5       | 40                | 70                    |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9       | 45                | 50                    |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13     | 35                | 45                    |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2   | 25                | 35                    |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                            | 14.3-14.4   | 25                | 30                    |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16     | 55                | 70                    |
|          | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20     | 35                | 45                    |
| <b>N</b> | Alu-Knetlegierung < 12% Si  | 21 - 22     | 115               | 125                   |
|          | Alu-Gusslegierung >12% Si   | 23 - 25     | 85                | 95                    |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26          | 100               | 110                   |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28     | 65                | 75                    |
|          | Kunststoff, Holz  | 29 - 30     | 150               | 165                   |
|          | Gold, Silber  | -           | 65                | 75                    |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31- 35      | 20                | 30                    |
|          | Titan, Titanlegierung   | 36 - 37     | 40                | 50                    |



**FASEN - NUTBEARBEITUNG - GRAVIEREN - UMFANGSBEARBEITUNG**

|          |   | VDI<br>3323 | VHM<br>Vc [m/min] | CUTINOX<br>Vc [m/min] |
|----------|---|-------------|-------------------|-----------------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5       | 40                | 70                    |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9       | 45                | 50                    |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13     | 35                | 45                    |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2   | 25                | 35                    |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                            | 14.3-14.4   | 25                | 30                    |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16     | 55                | 70                    |
|          | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20     | 35                | 45                    |
| <b>N</b> | Alu-Knetlegierung < 12% Si  | 21 - 22     | 115               | 125                   |
|          | Alu-Gusslegierung >12% Si   | 23 - 25     | 85                | 95                    |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26          | 100               | 110                   |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28     | 65                | 75                    |
|          | Kunststoff, Holz  | 29 - 30     | 150               | 165                   |
|          | Gold, Silber  | -           | 65                | 75                    |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31- 35      | 20                | 30                    |
|          | Titan, Titanlegierung   | 36 - 37     | 40                | 50                    |





$$n \text{ [U/min]} = \frac{Vc \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$Vf \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $fz \text{ [mm]}$

| $\emptyset D_1$<br>0.10 - 0.30 | $\emptyset D_1$<br>0.40 - 0.70 | $\emptyset D_1$<br>0.80 - 1.00 | $\emptyset D_1$<br>1.20 - 3.00 | $\emptyset D_1$<br>4.00 - 5.00 | $\emptyset D_1$<br>6.00 - 8.00 | $\emptyset D_1$<br>10.00 - 12.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|----------------------------------|
| 0.0008 - 0.0030                | 0.004 - 0.007                  | 0.008 - 0.010                  | 0.012 - 0.030                  | 0.040 - 0.050                  | 0.060 - 0.080                  | 0.090 - 0.110                    |
| 0.0007 - 0.0020                | 0.004 - 0.006                  | 0.007 - 0.009                  | 0.011 - 0.027                  | 0.036 - 0.045                  | 0.054 - 0.070                  | 0.080 - 0.100                    |
| 0.0006 - 0.0020                | 0.003 - 0.006                  | 0.006 - 0.008                  | 0.010 - 0.024                  | 0.032 - 0.040                  | 0.048 - 0.065                  | 0.070 - 0.090                    |
| 0.0006 - 0.0020                | 0.003 - 0.006                  | 0.006 - 0.008                  | 0.010 - 0.024                  | 0.032 - 0.040                  | 0.048 - 0.065                  | 0.070 - 0.090                    |
| 0.0006 - 0.0020                | 0.003 - 0.005                  | 0.006 - 0.007                  | 0.008 - 0.021                  | 0.028 - 0.035                  | 0.042 - 0.055                  | 0.065 - 0.080                    |
| 0.0010 - 0.0030                | 0.005 - 0.008                  | 0.010 - 0.012                  | 0.014 - 0.036                  | 0.048 - 0.060                  | 0.072 - 0.095                  | 0.110 - 0.130                    |
| 0.0008 - 0.0030                | 0.004 - 0.007                  | 0.008 - 0.010                  | 0.012 - 0.030                  | 0.040 - 0.050                  | 0.060 - 0.080                  | 0.090 - 0.110                    |
| 0.0012 - 0.0040                | 0.006 - 0.011                  | 0.012 - 0.015                  | 0.018 - 0.045                  | 0.060 - 0.075                  | 0.090 - 0.120                  | 0.135 - 0.160                    |
| 0.0010 - 0.0040                | 0.005 - 0.009                  | 0.010 - 0.013                  | 0.016 - 0.039                  | 0.052 - 0.065                  | 0.078 - 0.105                  | 0.150 - 0.140                    |
| 0.0012 - 0.0040                | 0.006 - 0.011                  | 0.012 - 0.015                  | 0.018 - 0.045                  | 0.060 - 0.075                  | 0.090 - 0.120                  | 0.135 - 0.160                    |
| 0.0010 - 0.0030                | 0.005 - 0.008                  | 0.010 - 0.012                  | 0.014 - 0.036                  | 0.048 - 0.060                  | 0.072 - 0.095                  | 0.110 - 0.130                    |
| 0.0012 - 0.0040                | 0.006 - 0.011                  | 0.012 - 0.015                  | 0.018 - 0.045                  | 0.060 - 0.075                  | 0.090 - 0.120                  | 0.135 - 0.160                    |
| 0.0008 - 0.0030                | 0.004 - 0.007                  | 0.008 - 0.010                  | 0.012 - 0.030                  | 0.040 - 0.050                  | 0.060 - 0.080                  | 0.090 - 0.110                    |
| 0.0004 - 0.0010                | 0.002 - 0.004                  | 0.004 - 0.005                  | 0.006 - 0.015                  | 0.020 - 0.025                  | 0.030 - 0.040                  | 0.045 - 0.050                    |
| 0.0008 - 0.0030                | 0.004 - 0.007                  | 0.008 - 0.010                  | 0.012 - 0.030                  | 0.040 - 0.050                  | 0.060 - 0.080                  | 0.090 - 0.110                    |

Werte basieren auf der Verwendung von Schneidöl und Emulsionsöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

Vorschub pro Zahn  $fz \text{ [mm]}$

| $\emptyset D_1$<br>0.10 - 0.30 | $\emptyset D_1$<br>0.40 - 0.70 | $\emptyset D_1$<br>0.80 - 1.00 | $\emptyset D_1$<br>1.20 - 3.00 | $\emptyset D_1$<br>4.00 - 5.00 | $\emptyset D_1$<br>6.00 - 8.00 | $\emptyset D_1$<br>10.00 - 12.00 |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|----------------------------------|
| 0.0006 - 0.0024                | 0.003 - 0.006                  | 0.006 - 0.008                  | 0.010 - 0.024                  | 0.032 - 0.040                  | 0.048 - 0.064                  | 0.072 - 0.088                    |
| 0.0005 - 0.0016                | 0.003 - 0.005                  | 0.006 - 0.007                  | 0.009 - 0.022                  | 0.029 - 0.036                  | 0.043 - 0.056                  | 0.064 - 0.080                    |
| 0.0005 - 0.0016                | 0.002 - 0.005                  | 0.005 - 0.006                  | 0.008 - 0.019                  | 0.026 - 0.032                  | 0.038 - 0.052                  | 0.056 - 0.072                    |
| 0.0005 - 0.0016                | 0.002 - 0.005                  | 0.005 - 0.006                  | 0.008 - 0.019                  | 0.026 - 0.032                  | 0.038 - 0.052                  | 0.056 - 0.072                    |
| 0.0005 - 0.0016                | 0.002 - 0.004                  | 0.005 - 0.006                  | 0.006 - 0.017                  | 0.022 - 0.028                  | 0.034 - 0.044                  | 0.052 - 0.064                    |
| 0.0008 - 0.0024                | 0.004 - 0.006                  | 0.008 - 0.010                  | 0.011 - 0.029                  | 0.038 - 0.048                  | 0.058 - 0.076                  | 0.088 - 0.104                    |
| 0.0006 - 0.0024                | 0.003 - 0.006                  | 0.006 - 0.008                  | 0.010 - 0.024                  | 0.032 - 0.040                  | 0.048 - 0.064                  | 0.072 - 0.088                    |
| 0.0009 - 0.0032                | 0.005 - 0.009                  | 0.010 - 0.012                  | 0.014 - 0.036                  | 0.048 - 0.060                  | 0.07 - 0.096                   | 0.108 - 0.128                    |
| 0.0008 - 0.0032                | 0.004 - 0.007                  | 0.008 - 0.010                  | 0.013 - 0.031                  | 0.042 - 0.052                  | 0.062 - 0.084                  | 0.092 - 0.112                    |
| 0.0009 - 0.0032                | 0.005 - 0.009                  | 0.010 - 0.012                  | 0.014 - 0.036                  | 0.048 - 0.060                  | 0.072 - 0.096                  | 0.108 - 0.128                    |
| 0.0008 - 0.0030                | 0.004 - 0.006                  | 0.008 - 0.010                  | 0.011 - 0.029                  | 0.038 - 0.048                  | 0.058 - 0.076                  | 0.088 - 0.104                    |
| 0.0009 - 0.0032                | 0.005 - 0.009                  | 0.010 - 0.012                  | 0.014 - 0.036                  | 0.048 - 0.060                  | 0.072 - 0.096                  | 0.108 - 0.128                    |
| 0.0006 - 0.0024                | 0.003 - 0.006                  | 0.006 - 0.008                  | 0.010 - 0.024                  | 0.032 - 0.040                  | 0.048 - 0.064                  | 0.072 - 0.088                    |
| 0.0003 - 0.0008                | 0.002 - 0.003                  | 0.003 - 0.004                  | 0.005 - 0.012                  | 0.016 - 0.020                  | 0.024 - 0.032                  | 0.036 - 0.040                    |
| 0.0006 - 0.0024                | 0.003 - 0.006                  | 0.006 - 0.008                  | 0.010 - 0.024                  | 0.032 - 0.040                  | 0.048 - 0.064                  | 0.072 - 0.088                    |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.





## ÜBERSICHT KREISSÄGEN

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## KREISSÄGEN

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## T-NUTENFRÄSER

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## T-SLOT CUTTERS

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## ABWÄLZFRÄSER

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## AUFLAGESCHEIBEN

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## WERKZEUGE AUF ANFRAGE

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## INFORMATIONEN



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## SCHNITTBEDINGUNGEN




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|  |   | Seite |   | <input type="checkbox"/> VHM | <input type="checkbox"/> CUTINOX |  |  |  |
|--|---|-------|---|------------------------------|----------------------------------|--|--|--|
| <b>KREISSÄGEN</b>                        |   |       |   |                              |                                  |  |  |  |
| <b>DIXI 1531</b><br>Ø 15.00 - 125.00     |    | 318   |   | ✓                            |                                  |  |  |  |
| <b>DIXI 1533</b><br>Ø 15.00 - 160.00     |    | 320   |   | ✓                            |                                  |  |  |  |
| <b>DIXI 1539</b><br>Ø 10.00 - 50.00      |    | 323   |    | ✓                            |                                  |  |  |  |
| <b>DIXI 1534</b><br>Ø 20.00 - 100.00     |    | 326   |   | ✓                            |                                  |  |  |  |
| <b>DIXI 1537</b><br>Ø 50.00 - 100.00     |   | 327   |   |                              | ✓                                |  |  |  |
| <b>DIXI 1640 R+L</b><br>Ø 50.00 - 100.00 |  | 328   |    | ✓                            | ✓                                |  |  |  |

**KREISSÄGENAUFNAHMEN**

|                                    |   |     |  |  |  |  |  |  |
|------------------------------------|---|-----|--|--|--|--|--|--|
| <b>DIXI 2713</b><br>Ø 3.00 - 22.00 |  | 329 |  |  |  |  |  |  |
| <b>DIXI 2714</b><br>Ø 5.00 - 16.00 |  | 329 |  |  |  |  |  |  |

**T-NUTENFRÄSER**

|                                    |   |     |  |   |   |  |  |  |
|------------------------------------|---|-----|--|---|---|--|--|--|
| <b>DIXI 1525</b><br>Ø2.00 - Ø30.00 |  | 330 |  | ✓ | ✓ |  |  |  |
| <b>DIXI 1528</b><br>Ø4.00 - Ø30.00 |  | 331 |  | ✓ | ✓ |  |  |  |
| <b>DIXI 1527</b><br>Ø4.00 - Ø16.00 |  | 332 |  | ✓ | ✓ |  |  |  |

| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |







|              |                    |                |                        |           |               |              |                           |                                  |             |                    |                |                          |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|

|   |   |   |   |   |   |   |   |   |   |   |   |  |
|---|---|---|---|---|---|---|---|---|---|---|---|--|
| ☉ | ☉ | ○ | ○ | ☉ | ○ | ○ | ☉ | ○ | ☉ | ○ | ☉ |  |
| ☉ | ☉ | ○ | ○ | ☉ | ○ | ○ | ☉ | ○ | ☉ | ○ | ☉ |  |
| ☉ | ☉ | ○ | ○ | ☉ | ○ | ○ | ☉ | ○ | ☉ | ○ | ☉ |  |
| ○ | ○ | ○ | ☉ | ○ | ☉ | ☉ | ○ | ☉ | ☉ | ○ | ○ |  |
| ☉ | ☉ | ☉ | ☉ | ○ | ○ | ○ |   |   |   | ☉ | ☉ |  |
| ☉ | ☉ | ○ | ○ | ☉ | ☉ | ☉ | ☉ | ○ | ☉ | ○ | ☉ |  |


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|   |   |   |   |   |   |   |   |   |   |   |   |  |
|---|---|---|---|---|---|---|---|---|---|---|---|--|
| ☉ | ☉ | ○ | ○ | ☉ | ○ | ☉ | ☉ | ○ | ☉ | ○ | ○ |  |
| ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ☉ | ○ | ☉ | ○ | ☉ |  |
| ☉ | ☉ | ○ | ○ | ☉ | ○ | ☉ | ☉ | ○ | ☉ | ○ | ○ |  |

○ gut      ☉ ausgezeichnet

|                                    |   | Seite | <input type="checkbox"/> VHM |  |  |  |  |  |
|------------------------------------|---|-------|------------------------------|--|--|--|--|--|
| <b>ABWÄLZFRÄSER</b>                |   |       |                              |  |  |  |  |  |
| <b>DIXI 1675</b><br>Ø 6.00 - 24.00 |    | 334   | ✓                            |  |  |  |  |  |
| <b>DIXI 1680</b><br>Ø 6.00 - 24.00 |    | 334   | ✓                            |  |  |  |  |  |
| <b>DIXI 1685</b><br>Ø 6.00 - 24.00 |    | 335   | ✓                            |  |  |  |  |  |
| <b>DIXI 1690</b><br>Ø 8.00 - 12.00 |    | 338   | ✓                            |  |  |  |  |  |
| <b>DIXI 1674</b><br>Ø 6.00 - 24.00 |   | 336   | ✓                            |  |  |  |  |  |
| <b>DIXI 1672</b><br>Ø 4.00 - 6.00  |  | 337   | ✓                            |  |  |  |  |  |
| <b>DIXI 1673</b><br>Ø 4.00 - 6.00  |  | 337   | ✓                            |  |  |  |  |  |

**AUFLAGESCHEIBEN**

|                                      |   |     |  |  |  |  |  |  |
|--------------------------------------|---|-----|--|--|--|--|--|--|
| <b>DIXI 0700</b><br><b>DIXI 0710</b> |  | 339 |  |  |  |  |  |  |
|--------------------------------------|---|-----|--|--|--|--|--|--|

| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |

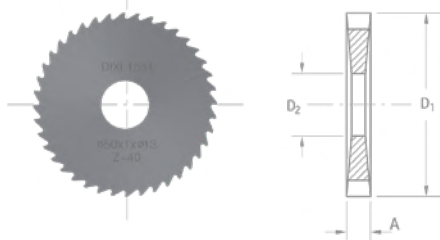
| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|

|   |   |   |   |  |   |   |   |  |   |  |   |  |
|---|---|---|---|--|---|---|---|--|---|--|---|--|
| ☉ | ☉ | ○ | ○ |  | ○ | ☉ | ☉ |  | ☉ |  | ○ |  |
| ☉ | ☉ | ○ | ○ |  | ○ | ☉ | ☉ |  | ☉ |  | ○ |  |
| ☉ | ☉ | ○ | ○ |  | ○ | ☉ | ☉ |  | ☉ |  | ○ |  |
| ☉ | ☉ | ○ | ○ |  | ○ | ☉ | ☉ |  | ☉ |  | ○ |  |
| ☉ | ☉ | ○ | ○ |  | ○ | ☉ | ☉ |  | ☉ |  | ○ |  |
| ☉ | ☉ | ○ | ○ |  | ○ | ☉ | ☉ |  | ☉ |  | ○ |  |
| ☉ | ☉ | ○ | ○ |  | ○ | ☉ | ☉ |  | ☉ |  | ○ |  |

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

○ gut      ☉ ausgezeichnet

KREISSÄGEN  
GROBE VERZÄHNUNG



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- Kreissägen, grobe Verzahnung. Für hohe Bearbeitungstiefen. Um eine optimale Leistung zu erreichen sollten 3 bis 5 Zähne im Eingriff sein..

○ gut    ⊙ ausgezeichnet

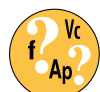
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
|                        | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ⊙        | ⊙  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |    |                        |   |              | S       |            |      |                         |       |    | H                        |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|----|------------------------|---|--------------|---------|------------|------|-------------------------|-------|----|--------------------------|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung |    | Cu-Legierung Schwierig |   | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |       |    | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
|                        | 21                      | 22 | 23                      | 24 | 25 | 26                | 27 | 28                     | - | -            | 29      | 30         | 31   | 32                      | 33-35 | 36 | 37                       | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊙                 | ⊙  | ⊙                      | ⊙ | ⊙            | ○       | ○          | ○    | ○                       | ○     | ⊙  | ⊙                        |    |                  |    |                  |  |

| D <sub>1 js12</sub> | A <sub>±0.01</sub> | D <sub>2 H6</sub> | Z  | VHM   |
|---------------------|--------------------|-------------------|----|-------|
| 15                  | 0.20               | 5                 | 32 | 37180 |
| 15                  | 0.30               | 5                 | 24 | 37182 |
| 15                  | 0.40               | 5                 | 24 | 35382 |
| 15                  | 0.50               | 5                 | 24 | 35383 |
| 15                  | 0.60               | 5                 | 20 | 601   |
| 15                  | 0.70               | 5                 | 20 | 603   |
| 15                  | 0.80               | 5                 | 20 | 2532  |
| 15                  | 0.90               | 5                 | 20 | 7707  |
| 15                  | 1.00               | 5                 | 20 | 602   |
| 15                  | 1.20               | 5                 | 16 | 38947 |
| 15                  | 1.50               | 5                 | 16 | 38948 |
| 15                  | 1.60               | 5                 | 16 | 42457 |
| 15                  | 1.80               | 5                 | 16 | 42536 |
| 15                  | 2.00               | 5                 | 16 | 38949 |
| 20                  | 0.20               | 5                 | 40 | 35384 |
| 20                  | 0.30               | 5                 | 32 | 35385 |
| 20                  | 0.40               | 5                 | 32 | 3281  |
| 20                  | 0.50               | 5                 | 24 | 31481 |
| 20                  | 0.60               | 5                 | 24 | 604   |
| 20                  | 0.70               | 5                 | 24 | 605   |
| 20                  | 0.80               | 5                 | 24 | 37080 |
| 20                  | 0.90               | 5                 | 20 | 3282  |
| 20                  | 1.00               | 5                 | 20 | 3283  |
| 20                  | 1.20               | 5                 | 20 | 2425  |
| 20                  | 1.50               | 5                 | 20 | 3287  |
| 20                  | 1.60               | 5                 | 20 | 3288  |
| 20                  | 1.80               | 5                 | 20 | 3290  |
| 20                  | 2.00               | 5                 | 16 | 42458 |
| 20                  | 2.50               | 5                 | 16 | 42459 |

| D <sub>1 js12</sub> | A <sub>±0.01</sub> | D <sub>2 H6</sub> | Z  | VHM   |
|---------------------|--------------------|-------------------|----|-------|
| 25                  | 0.30               | 8                 | 40 | 37740 |
| 25                  | 0.40               | 8                 | 32 | 42461 |
| 25                  | 0.50               | 8                 | 32 | 42376 |
| 25                  | 0.60               | 8                 | 24 | 42377 |
| 25                  | 0.70               | 8                 | 24 | 42378 |
| 25                  | 0.80               | 8                 | 24 | 2479  |
| 25                  | 0.90               | 8                 | 24 | 42379 |
| 25                  | 1.00               | 8                 | 24 | 42380 |
| 25                  | 1.20               | 8                 | 24 | 42462 |
| 25                  | 1.50               | 8                 | 20 | 3299  |
| 25                  | 1.60               | 8                 | 20 | 3300  |
| 25                  | 1.80               | 8                 | 20 | 3301  |
| 25                  | 2.00               | 8                 | 20 | 3303  |
| 25                  | 2.50               | 8                 | 20 | 3305  |
| 30                  | 0.30               | 8                 | 40 | 37845 |
| 30                  | 0.40               | 8                 | 40 | 37841 |
| 30                  | 0.50               | 8                 | 40 | 35386 |
| 30                  | 0.60               | 8                 | 32 | 30662 |
| 30                  | 0.70               | 8                 | 32 | 3309  |
| 30                  | 0.80               | 8                 | 32 | 41350 |
| 30                  | 0.90               | 8                 | 32 | 41351 |
| 30                  | 1.00               | 8                 | 32 | 36413 |
| 30                  | 1.20               | 8                 | 24 | 1327  |
| 30                  | 1.50               | 8                 | 24 | 3316  |
| 30                  | 1.60               | 8                 | 24 | 3317  |
| 30                  | 1.80               | 8                 | 24 | 3319  |
| 30                  | 2.00               | 8                 | 24 | 3321  |
| 30                  | 2.50               | 8                 | 20 | 42466 |
| 30                  | 3.00               | 8                 | 20 | 42467 |





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## KREISSÄGEN GROBE VERZÄHNUNG

| D <sub>1js12</sub> | A <sub>±0.01</sub> | D <sub>2H6</sub> | Z  | VHM   |
|--------------------|--------------------|------------------|----|-------|
| 30                 | 4.00               | 8                | 20 | 42468 |
| 40                 | 0.40               | 10               | 48 | 42470 |
| 40                 | 0.50               | 10               | 40 | 2662  |
| 40                 | 0.60               | 10               | 40 | 6348  |
| 40                 | 0.70               | 10               | 40 | 17953 |
| 40                 | 0.80               | 10               | 40 | 42471 |
| 40                 | 0.90               | 10               | 32 | 38817 |
| 40                 | 1.00               | 10               | 32 | 3034  |
| 40                 | 1.20               | 10               | 32 | 3307  |
| 40                 | 1.50               | 10               | 32 | 3326  |
| 40                 | 1.60               | 10               | 32 | 3798  |
| 40                 | 1.80               | 10               | 24 | 39499 |
| 40                 | 2.00               | 10               | 24 | 42472 |
| 40                 | 2.50               | 10               | 24 | 42473 |
| 40                 | 3.00               | 10               | 24 | 42474 |
| 40                 | 4.00               | 10               | 20 | 42475 |
| 50                 | 0.40               | 13               | 48 | 26023 |
| 50                 | 0.50               | 13               | 48 | 42477 |
| 50                 | 0.60               | 13               | 48 | 42478 |
| 50                 | 0.70               | 13               | 48 | 14681 |
| 50                 | 0.80               | 13               | 40 | 3330  |
| 50                 | 0.90               | 13               | 40 | 41064 |
| 50                 | 1.00               | 13               | 40 | 8636  |
| 50                 | 1.20               | 13               | 40 | 8637  |
| 50                 | 1.40               | 13               | 32 | 3336  |
| 50                 | 1.50               | 13               | 32 | 25731 |
| 50                 | 1.60               | 13               | 32 | 3337  |
| 50                 | 1.80               | 13               | 32 | 3657  |
| 50                 | 2.00               | 13               | 32 | 2533  |
| 50                 | 2.50               | 13               | 32 | 3339  |
| 50                 | 3.00               | 13               | 24 | 42479 |
| 63                 | 0.80               | 16               | 48 | 3342  |
| 63                 | 0.90               | 16               | 48 | 49467 |
| 63                 | 1.00               | 16               | 48 | 609   |
| 63                 | 1.20               | 16               | 40 | 3658  |
| 63                 | 1.50               | 16               | 40 | 3345  |
| 63                 | 1.60               | 16               | 40 | 3346  |
| 63                 | 1.80               | 16               | 40 | 3347  |
| 63                 | 2.00               | 16               | 40 | 610   |
| 63                 | 2.50               | 16               | 32 | 42483 |
| 63                 | 3.00               | 16               | 32 | 611   |
| 80                 | 0.80               | 22               | 64 | 6070  |

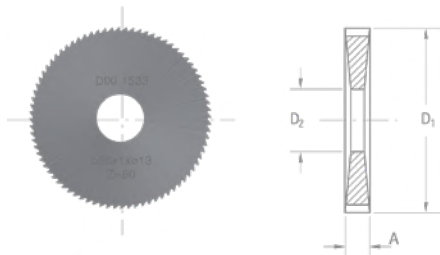
| D <sub>1js12</sub> | A <sub>±0.01</sub> | D <sub>2H6</sub> | Z  | VHM   |
|--------------------|--------------------|------------------|----|-------|
| 80                 | 0.90               | 22               | 48 | 49665 |
| 80                 | 1.00               | 22               | 48 | 3054  |
| 80                 | 1.20               | 22               | 48 | 4016  |
| 80                 | 1.50               | 22               | 48 | 3349  |
| 80                 | 1.60               | 22               | 48 | 34808 |
| 80                 | 1.80               | 22               | 40 | 22178 |
| 80                 | 2.00               | 22               | 40 | 2807  |
| 80                 | 2.50               | 22               | 40 | 42484 |
| 80                 | 3.00               | 22               | 40 | 21847 |
| 100                | 1.00               | 22               | 64 | 38542 |
| 100                | 1.20               | 22               | 64 | 38543 |
| 100                | 1.50               | 22               | 48 | 35387 |
| 100                | 1.60               | 22               | 48 | 39146 |
| 100                | 1.80               | 22               | 48 | 38927 |
| 100                | 2.00               | 22               | 48 | 38928 |
| 100                | 2.50               | 22               | 48 | 36588 |
| 100                | 3.00               | 22               | 40 | 38713 |
| 125                | 1.00               | 22               | 80 | 42489 |
| 125                | 1.20               | 22               | 64 | 42490 |
| 125                | 1.50               | 22               | 64 | 38480 |
| 125                | 1.60               | 22               | 64 | 42492 |
| 125                | 1.80               | 22               | 64 | 42493 |
| 125                | 2.00               | 22               | 64 | 39005 |

KREISSÄGEN  
FEINE VERZÄHNUNG



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- Kreissägen, feine Verzahnung. Für mittlere Bearbeitungstiefen. Um eine optimale Leistung zu erreichen, sollten 3 bis 5 Zähne im Eingriff sein.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                 |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|-----------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                              | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ○                                 | ○    | ○    | ○    | ⊙        | ⊙  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |    |                        |   |              | S       |            |      |                         |       |    | H                        |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|----|------------------------|---|--------------|---------|------------|------|-------------------------|-------|----|--------------------------|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung |    | Cu-Legierung Schwierig |   | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |       |    | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27 | 28                     | - | -            | 29      | 30         | 31   | 32                      | 33-35 | 36 | 37                       | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊙                 | ⊙  | ⊙                      | ⊙ |              |         | ○          | ○    | ○                       | ○     | ○  | ⊙                        | ⊙  |                  |    |                  |  |

| D <sub>1 js12</sub> | A <sub>±0.01</sub> | D <sub>2 H6</sub> | Z  | VHM   |
|---------------------|--------------------|-------------------|----|-------|
| 15                  | 0.20               | 5                 | 64 | 36382 |
| 15                  | 0.25               | 5                 | 64 | 35635 |
| 15                  | 0.30               | 5                 | 48 | 3707  |
| 15                  | 0.40               | 5                 | 48 | 3708  |
| 15                  | 0.50               | 5                 | 48 | 613   |
| 15                  | 0.60               | 5                 | 40 | 5453  |
| 15                  | 0.70               | 5                 | 40 | 6183  |
| 15                  | 0.80               | 5                 | 40 | 3244  |
| 15                  | 0.90               | 5                 | 40 | 3245  |
| 15                  | 1.00               | 5                 | 40 | 614   |
| 15                  | 1.10               | 5                 | 32 | 43250 |
| 15                  | 1.20               | 5                 | 32 | 37174 |
| 15                  | 1.50               | 5                 | 32 | 40710 |
| 15                  | 1.60               | 5                 | 32 | 40711 |
| 15                  | 1.80               | 5                 | 32 | 40713 |
| 15                  | 2.00               | 5                 | 32 | 37175 |
| 20                  | 0.20               | 5                 | 80 | 617   |
| 20                  | 0.25               | 5                 | 64 | 618   |
| 20                  | 0.30               | 5                 | 64 | 34590 |
| 20                  | 0.40               | 5                 | 64 | 1659  |
| 20                  | 0.50               | 5                 | 48 | 18560 |
| 20                  | 0.60               | 5                 | 48 | 36647 |
| 20                  | 0.70               | 5                 | 48 | 39659 |
| 20                  | 0.80               | 5                 | 48 | 627   |
| 20                  | 0.90               | 5                 | 48 | 623   |
| 20                  | 1.00               | 5                 | 40 | 35565 |
| 20                  | 1.10               | 5                 | 40 | 2689  |
| 20                  | 1.20               | 5                 | 40 | 38141 |
| 20                  | 1.30               | 5                 | 40 | 3407  |

| D <sub>1 js12</sub> | A <sub>±0.01</sub> | D <sub>2 H6</sub> | Z  | VHM   |
|---------------------|--------------------|-------------------|----|-------|
| 20                  | 1.40               | 5                 | 40 | 3408  |
| 20                  | 1.50               | 5                 | 40 | 624   |
| 20                  | 1.60               | 5                 | 40 | 3010  |
| 20                  | 1.80               | 5                 | 40 | 23600 |
| 20                  | 2.00               | 5                 | 32 | 625   |
| 20                  | 2.50               | 5                 | 32 | 36690 |
| 20                  | 3.00               | 5                 | 32 | 626   |
| 25                  | 0.15               | 8                 | 80 | 42274 |
| 25                  | 0.20               | 8                 | 80 | 61804 |
| 25                  | 0.20               | 8                 | 80 | 1660  |
| 25                  | 0.25               | 8                 | 80 | 3249  |
| 25                  | 0.30               | 8                 | 80 | 2421  |
| 25                  | 0.35               | 8                 | 80 | 1688  |
| 25                  | 0.40               | 8                 | 64 | 37661 |
| 25                  | 0.50               | 8                 | 64 | 14254 |
| 25                  | 0.60               | 8                 | 64 | 630   |
| 25                  | 0.70               | 8                 | 64 | 36365 |
| 25                  | 0.80               | 8                 | 48 | 632   |
| 25                  | 0.90               | 8                 | 48 | 633   |
| 25                  | 1.00               | 8                 | 48 | 634   |
| 25                  | 1.10               | 8                 | 48 | 2422  |
| 25                  | 1.20               | 8                 | 48 | 3250  |
| 25                  | 1.30               | 8                 | 48 | 3410  |
| 25                  | 1.40               | 8                 | 48 | 3412  |
| 25                  | 1.50               | 8                 | 40 | 35450 |
| 25                  | 1.60               | 8                 | 40 | 3413  |
| 25                  | 1.80               | 8                 | 40 | 3414  |
| 25                  | 2.00               | 8                 | 40 | 636   |
| 25                  | 2.50               | 8                 | 40 | 637   |



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| D <sub>1js12</sub> | A <sub>±0.01</sub> | D <sub>2H6</sub> | Z   | VHM   |
|--------------------|--------------------|------------------|-----|-------|
| 25                 | 3.00               | 8                | 32  | 38971 |
| 25                 | 4.00               | 8                | 32  | 3728  |
| 30                 | 0.20               | 8                | 100 | 14689 |
| 30                 | 0.25               | 8                | 100 | 4262  |
| 30                 | 0.30               | 8                | 80  | 638   |
| 30                 | 0.40               | 8                | 80  | 639   |
| 30                 | 0.50               | 8                | 80  | 18429 |
| 30                 | 0.60               | 8                | 64  | 18375 |
| 30                 | 0.70               | 8                | 64  | 37731 |
| 30                 | 0.80               | 8                | 64  | 35516 |
| 30                 | 0.90               | 8                | 64  | 36052 |
| 30                 | 1.00               | 8                | 64  | 2376  |
| 30                 | 1.10               | 8                | 48  | 35420 |
| 30                 | 1.20               | 8                | 48  | 36384 |
| 30                 | 1.30               | 8                | 48  | 3417  |
| 30                 | 1.40               | 8                | 48  | 2424  |
| 30                 | 1.50               | 8                | 48  | 2924  |
| 30                 | 1.60               | 8                | 48  | 3418  |
| 30                 | 1.70               | 8                | 48  | 5948  |
| 30                 | 1.80               | 8                | 48  | 6362  |
| 30                 | 2.00               | 8                | 48  | 645   |
| 30                 | 2.50               | 8                | 40  | 6361  |
| 30                 | 3.00               | 8                | 40  | 3419  |
| 30                 | 4.00               | 8                | 40  | 33482 |
| 30                 | 5.00               | 8                | 32  | 35095 |
| 40                 | 0.20               | 10               | 128 | 24084 |
| 40                 | 0.25               | 10               | 100 | 22049 |
| 40                 | 0.30               | 10               | 100 | 35370 |
| 40                 | 0.40               | 10               | 100 | 4690  |
| 40                 | 0.50               | 10               | 80  | 648   |
| 40                 | 0.60               | 10               | 80  | 677   |
| 40                 | 0.70               | 10               | 80  | 649   |
| 40                 | 0.80               | 10               | 80  | 35444 |
| 40                 | 0.90               | 10               | 80  | 35369 |
| 40                 | 1.00               | 10               | 64  | 653   |
| 40                 | 1.10               | 10               | 64  | 3253  |
| 40                 | 1.20               | 10               | 64  | 36049 |
| 40                 | 1.30               | 10               | 64  | 43352 |
| 40                 | 1.40               | 10               | 64  | 3422  |
| 40                 | 1.50               | 10               | 64  | 36050 |
| 40                 | 1.60               | 10               | 64  | 36051 |
| 40                 | 1.70               | 10               | 64  | 6170  |
| 40                 | 1.80               | 10               | 64  | 3424  |
| 40                 | 2.00               | 10               | 48  | 656   |
| 40                 | 2.50               | 10               | 48  | 36648 |

| D <sub>1js12</sub> | A <sub>±0.01</sub> | D <sub>2H6</sub> | Z   | VHM   |
|--------------------|--------------------|------------------|-----|-------|
| 40                 | 3.00               | 10               | 48  | 658   |
| 40                 | 4.00               | 10               | 40  | 3737  |
| 40                 | 5.00               | 10               | 40  | 35097 |
| 50                 | 0.20               | 13               | 128 | 36385 |
| 50                 | 0.25               | 13               | 128 | 3426  |
| 50                 | 0.30               | 13               | 128 | 659   |
| 50                 | 0.40               | 13               | 100 | 35234 |
| 50                 | 0.50               | 13               | 100 | 31880 |
| 50                 | 0.60               | 13               | 100 | 3030  |
| 50                 | 0.70               | 13               | 100 | 2957  |
| 50                 | 0.80               | 13               | 80  | 661   |
| 50                 | 0.90               | 13               | 80  | 3255  |
| 50                 | 1.00               | 13               | 80  | 662   |
| 50                 | 1.10               | 13               | 80  | 1663  |
| 50                 | 1.20               | 13               | 80  | 2536  |
| 50                 | 1.30               | 13               | 80  | 3429  |
| 50                 | 1.40               | 13               | 80  | 43114 |
| 50                 | 1.50               | 13               | 64  | 37517 |
| 50                 | 1.60               | 13               | 64  | 663   |
| 50                 | 1.70               | 13               | 64  | 8001  |
| 50                 | 1.80               | 13               | 64  | 36336 |
| 50                 | 2.00               | 13               | 64  | 37806 |
| 50                 | 2.50               | 13               | 64  | 37732 |
| 50                 | 3.00               | 13               | 48  | 35636 |
| 50                 | 4.00               | 13               | 48  | 667   |
| 50                 | 5.00               | 13               | 48  | 35109 |
| 63                 | 0.30               | 16               | 128 | 5398  |
| 63                 | 0.40               | 16               | 128 | 669   |
| 63                 | 0.50               | 16               | 128 | 2969  |
| 63                 | 0.60               | 16               | 100 | 2634  |
| 63                 | 0.70               | 16               | 100 | 3207  |
| 63                 | 0.80               | 16               | 100 | 36739 |
| 63                 | 0.90               | 16               | 100 | 36386 |
| 63                 | 1.00               | 16               | 100 | 671   |
| 63                 | 1.20               | 16               | 80  | 35233 |
| 63                 | 1.40               | 16               | 80  | 5093  |
| 63                 | 1.50               | 16               | 80  | 2774  |
| 63                 | 1.60               | 16               | 80  | 676   |
| 63                 | 1.70               | 16               | 80  | 3432  |
| 63                 | 1.80               | 16               | 80  | 3433  |
| 63                 | 2.00               | 16               | 80  | 672   |
| 63                 | 2.50               | 16               | 64  | 673   |
| 63                 | 3.00               | 16               | 64  | 674   |
| 63                 | 4.00               | 16               | 64  | 3748  |
| 63                 | 5.00               | 16               | 48  | 31882 |



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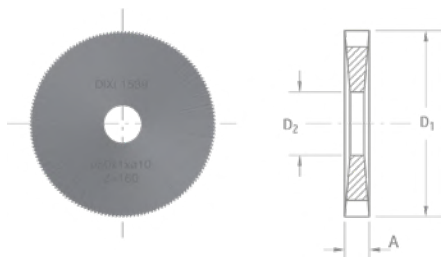
| $D_{1js12}$ | $A_{\pm 0.01}$ | $D_{2H6}$ | Z   | VHM   |
|-------------|----------------|-----------|-----|-------|
| 80          | 0.80           | 22        | 128 | 35817 |
| 80          | 0.90           | 22        | 100 | 46466 |
| 80          | 1.00           | 22        | 100 | 679   |
| 80          | 1.20           | 22        | 100 | 680   |
| 80          | 1.50           | 22        | 100 | 35721 |
| 80          | 1.60           | 22        | 100 | 19241 |
| 80          | 1.80           | 22        | 100 | 14115 |
| 80          | 2.00           | 22        | 80  | 17745 |
| 80          | 2.50           | 22        | 80  | 4030  |
| 80          | 3.00           | 22        | 80  | 684   |
| 80          | 4.00           | 22        | 64  | 21256 |
| 80          | 5.00           | 22        | 64  | 35122 |
| 100         | 0.80           | 22        | 128 | 685   |
| 100         | 1.00           | 22        | 128 | 35816 |
| 100         | 1.20           | 22        | 128 | 38383 |
| 100         | 1.50           | 22        | 100 | 36363 |
| 100         | 1.60           | 22        | 100 | 3438  |
| 100         | 1.80           | 22        | 100 | 6057  |
| 100         | 2.00           | 22        | 100 | 36048 |
| 100         | 2.50           | 22        | 100 | 689   |
| 100         | 3.00           | 22        | 80  | 36364 |
| 100         | 4.00           | 22        | 80  | 35138 |
| 100         | 5.00           | 22        | 80  | 35136 |
| 125         | 1.00           | 22        | 160 | 30687 |
| 125         | 1.20           | 22        | 128 | 35141 |
| 125         | 1.50           | 22        | 128 | 34954 |
| 125         | 2.00           | 22        | 128 | 34827 |
| 125         | 3.00           | 22        | 100 | 35294 |
| 160         | 1.20           | 32        | 160 | 34523 |
| 160         | 1.50           | 32        | 160 | 35299 |



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KREISSÄGEN  
EXTRA FEINE VERZÄHNUNG



- Kreissägen, extra feine Verzahnung. Werkzeuge, die für sehr flaches Eintauchen entwickelt wurden. Für eine optimale Leistung sollten 3 bis 5 Zähne im Eingriff sein.
- Typische Anwendung: Sägen von Nuten für Uhrmacherschrauben

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                   |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|-------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX /PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
|                        | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ○                                   | ○    | ○    | ○    | ⊙        | ⊙  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
|                        | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ○          | ○    | ○                       | ○  | ○     | ⊙                        | ⊙  |    |                  |    |                  |  |

| D ± 0.03 | A ± 0.005 | D <sub>2H6</sub> | Z  | VHM    |
|----------|-----------|------------------|----|--------|
| 10       | 0.10      | 3                | 60 | 964494 |
| 10       | 0.11      | 3                | 60 | 964499 |
| 10       | 0.12      | 3                | 60 | 964500 |
| 10       | 0.13      | 3                | 60 | 964501 |
| 10       | 0.14      | 3                | 60 | 964502 |
| 10       | 0.15      | 3                | 60 | 964503 |
| 10       | 0.16      | 3                | 60 | 964504 |
| 10       | 0.17      | 3                | 60 | 964505 |
| 10       | 0.18      | 3                | 60 | 964506 |
| 10       | 0.19      | 3                | 60 | 964507 |
| 10       | 0.20      | 3                | 60 | 964508 |
| 10       | 0.22      | 3                | 60 | 965568 |
| 10       | 0.24      | 3                | 60 | 963179 |
| 15       | 0.08      | 5                | 80 | 45005  |
| 15       | 0.10      | 5                | 80 | 40599  |
| 15       | 0.11      | 5                | 80 | 57238  |
| 15       | 0.12      | 5                | 80 | 23559  |
| 15       | 0.13      | 5                | 80 | 46325  |
| 15       | 0.14      | 5                | 80 | 38354  |
| 15       | 0.15      | 5                | 80 | 40588  |
| 15       | 0.16      | 5                | 80 | 28784  |
| 15       | 0.17      | 5                | 80 | 57240  |
| 15       | 0.18      | 5                | 80 | 27224  |
| 15       | 0.19      | 5                | 80 | 46858  |
| 15       | 0.20      | 5                | 80 | 19385  |
| 15       | 0.21      | 5                | 80 | 66021  |
| 15       | 0.22      | 5                | 80 | 60191  |
| 15       | 0.23      | 5                | 80 | 58358  |
| 15       | 0.24      | 5                | 80 | 950356 |

| D ± 0.03 | A ± 0.005 | D <sub>2H6</sub> | Z   | VHM   |
|----------|-----------|------------------|-----|-------|
| 15       | 0.25      | 5                | 80  | 19823 |
| 15       | 0.30      | 5                | 80  | 26517 |
| 15       | 0.35      | 5                | 80  | 40299 |
| 15       | 0.40      | 5                | 80  | 19825 |
| 15       | 0.50      | 5                | 80  | 19826 |
| 15       | 0.60      | 5                | 80  | 40300 |
| 15       | 0.70      | 5                | 80  | 40301 |
| 15       | 0.80      | 5                | 80  | 40302 |
| 15       | 0.90      | 5                | 80  | 40303 |
| 15       | 1.00      | 5                | 80  | 26518 |
| 15       | 1.10      | 5                | 80  | 40304 |
| 15       | 1.20      | 5                | 80  | 40305 |
| 15       | 1.40      | 5                | 80  | 40306 |
| 15       | 1.50      | 5                | 80  | 33843 |
| 20       | 0.12      | 5                | 100 | 40314 |
| 20       | 0.14      | 5                | 100 | 40307 |
| 20       | 0.15      | 5                | 100 | 43684 |
| 20       | 0.16      | 5                | 100 | 4913  |
| 20       | 0.18      | 5                | 100 | 16032 |
| 20       | 0.20      | 5                | 100 | 4914  |
| 20       | 0.25      | 5                | 100 | 28665 |
| 20       | 0.30      | 5                | 100 | 28340 |
| 20       | 0.35      | 5                | 100 | 40317 |
| 20       | 0.40      | 5                | 100 | 38355 |
| 20       | 0.50      | 5                | 100 | 35628 |
| 20       | 0.60      | 5                | 100 | 40320 |
| 20       | 0.70      | 5                | 100 | 40322 |
| 20       | 0.80      | 5                | 100 | 40324 |
| 20       | 0.90      | 5                | 100 | 40326 |



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# KREISSÄGEN EXTRA FEINE VERZÄHNUNG

| $D_{\pm 0.03}$ | $A_{\pm 0.005}$ | $D_{2H6}$ | Z   | VHM   |
|----------------|-----------------|-----------|-----|-------|
| 20             | 1.00            | 5         | 100 | 40328 |
| 20             | 1.10            | 5         | 100 | 40330 |
| 20             | 1.20            | 5         | 100 | 40332 |
| 20             | 1.40            | 5         | 100 | 40334 |
| 20             | 1.50            | 5         | 100 | 40336 |
| 20             | 0.12            | 6         | 100 | 40315 |
| 20             | 0.14            | 6         | 100 | 40308 |
| 20             | 0.16            | 6         | 100 | 40309 |
| 20             | 0.18            | 6         | 100 | 40310 |
| 20             | 0.20            | 6         | 100 | 40311 |
| 20             | 0.25            | 6         | 100 | 40312 |
| 20             | 0.30            | 6         | 100 | 40313 |
| 20             | 0.35            | 6         | 100 | 40316 |
| 20             | 0.40            | 6         | 100 | 40318 |
| 20             | 0.50            | 6         | 100 | 40319 |
| 20             | 0.60            | 6         | 100 | 40321 |
| 20             | 0.70            | 6         | 100 | 40323 |
| 20             | 0.80            | 6         | 100 | 40325 |
| 20             | 0.90            | 6         | 100 | 40327 |
| 20             | 1.00            | 6         | 100 | 40329 |

| $D_{1js10}$ | $A_{\pm 0.01}$ | $D_{2H6}$ | Z   | VHM   |
|-------------|----------------|-----------|-----|-------|
| 25          | 0.20           | 6         | 120 | 3649  |
| 25          | 0.25           | 6         | 120 | 40339 |
| 25          | 0.30           | 6         | 120 | 40341 |
| 25          | 0.35           | 6         | 120 | 40343 |
| 25          | 0.40           | 6         | 120 | 40345 |
| 25          | 0.50           | 6         | 120 | 40347 |
| 25          | 0.60           | 6         | 120 | 40349 |
| 25          | 0.70           | 6         | 120 | 40351 |
| 25          | 0.80           | 6         | 120 | 40353 |
| 25          | 0.90           | 6         | 120 | 40355 |
| 25          | 1.00           | 6         | 120 | 40357 |
| 25          | 1.10           | 6         | 120 | 40359 |
| 25          | 1.20           | 6         | 120 | 40361 |
| 25          | 1.40           | 6         | 120 | 40363 |
| 25          | 1.50           | 6         | 120 | 40365 |
| 25          | 0.20           | 8         | 120 | 40338 |
| 25          | 0.25           | 8         | 120 | 40340 |
| 25          | 0.30           | 8         | 120 | 40342 |
| 25          | 0.35           | 8         | 120 | 40344 |
| 25          | 0.40           | 8         | 120 | 40346 |

| $D_{1js10}$ | $A_{\pm 0.01}$ | $D_{2H6}$ | Z   | VHM   |
|-------------|----------------|-----------|-----|-------|
| 25          | 0.50           | 8         | 120 | 40348 |
| 25          | 0.60           | 8         | 120 | 40350 |
| 25          | 0.70           | 8         | 120 | 40352 |
| 25          | 0.80           | 8         | 120 | 40354 |
| 25          | 0.90           | 8         | 120 | 40356 |
| 25          | 1.00           | 8         | 120 | 40358 |
| 25          | 1.10           | 8         | 120 | 40360 |
| 25          | 1.20           | 8         | 120 | 40362 |
| 25          | 1.40           | 8         | 120 | 40364 |
| 25          | 1.50           | 8         | 120 | 40366 |
| 30          | 0.30           | 8         | 128 | 40367 |
| 30          | 0.35           | 8         | 128 | 40368 |
| 30          | 0.40           | 8         | 128 | 40369 |
| 30          | 0.50           | 8         | 128 | 40370 |
| 30          | 0.60           | 8         | 128 | 40371 |
| 30          | 0.70           | 8         | 128 | 40372 |
| 30          | 0.80           | 8         | 128 | 40373 |
| 30          | 0.90           | 8         | 128 | 40374 |
| 30          | 1.00           | 8         | 128 | 40375 |
| 30          | 1.10           | 8         | 128 | 40376 |
| 30          | 1.20           | 8         | 128 | 40377 |
| 30          | 1.40           | 8         | 128 | 40378 |
| 30          | 1.50           | 8         | 128 | 40379 |
| 40          | 0.30           | 8         | 160 | 40393 |
| 40          | 0.35           | 8         | 160 | 40395 |
| 40          | 0.40           | 8         | 160 | 40397 |
| 40          | 0.50           | 8         | 160 | 40399 |
| 40          | 0.60           | 8         | 160 | 40401 |
| 40          | 0.70           | 8         | 160 | 40403 |
| 40          | 0.80           | 8         | 160 | 40405 |
| 40          | 0.90           | 8         | 160 | 40407 |
| 40          | 1.00           | 8         | 160 | 40409 |
| 40          | 1.20           | 8         | 160 | 40413 |
| 40          | 1.40           | 8         | 160 | 40415 |
| 40          | 1.50           | 8         | 160 | 40417 |
| 40          | 0.30           | 10        | 160 | 40394 |
| 40          | 0.35           | 10        | 160 | 40396 |
| 40          | 0.40           | 10        | 160 | 40398 |
| 40          | 0.50           | 10        | 160 | 40400 |
| 40          | 0.60           | 10        | 160 | 40402 |
| 40          | 0.70           | 10        | 160 | 40404 |
| 40          | 0.80           | 10        | 160 | 40406 |



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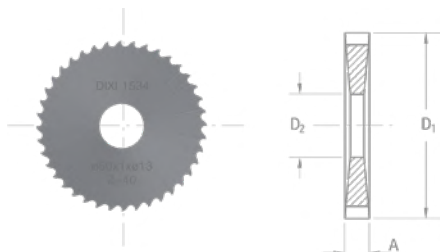
| $D_{1js10}$ | $A_{\pm 0.01}$ | $D_{2 H6}$ | Z   | VHM   |
|-------------|----------------|------------|-----|-------|
| 40          | 0.90           | 10         | 160 | 40408 |
| 40          | 1.00           | 10         | 160 | 40410 |
| 40          | 1.10           | 10         | 160 | 40412 |
| 40          | 1.20           | 10         | 160 | 40414 |
| 40          | 1.50           | 10         | 160 | 40418 |
| 50          | 0.30           | 10         | 160 | 40445 |
| 50          | 0.40           | 10         | 160 | 40447 |
| 50          | 0.50           | 10         | 160 | 40448 |
| 50          | 0.60           | 10         | 160 | 40449 |
| 50          | 0.70           | 10         | 160 | 40450 |
| 50          | 0.80           | 10         | 160 | 40451 |
| 50          | 0.90           | 10         | 160 | 40452 |
| 50          | 1.00           | 10         | 160 | 40453 |
| 50          | 1.20           | 10         | 160 | 40455 |
| 50          | 1.50           | 10         | 160 | 40457 |

KREISSÄGEN  
BOGENZAHN



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- Kreissägen, Bogenzahn. Für hohe Bearbeitungstiefen von langspannenden Werkstoffen. Für eine optimale Leistung sollten 3 bis 5 Zähne im Eingriff sein.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                   |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|-------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLIX /PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
|                        | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ⊙                                   | ⊙    | ⊙    | ⊙    | ○        | ○  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
|                        | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ○                 | ○                      | ○  | ⊙            |         | ○          | ○    | ○                       | ○  | ○     | ○                        | ○  |    |                  |    |                  |  |

| D <sub>1 js12</sub> | A <sub>±0.01</sub> | D <sub>2 H6</sub> | Z  | VHM   |
|---------------------|--------------------|-------------------|----|-------|
| 20                  | 0.30               | 5                 | 32 | 34869 |
| 20                  | 0.50               | 5                 | 24 | 29836 |
| 20                  | 0.60               | 5                 | 24 | 29541 |
| 20                  | 0.70               | 5                 | 24 | 29282 |
| 20                  | 0.80               | 5                 | 24 | 31598 |
| 20                  | 1.00               | 5                 | 20 | 39176 |
| 20                  | 1.20               | 5                 | 20 | 42582 |
| 20                  | 1.50               | 5                 | 20 | 31267 |
| 25                  | 0.30               | 8                 | 40 | 29785 |
| 25                  | 0.50               | 8                 | 32 | 42427 |
| 25                  | 0.60               | 8                 | 32 | 42428 |
| 25                  | 0.80               | 8                 | 24 | 29542 |
| 25                  | 0.90               | 8                 | 24 | 42430 |
| 25                  | 1.00               | 8                 | 24 | 30411 |
| 25                  | 1.50               | 8                 | 20 | 38204 |
| 30                  | 0.30               | 8                 | 40 | 42434 |
| 30                  | 0.40               | 8                 | 40 | 42435 |
| 30                  | 0.50               | 8                 | 40 | 28826 |
| 30                  | 0.60               | 8                 | 32 | 3308  |
| 30                  | 0.80               | 8                 | 32 | 38804 |
| 30                  | 1.00               | 8                 | 32 | 38806 |
| 30                  | 1.20               | 8                 | 24 | 36576 |
| 30                  | 1.30               | 8                 | 24 | 38114 |
| 30                  | 1.50               | 8                 | 24 | 36577 |
| 30                  | 1.60               | 8                 | 24 | 38756 |
| 30                  | 2.00               | 8                 | 24 | 35379 |
| 40                  | 0.50               | 10                | 40 | 34152 |
| 40                  | 0.80               | 10                | 40 | 29793 |
| 40                  | 1.00               | 10                | 32 | 32137 |

| D <sub>1 js12</sub> | A <sub>±0.01</sub> | D <sub>2 H6</sub> | Z  | VHM   |
|---------------------|--------------------|-------------------|----|-------|
| 40                  | 2.00               | 10                | 24 | 35310 |
| 50                  | 0.50               | 13                | 48 | 14901 |
| 50                  | 0.80               | 13                | 40 | 29704 |
| 50                  | 1.00               | 13                | 40 | 5111  |
| 50                  | 1.50               | 13                | 32 | 39153 |
| 50                  | 2.00               | 13                | 32 | 37281 |
| 63                  | 0.40               | 16                | 64 | 34999 |
| 63                  | 0.50               | 16                | 64 | 2872  |
| 63                  | 0.60               | 16                | 48 | 37364 |
| 63                  | 0.80               | 16                | 48 | 29794 |
| 63                  | 1.00               | 16                | 48 | 28979 |
| 63                  | 1.30               | 16                | 40 | 40597 |
| 63                  | 1.50               | 16                | 40 | 28990 |
| 63                  | 1.60               | 16                | 40 | 41638 |
| 63                  | 1.80               | 16                | 40 | 37787 |
| 63                  | 2.00               | 16                | 40 | 28845 |
| 63                  | 2.50               | 16                | 32 | 35380 |
| 63                  | 3.00               | 16                | 32 | 28828 |
| 80                  | 0.80               | 22                | 64 | 36043 |
| 80                  | 1.00               | 22                | 48 | 29219 |
| 80                  | 1.20               | 22                | 48 | 35967 |
| 80                  | 1.50               | 22                | 48 | 18568 |
| 80                  | 2.00               | 22                | 40 | 28829 |
| 100                 | 0.80               | 22                | 64 | 35381 |
| 100                 | 1.00               | 22                | 64 | 35429 |
| 100                 | 1.20               | 22                | 64 | 35431 |
| 100                 | 1.50               | 22                | 48 | 25267 |
| 100                 | 2.00               | 22                | 48 | 29408 |

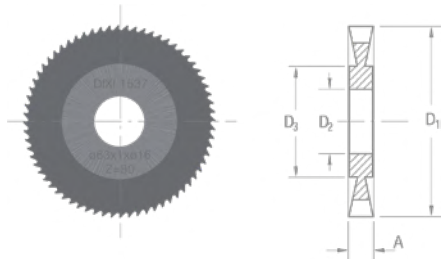




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## KREISSÄGEN FÜR ROSTFREIEN STAHL



- Kreissägen, für rostfreien Stahl. Für das Trennen und Schlitzen kleinerer Bauteile.
- Die CUTINOX-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen.

○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗              | ⊗                | ⊗  | ⊗  | ⊗                                    | ⊗    | ⊗    | ⊗    | ○        | ○  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      |                         | S  |       |                          |    |                  | H  |                  |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  |                   |                        |    |              |         |            |      | ⊗                       | ⊗  | ○     | ⊗                        | ⊗  |                  |    |                  |    |  |

| D <sub>1</sub> js12 | A <sub>±0.01</sub> | D <sub>3</sub> | D <sub>2 H6</sub> | Z   | VHM    |
|---------------------|--------------------|----------------|-------------------|-----|--------|
| 50                  | 0.80               | 30             | 13                | 68  | 954330 |
| 50                  | 1.00               | 30             | 13                | 68  | 954331 |
| 63                  | 0.60               | 40             | 16                | 80  | 60407  |
| 63                  | 0.70               | 40             | 16                | 80  | 995182 |
| 63                  | 0.80               | 40             | 16                | 80  | 60408  |
| 63                  | 1.00               | 40             | 16                | 80  | 60409  |
| 80                  | 0.60               | 50             | 22                | 100 | 60410  |
| 80                  | 0.80               | 50             | 22                | 100 | 60411  |
| 80                  | 1.00               | 50             | 22                | 100 | 60414  |
| 100                 | 0.80               | 60             | 22                | 120 | 60412  |
| 100                 | 1.00               | 60             | 22                | 120 | 60413  |



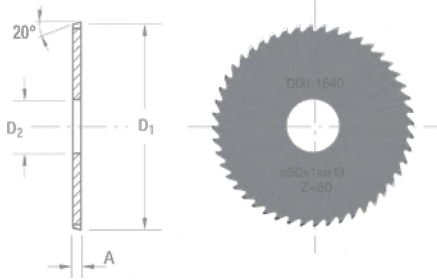
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## WINKELKREISSÄGEN LINKS- UND RECHTSSCHNEIDEND



- Winkelsäge, rechtsschneidend. Werkzeuge, die für das Trennen von Werkstücken ohne Butzen entwickelt wurden.
- Die CUTINOX-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen.

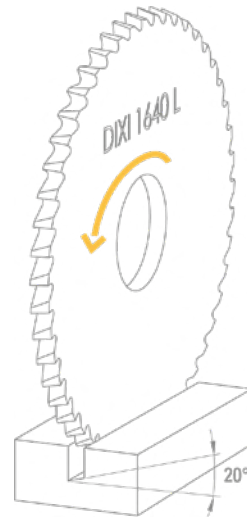
○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLIX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
|                        | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
|                        | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ○          | ○    | ○                       | ○  | ○     | ○                        | ○  |                  |    |                  |    |

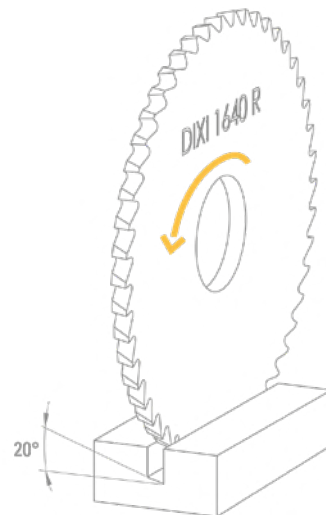
### DIXI 1640 L

| D <sub>1</sub> js12 | A ± 0.01 | D <sub>2</sub> H6 | Z   | VHM    | CUTINOX |
|---------------------|----------|-------------------|-----|--------|---------|
| 50                  | 0.50     | 13                | 100 | 977529 | 977548  |
| 50                  | 0.80     | 13                | 80  | 977530 | 957215  |
| 50                  | 1.00     | 13                | 80  | 977531 | 977549  |
| 63                  | 0.50     | 16                | 128 | 977532 | 977552  |
| 63                  | 0.80     | 16                | 100 | 954255 | 977553  |
| 63                  | 1.00     | 16                | 100 | 977533 | 955787  |
| 80                  | 0.80     | 22                | 128 | 975393 | 975569  |
| 80                  | 1.00     | 22                | 100 | 977534 | 977554  |
| 100                 | 0.80     | 22                | 100 | 977535 | 977555  |
| 100                 | 1.00     | 22                | 100 | 977536 | 977556  |



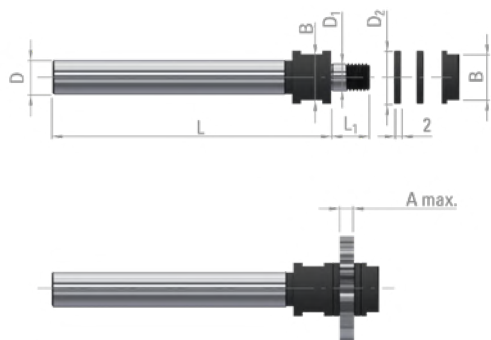
### DIXI 1640 R

| D <sub>1</sub> js12 | A ± 0.01 | D <sub>2</sub> H6 | Z   | VHM    | CUTINOX |
|---------------------|----------|-------------------|-----|--------|---------|
| 50                  | 0.50     | 13                | 100 | 977520 | 977537  |
| 50                  | 0.80     | 13                | 80  | 977521 | 977538  |
| 50                  | 1.00     | 13                | 80  | 59024  | 977539  |
| 63                  | 0.50     | 16                | 128 | 977522 | 977540  |
| 63                  | 0.80     | 16                | 100 | 977523 | 977541  |
| 63                  | 1.00     | 16                | 100 | 977524 | 977542  |
| 80                  | 0.80     | 22                | 128 | 977525 | 977543  |
| 80                  | 1.00     | 22                | 100 | 977526 | 977544  |
| 100                 | 0.80     | 22                | 100 | 977527 | 977545  |
| 100                 | 1.00     | 22                | 100 | 977528 | 977547  |



## DIXI 2713

### KREISSÄGENAUFNAHMEN FRONTSEITIGE SPANNUNG



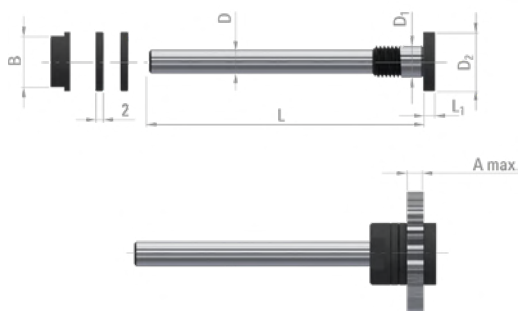
- Kreissägenaufnahmen, frontseitige Spannung. Für Rechtsdrehung verwenden. Jede Aufnahme wird mit zwei Distanzstücken und einer Mutter geliefert.



| $D_{1\ h6}$ | $D_{h6}$ | $D_2$ | L   | $L_1$ | B  | $A_{max.}$ | Art.   |
|-------------|----------|-------|-----|-------|----|------------|--------|
| 3           | 5        | 5     | 60  | 7.00  | 4  | 3          | 968329 |
| 5           | 6        | 10    | 70  | 10.00 | 8  | 6          | 953911 |
| 5           | 10       | 10    | 80  | 10.00 | 8  | 6          | 953917 |
| 6           | 10       | 12    | 80  | 10.50 | 10 | 6          | 953918 |
| 8           | 10       | 15    | 80  | 10.00 | 13 | 6          | 954975 |
| 8           | 12       | 15    | 90  | 11.0  | 13 | 6          | 953919 |
| 10          | 10       | 18    | 80  | 10.50 | 15 | 6          | 954976 |
| 10          | 16       | 18    | 100 | 11.50 | 15 | 6          | 953920 |
| 13          | 16       | 22    | 110 | 12.00 | 19 | 6          | 953921 |
| 16          | 20       | 26    | 120 | 13.00 | 22 | 6          | 953922 |
| 22          | 16       | 32    | 120 | 12.00 | 27 | 6          | 347691 |

## DIXI 2714

### KREISSÄGENAUFNAHMEN RÜCKSEITIGE SPANNUNG



- Kreissägenaufnahmen, rückseitige Spannung. Aufnahme, die den frontseitigen Abstand reduziert. Für Rechtsdrehung verwenden. Jede Aufnahme wird mit zwei Distanzstücken und einer Mutter geliefert.



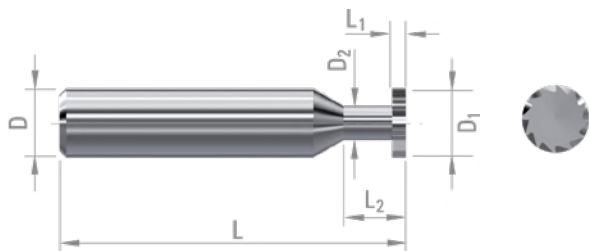
| $D_{1\ h6}$ | $D_{h6}$ | $D_2$ | L   | $L_1$ | B  | $A_{max.}$ | Art.   |
|-------------|----------|-------|-----|-------|----|------------|--------|
| 5           | 4        | 10    | 50  | 3.00  | 8  | 6          | 953923 |
| 6           | 5        | 12    | 60  | 3.00  | 10 | 6          | 953924 |
| 8           | 6        | 15    | 70  | 3.00  | 13 | 6          | 953925 |
| 8           | 7        | 15    | 80  | 3.00  | 13 | 6          | 953926 |
| 10          | 6        | 18    | 70  | 3.50  | 15 | 6          | 953927 |
| 10          | 8        | 18    | 90  | 3.50  | 15 | 6          | 953928 |
| 13          | 10       | 22    | 110 | 3.50  | 19 | 6          | 953929 |
| 16          | 12       | 26    | 120 | 3.50  | 22 | 6          | 953930 |



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T-NUTENFRÄSER  
GERADE GENUTET



- T-Nutenfräser, gerade genutet.
- Halbfertigprodukte, die an Ihre Bedürfnisse angepasst werden können (Dicke und Anzahl der Zähne).

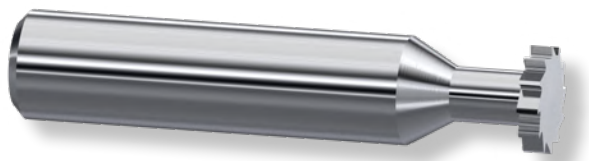
○ gut    ⊗ ausgezeichnet

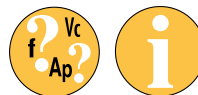
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗                 | ⊗ | ⊗ | ⊗ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ⊗        | ⊗  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          | H  |                  |    |                  |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen           | ○                       | ○  | ⊗                       | ⊗  | ⊗  | ⊗                 | ⊗                      | ⊗  | ⊗            |         |            | ○    | ○                       | ○  | ○     | ○                        | ○  | ○                |    |                  |    |  |

$D_1$      $L_1$      $D_2$  <sub>0/-0.20</sub>     $L_2$  <sub>±0.2</sub>     $D_{h5}$     L    Z    VHM    CUTINOX  
∅ < 4.0 ± 0.01  
∅ ≥ 4.0 -0.05/+0.10

|    |             |      |       |    |    |         |   |   |
|----|-------------|------|-------|----|----|---------|---|---|
| 2  | 0.20 - 1.00 | 1.00 | 3.00  | 4  | 42 | 3 - 6   | □ | □ |
| 3  | 0.20 - 1.50 | 1.50 | 3.50  | 4  | 42 | 3 - 6   | □ | □ |
| 4  | 0.20 - 1.50 | 2.50 | 6.00  | 4  | 42 | 3 - 6   | □ | □ |
| 5  | 0.50 - 1.50 | 3.00 | 6.00  | 5  | 42 | 3 - 6   | □ | □ |
| 6  | 0.50 - 2.50 | 3.50 | 7.00  | 6  | 42 | 4 - 8   | □ | □ |
| 8  | 0.50 - 3.00 | 4.00 | 9.00  | 8  | 50 | 5 - 10  | □ | □ |
| 10 | 0.50 - 4.00 | 5.00 | 9.00  | 10 | 50 | 5 - 12  | □ | □ |
| 12 | 0.50 - 3.50 | 5.00 | 11.50 | 6  | 50 | 6 - 16  | □ | □ |
| 12 | 0.50 - 4.00 | 6.00 | 14.00 | 10 | 50 | 6 - 16  | □ | □ |
| 15 | 0.50 - 5.00 | 8.00 | 14.00 | 10 | 60 | 8 - 18  | □ | □ |
| 16 | 0.50 - 2.90 | 8.00 | 14.00 | 10 | 60 | 8 - 20  | □ | □ |
| 16 | 3.00 - 6.00 | 8.00 | 14.00 | 10 | 60 | 8 - 20  | □ | □ |
| 18 | 0.50 - 2.90 | 8.00 | 14.00 | 10 | 60 | 10 - 24 | □ | □ |
| 18 | 3.00 - 6.00 | 8.00 | 14.00 | 10 | 60 | 10 - 24 | □ | □ |
| 20 | 0.50 - 2.90 | 8.00 | 11.00 | 10 | 60 | 10 - 24 | □ | □ |
| 20 | 3.00 - 6.00 | 8.00 | 14.00 | 10 | 60 | 10 - 24 | □ | □ |
| 25 | 0.50 - 3.90 | 8.00 | 13.00 | 10 | 60 | 10 - 32 | □ | □ |
| 25 | 4.00 - 8.00 | 8.00 | 18.00 | 10 | 60 | 10 - 32 | □ | □ |
| 30 | 0.50 - 3.90 | 8.00 | 18.00 | 10 | 60 | 10 - 36 | □ | □ |
| 30 | 4.00 - 8.00 | 8.00 | 18.00 | 10 | 60 | 10 - 36 | □ | □ |

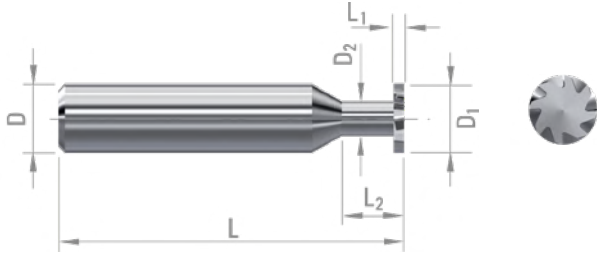




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T-NUTENFRÄSER  
WECHSELVERZÄHNUNG



- T-Nutenfräser, Wechselverzahnung. Halbfertigprodukte, die an Ihre Bedürfnisse angepasst werden können (Dicke und Anzahl der Zähne).
- Reduktion von Vibrationen und Verbesserung der Oberflächenbeschaffenheit.

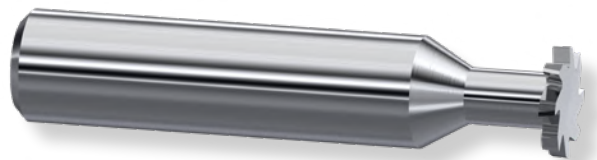
○ gut    ⊗ ausgezeichnet

| ISO          | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|--------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
|              | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323     | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗              | ⊗                | ⊗  | ⊗  | ⊗                                    | ⊗    | ⊗    | ⊗    | ○        | ○  | ⊗                | ⊗  | ⊗                  | ⊗  |

| ISO          | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          | H  |                  |    |                  |    |  |
|--------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
|              | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323     | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen | ⊗                       | ⊗  | ⊗                       | ⊗  | ⊗  | ⊗                 | ⊗                      | ⊗  | ⊗            |         |            | ○    | ○                       | ○  | ○     | ○                        | ⊗  | ⊗                |    |                  |    |  |

$D_1$        $L_1$        $D_2$  <sub>0/-0.20</sub>       $L_2$  <sub>±0.2</sub>       $D_{h5}$       L      Z      VHM      CUTINOX  
∅ < 4.0 ± 0.01  
∅ ≥ 4.0 -0.05/-0.10

|    |              |      |       |    |    |         |   |   |
|----|--------------|------|-------|----|----|---------|---|---|
| 4  | 0.50 - 3.00  | 2.50 | 6.00  | 4  | 42 | 4 - 6   | □ | □ |
| 5  | 0.50 - 3.00  | 3.00 | 6.00  | 5  | 42 | 4 - 6   | □ | □ |
| 6  | 0.50 - 3.00  | 3.50 | 7.00  | 6  | 42 | 4 - 6   | □ | □ |
| 8  | 1.00 - 4.00  | 4.00 | 9.00  | 8  | 50 | 4 - 8   | □ | □ |
| 10 | 1.00 - 4.00  | 5.00 | 9.00  | 10 | 50 | 6 - 10  | □ | □ |
| 12 | 0.50 - 3.50  | 5.00 | 11.50 | 6  | 50 | 6 - 10  | □ | □ |
| 12 | 1.00 - 5.00  | 6.00 | 14.00 | 10 | 60 | 6 - 10  | □ | □ |
| 15 | 1.50 - 6.00  | 8.00 | 14.00 | 10 | 60 | 8 - 14  | □ | □ |
| 16 | 1.50 - 3.90  | 8.00 | 14.00 | 10 | 60 | 8 - 14  | □ | □ |
| 16 | 4.00 - 6.00  | 8.00 | 14.00 | 10 | 60 | 8 - 14  | □ | □ |
| 18 | 1.50 - 3.90  | 8.00 | 14.00 | 10 | 60 | 10 - 16 | □ | □ |
| 18 | 4.00 - 6.00  | 8.00 | 14.00 | 10 | 60 | 10 - 16 | □ | □ |
| 20 | 1.50 - 3.90  | 8.00 | 11.00 | 10 | 60 | 10 - 18 | □ | □ |
| 20 | 4.00 - 6.00  | 8.00 | 14.00 | 10 | 60 | 10 - 18 | □ | □ |
| 25 | 1.50 - 4.90  | 8.00 | 13.00 | 10 | 60 | 10 - 24 | □ | □ |
| 25 | 5.00 - 10.00 | 8.00 | 18.00 | 10 | 60 | 14 - 24 | □ | □ |
| 30 | 1.50 - 4.90  | 8.00 | 13.00 | 10 | 60 | 18 - 28 | □ | □ |
| 30 | 5.00 - 10.00 | 8.00 | 18.00 | 10 | 60 | 18 - 28 | □ | □ |

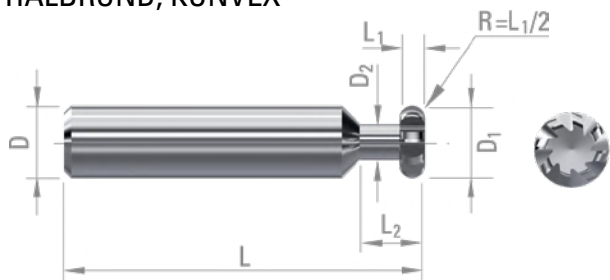




P.346

P.333

T-NUTENFRÄSER  
HALBRUND, KONVEX



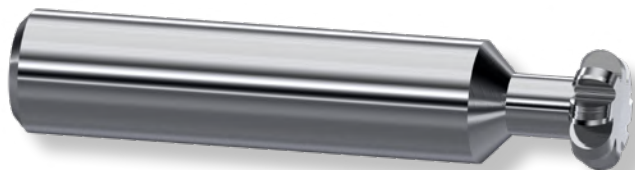
○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗                 | ⊗ | ⊗ | ⊗ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ⊗        | ⊗  | ○                | ○  | ○                  | ○  |

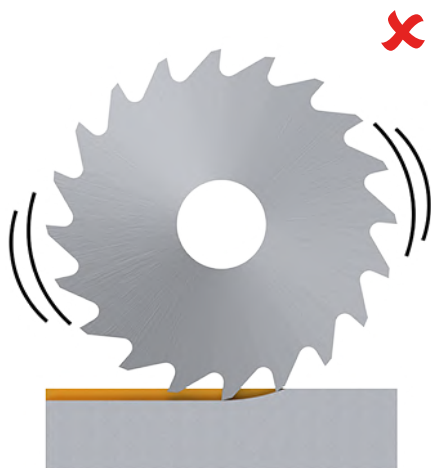
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          |    | H  |                  |    |                  |  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |  |
| Empfehlungen           | ○                       | ○  | ⊗                       | ⊗  | ⊗  | ⊗                 | ⊗                      | ⊗  | ⊗            |         | ○          | ○    | ○                       | ○  | ○     | ○                        | ○  |    |                  |    |                  |  |  |

$D_1$        $L_1$        $D_2$  <sub>0/-0.20</sub>       $L_2$  <sub>± 0.2</sub>       $D_{hs}$       L      Z      VHM      CUTINOX  
∅ < 4.0 ± 0.01  
∅ ≥ 4.0 -0.05/-0.10

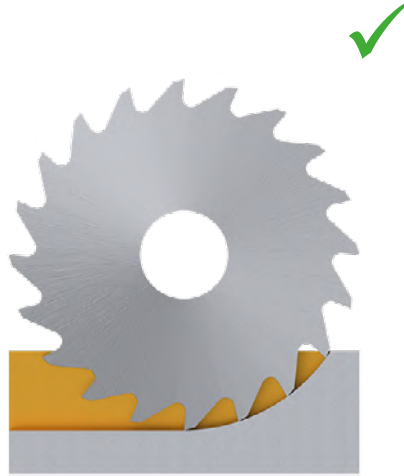
|    |             |      |       |    |    |    |   |   |
|----|-------------|------|-------|----|----|----|---|---|
| 4  | 0.40 - 1.50 | 1.50 | 6.00  | 4  | 42 | 4  | □ | □ |
| 6  | 0.50 - 2.00 | 3.50 | 7.00  | 6  | 42 | 6  | □ | □ |
| 8  | 1.00 - 3.00 | 4.00 | 9.00  | 8  | 50 | 6  | □ | □ |
| 10 | 1.00 - 4.00 | 5.00 | 9.00  | 10 | 50 | 8  | □ | □ |
| 12 | 0.50 - 3.50 | 5.00 | 11.50 | 6  | 50 | 10 | □ | □ |
| 12 | 1.00 - 5.00 | 6.00 | 14.00 | 10 | 50 | 10 | □ | □ |
| 16 | 1.00 - 6.00 | 8.00 | 14.00 | 10 | 60 | 12 | □ | □ |



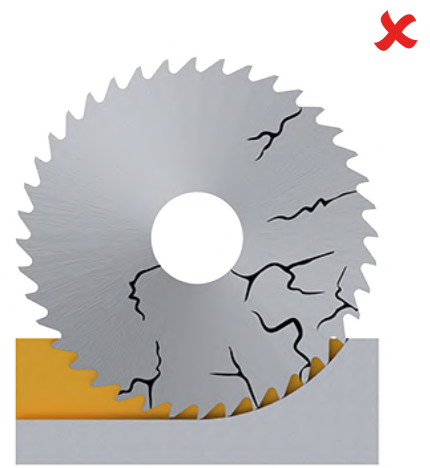
Weitere Verzahnungsmöglichkeiten und Formen Seite 343



1 - 2 Zähne im Material  
Zu wenig Zähne  
= Gefahr von Vibrationen



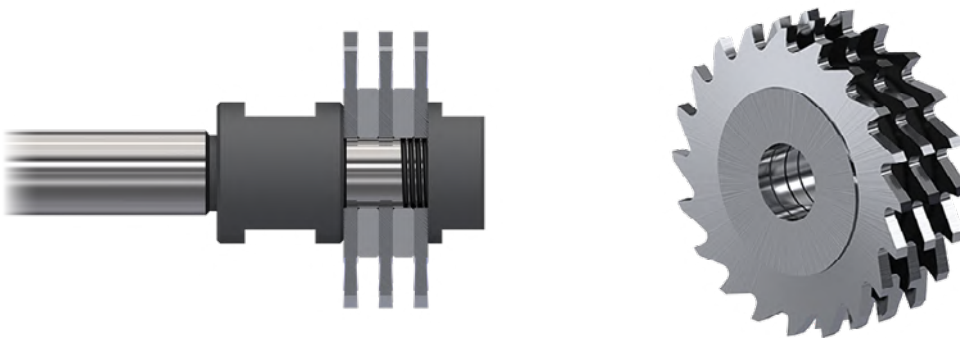
3 - 4 Zähne im Material  
= stabile Bearbeitung



Mehr als 4 Zähne im Material  
Zu viele Zähne  
= Bruchgefahr

## MONTAGE IM SATZ

Für die Montage von Kreissägen im Satz ist eine Nabe notwendig, um die Parallelität zwischen der verschiedenen Komponenten zu gewährleisten.



## WERKZEUGE AUF ANFRAGE

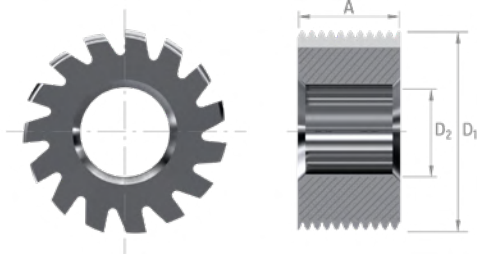
Formwerkzeuge nach Ihren Vorgaben.

Auf der Seite 342 finden Sie Formvorschläge.

Auf Wunsch fertigt DIXI Polytool Keilnuten auf allen seinen Kreissägenreihen an.



NACHSCHLEIFBAR  
LOGARITHMISCHES PROFIL



- **DIXI 1675** - Abwälzfräser für zyklode Zahnformen. Für das Abwälzfräsen durch Erzeugung von Ritzeln und Zahnrädern entwickelt (NIHS, EVJ, CETEHOR-Normen...). Nachschleifbares logarithmisches Profil.
- **DIXI 1680** - Abwälzfräser für evolvente Zahnformen. Für das Wälzfräsen durch Erzeugen von Ritzeln und Zahnrädern. Standard Profiltyp DIN 867.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                 |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|-----------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                              | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ○                                 | ○    | ○    | ○    |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ○                       | ○  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      |                         |    |       | ⊙                        | ⊙  |                  |    |                  |    |

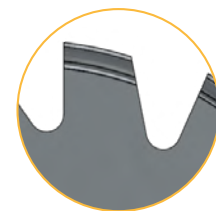
| D <sub>1</sub> | A      | D <sub>2 H3</sub> | Z       | VHM |
|----------------|--------|-------------------|---------|-----|
| 6              | 4 - 6  | 3.50              | 12      | □   |
| 8              | 4 - 6  | 3.50              | 12 - 15 | □   |
| 10             | 4 - 6  | 3.50              | 12 - 15 | □   |
| 10             | 6      | 4.50              | 12 - 15 | □   |
| 12             | 6      | 3.50              | 12 - 15 | □   |
| 12             | 6 - 8  | 4.50              | 12 - 15 | □   |
| 16             | 4 - 10 | 8.00              | 12 - 15 | □   |
| 18             | 6      | 8.00              | 12 - 15 | □   |
| 18             | 6 - 8  | 8.00              | 12 - 15 | □   |
| 24             | 8 - 15 | 8.00              | 12 - 15 | □   |

Modul (m) = 0.03 - 0.50



Beschichtung auf Anfrage

Nachschleifbares  
logarithmisches Profil



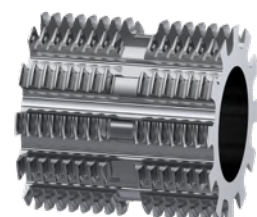
Erhaltenes Zahnprofil

**DIXI 1675**  
Zyklode

**DIXI 1680**  
Evolvente



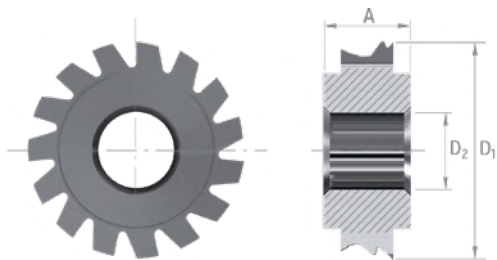
**DOPPELFRÄSE**  
auf Anfrage



Falls Sie Fräsdorne benötigen, wenden Sie sich an den Maschinenhersteller.



EINSTELL-ABWÄLZFRÄSER



- Einstell-Abwälzfräser. Zum Abwälzfräsen durch Erzeugung von asymmetrischen Ritzeln und Zahnradern, Farbrad, Wolfzahn.
- Nachschleifbares logarithmisches Profil.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K                |    |                    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|------------------|----|--------------------|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○                | ○  | ○  | ○    | ○                                    | ○    | ○        |                  |    |                    |    |    |    |

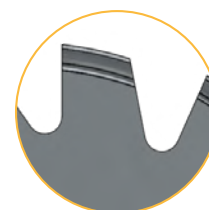
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      | S                       |    |       |                          |    | H                |                  |    |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|------------------|----|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl | Hartes Gusseisen |    |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39               | 40 | 41 |
| Empfehlungen           | ○                       | ○  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      |                         |    |       | ○                        | ○  |                  |                  |    |    |

| D <sub>1</sub> | A         | D <sub>2H3</sub> | Z  | VHM |
|----------------|-----------|------------------|----|-----|
| 6              | 4 - 6     | 3.50             | 12 | □   |
| 8              | 2 - 4 - 6 | 3.50             | 12 | □   |
| 10             | 2 - 6     | 3.50             | 12 | □   |
| 10             | 2 - 6     | 4.50             | 12 | □   |
| 12             | 2 - 6     | 3.50             | 12 | □   |
| 12             | 6 - 8     | 4.50             | 12 | □   |
| 16             | 4 - 10    | 8.00             | 12 | □   |
| 18             | 6         | 6.00             | 12 | □   |
| 18             | 6 - 8     | 8.00             | 12 | □   |
| 24             | 8         | 8.00             | 12 | □   |

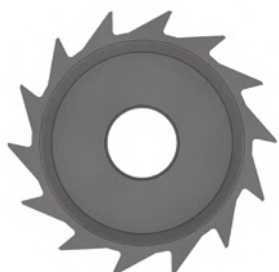


Beschichtung auf Anfrage

Nachschleifbares logarithmisches Profil

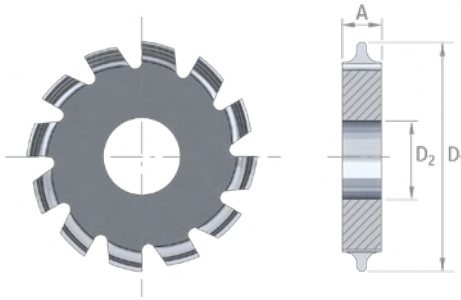


Erhaltenes Zahnprofil



Falls Sie Fräsdorne benötigen, wenden Sie sich an den Maschinenhersteller.

ZAHNFORMFRÄSER



- Zahnformfräser. Werkzeuge, die für das Radial-, Stirn- und Kegel verzahnungsfräsen entwickelt wurden.
- Nachschärfbares logarithmisches Profil.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ○                       | ○  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      |                         |    |       | ○                        | ○  |    |                  |    |                  |  |

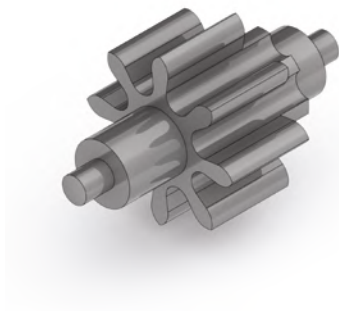
| D <sub>1</sub> | A      | D <sub>2H3</sub> | Z      | VHM |
|----------------|--------|------------------|--------|-----|
| 6              | 4 - 6  | 3.50             | 6 - 12 | □   |
| 8              | 2 - 6  | 3.50             | 6 - 12 | □   |
| 10             | 2 - 6  | 3.50             | 6 - 12 | □   |
| 10             | 2      | 4.50             | 6 - 12 | □   |
| 10             | 6      | 4.50             | 6 - 12 | □   |
| 12             | 2      | 3.50             | 6 - 12 | □   |
| 12             | 6      | 3.50             | 6 - 12 | □   |
| 12             | 6 - 8  | 4.50             | 6 - 12 | □   |
| 16             | 4 - 10 | 8.00             | 6 - 12 | □   |
| 18             | 6      | 6.00             | 6 - 12 | □   |
| 18             | 6 - 8  | 8.00             | 6 - 12 | □   |
| 24             | 8 - 15 | 8.00             | 6 - 12 | □   |

Modul (m) = 0.03 - 0.50

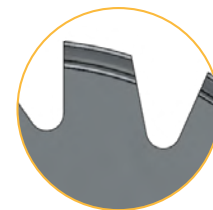


Beschichtung auf Anfrage

Erhaltenes Zahnprofil



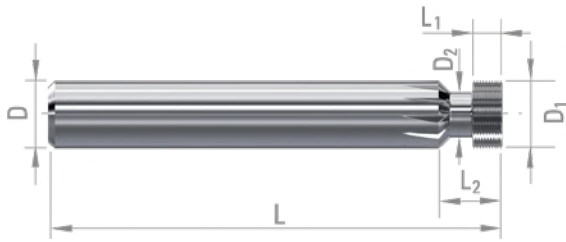
Nachschleifbares logarithmisches Profil



Falls Sie Fräsdorne benötigen, wenden Sie sich an den Maschinenhersteller.

ABWÄLZFRÄSE MIT ZYLINDRISCHEM KÖRPER

- **DIXI 1672** - Monoblock-Abwälzfräser für zyklode Zahnformen. Zum Abwälzfräsen bei der Erzeugung von kleinen Zahnradern (NIHS, EVJ, CETEHOR-Normen, etc.) Nachschleifbares logarithmisches Profil.
- **DIXI 1673** - Monoblock-Zahnformfräser. Zum Radial, Stirn und Kegelfzahnfräsen. Nachschleifbares logarithmische Profil. Ideal für Decolletage-Maschinen und direkt in Zangen montiert.



○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K                |    |                    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|------------------|----|--------------------|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○                | ○  | ○  | ○    | ○                                    | ○    | ○        |                  |    |                    |    |    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      |                         | S  |       |                          |    |                  | H                |    |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|------------------|----|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl | Hartes Gusseisen |    |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39               | 40 | 41 |  |
| Empfehlungen           | ○                       | ○  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      |                         |    |       | ○                        | ○  |                  |                  |    |    |  |

DIXI 1672

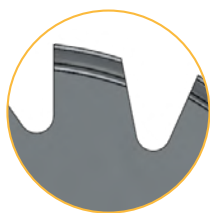
DIXI 1673



| D <sub>1</sub> | L <sub>1</sub> | D <sub>2</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z      | VHM |
|----------------|----------------|----------------|----------------|-----------------|----|--------|-----|
| 4              | 4              | 2.40           | 4              | 4               | 40 | 6 - 10 | □   |
| 5              | 4              | 3.00           | 4              | 5               | 40 | 6 - 10 | □   |
| 5              | 4              | 4.00           | 4              | 6               | 40 | 6 - 10 | □   |
| 6              | 4              | 4.00           | 4              | 6               | 40 | 6 - 10 | □   |

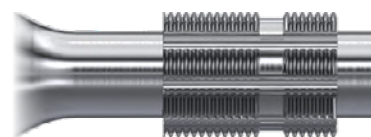
| D <sub>1</sub> | L <sub>1</sub> | D <sub>2</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | VHM |
|----------------|----------------|----------------|----------------|-----------------|----|---|-----|
| 4              | 2              | 2.40           | 4              | 4               | 40 | 5 | □   |
| 5              | 2              | 3.00           | 4              | 5               | 40 | 6 | □   |
| 5              | 2              | 4.00           | 4              | 6               | 40 | 6 | □   |
| 6              | 2              | 4.00           | 4              | 6               | 40 | 6 | □   |

Nachschleifbares logarithmisches Profil



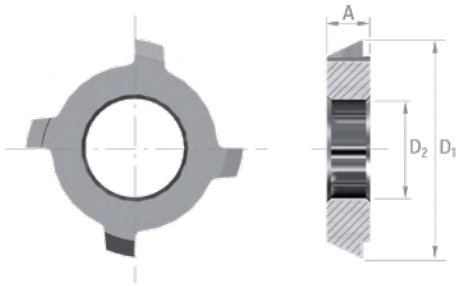
Module (m) = 0.03 - 0.50

**DOPPELFRÄSE**  
auf Anfrage



Beschichtung auf Anfrage

ABWÄLZFRÄSE  
FRONTZÄHNE



- Abwälzfräser zum Fräsen von Frontzähnen.
- Nachschleifbares logarithmisches Profil.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ○                       | ○  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      |                         |    |       | ○                        | ○  |                  |    |                  |    |

| D <sub>1</sub> | A | D <sub>2 H3</sub> | Z     | VHM |
|----------------|---|-------------------|-------|-----|
| 8              | 2 | 3.50              | 2 - 6 | □   |
| 10             | 2 | 3.50 - 4.50       | 2 - 6 | □   |
| 12             | 2 | 3.50 - 4.50       | 2 - 6 | □   |

Modul (m) = 0.03 - 0.50

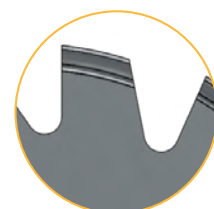


Beschichtung auf Anfrage

Erhaltenes Zahnprofil



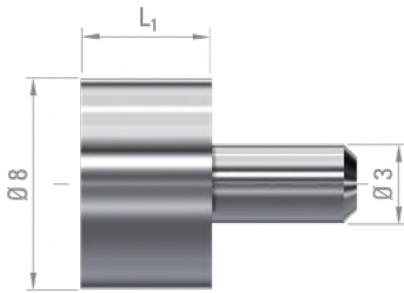
Nachschleifbares logarithmisches Profil



Falls Sie Fräsdorne benötigen, wenden Sie sich an den Maschinenhersteller.

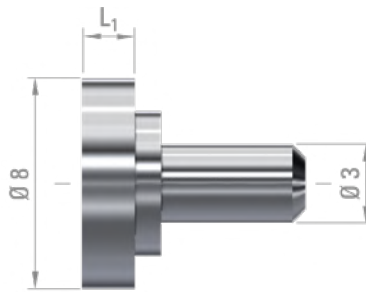
AUFLAGESCHEIBEN

DIXI 0700-A



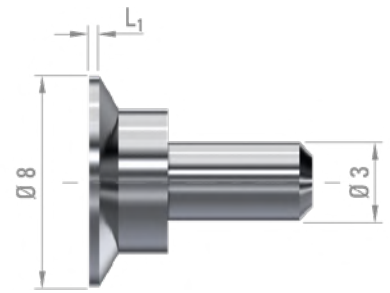
Dicke  $L_1$  von 3 bis 5 mm  
Bis 8 Kerben

DIXI 0700-B



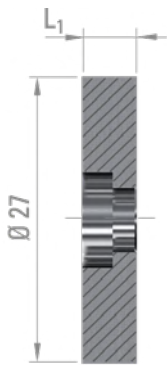
Dicke  $L_1$  von 1 bis 2.99 mm  
Bis 8 Kerben

DIXI 0700-C



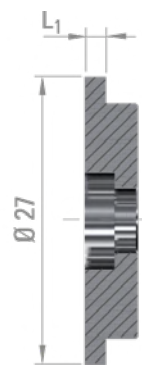
Dicke  $L_1$  von 0.05 bis 0.99 mm  
Bis 8 Kerben

DIXI 0710-D



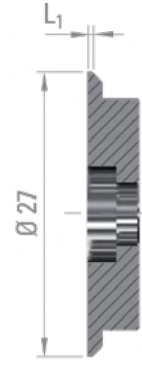
Dicke  $L_1$  5 mm  
Bis 24 Kerben

DIXI 0710-E



Dicke  $L_1$  von 1 bis 4 mm  
Bis 24 Kerben

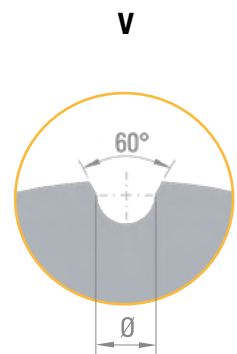
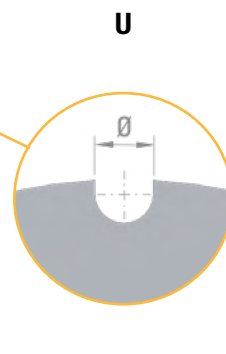
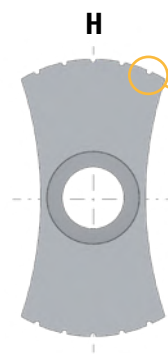
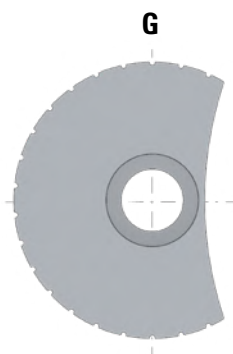
DIXI 0710-F



Dicke  $L_1$  von 0.05 bis 0.99 mm  
Bis 24 Kerben

Spezial Geometriescheibe für DIXI 0710

Form der Kerben



Beispiel

| Stückzahl | Art. DIXI | DICKE $L_1$ | Scheiben Form <b>G</b> oder <b>H</b> | Form der Kerben <b>U</b> oder <b>V</b> | Ø Kerben | Nuten Zahl |
|-----------|-----------|-------------|--------------------------------------|--|----------|------------|
| 1         | 0710-E    | 1           | G                                    | U                                      | 0.20     | 3          |
|           |           |             |                                      | V                                      | 0.24     | 5          |
|           |           |             |                                      |  |          |            |
|           |           |             |                                      |  |          |            |



INFORMATIONEN ÜBER DAS ZU BEARBEITENDE WERKSTÜCK

**Norm**

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**Zeichnung**

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**DXF**

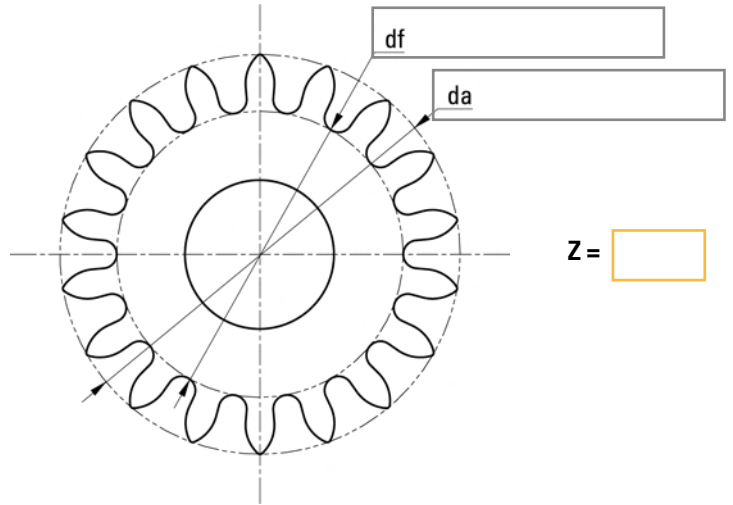
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**Zu bearbeitender Werkstoff**

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**Modul (m)**

---



**Steigungswinkel (Profil)** R  L

**Anzahl der Gewinde**

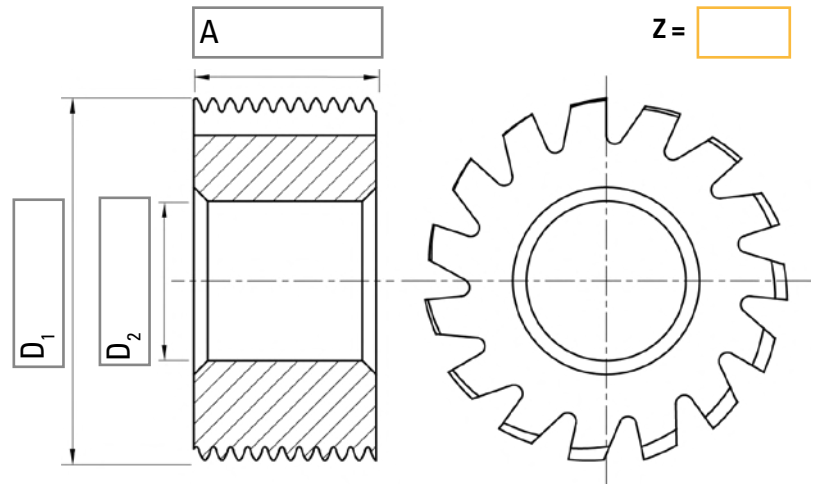
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**Beschichtung**

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**Menge**

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**Steigungswinkel (Profil)** R  L

**Anzahl der Gewinde**

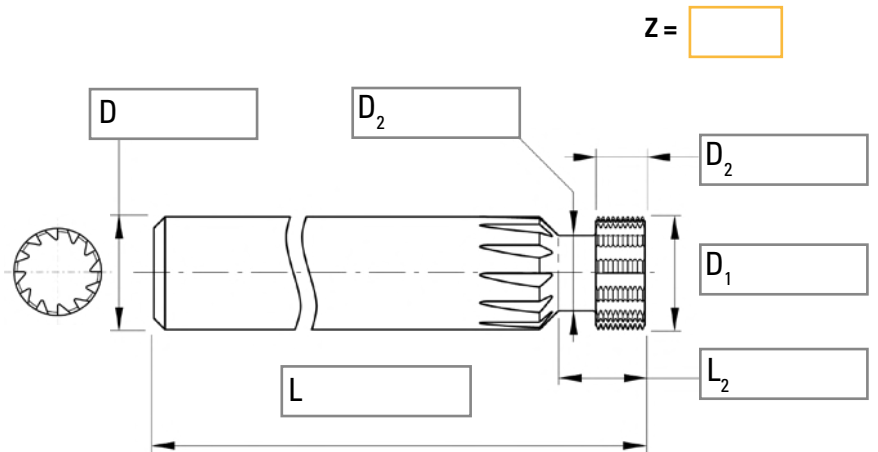
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**Beschichtung**

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**Menge**

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**Bemerkungen**

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INFORMATIONEN ÜBER DAS ZU BEARBEITENDE WERKSTÜCK

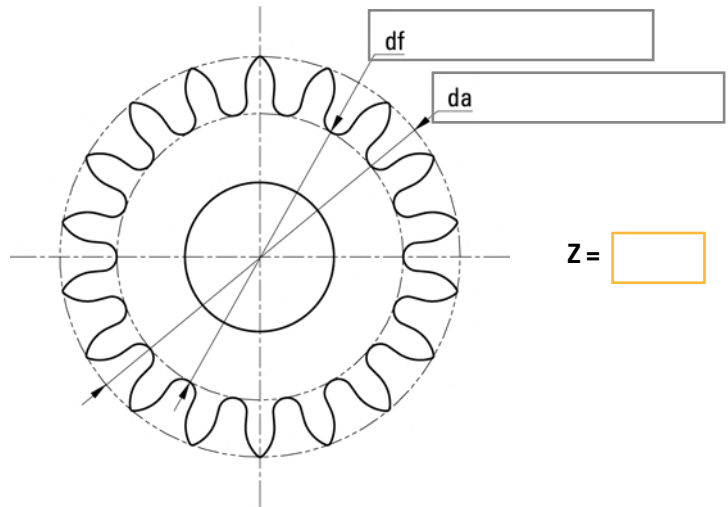
Norm

Zeichnung

DXF

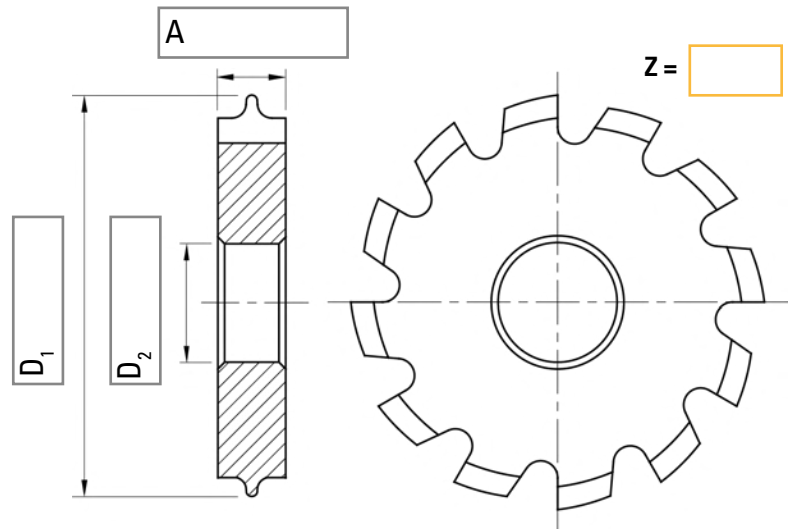
Zu bearbeitender Werkstoff

Modul (m)



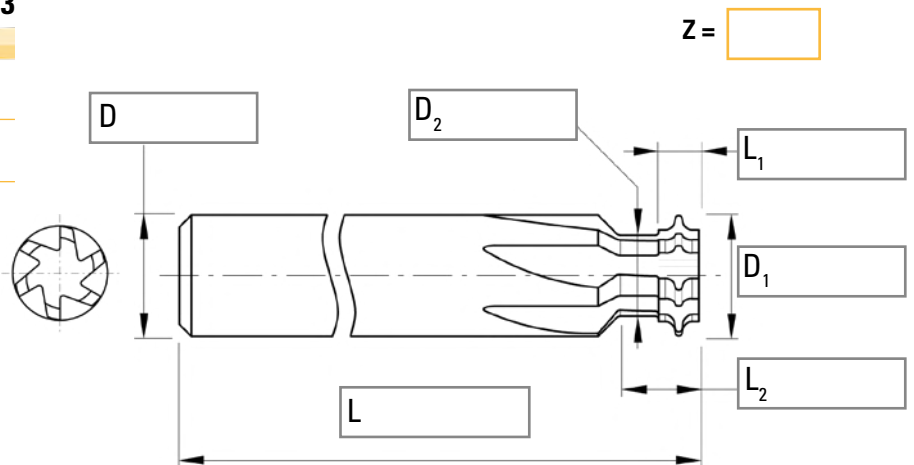
Beschichtung

Menge



Beschichtung

Menge

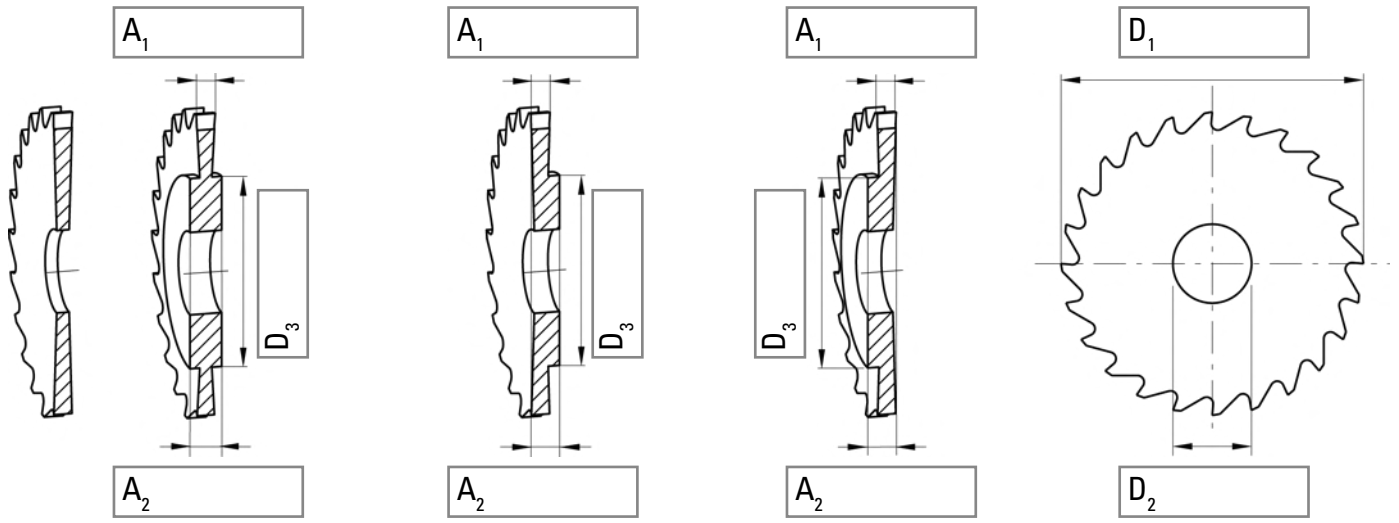


Bemerkungen

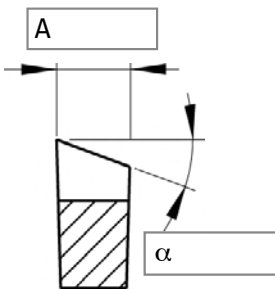


Menge

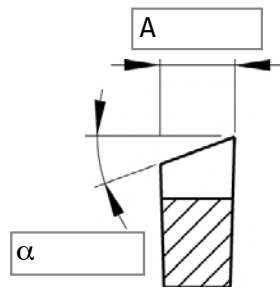
Zu bearbeitender Werkstoff



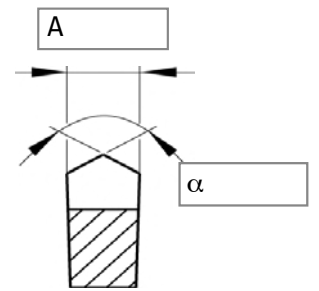
1640 L



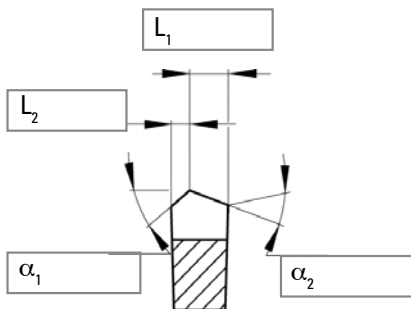
1640 R



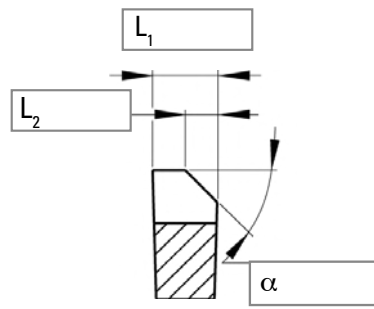
1643



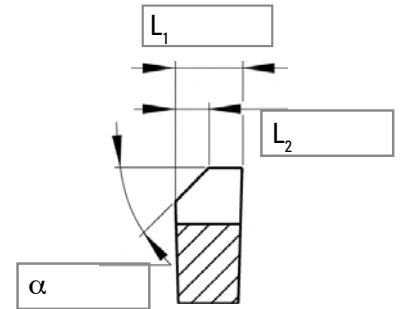
1650



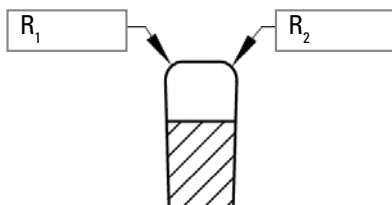
1650



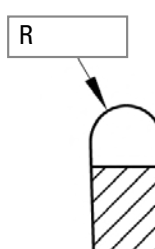
1650



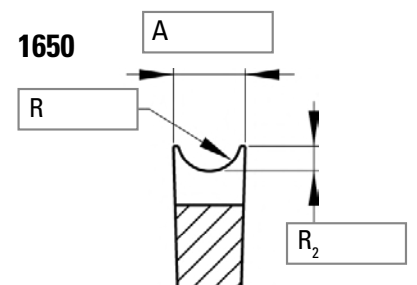
1650



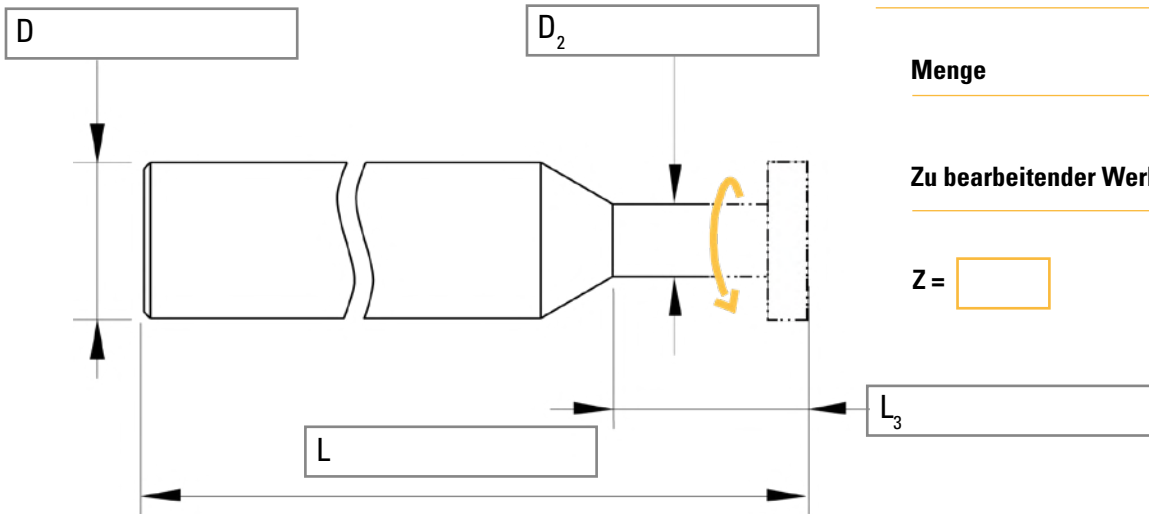
1650



1650



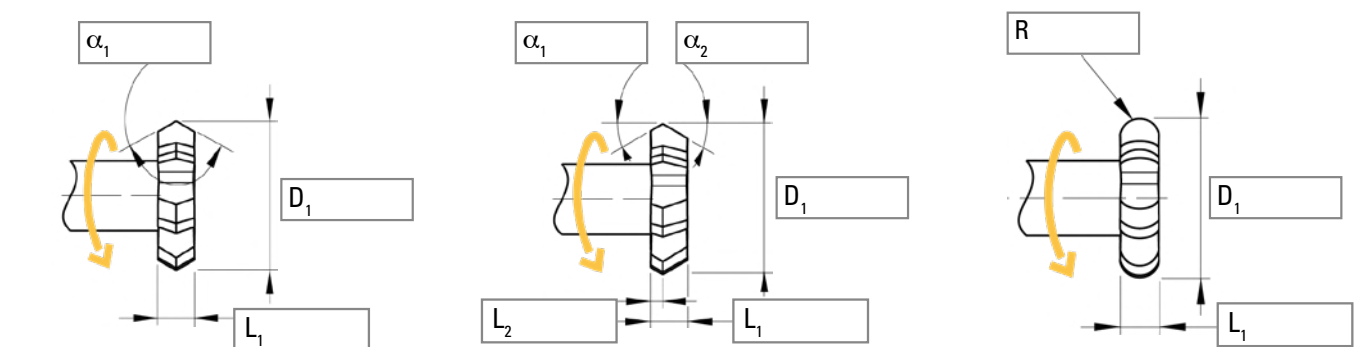
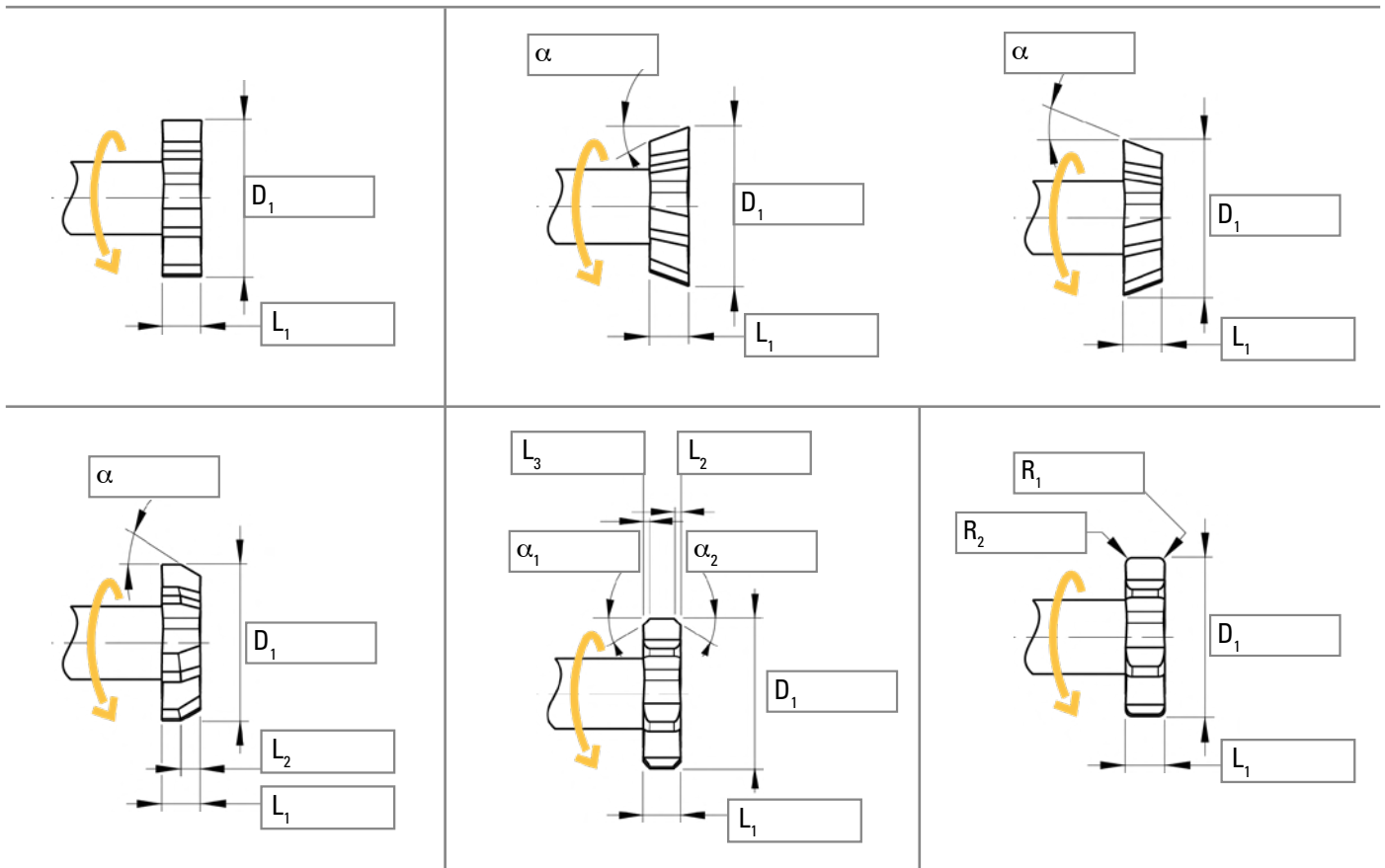




Menge

Zu bearbeitender Werkstoff

Z =



NUTZEN SIE UNSER ANFRAGEFORMULAR UNTER  
WWW.DIXIPOLYTOOL.COM

## DIXI 1531 - 1533 - 1534

|   |   | VDI<br>3323 | VHM<br>Vc [m/min] |
|---|---|-------------|-------------------|
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5       | 120               |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9       | 105               |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13     | 75                |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2   | 100               |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                            | 14.3-14.4   | 75                |
| K | Grauguss < 250 HB   | 15 - 16     | 110               |
|   | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20     | 95                |
| N | Alu-Knetlegierung < 12% Si  | 21 - 22     | 350               |
|   | Alu-Gusslegierung > 12% Si  | 23 - 25     | 325               |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26          | 325               |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28     | 225               |
|   | Kunststoff, Holz  | 29 - 30     | 165               |
|   | Gold, Silber  | -           | 225               |
| S | Spezielle Nickel-Kobalt-Legierung   | 31- 35      | 30                |
|   | Titan, Titanlegierung   | 36 - 37     | 60                |



## DIXI 1539

|   |   | VDI<br>3323 | VHM<br>Vc [m/min] |
|---|---|-------------|-------------------|
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5       | 120               |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9       | 105               |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13     | 75                |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2   | 100               |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                            | 14.3-14.4   | 75                |
| K | Grauguss < 250 HB   | 15 - 16     | 110               |
|   | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20     | 95                |
| N | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26          | 325               |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28     | 225               |
|   | Gold, Silber  | -           | 225               |
| S | Spezielle Nickel-Kobalt-Legierung   | 31- 35      | 30                |
|   | Titan, Titanlegierung   | 36 - 37     | 60                |



$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

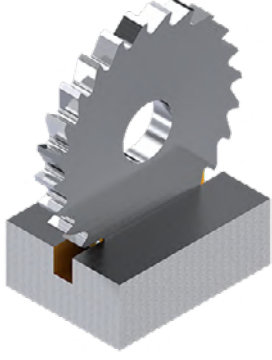
| $\emptyset D_1$<br>15.00 - 30.00 | $\emptyset D_1$<br>30.00 - 50.00 | $\emptyset D_1$<br>50.00 - 80.00 | $\emptyset D_1$<br>80.00 - 125.00 | $\emptyset D_1$<br>125.00 - 160.00 |
|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|
| 0.0015 - 0.0034                  | 0.003 - 0.005                    | 0.004 - 0.007                    | 0.006 - 0.010                     | 0.008 - 0.011                      |
| 0.0014 - 0.0030                  | 0.002 - 0.005                    | 0.004 - 0.006                    | 0.005 - 0.009                     | 0.007 - 0.010                      |
| 0.0012 - 0.0026                  | 0.002 - 0.004                    | 0.003 - 0.006                    | 0.004 - 0.008                     | 0.006 - 0.009                      |
| 0.0012 - 0.0026                  | 0.002 - 0.004                    | 0.003 - 0.006                    | 0.004 - 0.008                     | 0.006 - 0.009                      |
| 0.0011 - 0.0024                  | 0.002 - 0.004                    | 0.003 - 0.005                    | 0.004 - 0.007                     | 0.005 - 0.008                      |
| 0.0018 - 0.0040                  | 0.003 - 0.006                    | 0.005 - 0.009                    | 0.007 - 0.012                     | 0.009 - 0.013                      |
| 0.0015 - 0.0034                  | 0.003 - 0.005                    | 0.004 - 0.007                    | 0.006 - 0.010                     | 0.008 - 0.011                      |
| 0.0023 - 0.0050                  | 0.004 - 0.008                    | 0.006 - 0.011                    | 0.008 - 0.015                     | 0.011 - 0.017                      |
| 0.0020 - 0.0042                  | 0.004 - 0.007                    | 0.005 - 0.009                    | 0.007 - 0.013                     | 0.010 - 0.015                      |
| 0.0023 - 0.0050                  | 0.004 - 0.008                    | 0.006 - 0.011                    | 0.008 - 0.015                     | 0.011 - 0.017                      |
| 0.0018 - 0.0040                  | 0.003 - 0.006                    | 0.005 - 0.009                    | 0.007 - 0.012                     | 0.009 - 0.013                      |
| 0.0023 - 0.0050                  | 0.004 - 0.008                    | 0.006 - 0.011                    | 0.008 - 0.015                     | 0.011 - 0.017                      |
| 0.0020 - 0.0042                  | 0.004 - 0.007                    | 0.005 - 0.009                    | 0.007 - 0.013                     | 0.010 - 0.015                      |
| 0.0008 - 0.0016                  | 0.001 - 0.003                    | 0.002 - 0.004                    | 0.003 - 0.005                     | 0.004 - 0.006                      |
| 0.0015 - 0.0034                  | 0.003 - 0.005                    | 0.004 - 0.007                    | 0.006 - 0.010                     | 0.008 - 0.011                      |

Vorschub pro Zahn  $f_z$  [mm]

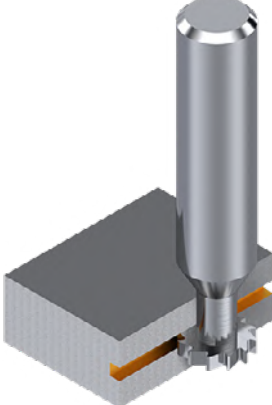
| $\emptyset D_1$<br>15.00 - 30.00 | $\emptyset D_1$<br>30.00 - 40.00 | $\emptyset D_1$<br>40.00 - 50.00 |
|----------------------------------|----------------------------------|----------------------------------|
| 0.0008 - 0.0016                  | 0.0014 - 0.0020                  | 0.0018 - 0.0025                  |
| 0.0007 - 0.0014                  | 0.0013 - 0.0018                  | 0.0016 - 0.0020                  |
| 0.0006 - 0.0012                  | 0.0012 - 0.0016                  | 0.0014 - 0.0020                  |
| 0.0006 - 0.0012                  | 0.0012 - 0.0016                  | 0.0014 - 0.0020                  |
| 0.0005 - 0.0010                  | 0.0010 - 0.0014                  | 0.0012 - 0.0015                  |
| 0.0009 - 0.0018                  | 0.0017 - 0.0024                  | 0.0022 - 0.0030                  |
| 0.0008 - 0.0016                  | 0.0014 - 0.0020                  | 0.0018 - 0.0025                  |
| 0.0011 - 0.0024                  | 0.0022 - 0.0030                  | 0.0028 - 0.0035                  |
| 0.0009 - 0.0018                  | 0.0017 - 0.0024                  | 0.0022 - 0.0030                  |
| 0.0010 - 0.0020                  | 0.0019 - 0.0026                  | 0.0024 - 0.0030                  |
| 0.0004 - 0.0008                  | 0.0007 - 0.0010                  | 0.0009 - 0.0012                  |
| 0.0008 - 0.0016                  | 0.0014 - 0.0020                  | 0.0018 - 0.0025                  |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

## DIXI 1537 - 1640

|   |   | VDI<br>3323 |  | VHM<br>Vc [m/min] | CUTINOX<br>Vc [m/min] |
|---|---|-------------|--|-------------------|-----------------------|
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5       |  | 150               | 175                   |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9       |  | 125               | 145                   |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13     |  | 100               | 125                   |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2   |  | 140               | 165                   |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                            | 14.3-14.4   |  | 100               | 125                   |
| K | Grauguss < 250 HB   | 15 - 16     |  | 280               | 300                   |
|   | Duktilen Gusseisen, Temperguss > 250 HB   | 17 - 20     |  | 180               | 200                   |
| N | Alu-Knetlegierung < 12% Si  | 21 - 22     |  | 300               | 325                   |
|   | Alu-Gusslegierung > 12% Si  | 23 - 25     |  | 250               | 275                   |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26          |  | 300               | 325                   |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28     |  | 220               | 240                   |
|   | Kunststoff, Holz  | 29 - 30     |  | 150               | 175                   |
|   | Gold, Silber  | -           |  | 220               | 240                   |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35     |  | 40                | 65                    |
|   | Titan, Titanlegierung   | 36 - 37     |  | 90                | 115                   |

## DIXI 1525 - 1527 - 1528

|   |   | VDI<br>3323 |  | VHM<br>Vc [m/min] | CUTINOX<br>Vc [m/min] |
|---|---|-------------|--|-------------------|-----------------------|
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5       |  | 85                | 95                    |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9       |  |                   | 80                    |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13     |  |                   | 55                    |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2   |  |                   | 75                    |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                            | 14.3-14.4   |  |                   | 55                    |
| K | Grauguss < 250 HB   | 15 - 16     |  | 85                | 95                    |
|   | Duktilen Gusseisen, Temperguss > 250 HB   | 17 - 20     |  | 65                | 70                    |
| N | Alu-Knetlegierung < 12% Si  | 21 - 22     |  | 130               |                       |
|   | Alu-Gusslegierung > 12% Si  | 23 - 25     |  | 150               |                       |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26          |  | 150               |                       |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28     |  | 120               |                       |
|   | Kunststoff, Holz  | 29 - 30     |  | 250               |                       |
|   | Gold, Silber  | -           |  | 150               |                       |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35     |  |                   | 55                    |
|   | Titan, Titanlegierung   | 36 - 37     |  | 40                | 45                    |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>50.00 - 63.00 | $\varnothing D_1$<br>63.00 - 80.00 | $\varnothing D_1$<br>80.00 - 100.00 |
|------------------------------------|------------------------------------|-------------------------------------|
| 0.0045 - 0.0070                    | 0.005 - 0.008                      | 0.005 - 0.008                       |
| 0.0041 - 0.0062                    | 0.004 - 0.007                      | 0.004 - 0.007                       |
| 0.0036 - 0.0056                    | 0.004 - 0.006                      | 0.004 - 0.006                       |
| 0.0036 - 0.0056                    | 0.004 - 0.006                      | 0.004 - 0.006                       |
| 0.0032 - 0.0048                    | 0.003 - 0.005                      | 0.003 - 0.006                       |
| 0.0054 - 0.0084                    | 0.006 - 0.009                      | 0.006 - 0.010                       |
| 0.0045 - 0.0070                    | 0.005 - 0.008                      | 0.005 - 0.008                       |
| 0.0068 - 0.0104                    | 0.007 - 0.011                      | 0.007 - 0.012                       |
| 0.0059 - 0.0090                    | 0.006 - 0.010                      | 0.006 - 0.010                       |
| 0.0068 - 0.0104                    | 0.007 - 0.011                      | 0.007 - 0.012                       |
| 0.0054 - 0.0084                    | 0.006 - 0.009                      | 0.006 - 0.010                       |
| 0.0068 - 0.0104                    | 0.007 - 0.011                      | 0.007 - 0.012                       |
| 0.0059 - 0.0090                    | 0.006 - 0.010                      | 0.006 - 0.010                       |
| 0.0023 - 0.0034                    | 0.002 - 0.004                      | 0.002 - 0.004                       |
| 0.0045 - 0.0070                    | 0.005 - 0.008                      | 0.005 - 0.008                       |

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>2.00 - 5.00 | $\varnothing D_1$<br>5.00 - 8.00 | $\varnothing D_1$<br>8.00 - 12.00 | $\varnothing D_1$<br>12.00 - 15.00 | $\varnothing D_1$<br>15.00 - 20.00 | $\varnothing D_1$<br>20.00 - 25.00 | $\varnothing D_1$<br>25.00 - 30.00 |
|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| 0.0018 - 0.0046                  | 0.004 - 0.007                    | 0.007 - 0.011                     | 0.010 - 0.013                      | 0.013 - 0.017                      | 0.016 - 0.021                      | 0.020 - 0.025                      |
| 0.0016 - 0.0042                  | 0.004 - 0.007                    | 0.006 - 0.010                     | 0.009 - 0.012                      | 0.011 - 0.015                      | 0.015 - 0.019                      | 0.018 - 0.022                      |
| 0.0014 - 0.0036                  | 0.004 - 0.006                    | 0.006 - 0.009                     | 0.008 - 0.011                      | 0.010 - 0.014                      | 0.013 - 0.017                      | 0.016 - 0.020                      |
| 0.0014 - 0.0036                  | 0.004 - 0.006                    | 0.006 - 0.009                     | 0.008 - 0.011                      | 0.010 - 0.014                      | 0.013 - 0.017                      | 0.016 - 0.020                      |
| 0.0013 - 0.0032                  | 0.003 - 0.005                    | 0.005 - 0.007                     | 0.007 - 0.009                      | 0.009 - 0.012                      | 0.012 - 0.015                      | 0.014 - 0.017                      |
| 0.0022 - 0.0056                  | 0.005 - 0.009                    | 0.008 - 0.013                     | 0.012 - 0.016                      | 0.015 - 0.021                      | 0.020 - 0.025                      | 0.024 - 0.030                      |
| 0.0018 - 0.0046                  | 0.004 - 0.007                    | 0.007 - 0.011                     | 0.010 - 0.013                      | 0.013 - 0.017                      | 0.016 - 0.021                      | 0.020 - 0.025                      |
| 0.0027 - 0.0070                  | 0.007 - 0.011                    | 0.010 - 0.016                     | 0.015 - 0.020                      | 0.019 - 0.026                      | 0.025 - 0.032                      | 0.030 - 0.037                      |
| 0.0023 - 0.0060                  | 0.006 - 0.009                    | 0.009 - 0.014                     | 0.013 - 0.017                      | 0.016 - 0.022                      | 0.021 - 0.027                      | 0.026 - 0.032                      |
| 0.0027 - 0.0070                  | 0.007 - 0.011                    | 0.010 - 0.016                     | 0.015 - 0.020                      | 0.019 - 0.026                      | 0.025 - 0.032                      | 0.030 - 0.037                      |
| 0.0022 - 0.0056                  | 0.005 - 0.009                    | 0.008 - 0.013                     | 0.012 - 0.016                      | 0.015 - 0.021                      | 0.020 - 0.025                      | 0.024 - 0.030                      |
| 0.0027 - 0.0070                  | 0.007 - 0.011                    | 0.010 - 0.016                     | 0.015 - 0.020                      | 0.019 - 0.026                      | 0.025 - 0.032                      | 0.030 - 0.037                      |
| 0.0023 - 0.0060                  | 0.006 - 0.009                    | 0.009 - 0.014                     | 0.013 - 0.017                      | 0.016 - 0.022                      | 0.021 - 0.027                      | 0.026 - 0.032                      |
| 0.0009 - 0.0024                  | 0.002 - 0.004                    | 0.003 - 0.005                     | 0.005 - 0.007                      | 0.006 - 0.009                      | 0.008 - 0.011                      | 0.010 - 0.012                      |
| 0.0018 - 0.0046                  | 0.004 - 0.007                    | 0.007 - 0.011                     | 0.010 - 0.013                      | 0.013 - 0.017                      | 0.016 - 0.021                      | 0.020 - 0.025                      |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.



## ÜBERSICHT GEWINDEWERKZEUGE

350



MIKRO-GEWINDEBOHRER

360



MIKRO-GEWINDEBOHRER

365



GEWINDEWIRBLER

367



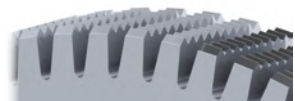
BOHRGEWINDEWIRBLER

374



GEWINDE MIT SELBSTSICHERENDEM PROFIL

377



WÄLZFRÄSER

383



GEWINDEFRÄSER

385



GEWINDELEHREN

397



LEHRDORNE

400



SATZ NIHS GEWINDELEHREN

401








INFORMATIONEN

402





SCHNITTBEDINGUNGEN






412

|  |   | Z | Seite |                    | VHM | TiAIN | C-TOP | CUTINOX | DRY-CUT* | DI-TOP |
|--|---|---|-------|--------------------|-----|-------|-------|---------|----------|--------|
|  |   |   |       |                    | ☐   | ■     | ■     | ■       | ■        | ■      |
| <b>MIKRO-GEWINDEBOHRER</b>                             |   |   |       |                    |     |       |       |         |          |        |
| <b>DIXI 1712</b><br>S 0.30 - S 1.40<br>M 1.50 - M 2.00 |  | 3 | 360   | NIHS 06<br>ISO 60° | ✓   |       |       |         |          |        |
| <b>DIXI 1712 L</b><br>S 0.60 - S 1.00                  |  | 3 | 361   | NIHS 06            | ✓   |       |       |         |          |        |
| <b>DIXI 1713</b><br>S 0.40 - S 1.40                    |  | 3 | 362   | NIHS 06            | ✓   |       |       |         |          |        |
| <b>DIXI 1708</b><br>S 0.30 - S 1.40                    |  | 3 | 363   | NIHS 06            | ✓   |       |       |         |          | ✓      |
| <b>DIXI 1710</b><br>S 0.30 - S 1.40                    |  | 3 | 364   | NIHS 06            | ✓   |       |       |         |          |        |

**MIKRO-GEWINDEFORMER**

|  |   |   |     |                    |  |  |  |  |  |   |
|--|---|---|-----|--------------------|--|--|--|--|--|---|
| <b>DIXI 1715</b><br>S 0.40 - S 1.40<br>M 1.00 - M 2.20 |  | 3 | 365 | NIHS 06<br>ISO 60° |  |  |  |  |  | ✓ |
| <b>DIXI 1716</b><br>S 0.40 - S 1.40<br>M 1.00 - M 1.40 |  | 3 | 366 | NIHS 06<br>ISO 60° |  |  |  |  |  | ✓ |

**GEWINDEWIRBLER**

|  |   |     |     |                    |   |   |   |   |    |  |
|--|---|-----|-----|--------------------|---|---|---|---|----|--|
| <b>DIXI 1739</b><br>S 0.30 - S 1.40<br>Teilprofil                    |  | 1   | 367 | NIHS 06            | ✓ |   |   |   |    |  |
| <b>DIXI 1738</b><br>S 0.50 - S 1.40<br>M 1.00 - M 3.00<br>Teilprofil |  | 3   | 368 | NIHS 06<br>ISO 60° | ✓ |   |   | ✓ |    |  |
| <b>DIXI 1737</b><br>S 0.50 - S 1.40<br>M 1.00 - M 3.00               |  | 3   | 369 | NIHS 06<br>ISO 60° | ✓ |   | ✓ |   | ✓* |  |
| <b>DIXI 1730-xD</b><br>M 0.80 - M 10.00                              |  | 3-6 | 370 | ISO 60°            | ✓ | ✓ |   |   |    |  |
| <b>DIXI 1735-xD</b><br>UNFN°1 - UNC 1/2"                             |  | 3-6 | 372 | UN 60°             | ✓ | ✓ |   |   |    |  |



| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |




| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|









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|---|--|--|--|--|---|---|---|---|---|--|--|--|
| ○ |  |  |  |  | ○ | ○ | ⊙ |   | ⊙ |  |  |  |
| ○ |  |  |  |  | ○ | ○ | ⊙ |   | ⊙ |  |  |  |
| ⊙ |  |  |  |  | ○ | ○ | ⊙ | ○ | ⊙ |  |  |  |
| ○ |  |  |  |  | ○ | ○ | ⊙ |   | ⊙ |  |  |  |
| ○ |  |  |  |  | ○ | ○ | ⊙ |   | ⊙ |  |  |  |

|   |   |  |  |  |   |   |   |  |   |  |  |  |
|---|---|--|--|--|---|---|---|--|---|--|--|--|
| ⊙ | ○ |  |  |  | ○ | ○ | ○ |  | ○ |  |  |  |
| ○ |   |  |  |  | ⊙ | ⊙ | ⊙ |  | ⊙ |  |  |  |

|   |   |   |   |   |   |   |   |   |   |   |   |  |
|---|---|---|---|---|---|---|---|---|---|---|---|--|
| ⊙ | ○ | ○ | ○ | ○ | ○ | ○ | ⊙ | ○ | ⊙ |   | ○ |  |
| ⊙ | ⊙ | ⊙ | ⊙ | ○ | ⊙ | ⊙ | ⊙ | ○ | ⊙ | ○ | ⊙ |  |
| ⊙ | ⊙ | ⊙ | ⊙ | ○ | ⊙ | ⊙ | ⊙ | ○ | ⊙ | ○ | ⊙ |  |
| ⊙ | ⊙ | ⊙ | ⊙ | ○ | ⊙ | ⊙ | ⊙ | ⊙ | ⊙ | ○ | ⊙ |  |

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|   |   | Z     | Seite |                 | VHM                      | CUTINOX                  | DAC                      | DI-TOP                   |
|---|---|-------|-------|-----------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <b>BOHRGEWINDEWIRBLER</b>                               |   |       |       |                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>DIXI 1740</b><br>S 0.80 - S 0.90<br>M 1.00 - M 10.00 |  | 1 - 3 | 374   | NIHS 06 ISO 60° | ✓                        | ✓                        |                          |                          |
| <b>DIXI 1742-TC</b><br>M 5.00 - M 12.00                 |  | 2     | 375   | ISO 60°         |                          |                          | ✓                        |                          |
| <b>DIXI 1744-TC</b><br>M 5.00 - M 12.00                 |  | 4     | 376   | ISO 60°         |                          | ✓                        |                          |                          |

| <b>GEWINDE MIT SELBSTSICHERNDEM PROFIL</b>                   |   | Z     | Seite |           | VHM | CUTINOX | DAC | DI-TOP |
|--|---|-------|-------|-----------|-----|---------|-----|--------|
| <b>DIXI 1712-AF/BT</b><br>S 0.70 - S 0.90<br>M 1.00 - M 1.40 |    | 3     | 377   | DIXI NORM | ✓   |         |     |        |
| <b>DIXI 1716-AF/BT</b><br>S 0.70 - S 0.90<br>M 1.00 - M 1.40 |  | -     | 378   | DIXI NORM |     |         |     | ✓      |
| <b>DIXI 1738-AF/BT</b><br>S 0.70 - S 0.90<br>M 1.00 - M 3.00 |  | 3     | 379   | DIXI NORM | ✓   |         |     |        |
| <b>DIXI 1740-AF/BT</b><br>S 0.80 - S 0.90<br>M 1.00 - M 3.00 |  | 1 - 2 | 380   | DIXI NORM | ✓   |         |     |        |
| <b>DIXI 1718-AF/BT</b><br>S 0.70 - S 0.90<br>M 1.00 - M 3.00 |  | -     | 381   | DIXI NORM | ✓   |         |     |        |
| <b>DIXI 1719-AF/BT</b><br>S 0.70 - S 0.90<br>M 1.00 - M 3.00 |  | -     | 381   | DIXI NORM | ✓   |         |     |        |
| <b>DIXI 0418-AF</b><br>S 0.70 - S 0.90<br>M 1.00 - M 3.00    |  | -     | 382   | DIXI NORM | ✓   |         |     |        |
| <b>DIXI 0419-AF</b><br>S 0.70 - S 0.90<br>M 1.00 - M 3.00    |  | -     | 382   | DIXI NORM | ✓   |         |     |        |

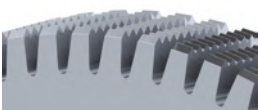

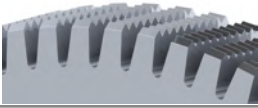

| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |

| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|



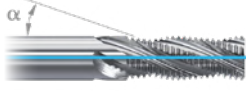

|   |   |   |   |   |   |   |   |   |   |   |   |  |
|---|---|---|---|---|---|---|---|---|---|---|---|--|
| ⊙ | ○ | ○ | ○ | ⊙ | ⊙ | ⊙ | ⊙ | ⊙ | ⊙ | ○ | ⊙ |  |
|   |   |   |   |   | ⊙ | ⊙ | ⊙ | ⊙ | ⊙ |   |   |  |
| ⊙ | ⊙ | ⊙ | ⊙ | ⊙ |   |   |   |   |   | ⊙ | ⊙ |  |

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|---|---|---|---|---|---|---|---|---|---|---|---|--|
| ○ |   |   |   |   | ○ | ○ | ⊙ |   | ⊙ |   |   |  |
| ⊙ | ○ |   |   |   | ⊙ | ⊙ | ⊙ |   | ⊙ |   |   |  |
| ⊙ | ⊙ | ⊙ | ⊙ | ○ | ⊙ | ⊙ | ⊙ | ○ | ⊙ | ○ | ⊙ |  |
| ⊙ | ○ | ○ | ○ | ⊙ | ⊙ | ⊙ | ⊙ | ⊙ | ⊙ | ○ | ⊙ |  |
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|   |   |   |   |   |   |   |   |   |   |   |   |  |
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|                                     |   | Z  | Seite |   | VHM                      | TAIN                     | CUTINOX                  |
|-------------------------------------|---|----|-------|---|--------------------------|--------------------------|--------------------------|
| <b>WÄLZFRÄSER</b>                   |   |    |       |   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>DIXI 1660</b><br>S 0.40 - S 1.40 |  | 94 | 383   |  | ✓                        |                          |                          |
| <b>DIXI 1661</b><br>S 0.40 - S 1.40 |  | 94 | 384   |  | ✓                        |                          |                          |

**GEWINDEFÄSER**

|   |   |       |     |   |   |   |   |
|---|---|-------|-----|---|---|---|---|
| <b>DIXI 7910</b><br>M 1.40 - M 18.00                |    | 2 - 4 | 385 |    | ✓ | ✓ |   |
| <b>DIXI 7908</b><br>M 3.00 - M 24.00                |    | 3 - 6 | 386 |    | ✓ | ✓ |   |
| <b>DIXI 7913-TC</b><br>M 10.00 - M 30.00            |  | 4 - 5 | 387 |   | ✓ |   | ✓ |
| <b>DIXI 7920</b><br>UNC N°2 - UNC 3/4"              |  | 2 - 4 | 388 |    | ✓ | ✓ |   |
| <b>DIXI 7918</b><br>UNFN°2 - UNC 3/4"               |  | 3 - 5 | 389 |    | ✓ | ✓ |   |
| <b>DIXI 7914-TC</b><br>1/2" - 32 UN -<br>1" - 8 UNC |  | 4 - 5 | 390 |   | ✓ |   | ✓ |
| <b>DIXI 7923-TC</b><br>UNJFN°10 -<br>UNJF 1/2"      |  | 3 - 4 | 391 |   | ✓ |   |   |
| <b>DIXI 7940</b><br>G1/16" - G1"                    |  | 3 - 4 | 392 |    | ✓ |   |   |

| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |

|              |                    |                |                        |           |               |              |                           |                                  |             |                    |                |                          |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|

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|   |  | Z     | Seite |  | <input type="checkbox"/> VHM        | <input checked="" type="checkbox"/> CUTINOX |  |  |
|---|--|-------|-------|--|-------------------------------------|---|--|--|
| <b>GEWINDEFÄSER MIT SENKSTUFE</b>             |  |       |       |  |                                     |   |  |  |
| <b>DIXI 7915-xD-TC</b><br>M 4.00 - M 16.00    |  | 3 - 4 | 393   |  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/>         |  |  |
| <b>DIXI 7925-xD-TC</b><br>UNC N°8 - UNC 5/8"  |  | 3 - 4 | 394   |  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/>         |  |  |
| <b>DIXI 7935-xD-TC</b><br>UNF N°10 - UNF 5/8" |  | 3 - 4 | 395   |  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/>         |  |  |

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|---|--|---|-----|--|-------------------------------------|-------------------------------------|--|--|
| <b>BOHRGEWINDEFÄSER MIT SENKSTUFE</b>   |  |   |     |  |                                     |                                     |  |  |
| <b>DIXI 7985-HH</b><br>M 4.00 - M 16.00 |  | 2 | 396 |  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |  |  |

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| <b>GEWINDELEHREN</b>                          |  |   |     |  |                                     |  |  |  |
| <b>DIXI 1718-S 4H</b><br>R S 0.30 - S 1.40    |  | - | 397 |  | <input checked="" type="checkbox"/> |  |  |  |
| <b>DIXI 1718-S 4H</b><br>L S 0.50 - S 1.20    |  | - | 397 |  | <input checked="" type="checkbox"/> |  |  |  |
| <b>DIXI 1718-S 3G</b><br>S 0.30 - S 1.40      |  | - | 397 |  | <input checked="" type="checkbox"/> |  |  |  |
| <b>DIXI 1719-S 4H/3G</b><br>R S 0.30 - S 1.20 |  | - | 397 |  | <input checked="" type="checkbox"/> |  |  |  |
| <b>DIXI 1719-S 4H/3G</b><br>L S 0.50 - S 1.20 |  | - | 397 |  | <input checked="" type="checkbox"/> |  |  |  |
| <b>DIXI 1718-M</b><br>M 1.00 - M 3.00         |  | - | 398 |  | <input checked="" type="checkbox"/> |  |  |  |
| <b>DIXI 1719-M</b><br>M 1.00 - M 3.00         |  | - | 398 |  | <input checked="" type="checkbox"/> |  |  |  |

| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |





|              |                    |                |                        |           |               |              |                           |                                  |             |                    |                |                          |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|





|                                  |                       |                       |                       |                                  |                                  |                                  |                                  |                                  |                                  |                       |                                  |  |
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| <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |  |



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|  | Z | Seite |   | <input type="checkbox"/> VHM |  |  |  |
|--|---|-------|---|------------------------------|--|--|--|
| <b>GEWINDEPRÜFDORNE</b>  |   |       |   |                              |  |  |  |
| <b>DIXI 1720 GO</b><br>S 0.30 - S 1.40<br>    | - | 399   |  | ✓                            |  |  |  |
| <b>DIXI 1720 NO GO</b><br>S 0.30 - S 1.40<br> | - | 399   |  | ✓                            |  |  |  |

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| <b>LEHRDORNE</b>   |  |     |   |   |  |  |  |
| <b>DIXI 0418 GO</b><br>S 0.30 - S 1.40<br>    |  | 400 |  | ✓ |  |  |  |
| <b>DIXI 0419 NO GO</b><br>S 0.30 - S 1.40<br> |  | 400 |  | ✓ |  |  |  |

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|---|---|-----|---|--|--|--|--|
| <b>GEWINDELEHRENSET</b>   |   |     |   |  |  |  |  |
|  | - | 401 |  |  |  |  |  |



| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |

|              |                    |                |                        |           |               |              |                           |                                  |             |                    |                |                          |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|

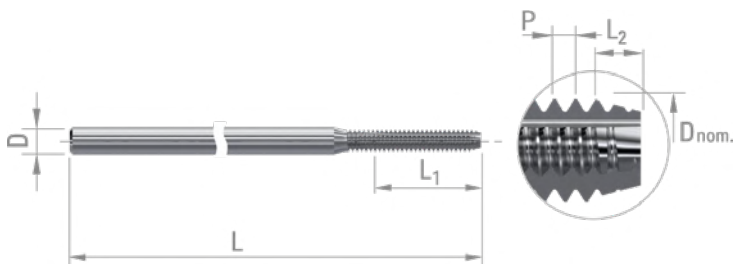
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MIKRO-GEWINDEBOHRER



P.404/406

- Mikro-Gewindebohrer, für Materialien mit sehr guter Zerspanbarkeit entwickelt.
- Gewinde nach NIHS 06-10 (ISO 1501 / DIN 14) und ISO 965 (DIN 13).

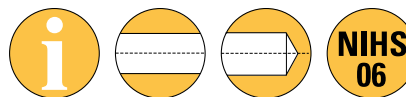
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| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ |   |   |   |                   |   |   |   |                |    |                  |    |                                      |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      |                         |    |       |                          |    |    |                  |    |                  |  |

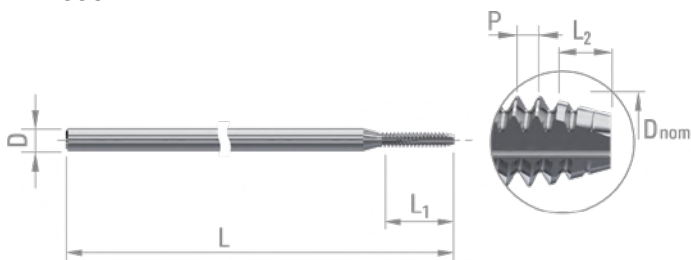
| D nom. | Steigung P | Bohr. Ø Messing (5H Kern Ø) | Bohr. Ø Stahl (6H Kern Ø) | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | NIHS-3G | NIHS-3G+ | ISO2-6H |
|--------|------------|-----------------------------|---------------------------|----------------|----------------|-----------------|----|---------|----------|---------|
| S 0.30 | 0.08       | 0.23                        | 0.24                      | 1.0            | 0.25           | 1.5             | 30 | 62326   |          |         |
| S 0.35 | 0.09       | 0.27                        | 0.28                      | 1.5            | 0.27           | 1.5             | 30 | 965642  |          |         |
| S 0.40 | 0.10       | 0.32                        | 0.34                      | 2.0            | 0.30           | 1.5             | 30 | 62327   | 62328    |         |
| S 0.50 | 0.125      | 0.40                        | 0.42                      | 2.5            | 0.38           | 1.5             | 30 | 62329   | 62330    |         |
| S 0.60 | 0.15       | 0.48                        | 0.50                      | 3.0            | 0.45           | 1.5             | 30 | 62331   | 62332    |         |
| S 0.70 | 0.175      | 0.56                        | 0.58                      | 3.0            | 0.52           | 1.5             | 30 | 62334   | 62335    |         |
| S 0.80 | 0.20       | 0.64                        | 0.66                      | 3.5            | 0.60           | 1.5             | 30 | 62337   | 62338    |         |
| S 0.90 | 0.225      | 0.72                        | 0.74                      | 4.0            | 0.67           | 1.5             | 30 | 62342   | 62343    |         |
| S 1.00 | 0.25       | 0.80                        | 0.82                      | 4.0            | 0.76           | 1.5             | 30 | 62345   | 62346    |         |
| S 1.20 | 0.25       | 1.00                        | 1.02                      | 5.0            | 0.76           | 1.5             | 30 | 62348   |          |         |
| S 1.40 | 0.30       | 1.15                        | 1.17                      | 5.0            | 0.85           | 1.5             | 30 | 62351   |          |         |
| M 1.50 | 0.30       | 1.26                        | 1.28                      | 6.0            | 0.85           | 2.0             | 38 |         |          | 62353   |
| M 2.00 | 0.40       | 1.65                        | 1.68                      | 11.0           | 1.00           | 2.5             | 43 |         |          | 62354   |

Schnittbedingungen n = 500 - 2'500 [U/min]



P.404/406

MIKRO-GEWINDEBOHRER  
LINKSSCHNEIDEND



- Mikro-Gewindebohrer, Linksschneidend, für Materialien mit sehr guter Zerspanbarkeit entwickelt.
- Gewinde nach NIHS 06-10 (ISO 1501 / DIN 14).

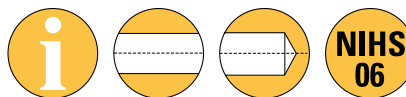
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| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |          |      | K                |    |                    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|----------|------|------------------|----|--------------------|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |      | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3     | 14.4 | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen           | ○                 | ○ |   |   |   |                   |   |   |   |                |    |                  |    |                                      |      |          |      |                  |    |                    |    |    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      | S                       |    |       |                          |    | H                |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊗                 | ⊗                      | ⊗  | ⊗            |         |            |      |                         |    |       |                          |    |                  |    |                  |    |

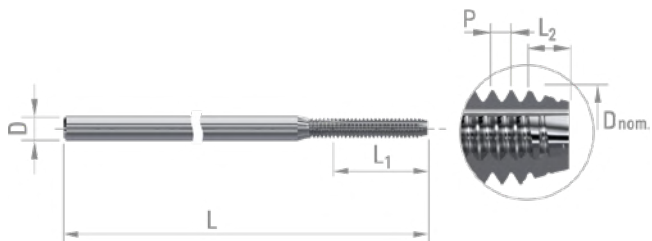
| D nom. | Steigung P | Bohr. Ø Messing (5H Kern Ø) | Bohr. Ø Stahl (6H Kern Ø) | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | NIHS-3G VHM |
|--------|------------|-----------------------------|---------------------------|----------------|----------------|-----------------|----|-------------|
| S 0.60 | 0.15       | 0.49                        | 0.51                      | 4.0            | 0.45           | 1.5             | 30 | 969369      |
| S 0.70 | 0.175      | 0.57                        | 0.59                      | 4.0            | 0.52           | 1.5             | 30 | 969370      |
| S 0.80 | 0.20       | 0.65                        | 0.67                      | 4.0            | 0.60           | 1.5             | 30 | 969371      |
| S 0.90 | 0.225      | 0.73                        | 0.75                      | 4.0            | 0.67           | 1.5             | 30 | 969372      |
| S 1.00 | 0.25       | 0.81                        | 0.83                      | 4.0            | 0.75           | 1.5             | 30 | 969373      |

Schnittbedingungen n = 500 - 2'500 [U/min]



P.404/406

HOCHLEISTUNGS  
MIKRO-GEWINDEBOHRER



- Mikro-Gewindebohrer, für Materialien mit guter Bearbeitbarkeit entwickelt.
- Gewinde nach NIHS 06-10 (ISO 1501 / DIN 14).

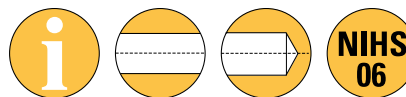
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| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊗                 | ⊗ | ○ | ○ |   |                   |   |   |   |                |    |                  |    |                                      |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |  |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊗                 | ⊗                      | ⊗  |              |         | ○          |      |                         |    |       |                          |    |                  |    |                  |    |  |  |

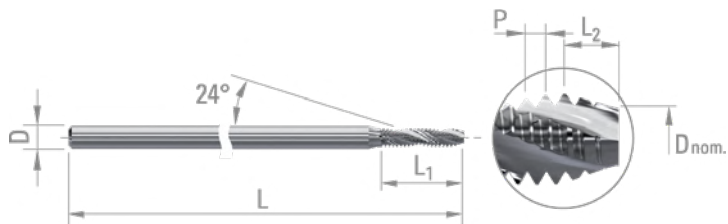
| D nom. | Steigung P | Bohr. Ø Messing (5H Kern Ø) | Bohr. Ø Stahl (6H Kern Ø) | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | NIHS-3G VHM |
|--------|------------|-----------------------------|---------------------------|----------------|----------------|-----------------|----|-------------|
| S 0.40 | 0.10       | 0.33                        | 0.34                      | 2.5            | 0.30           | 2               | 32 | 969795      |
| S 0.50 | 0.125      | 0.41                        | 0.43                      | 3.5            | 0.38           | 2               | 32 | 969474      |
| S 0.60 | 0.15       | 0.49                        | 0.51                      | 4.0            | 0.45           | 2               | 32 | 969497      |
| S 0.70 | 0.175      | 0.57                        | 0.59                      | 4.0            | 0.52           | 2               | 32 | 969498      |
| S 0.80 | 0.20       | 0.65                        | 0.67                      | 4.0            | 0.60           | 2               | 32 | 969499      |
| S 0.90 | 0.225      | 0.73                        | 0.75                      | 4.0            | 0.67           | 2               | 32 | 969500      |
| S 1.00 | 0.25       | 0.81                        | 0.83                      | 4.0            | 0.76           | 2               | 32 | 969501      |
| S 1.20 | 0.25       | 1.01                        | 1.03                      | 5.0            | 0.76           | 2               | 32 | 969502      |
| S 1.40 | 0.30       | 1.16                        | 1.18                      | 5.0            | 0.85           | 2               | 32 | 969503      |

Schnittbedingungen n = 500 - 2'500 [U/min]



P.404/406

MIKRO-GEWINDEBOHRER,  
RECHTSSCHNEIDEND, RECHTSSPIRALISIERT



- Mikro-Gewindebohrer, Drallwinkel rechts, für das Gewindeschneiden in Sacklochbohrungen entwickelt.
- Gewinde nach NIHS 06-10 (ISO 1501 / DIN 14).
- Die DI-TOP-Beschichtung verbessert die Standzeit in Eisen- und NE-Metallen.

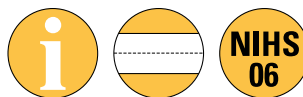
○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ |   |                   |   |   |   |                |                  |    |    |                                      |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  |              |         |            |      |                         |    |       |                          |    |                  |    |                  |    |

| D nom. | Steigung P | Bohr. Ø Messing (5H Kern Ø) | Bohr. Ø Stahl (6H Kern Ø) | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | NIHS-3G VHM | NIHS-3G D-TOP |
|--------|------------|-----------------------------|---------------------------|----------------|----------------|-----------------|----|-------------|---------------|
| S 0.30 | 0.08       | 0.23                        | 0.24                      | 1.00           | 0.25           | 1.50            | 30 | 986881      | 303483        |
| S 0.35 | 0.09       | 0.27                        | 0.28                      | 1.50           | 0.27           | 1.50            | 30 | 986882      | 303484        |
| S 0.40 | 0.10       | 0.32                        | 0.34                      | 2.50           | 0.30           | 1.50            | 30 | 986883      | 303485        |
| S 0.50 | 0.125      | 0.40                        | 0.42                      | 3.50           | 0.38           | 1.50            | 30 | 984405      | 303486        |
| S 0.60 | 0.15       | 0.48                        | 0.50                      | 4.00           | 0.45           | 1.50            | 30 | 983633      | 303487        |
| S 0.70 | 0.175      | 0.56                        | 0.58                      | 4.00           | 0.52           | 1.50            | 30 | 986884      | 303488        |
| S 0.80 | 0.20       | 0.64                        | 0.66                      | 4.00           | 0.60           | 1.50            | 30 | 986885      | 303489        |
| S 0.90 | 0.225      | 0.72                        | 0.74                      | 4.00           | 0.67           | 1.50            | 30 | 986886      | 303490        |
| S 1.00 | 0.25       | 0.80                        | 0.82                      | 4.00           | 0.76           | 1.50            | 30 | 986887      | 303491        |
| S 1.20 | 0.25       | 1.00                        | 1.02                      | 5.00           | 0.76           | 1.50            | 30 | 986888      | 303492        |
| S 1.40 | 0.30       | 1.15                        | 1.17                      | 5.00           | 0.85           | 1.50            | 30 | 986889      | 303493        |

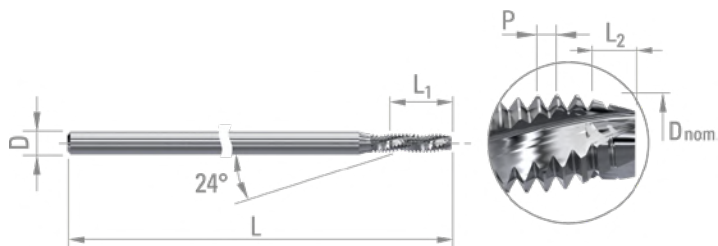
Schnittbedingungen n = 500 - 2'500 [U/min]



P.404/406

HOCHLEISTUNGS  
MIKRO-GEWINDEBOHRER

- Mikro-Gewindebohrer, für Materialien mit guter Bearbeitbarkeit entwickelt.
- Gewinde nach NIHS 06-10 (ISO 1501 / DIN 14).



○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ |   |                   |   |   |   |                |    |                  |    |                                    |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊗                 | ⊗                      | ⊗  | ⊗            |         |            |      |                         |    |       |                          |    |    |                  |    |                  |  |

| D nom. | Steigung P | Bohr. Ø Messing (5H Kern Ø) | Bohr. Ø Stahl (6H Kern Ø) | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | NIHS-3G VHM |
|--------|------------|-----------------------------|---------------------------|----------------|----------------|-----------------|----|-------------|
| S 0.30 | 0.08       | 0.23                        | 0.24                      | 1.00           | 0.25           | 1.50            | 30 | 986890      |
| S 0.35 | 0.09       | 0.27                        | 0.28                      | 1.50           | 0.27           | 1.50            | 30 | 986891      |
| S 0.40 | 0.10       | 0.32                        | 0.34                      | 2.50           | 0.30           | 1.50            | 30 | 986892      |
| S 0.50 | 0.125      | 0.40                        | 0.42                      | 3.50           | 0.38           | 1.50            | 30 | 986893      |
| S 0.60 | 0.15       | 0.48                        | 0.50                      | 4.00           | 0.45           | 1.50            | 30 | 986894      |
| S 0.70 | 0.175      | 0.56                        | 0.58                      | 4.00           | 0.52           | 1.50            | 30 | 986895      |
| S 0.80 | 0.20       | 0.64                        | 0.66                      | 4.00           | 0.60           | 1.50            | 30 | 986896      |
| S 0.90 | 0.225      | 0.72                        | 0.74                      | 4.00           | 0.67           | 1.50            | 30 | 986897      |
| S 1.00 | 0.25       | 0.80                        | 0.82                      | 4.00           | 0.76           | 1.50            | 30 | 986898      |
| S 1.20 | 0.25       | 1.00                        | 1.02                      | 5.00           | 0.76           | 1.50            | 30 | 986899      |
| S 1.40 | 0.30       | 1.15                        | 1.17                      | 5.00           | 0.85           | 1.50            | 30 | 986900      |

Schnittbedingungen n = 500 - 2'500 [U/min]

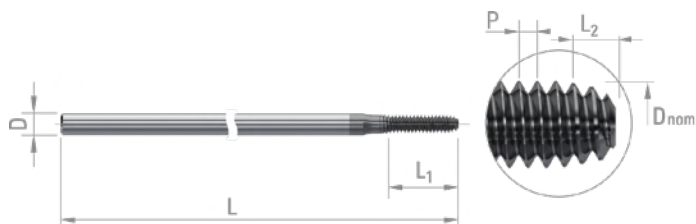
# DIXI 1715 DI TOP

Z=3



P.404/406

MIKRO-GEWINDEBOHRER,  
RECHTSSCHNEIDEND, RECHTSSPIRALISIERT



- Mikro-Gewindebohrer, Drallwinkel rechts, für das Gewindeschneiden in Sacklochbohrungen entwickelt.
- Gewinde nach NIHS 06-10 (ISO 1501 / DIN 14).
- Die DI-TOP-Beschichtung verbessert die Standzeit in Eisen- und NE-Metallen.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |                                      |    | M    |      |          |                  | K                  |    |    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|--------------------------------------|----|------|------|----------|------------------|--------------------|----|----|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl | Aust. Rostfreier Stahl (DUPLIX / PH) |    |      |      | Grauguss | KugelgraphitGuss | Gusseisen, formbar |    |    |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12                                   | 13 | 14.1 | 14.2 | 14.3     | 14.4             | 15                 | 16 | 17 | 18 | 19 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ |                |                  |                                      |    |      |      |          |                  |                    |    |    |    |    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          | H  |                  |                  |    |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|------------------|----|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl | Hartes Gusseisen |    |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39               | 40 | 41 |  |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ○                 | ○                      | ○  | ○            |         |            |      |                         |    |       |                          |    |                  |                  |    |    |  |

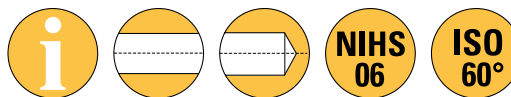
| D nom. | Steigung P | Bohr. Ø Messing (5H Kern Ø) | Bohr. Ø Stahl (6H Kern Ø) | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | NIHS-3GX DI-TOP |
|--------|------------|-----------------------------|---------------------------|----------------|----------------|-----------------|----|-----------------|
| S 0.40 | 0.10       | 0.36 - 0.37                 | 0.37 - 0.38               | 2.00           | 0.30           | 1.50            | 30 | 974654          |
| S 0.50 | 0.125      | 0.45 - 0.46                 | 0.46 - 0.47               | 2.00           | 0.37           | 1.50            | 30 | 972407          |
| S 0.60 | 0.15       | 0.54 - 0.55                 | 0.55 - 0.56               | 2.40           | 0.45           | 1.50            | 30 | 970899          |
| S 0.70 | 0.175      | 0.62 - 0.63                 | 0.63 - 0.64               | 2.80           | 0.52           | 1.50            | 30 | 970900          |
| S 0.80 | 0.20       | 0.70 - 0.71                 | 0.71 - 0.72               | 3.20           | 0.60           | 1.50            | 30 | 970901          |
| S 0.90 | 0.225      | 0.81 - 0.82                 | 0.82 - 0.83               | 3.60           | 0.67           | 1.50            | 30 | 970902          |
| S 1.00 | 0.25       | 0.89 - 0.90                 | 0.90 - 0.91               | 4.00           | 0.75           | 1.50            | 30 | 305793          |
| S 1.20 | 0.20       | 1.11 - 1.12                 | 1.12 - 1.13               | 4.80           | 0.60           | 1.50            | 30 | 305794          |
| S 1.20 | 0.25       | 1.08 - 1.09                 | 1.09 - 1.10               | 4.80           | 0.75           | 1.50            | 30 | 305795          |
| S 1.40 | 0.20       | 1.31 - 1.32                 | 1.32 - 1.33               | 5.60           | 0.60           | 1.50            | 30 | 305796          |
| S 1.40 | 0.30       | 1.27 - 1.28                 | 1.28 - 1.29               | 5.60           | 0.90           | 1.50            | 30 | 305797          |

| D nom. | Steigung P | Bohr. Ø Messing (5H Kern Ø) | Bohr. Ø Stahl (6H Kern Ø) | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | 4HX DI-TOP | 5HX DI-TOP | 6HX DI-TOP |
|--------|------------|-----------------------------|---------------------------|----------------|----------------|-----------------|----|------------|------------|------------|
| M 1.00 | 0.25       | 0.89 - 0.90                 | 0.90 - 0.91               | 4.00           | 0.75           | 1.50            | 30 |            | 970903     |            |
| M 1.20 | 0.20       | 1.11 - 1.12                 | 1.12 - 1.13               | 4.80           | 0.60           | 1.50            | 30 | 978772     |            |            |
| M 1.20 | 0.25       | 1.09 - 1.10                 | 1.10 - 1.11               | 4.80           | 0.75           | 1.50            | 30 |            | 970904     |            |
| M 1.40 | 0.20       | 1.31 - 1.32                 | 1.32 - 1.33               | 5.60           | 0.60           | 1.50            | 30 | 973645     |            |            |
| M 1.40 | 0.30       | 1.27 - 1.28                 | 1.28 - 1.29               | 5.60           | 0.90           | 1.50            | 30 |            | 970905     |            |
| M 1.50 | 0.30       | 1.37 - 1.38                 | 1.38 - 1.39               | 6.00           | 0.90           | 1.50            | 38 |            |            | 971650     |
| M 1.60 | 0.35       | 1.45 - 1.46                 | 1.46 - 1.47               | 6.00           | 1.05           | 1.50            | 38 |            |            | 970906     |
| M 1.80 | 0.20       | 1.71 - 1.72                 | 1.72 - 1.73               | 7.00           | 0.60           | 1.50            | 38 | 975090     |            |            |
| M 2.00 | 0.20       | 1.91 - 1.92                 | 1.92 - 1.93               | 8.00           | 0.60           | 1.50            | 43 | 976259     |            |            |
| M 2.00 | 0.40       | 1.83 - 1.84                 | 1.83 - 1.84               | 8.00           | 1.20           | 1.50            | 43 |            |            | 970907     |
| M 2.20 | 0.25       | 2.09 - 2.10                 | 2.10 - 2.11               | 8.00           | 0.75           | 1.50            | 43 |            | 974959     |            |

Schnittbedingungen n = 500 - 2'500 [U/min]

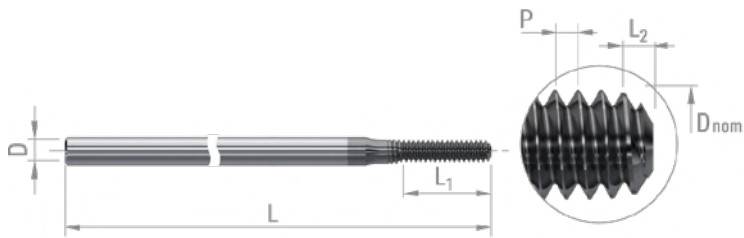
# DIXI 1716 DI-TOP

Z=3



P.404/406

MIKRO-GEWINDEFORMER



- Mikro-Gewindeformer, Werkzeuge zum Gewinden durch Verformung von Kupferlegierungen entwickelt.
- Gewinde nach NIHS 06-10 (ISO 1501 / DIN 14) und ISO 965 (DIN 13).
- Die DI-TOP-Beschichtung verbessert die Standzeit in Eisen und NE-Metallen.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLIX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ | ○ | ○ | ○ |                   |   |   |   |                |    |                  |    |                                    |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |    | H                        |    |                  |    |                  |  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|----|--------------------------|----|------------------|----|------------------|--|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       |    | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |  |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36 | 37                       | 38 | 39               | 40 | 41               |  |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      |                         |    |       |    |                          |    |                  |    |                  |  |  |

| D nom. | Steigung P | Bohr. Ø Messing (5H Kern Ø) | Bohr. Ø Stahl (6H Kern Ø) | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | NIHS-3GX DI-TOP |
|--------|------------|-----------------------------|---------------------------|----------------|----------------|-----------------|----|-----------------|
| S 0.40 | 0.10       | 0.36 - 0.37                 | 0.37 - 0.38               | 1.60           | 0.20           | 1.50            | 30 | 992498          |
| S 0.50 | 0.125      | 0.45 - 0.46                 | 0.46 - 0.47               | 2.00           | 0.25           | 1.50            | 30 | 992509          |
| S 0.60 | 0.15       | 0.54 - 0.55                 | 0.55 - 0.56               | 2.40           | 0.30           | 1.50            | 30 | 992514          |
| S 0.70 | 0.175      | 0.62 - 0.63                 | 0.63 - 0.64               | 2.80           | 0.35           | 1.50            | 30 | 992515          |
| S 0.80 | 0.20       | 0.70 - 0.71                 | 0.71 - 0.72               | 3.20           | 0.40           | 1.50            | 30 | 992516          |
| S 0.90 | 0.225      | 0.81 - 0.82                 | 0.82 - 0.83               | 3.60           | 0.45           | 1.50            | 30 | 992517          |
| S 1.00 | 0.25       | 0.89 - 0.90                 | 0.90 - 0.91               | 4.00           | 0.50           | 1.50            | 30 | 305799          |
| S 1.20 | 0.20       | 1.11 - 1.12                 | 1.12 - 1.13               | 4.80           | 0.40           | 1.50            | 30 | 305800          |
| S 1.20 | 0.25       | 1.08 - 1.09                 | 1.09 - 1.10               | 4.80           | 0.50           | 1.50            | 30 | 305801          |
| S 1.40 | 0.20       | 1.31 - 1.32                 | 1.32 - 1.33               | 5.60           | 0.40           | 1.50            | 30 | 305802          |
| S 1.40 | 0.30       | 1.27 - 1.28                 | 1.28 - 1.29               | 5.60           | 0.60           | 1.50            | 30 | 305804          |

| D nom. | Steigung P | Bohr. Ø Messing (5H Kern Ø) | Bohr. Ø Stahl (6H Kern Ø) | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | 4HX DI-TOP | 5HX DI-TOP |
|--------|------------|-----------------------------|---------------------------|----------------|----------------|-----------------|----|------------|------------|
| M 1.00 | 0.25       | 0.89 - 0.90                 | 0.90 - 0.91               | 4.00           | 0.50           | 1.50            | 30 |            | 992518     |
| M 1.20 | 0.20       | 1.11 - 1.12                 | 1.12 - 1.13               | 4.80           | 0.40           | 1.50            | 30 | 992519     |            |
| M 1.20 | 0.25       | 1.09 - 1.10                 | 1.10 - 1.11               | 4.80           | 0.50           | 1.50            | 30 |            | 992520     |
| M 1.40 | 0.20       | 1.31 - 1.32                 | 1.32 - 1.33               | 5.60           | 0.40           | 1.50            | 30 | 992521     |            |
| M 1.40 | 0.30       | 1.27 - 1.28                 | 1.28 - 1.29               | 5.60           | 0.60           | 1.50            | 30 |            | 992522     |

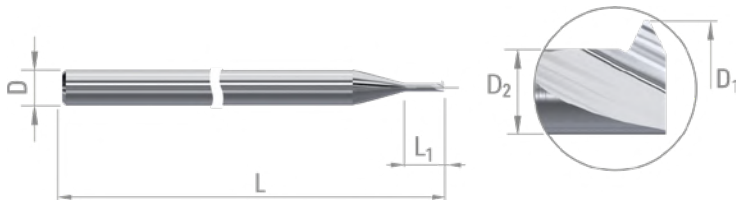
Schnittbedingungen n = 500 - 2'500 [U/min]





P.412 P.406/410

GEWINDEWIRBLER  
TEILPROFIL



- Gewindewirbler, Teilprofil, entwickelt zur Reduzierung der Schnittkräfte für alle Materialien.
- Gewinde nach NIHS 06-10 (ISO 1501 / DIN 14).

○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |                                      |    | M    |      |          |                  | K                  |    |    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|--------------------------------------|----|------|------|----------|------------------|--------------------|----|----|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl | Aust. Rostfreier Stahl (DUPLEX / PH) |    |      |      | Grauguss | KugelgraphitGuss | Gusseisen, formbar |    |    |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12                                   | 13 | 14.1 | 14.2 | 14.3     | 14.4             | 15                 | 16 | 17 | 18 | 19 | 20 |
| Empfehlungen           | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗ | ○                 | ○ | ○ | ○ | ○              | ○                | ○                                    | ○  | ○    | ○    | ○        | ○                | ○                  | ○  | ○  | ○  | ○  | ○  |

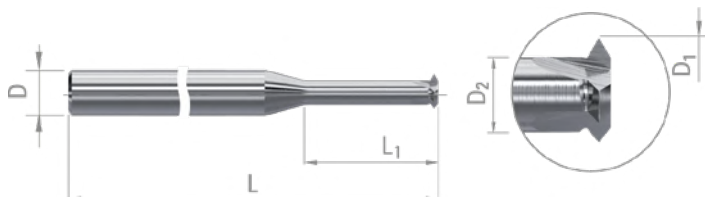
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      | S                       |    |       |                          |    | H                |                  |    |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|------------------|----|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl | Hartes Gusseisen |    |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39               | 40 | 41 |  |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊗                 | ⊗                      | ⊗  | ⊗            |         |            | ○    | ○                       |    |       |                          | ○  | ○                |                  |    |    |  |

| D nom. | Steigung P | Bohr. Ø | D <sub>1</sub> | L <sub>1</sub> | D <sub>2</sub> | D <sub>h5</sub> | L  | VHM    |
|--------|------------|---------|----------------|----------------|----------------|-----------------|----|--------|
| S 0.30 | 0.08       | 0.23    | 0.21           | 0.70           | 0.12           | 3               | 38 | 961147 |
| S 0.35 | 0.09       | 0.27    | 0.25           | 0.90           | 0.15           | 3               | 38 | 984299 |
| S 0.40 | 0.10       | 0.32    | 0.29           | 0.90           | 0.18           | 3               | 38 | 961149 |
| S 0.50 | 0.125      | 0.40    | 0.37           | 1.20           | 0.23           | 3               | 38 | 961163 |
| S 0.60 | 0.15       | 0.48    | 0.44           | 1.50           | 0.27           | 3               | 38 | 961164 |
| S 0.70 | 0.175      | 0.56    | 0.52           | 1.80           | 0.32           | 3               | 38 | 961165 |
| S 0.80 | 0.20       | 0.64    | 0.59           | 2.00           | 0.36           | 3               | 38 | 961166 |
| S 0.90 | 0.225      | 0.72    | 0.67           | 2.20           | 0.41           | 3               | 38 | 961167 |
| S 1.00 | 0.25       | 0.80    | 0.74           | 2.40           | 0.46           | 3               | 38 | 961168 |
| S 1.20 | 0.25       | 1.00    | 0.94           | 3.00           | 0.66           | 3               | 38 | 961169 |
| S 1.40 | 0.30       | 1.15    | 1.08           | 3.30           | 0.74           | 3               | 38 | 961170 |



P.412 P.404/406

GEWINDEWIRBLER  
TEILPROFIL



- Gewindewirbler, Teilprofil, entwickelt zur Reduzierung der Schnittkräfte für alle Materialien.
- Gewinde nach NIHS 06-10 (ISO 1501 / DIN 14) und ISO 965 (DIN 13).
- Die CUTINOX-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen.

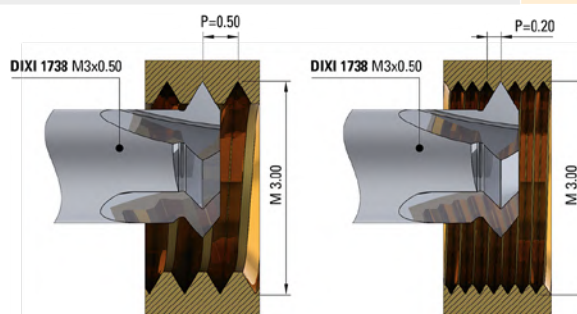
○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPELX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗              | ⊗  | ⊗                | ⊗  | ⊗                                  | ⊗    | ⊗    | ⊗    | ○        | ○  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊗                       | ⊗  | ⊗                       | ⊗  | ⊗  | ⊗                 | ⊗                      | ⊗  | ⊗            |         | ○          | ○    | ○                       | ○  | ○     | ⊗                        | ⊗  |                  |    |                  |    |

| D nom. | Steigung P | Kern Ø                             |                              | D <sub>1</sub> | L <sub>1</sub> | D <sub>2</sub> | D <sub>h5</sub> | L  | VHM    | CUTINOX |        |
|--------|------------|------------------------------------|------------------------------|----------------|----------------|----------------|-----------------|----|--------|---------|--------|
|        |            | ISO                                | NIHS                         |                |                |                |                 |    |        |         |        |
| S 0.50 | 0.125      |                                    | 0.40                         | 0.37           | 0.85           | 0.23           | 3               | 38 | 306969 | 318544  |        |
| S 0.60 | 0.150      |                                    | 0.48                         | 0.44           | 1.25           | 0.27           | 3               | 38 | 318623 | 318545  |        |
| S 0.70 | 0.175      |                                    | 0.56                         | 0.52           | 1.80           | 0.31           | 3               | 38 | 984319 | 985156  |        |
| S 0.80 | 0.20       |                                    | 0.64                         | 0.59           | 2.30           | 0.35           | 3               | 38 | 965997 | 966008  |        |
| S 0.90 | 0.225      |                                    | 0.72                         | 0.67           | 2.50           | 0.38           | 3               | 38 | 965996 | 966007  |        |
| M 1.00 | S 1.00     | 0.25                               | 0.75                         | 0.80           | 0.71           | 2.80           | 0.37            | 3  | 38     | 964485  | 966006 |
| M 1.20 | S 1.20     | 0.25                               | 0.95                         | 1.00           | 0.91           | 3.40           | 0.57            | 3  | 38     | 965664  | 965943 |
| M 1.40 | S 1.40     | 0.30                               | 1.10                         | 1.15           | 1.05           | 4.00           | 0.64            | 3  | 38     | 965988  | 965998 |
| M 1.40 |            | 0.20                               | 1.22                         |                | 1.15           | 4.00           | 0.77            | 3  | 38     | 965989  | 965999 |
| M 1.60 |            | 0.35                               | 1.30                         |                | 1.19           | 4.50           | 0.65            | 3  | 38     | 965990  | 966000 |
| M 1.80 |            | 0.35<br>(0.20)                     | 1.50<br>1.60                 |                | 1.39           | 5.10           | 0.71            | 3  | 38     | 965991  | 966001 |
| M 2.00 |            | 0.40<br>(0.20)                     | 1.65<br>1.80                 |                | 1.53           | 5.60           | 0.78            | 3  | 38     | 965992  | 966002 |
| M 2.20 |            | 0.45<br>(0.25)                     | 1.80<br>1.95                 |                | 1.67           | 6.20           | 0.88            | 3  | 38     | 965993  | 966003 |
| M 2.50 |            | 0.45<br>(0.35)<br>(0.25)<br>(0.20) | 2.10<br>2.15<br>2.25<br>2.30 |                | 1.97           | 7.00           | 1.17            | 3  | 38     | 965994  | 966004 |
| M 3.00 |            | 0.50<br>(0.35)<br>(0.25)<br>(0.20) | 2.50<br>2.65<br>2.75<br>2.80 |                | 2.40           | 8.40           | 1.60            | 3  | 38     | 965995  | 966005 |

Ein Werkzeug für verschiedene Steigungen  
(Beispiel, von 0.20 bis 0.50)





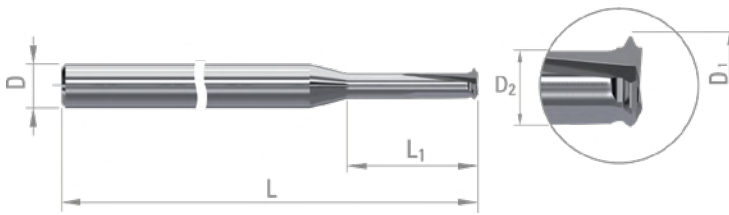
DIXI 1737

Z=3



P.412 P.406/410

GEWINDEWIRBLER  
TEILPROFIL



- Gewindewirbler. Keine Gratbildung dank des Vollprofils.
- Gewinde nach NIHS 06-10 (ISO 1501 / DIN 14) und ISO 965 (DIN 13).
- C-TOP-Beschichtung verbessert die Standzeit in schwer zerspanbaren Materialien.
- Die DRYCUT-Beschichtung verbessert die Standzeit in NE-Metallen.  gut  ausgezeichnet

| ISO                    | P                                |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  | M                                    |                                  |                                  |                                  | K                     |                       |                       |                       |                       |                       |
|------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|--------------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Werkstoff Beschreibung | Unlegierter Stahl                |                                  |                                  |                                  |                                  | Niedrigleg. Stahl                |                                  |                                  |                                  | Hochleg. Stahl                   |                                  | Rostfreier Stahl                 |                                  | Aust. Rostfreier Stahl (DUPLEX / PH) |                                  | Grauguss                         |                                  | KugelgraphitGuss      |                       | Gusseisen, formbar    |                       |                       |                       |
| VDI 3323               | 1                                | 2                                | 3                                | 4                                | 5                                | 6                                | 7                                | 8                                | 9                                | 10                               | 11                               | 12                               | 13                               | 14.1                                 | 14.2                             | 14.3                             | 14.4                             | 15                    | 16                    | 17                    | 18                    | 19                    | 20                    |
| Empfehlungen           | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/>     | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

| ISO                    | N                                |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |         | S                     |                       |                                  |                                  |                                  |                                  | H                                |                  |    |                  |    |
|------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|---------|-----------------------|-----------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung          |                                  | Aluminium-Gusslegierung          |                                  |                                  | Cu + Pb Legierung                | Cu-Legierung Schwierig           |                                  | Gold, Silber                     | Graphit | Kunststoff            | Holz                  | Sonderlegierung Ni / Co          |                                  |                                  | Titan / Titanlegierungen         |                                  | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                               | 22                               | 23                               | 24                               | 25                               | 26                               | 27                               | 28                               | -                                | -       | 29                    | 30                    | 31                               | 32                               | 33-35                            | 36                               | 37                               | 38               | 39 | 40               | 41 |
| Empfehlungen           | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> |         | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> |                  |    |                  |    |

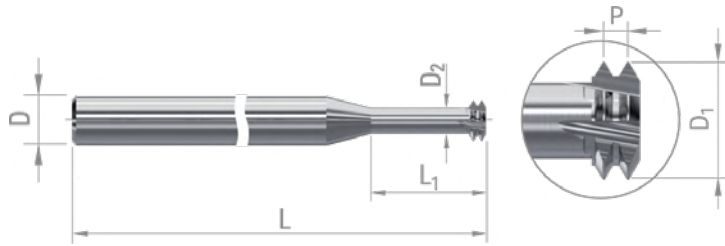
| D nom. | Steigung P | Kern Ø      | D <sub>1</sub> | L <sub>1</sub> | D <sub>2</sub> | D <sub>h5</sub> | L  | VHM    | C-TOP  | DRYCUT* |
|--------|------------|-------------|----------------|----------------|----------------|-----------------|----|--------|--------|---------|
| S 0.50 | 0.125      | 0.38 - 0.40 | 0.37           | 0.85           | 0.22           | 3               | 38 | 378072 | 378089 | 378351  |
| S 0.60 | 0.15       | 0.46 - 0.49 | 0.44           | 1.25           | 0.26           | 3               | 38 | 378073 | 378090 | 378352  |
| S 0.70 | 0.175      | 0.54 - 0.57 | 0.52           | 1.80           | 0.31           | 3               | 38 | 378074 | 378091 | 378353  |
| S 0.80 | 0.20       | 0.61 - 0.64 | 0.59           | 2.30           | 0.35           | 3               | 38 | 378075 | 378092 | 378354  |
| S 0.90 | 0.225      | 0.69 - 0.73 | 0.67           | 2.50           | 0.40           | 3               | 38 | 378076 | 378093 | 378355  |
| S 1.00 | 0.25       | 0.76 - 0.80 | 0.74           | 2.80           | 0.44           | 3               | 38 | 378077 | 378094 | 378356  |
| S 1.20 | 0.25       | 0.96 - 1.00 | 0.94           | 3.40           | 0.64           | 3               | 38 | 378078 | 378095 | 378357  |
| S 1.40 | 0.30       | 1.12 - 1.16 | 1.08           | 4.00           | 0.72           | 3               | 38 | 378079 | 378096 | 378358  |
| M 1.00 | 0.25       | 0.73 - 0.77 | 0.71           | 2.80           | 0.37           | 3               | 38 | 378080 | 378097 | 378359  |
| M 1.20 | 0.25       | 0.93 - 0.97 | 0.91           | 3.40           | 0.57           | 3               | 38 | 378081 | 378098 | 378360  |
| M 1.40 | 0.30       | 1.08 - 1.12 | 1.05           | 4.00           | 0.64           | 3               | 38 | 378082 | 378099 | 378361  |
| M 1.60 | 0.35       | 1.23 - 1.28 | 1.19           | 4.50           | 0.72           | 3               | 38 | 378083 | 378100 | 378362  |
| M 1.80 | 0.35       | 1.43 - 1.48 | 1.39           | 5.10           | 0.91           | 3               | 38 | 378084 | 378101 | 378363  |
| M 2.00 | 0.40       | 1.57 - 1.62 | 1.53           | 5.60           | 0.99           | 3               | 38 | 378085 | 378102 | 378364  |
| M 2.20 | 0.45       | 1.72 - 1.78 | 1.67           | 6.20           | 1.06           | 3               | 38 | 378086 | 378103 | 378365  |
| M 2.50 | 0.45       | 2.02 - 2.08 | 1.97           | 7.00           | 1.36           | 3               | 38 | 378087 | 378104 | 378366  |
| M 3.00 | 0.50       | 2.46 - 2.53 | 2.40           | 8.40           | 1.72           | 3               | 38 | 378088 | 378105 | 378367  |

\*nicht für eisenhaltige Werkstoffe



P.412 P.406/410

GEWINDEWIRBLER  
VOLLPROFIL



- Gewindewirbler mit 2-Profilen. Werkzeuge, die zur Reduzierung der Schnittkräfte für alle Materialien entwickelt wurden. Durch das Vollprofil keine Gratbildung.
- Gewinde nach ISO 965 (DIN 13).
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |   |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|---|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLIX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |   |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |   |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙              | ⊙  | ⊙                | ⊙  | ⊙                                  | ⊙    | ⊙    | ⊙    | ○        | ○  | ○                | ○  | ○                  | ○  | ○ |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      |                         | S  |       |                          |    |                  |    | H                |    |  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            | ○    | ○                       | ○  | ○     | ○                        | ⊙  | ⊙                |    |                  |    |  |  |

| D nom. | Steigung P | D <sub>1</sub> | D <sub>2</sub> | D <sub>h5</sub> | L  | L <sub>1</sub> | Z | DIXI               | VHM              | TiAlN            |
|--------|------------|----------------|----------------|-----------------|----|----------------|---|--------------------|------------------|------------------|
| M 0.80 | 0.20       | 0.57           | 0.25           | 3               | 38 | 1.85<br>2.60   | 3 | 1730-2D<br>1730-3D | 958853<br>961148 | 960446<br>961176 |
| M 0.90 | 0.225      | 0.64           | 0.29           | 3               | 38 | 2.10<br>2.90   | 3 | 1730-2D<br>1730-3D | 953216<br>961150 | 960117<br>961177 |
| M 1.00 | 0.25       | 0.71           | 0.32           | 3               | 38 | 2.30<br>3.20   | 3 | 1730-2D<br>1730-3D | 953217<br>961151 | 960118<br>961178 |
| M 1.20 | 0.25       | 0.91           | 0.51           | 3               | 38 | 2.80<br>3.85   | 3 | 1730-2D<br>1730-3D | 953218<br>961152 | 960450<br>961179 |
| M 1.40 | 0.30       | 1.05           | 0.58           | 3               | 38 | 3.20<br>4.50   | 3 | 1730-2D<br>1730-3D | 953219<br>961153 | 960451<br>961180 |
| M 1.60 | 0.35       | 1.19           | 0.64           | 3               | 38 | 3.70<br>5.10   | 3 | 1730-2D<br>1730-3D | 953220<br>961154 | 960453<br>961181 |
| M 1.80 | 0.20       | 1.55           | 1.23           | 3               | 38 | 4.10<br>5.80   | 3 | 1730-2D<br>1730-3D | 961128<br>961155 | 961130<br>961182 |
| M 1.80 | 0.35       | 1.39           | 0.84           | 3               | 38 | 4.10<br>5.80   | 3 | 1730-2D<br>1730-3D | 953221<br>961156 | 960454<br>961183 |
| M 2.00 | 0.40       | 1.53           | 1.10           | 3               | 38 | 4.60<br>6.40   | 3 | 1730-2D<br>1730-3D | 953222<br>961157 | 960455<br>961184 |
| M 2.20 | 0.20       | 1.94           | 1.63           | 3               | 38 | 5.10<br>7.10   | 3 | 1730-2D<br>1730-3D | 961129<br>961158 | 961132<br>961185 |
| M 2.20 | 0.45       | 1.67           | 0.96           | 3               | 38 | 5.10<br>7.10   | 3 | 1730-2D<br>1730-3D | 953223<br>961159 | 960456<br>961186 |
| M 2.50 | 0.25       | 2.18           | 1.79           | 3               | 38 | 5.80<br>8.00   | 3 | 1730-2D<br>1730-3D | 960062<br>961160 | 960459<br>961187 |
| M 2.50 | 0.35       | 2.07           | 1.52           | 3               | 38 | 5.80<br>8.00   | 3 | 1730-2D<br>1730-3D | 960063<br>961161 | 960460<br>961188 |
| M 2.50 | 0.45       | 1.97           | 1.26           | 3               | 38 | 5.80<br>8.00   | 3 | 1730-2D<br>1730-3D | 953225<br>961162 | 960461<br>961189 |
| M 3.00 | 0.50       | 2.40           | 1.62           | 4               | 42 | 7.00<br>9.60   | 3 | 1730-2D<br>1730-3D | 955698<br>961171 | 960462<br>961190 |



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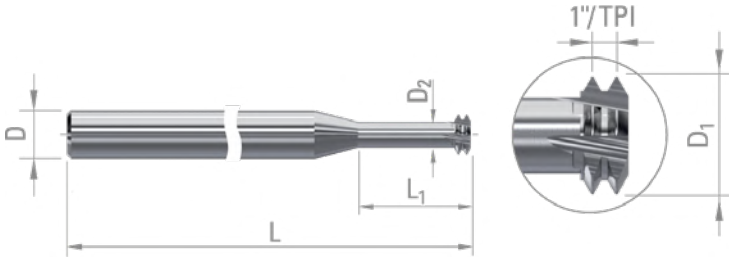

 GEWINDEWIRBLER  
 VOLLPROFIL

| D nom.  | Steigung<br>P | D <sub>1</sub> | D <sub>2</sub> | D <sub>h5</sub> | L  | L <sub>1</sub> | Z | DIXI               | VHM              | TiAIN            |
|---------|---------------|----------------|----------------|-----------------|----|----------------|---|--------------------|------------------|------------------|
| M 4.00  | 0.70          | 3.17           | 2.07           | 4               | 42 | 9.30<br>12.80  | 3 | 1730-2D<br>1730-3D | 955699<br>961172 | 960463<br>961191 |
| M 4.50  | 0.75          | 3.61           | 2.42           | 6               | 57 | 10.40<br>14.40 | 4 | 1730-2D<br>1730-3D | 413655<br>413658 | 413656<br>413659 |
| M 5.00  | 0.80          | 4.05           | 2.78           | 6               | 57 | 11.50<br>16.00 | 4 | 1730-2D<br>1730-3D | 957925<br>961173 | 960464<br>961192 |
| M 6.00  | 1.00          | 4.81           | 3.23           | 6               | 57 | 13.80<br>19.20 | 4 | 1730-2D<br>1730-3D | 957982<br>961174 | 960465<br>961193 |
| M 8.00  | 1.25          | 6.51           | 4.53           | 8               | 75 | 18.40<br>25.60 | 6 | 1730-2D<br>1730-3D | 958039<br>961175 | 960466<br>961194 |
| M 10.00 | 1.50          | 7.90           | 5.53           | 8               | 75 | 23.00<br>32.00 | 6 | 1730-2D<br>1730-3D | 958040<br>960883 | 960467<br>961195 |



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GEWINDEWIRBLER  
VOLLPROFIL



- Gewindewirbler mit 2-Profilen. Werkzeuge, die zur Reduzierung der Schnittkräfte für alle Materialien entwickelt wurden. Durch das Vollprofil keine Gratbildung.
- Gewinde nach ISO 5864 (ASME B1.1).
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

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| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙              | ⊙  | ⊙                | ⊙  | ⊙                                  | ⊙    | ⊙    | ⊙    | ○        | ○  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ○          | ○    | ○                       | ○  | ○     | ⊙                        | ⊙  |                  |    |                  |    |

| UNC  | UNF  | UNEF  | UN    | TPI | D <sub>1</sub> | D <sub>2</sub> | D <sub>h5</sub> | L  | L <sub>1</sub> | Z | DIXI               | VHM              | TiAlN            |
|------|------|-------|-------|-----|----------------|----------------|-----------------|----|----------------|---|--------------------|------------------|------------------|
|      | N°1  |       |       | 72  | 1.44           | 0.88           | 3               | 38 | 4.30<br>6.00   | 3 | 1735-2D<br>1735-3D | 966664<br>966653 | 966833<br>966852 |
| N°1  | N°2  |       |       | 64  | 1.39           | 0.77           | 3               | 38 | 4.30<br>6.00   | 3 | 1735-2D<br>1735-3D | 966663<br>966652 | 966834<br>966851 |
| N°2  | N°3  |       |       | 56  | 1.65           | 0.94           | 3               | 38 | 5.00<br>7.00   | 3 | 1735-2D<br>1735-3D | 966662<br>966651 | 966835<br>966850 |
| N°3  | N°4  |       |       | 48  | 1.90           | 1.06           | 3               | 38 | 5.80<br>8.10   | 3 | 1735-2D<br>1735-3D | 966661<br>966650 | 966836<br>966849 |
|      | N°5  |       |       | 44  | 2.49           | 1.58           | 3               | 38 | 7.30<br>10.20  | 3 | 1735-2D<br>1735-3D | 966660<br>966649 | 966837<br>966848 |
| N°4  |      |       |       | 40  | 2.11           | 1.11           | 4               | 42 | 6.60<br>9.10   | 3 | 1735-2D<br>1735-3D | 966659<br>966648 | 966838<br>966847 |
| N°5  | N°6  |       |       | 40  | 2.43           | 1.43           | 4               | 42 | 7.30<br>10.20  | 3 | 1735-2D<br>1735-3D | 966658<br>966647 | 966839<br>966846 |
|      | N°8  |       |       | 36  | 3.33           | 2.21           | 4               | 42 | 9.60<br>13.40  | 3 | 1735-2D<br>1735-3D | 966657<br>966646 | 966841<br>966845 |
| N°6  |      |       |       | 32  | 2.59           | 1.33           | 4               | 42 | 8.10<br>11.30  | 3 | 1735-2D<br>1735-3D | 966656<br>966645 | 966840<br>966844 |
| N°8  | N°10 | N°12  |       | 32  | 3.24           | 1.98           | 4               | 55 | 9.60<br>13.40  | 3 | 1735-2D<br>1735-3D | 960205<br>961020 | 960628<br>961062 |
|      | N°12 | 7/16" | 5/16" | 28  | 4.41           | 2.97           | 6               | 63 | 12.60<br>17.60 | 4 | 1735-2D<br>1735-3D | 966655<br>966644 | 966842<br>966643 |
|      | 1/4" | 7/16" | 5/16" | 28  | 5.26           | 3.82           | 6               | 63 | 14.60<br>20.30 | 4 | 1735-2D<br>1735-3D | 966654<br>966641 | 966843<br>966642 |
| N°10 |      |       |       | 24  | 3.60           | 1.93           | 4               | 55 | 11.10<br>15.50 | 3 | 1735-2D<br>1735-3D | 960395<br>961052 | 960629<br>961063 |
| 1/4" |      |       | 5/16" | 20  | 4.87           | 2.86           | 6               | 57 | 14.60<br>20.30 | 4 | 1735-2D<br>1735-3D | 960397<br>961054 | 960631<br>961085 |



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GEWINDEWIRBLER  
VOLLPROFIL

| UNC   | UNF   | UNEF | UN    | TPI | D <sub>1</sub> | D <sub>2</sub> | D <sub>h5</sub> | L  | L <sub>1</sub> | Z | DIXI               | VHM              | TiAIN            |
|-------|-------|------|-------|-----|----------------|----------------|-----------------|----|----------------|---|--------------------|------------------|------------------|
| 5/16" | 9/16" |      |       | 18  | 6.28           | 4.04           | 8               | 63 | 18.20<br>25.40 | 6 | 1735-2D<br>1735-3D | 960398<br>961055 | 960635<br>961086 |
| 3/8"  |       |      | 7/16" | 16  | 7.65           | 5.13           | 8               | 63 | 21.90<br>30.50 | 6 | 1735-2D<br>1735-3D | 960399<br>961056 | 960636<br>961087 |
| 7/16" | 7/8"  |      |       | 14  | 8.96           | 6.08           | 10              | 75 | 25.60<br>35.50 | 6 | 1735-2D<br>1735-3D | 960400<br>961057 | 960637<br>961088 |
| 1/2"  |       |      |       | 13  | 10.37          | 7.27           | 12              | 75 | 29.20<br>40.60 | 6 | 1735-2D<br>1735-3D | 960402<br>961058 | 960638<br>961060 |



**DIXI 1740**

**Z=1-3**



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**BOHRGEWINDEWIRBLER**



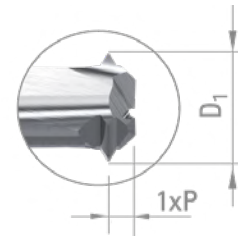
- Bohrgewindewirbler, diese Werkzeuge werden verwendet, um den Bohrvorgang vor dem Gewindeschneiden zu vermeiden.
- Gewindeschneiden nach NIHS 06-10 (ISO 1501 / DIN 14) und ISO 965 (DIN 13).
- Die CUTINOX-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen.

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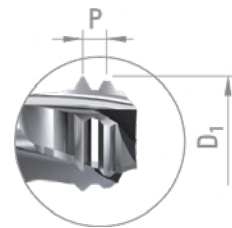
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ⊙        | ⊙  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ⊙          | ⊙    | ○                       | ○  | ○     | ⊙                        | ⊙  |                  |    |                  |    |

| D nom. | Steigung |  | D <sub>1</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | Z | VHM    | CUTINOX |
|--------|----------|--|----------------|----------------|-----------------|----|---|--------|---------|
|        | P        |  |                |                |                 |    |   |        |         |
| S 0.80 | 0.20     |  | 0.60           | 2.40           | 3               | 38 | 1 | 977703 | 977716  |
| S 0.90 | 0.225    |  | 0.66           | 2.70           | 3               | 38 | 1 | 977704 | 977717  |
| M 1.00 | 0.20     |  | 0.80           | 3.00           | 3               | 38 | 1 | 985121 | 985134  |
| M 1.00 | 0.25     |  | 0.73           | 3.00           | 3               | 38 | 1 | 977656 | 977698  |
| M 1.20 | 0.20     |  | 1.00           | 3.60           | 3               | 38 | 1 | 985136 | 985143  |
| M 1.20 | 0.25     |  | 0.92           | 3.60           | 3               | 38 | 1 | 977705 | 977718  |
| M 1.40 | 0.20     |  | 1.20           | 4.20           | 3               | 38 | 1 | 985144 | 985145  |
| M 1.40 | 0.30     |  | 1.05           | 4.20           | 3               | 38 | 1 | 977706 | 977719  |
| M 1.60 | 0.35     |  | 1.21           | 4.80           | 3               | 38 | 1 | 977707 | 977720  |
| M 2.00 | 0.40     |  | 1.55           | 6.00           | 3               | 38 | 2 | 977708 | 977721  |
| M 2.50 | 0.45     |  | 2.00           | 7.50           | 3               | 38 | 2 | 977709 | 977722  |
| M 3.00 | 0.50     |  | 2.44           | 9.00           | 6               | 57 | 2 | 977710 | 977723  |
| M 4.00 | 0.70     |  | 3.20           | 12.0           | 6               | 57 | 2 | 977711 | 977724  |
| M 5.00 | 0.80     |  | 4.00           | 15.0           | 6               | 57 | 2 | 977712 | 977725  |



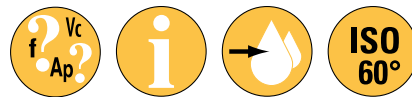
| D nom. | Steigung |  | D <sub>1</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | Z | VHM    | CUTINOX |
|--------|----------|--|----------------|----------------|-----------------|----|---|--------|---------|
|        | P        |  |                |                |                 |    |   |        |         |
| M 6.00 | 1.00     |  | 4.85           | 18.0           | 6               | 57 | 3 | 977713 | 977726  |
| M 8.00 | 1.25     |  | 6.50           | 24.0           | 8               | 75 | 3 | 977714 | 977727  |
| M10.00 | 1.50     |  | 7.90           | 30.0           | 8               | 75 | 3 | 977715 | 977728  |





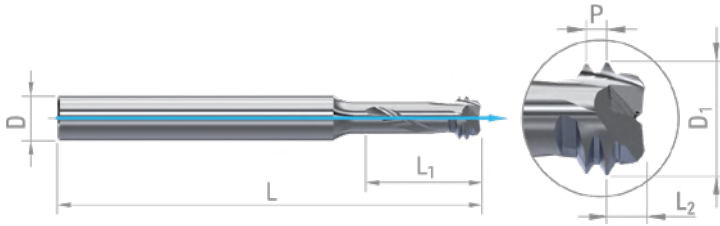
# DIXI 1742-TC DAC

Z=2



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## BOHRGEWINDEWIRBLER MIT INNENKÜHLUNG



- Bohrgewindewirbler mit Innenkühlung. Für die Herstellung von Gewinden ohne Kernbohrung in Eisenwerkstoffen.
- Gewindeschneiden nach ISO 965 (DIN 13).
- Die DAC-Beschichtung verbessert die Standzeit in NE-Metallen und reduziert die Bildung von Aufbauschneiden..

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                   |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|-------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX /PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |                  |    |    |                                     |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      | S                       |    |       |                          |    | H                |    |                  |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            | ⊙    | ⊙                       |    |       |                          |    |                  |    |                  |    |  |

| D nom.  | Steigung P | D <sub>1</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L   | DAC    |
|---------|------------|----------------|----------------|----------------|-----------------|-----|--------|
| M 5.00  | 0.80       | 4.00           | 12.5           | 1.50           | 8               | 60  | 303475 |
| M 6.00  | 1.00       | 4.80           | 15.0           | 1.85           | 8               | 60  | 303476 |
| M 8.00  | 1.25       | 6.40           | 20.0           | 2.30           | 8               | 75  | 303477 |
| M 10.00 | 1.50       | 7.80           | 25.0           | 2.75           | 8               | 75  | 303478 |
| M 12.00 | 1.75       | 9.50           | 30.0           | 3.10           | 10              | 100 | 308709 |

# DIXI 1744-TC CUTINOX

Z=4



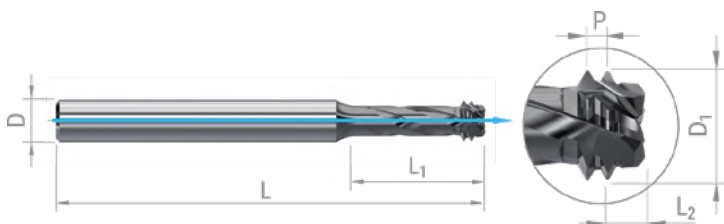
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BOHRGEWINDEWIRBLER  
MIT INNENKÜHLUNG



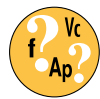
- Bohrgewindewirbler mit Innenkühlung. Für die Herstellung von Gewinden ohne Kernbohrung in Eisenwerkstoffen.
- Gewindeschneiden nach ISO 965 (DIN 13).
- Die CUTINOX-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen.

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| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙              | ⊙  | ⊙                | ⊙  | ⊙                                  | ⊙    | ⊙    | ⊙    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

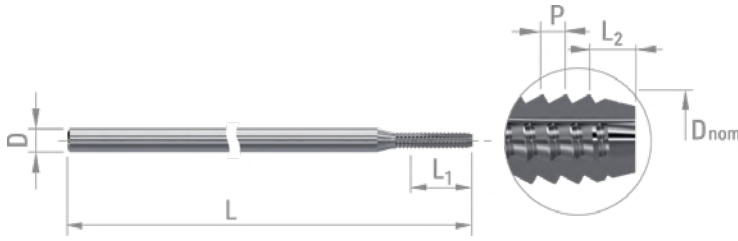
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         |            |      | ⊙                       | ⊙  | ⊙     | ⊙                        | ⊙  |                  |    |                  |    |

| D nom.  | Steigung P | D <sub>1</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L   | VHM    |
|---------|------------|----------------|----------------|----------------|-----------------|-----|--------|
| M 5.00  | 0.80       | 4.00           | 12.50          | 1.50           | 8               | 60  | 303479 |
| M 6.00  | 1.00       | 4.80           | 15.00          | 1.85           | 8               | 60  | 303480 |
| M 8.00  | 1.25       | 6.40           | 20.00          | 2.30           | 8               | 75  | 303481 |
| M 10.00 | 1.50       | 7.80           | 25.00          | 2.75           | 8               | 75  | 303482 |
| M 12.00 | 1.75       | 9.50           | 30.00          | 3.10           | 10              | 100 | 308710 |



P.405

MIKRO-GEWINDEBOHRER  
MIT SELBSTSICHERNDEM PROFIL



- Mikro-Gewindebohrer mit selbstsicherndem Profil, Werkzeuge, die für Materialien mit sehr guter Zerspanbarkeit entwickelt wurden.
- Gewindeschneiden nach internem Standard DIXI.

○ gut    ⊙ ausgezeichnet

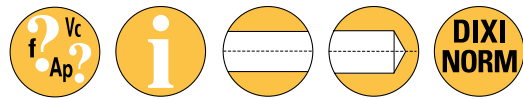
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                   |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|-------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX /PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ○                 | ○ |   |   |   |                   |   |   |   |                |                  |    |    |                                     |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      |                         | S  |       |                          |    |                  | H  |                  |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen           | ○                       | ○  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      |                         |    |       |                          |    |                  |    |                  |    |  |

| D nom. | Steigung P | Bohr. Ø | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | AF/BT 4H VHM |
|--------|------------|---------|----------------|----------------|-----------------|----|--------------|
| S 0.70 | 0.175      | 0.59    | 3.00           | 0.35           | 1.50            | 30 | 995574       |
| S 0.80 | 0.20       | 0.68    | 3.50           | 0.40           | 1.50            | 30 | 995676       |
| S 0.90 | 0.225      | 0.76    | 4.00           | 0.45           | 1.50            | 30 | 995677       |
| M 1.00 | 0.25       | 0.84    | 4.00           | 0.50           | 1.50            | 30 | 995678       |
| M 1.20 | 0.25       | 1.04    | 5.00           | 0.50           | 1.50            | 30 | 995679       |
| M 1.40 | 0.30       | 1.21    | 5.00           | 0.60           | 1.50            | 30 | 995680       |

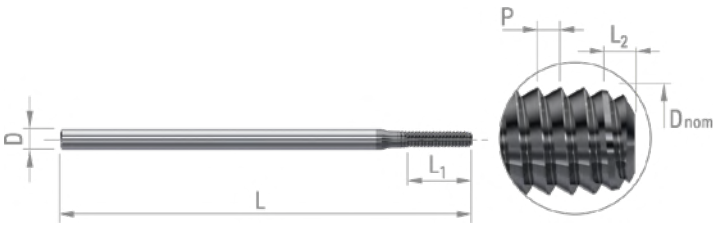
Schnittbedingungen n = 500 - 2'500 [U/min]

# DIXI 1716-AF/BT DI-TOP



P.405

MIKRO-GEWINDEFORMER  
MIT SELBSTSICHERNDEM PROFIL



- Mikro-Gewindeformer mit selbstsicherndem Profil, diese Werkzeuge wurden für das Gewinden durch Verformung von Materialien mit guter Bearbeitbarkeit entwickelt.
- Gewindeformen nach internem Standard DIXI.
- Die DI-TOP-Beschichtung verbessert die Standzeit in Eisen- und NE-Metallen.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ |                |    |                  |    |                                    |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      |                         |    |       |                          |    |                  |    |                  |    |

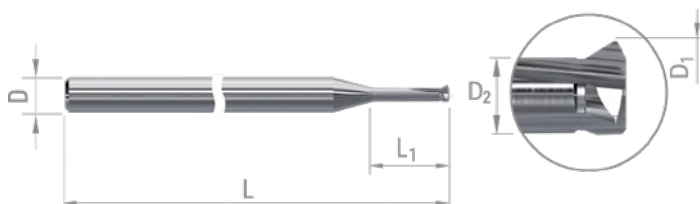
| D nom. | Steigung P | Bohr. Ø | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | AF/BT 4HX DI-TOP |
|--------|------------|---------|----------------|----------------|-----------------|----|------------------|
| S 0.70 | 0.175      | 0.65    | 2.80           | 0.35           | 1.50            | 30 | 995723           |
| S 0.80 | 0.20       | 0.74    | 3.20           | 0.40           | 1.50            | 30 | 995745           |
| S 0.90 | 0.225      | 0.83    | 3.60           | 0.45           | 1.50            | 30 | 995746           |
| M 1.00 | 0.25       | 0.92    | 4.00           | 0.50           | 1.50            | 30 | 995747           |
| M 1.20 | 0.25       | 1.12    | 4.80           | 0.50           | 1.50            | 30 | 995748           |
| M 1.40 | 0.30       | 1.31    | 5.60           | 0.60           | 1.50            | 30 | 995749           |

Schnittbedingungen n = 500 - 2'500 [U/min]



GEWINDEWIRBLER  
MIT SELBSTSICHERNDEM PROFIL

- Gewindewirbler mit selbstsicherndem Teilprofil, Werkzeuge entwickelt, um die Schnittkräfte bei allen Materialien zureduzieren.
- Gewindeschneiden nach internem Standard DIXI.



○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙              | ⊙                | ⊙  | ⊙  | ⊙                                    | ⊙    | ⊙    | ⊙    | ○        | ○  | ○                | ○  | ○                  | ○  |

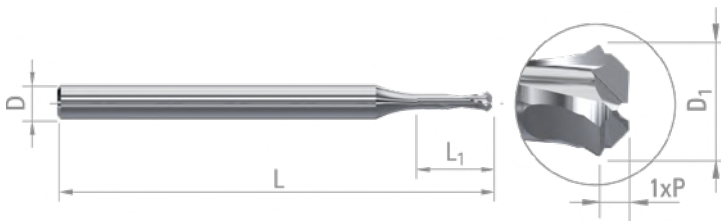
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ○          | ○    | ○                       | ○  | ○     | ⊙                        | ⊙  |                  |    |                  |    |

| D nom. | Steigung P | Bohr. Ø | D <sub>1</sub> | L <sub>1</sub> | D <sub>2</sub> | D <sub>h5</sub> | L  | VHM    |
|--------|------------|---------|----------------|----------------|----------------|-----------------|----|--------|
| S 0.70 | 0.175      | 0.59    | 0.54           | 1.80           | 0.34           | 3               | 38 | 995725 |
| S 0.80 | 0.20       | 0.68    | 0.62           | 2.30           | 0.39           | 3               | 38 | 995880 |
| S 0.90 | 0.225      | 0.76    | 0.70           | 2.50           | 0.44           | 3               | 38 | 995881 |
| M 1.00 | 0.25       | 0.84    | 0.80           | 2.80           | 0.51           | 3               | 38 | 995882 |
| M 1.20 | 0.25       | 1.04    | 0.98           | 3.40           | 0.69           | 3               | 38 | 995883 |
| M 1.40 | 0.30       | 1.21    | 1.12           | 4.00           | 0.77           | 3               | 38 | 995884 |
| M 1.60 | 0.35       | 1.38    | 1.26           | 4.50           | 0.86           | 3               | 38 | 995885 |
| M 2.00 | 0.40       | 1.75    | 1.60           | 5.60           | 1.14           | 3               | 38 | 995886 |
| M 2.20 | 0.45       | 1.91    | 1.70           | 6.20           | 1.18           | 3               | 38 | 995887 |
| M 3.00 | 0.50       | 2.68    | 2.40           | 8.40           | 1.82           | 3               | 38 | 995888 |



P.414 P.405/410

BOHRGEWINDEWIRBLER  
MIT SELBSTSICHERNDEM PROFIL



- Bohrgewindewirbler mit selbstsicherndem Profil, endwickelt für die Herstellung von Gewinden ohne Kernbohrung.
- Gewindeschneiden nach internem Standard DIXI.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ⊙        | ⊙  | ○                | ○  | ○                  | ○  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          | H  |                  |    |                  |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            | ⊙    | ⊙                       | ○  | ○     | ○                        | ⊙  | ⊙                |    |                  |    |  |

| D nom. | Steigung P | D <sub>1</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | Z | VHM    |
|--------|------------|----------------|----------------|-----------------|----|---|--------|
| S 0.80 | 0.20       | 0.60           | 2.40           | 3               | 38 | 1 | 300295 |
| S 0.90 | 0.225      | 0.66           | 2.70           | 3               | 38 | 1 | 300435 |
| M 1.00 | 0.25       | 0.73           | 3.00           | 3               | 38 | 1 | 300436 |
| M 1.20 | 0.25       | 0.92           | 3.60           | 3               | 38 | 1 | 300437 |
| M 1.40 | 0.30       | 1.05           | 4.20           | 3               | 38 | 1 | 300438 |
| M 1.60 | 0.35       | 1.21           | 4.80           | 3               | 38 | 1 | 300439 |
| M 2.00 | 0.40       | 1.55           | 6.00           | 3               | 38 | 2 | 300440 |
| M 2.20 | 0.45       | 1.70           | 6.60           | 3               | 38 | 2 | 300441 |
| M 2.50 | 0.45       | 2.00           | 7.50           | 3               | 38 | 2 | 300444 |
| M 3.00 | 0.50       | 2.44           | 9.00           | 6               | 57 | 2 | 300445 |

HOCHPRÄZISIONS-GEWINDELEHREN  
 "GO" - "NO GO"  
 FÜR SELBSTSICHERNDES PROFIL

- Hochpräzisions-Gewindelehren zur Überprüfung des Flankendurchmessers von selbstsichernden.
- Gewinden nach dem DIXI-Innenstandard.



| D nom. | Steigung<br>P | L <sub>1</sub> | 1718-AF/BT<br>4H GO | 1719-AF/BT<br>4H/3G NO GO |
|--------|---------------|----------------|---------------------|---------------------------|
| S 0.70 | 0.175         | 3.00           | 995572              | 995573                    |
| S 0.80 | 0.20          | 3.50           | 995615              | 995664                    |
| S 0.90 | 0.225         | 4.00           | 995616              | 995665                    |
| M 1.00 | 0.25          | 5.00           | 995617              | 995666                    |
| M 1.20 | 0.25          | 5.00           | 995619              | 995667                    |
| M 1.40 | 0.30          | 5.00           | 995620              | 995668                    |
| M 1.60 | 0.35          | 6.00           | 995621              | 995669                    |
| M 1.80 | 0.35          | 6.00           | 995622              | 995670                    |
| M 2.00 | 0.40          | 6.00           | 995623              | 995671                    |
| M 2.20 | 0.45          | 8.00           | 995624              | 995672                    |
| M 2.50 | 0.45          | 8.00           | 995631              | 995674                    |
| M 3.00 | 0.50          | 8.00           | 995626              | 995675                    |

ZYLINDRISCHE VOLLHARTMETALL-LEHRE ZUR PRÜFUNG  
DES KERNDURCHMESSERS VON SELBSTSICHERNDEN  
GEWINDEN

“GO” - “NO GO”

- “GO” Zylindrische Vollhartmetall-Lehre zur Prüfung des Kerndurchmessers von selbstsichernden Gewinden nach DIXI-Norm
- “NO GO” zylindrische Vollhartmetall-Lehre zur Prüfung des Kerndurchmessers von selbstsichernden Gewinden nach DIXI-Norm



0418-AF/BT  
4H GO

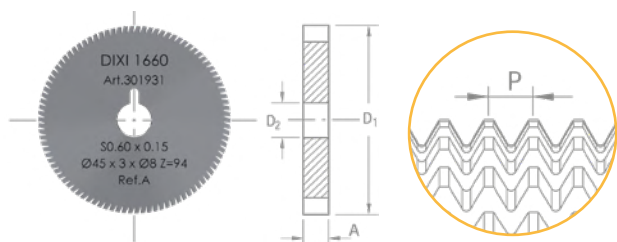


0419-AF/BT  
4H/3G NO GO

| D nom. | Steigung<br>P | L <sub>1</sub> | Tol. | 0418-AF/BT<br>4H GO | Tol.  | 0419-AF/BT<br>4H/3G NO GO |
|--------|---------------|----------------|------|---------------------|-------|---------------------------|
| S 0.70 | 0.175         | 5              | 4H   | 414480              | 4H/3G | 414492                    |
| S 0.80 | 0.20          | 5              | 4H   | 414481              | 4H/3G | 414493                    |
| S 0.90 | 0.225         | 5              | 4H   | 414482              | 4H/3G | 414494                    |
| M 1.00 | 0.25          | 5              | 4H   | 414483              | 4H/3G | 414495                    |
| M 1.20 | 0.25          | 5              | 4H   | 414484              | 4H/3G | 414496                    |
| M 1.40 | 0.30          | 5              | 4H   | 414485              | 4H/3G | 414497                    |
| M 1.60 | 0.35          | 5              | 4H   | 414486              | 4H/3G | 414498                    |
| M 1.80 | 0.35          | 6              | 4H   | 414487              | 4H/3G | 414499                    |
| M 2.00 | 0.40          | 6              | 4H   | 414488              | 4H/3G | 414500                    |
| M 2.20 | 0.45          | 6              | 4H   | 414489              | 4H/3G | 414501                    |
| M 2.50 | 0.45          | 8              | 4H   | 414490              | 4H/3G | 414502                    |
| M 3.00 | 0.50          | 8              | 4H   | 414491              | 4H/3G | 414503                    |



WÄLZFRÄSER  
FÜR NIHS-AUSSENGEWINDE



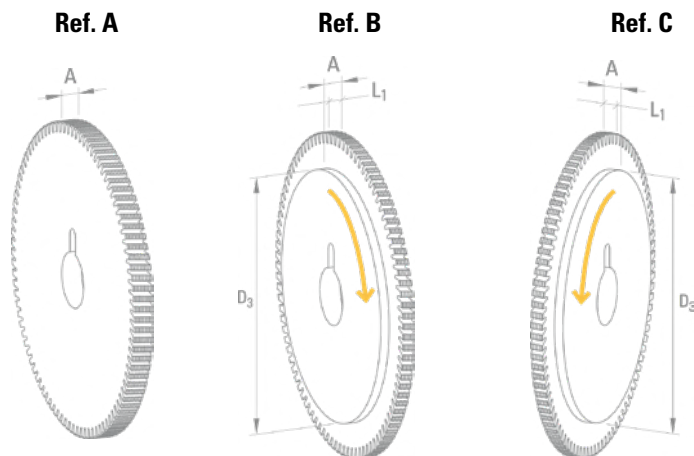
- Wälzfräser, Werkzeuge zum Schneiden von Außengewinde. Kurze Zykluszeiten und hervorragende Gewindequalität.
- Flacher Gewindeboden.
- Gewinde nach NIHS 06-10 (ISO 1501 / DIN 14).

○ gut    ⊙ ausgezeichnet

| ISO          | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |  |
|--------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|--|
|              | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |  |
| VDI 3323     | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |  |
| Empfehlungen | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    |          |    |                  |    |                    |    |  |

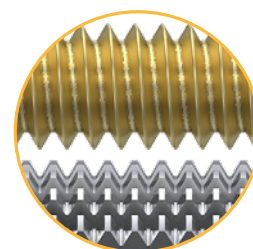
| ISO          | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |  |
|--------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|--|
|              | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |  |
| VDI 3323     | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |  |
| Empfehlungen | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            |      |                         |    |       |                          | ⊙  | ⊙  |                  |    |                  |  |  |

| D nom. | Steigung P | D <sub>1 ± 0.03</sub> | D <sub>2 h5</sub> | D <sub>3</sub> | Z  | A | L <sub>1</sub> | Ref. | VHM    |
|--------|------------|-----------------------|-------------------|----------------|----|---|----------------|------|--------|
| S 0.40 | 0.100      | 45                    | 8                 | 35             | 94 | 3 | 1.00           | B    | 301926 |
|        |            |                       |                   |                |    |   | 1.00           | C    | 301927 |
| S 0.50 | 0.125      | 45                    | 8                 | 35             | 94 | 3 | 1.10           | B    | 301928 |
|        |            |                       |                   |                |    |   | 1.10           | C    | 301929 |
| S 0.60 | 0.150      | 45                    | 8                 | 35             | 94 | 3 | 1.35           | B    | 301930 |
|        |            |                       |                   |                |    |   | 1.35           | C    | 301305 |
|        |            |                       |                   |                |    |   | 3.00           | A    | 301931 |
| S 0.70 | 0.175      | 45                    | 8                 | 35             | 94 | 3 | 1.60           | B    | 301932 |
|        |            |                       |                   |                |    |   | 1.60           | C    | 301943 |
|        |            |                       |                   |                |    |   | 3.00           | A    | 301945 |
| S 0.80 | 0.200      | 45                    | 8                 | 35             | 94 | 3 | 1.80           | B    | 301946 |
|        |            |                       |                   |                |    |   | 1.80           | C    | 301947 |
|        |            |                       |                   |                |    |   | 3.00           | A    | 301948 |
| S 0.90 | 0.225      | 45                    | 8                 | 35             | 94 | 3 | 2.00           | B    | 301949 |
|        |            |                       |                   |                |    |   | 2.00           | C    | 301950 |
|        |            |                       |                   |                |    |   | 3.00           | A    | 301951 |
| S 1.00 | 0.250      | 45                    | 8                 | 35             | 94 | 3 | 3.00           | A    | 301952 |
| S 1.40 | 0.300      | 45                    | 8                 | 35             | 94 | 3 | 3.00           | A    | 301953 |

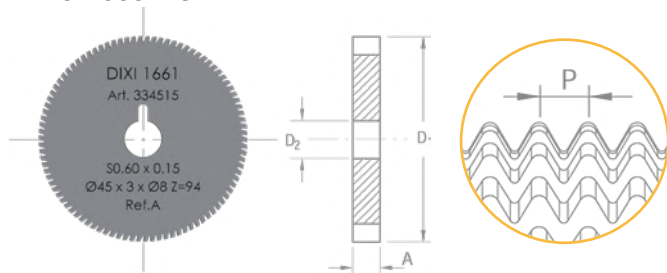


auf Anfrage erhältlich in Ø 8 und Ø 40

Flacher Grund



WÄLZFRÄSER  
FÜR NIHS-AUSSENGEWINDE



- Wälzfräser, Werkzeuge zum Schneiden von Außengewinde. Kurze Zykluszeiten und hervorragende Gewindequalität.
- Abgerundeter Gewindeboden.
- Gewinde nach NIHS 06-10 (ISO 1501 / DIN 14).

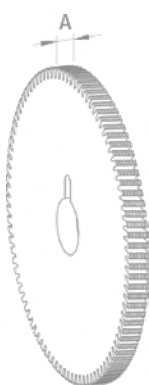
○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ○ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    |          |    |                  |    |                    |    |

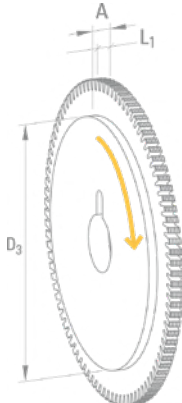
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            | ○       |            |      |                         |    |       | ⊙                        | ⊙  |    |                  |    |                  |  |

| D nom. | Steigung P | D <sub>1 ± 0.03</sub> | D <sub>2 h5</sub> | D <sub>3</sub> | Z  | A | L <sub>1</sub> | Ref. | VHM    |
|--------|------------|-----------------------|-------------------|----------------|----|---|----------------|------|--------|
| S 0.40 | 0.100      | 45                    | 8                 | 35             | 94 | 3 | 1.00           | B    | 334510 |
|        |            |                       |                   |                |    |   | 1.00           | C    | 327631 |
| S 0.50 | 0.125      | 45                    | 8                 | 35             | 94 | 3 | 1.10           | B    | 334511 |
|        |            |                       |                   |                |    |   | 1.10           | C    | 334512 |
| S 0.60 | 0.150      | 45                    | 8                 | 35             | 94 | 3 | 1.35           | B    | 334513 |
|        |            |                       |                   |                |    |   | 1.35           | C    | 334514 |
|        |            |                       |                   |                |    |   | 3.00           | A    | 334515 |
| S 0.70 | 0.175      | 45                    | 8                 | 35             | 94 | 3 | 1.60           | B    | 334516 |
|        |            |                       |                   |                |    |   | 1.60           | C    | 334517 |
|        |            |                       |                   |                |    |   | 3.00           | A    | 334518 |
| S 0.80 | 0.200      | 45                    | 8                 | 35             | 94 | 3 | 1.80           | B    | 334519 |
|        |            |                       |                   |                |    |   | 1.80           | C    | 334520 |
|        |            |                       |                   |                |    |   | 3.00           | A    | 334521 |
| S 0.90 | 0.225      | 45                    | 8                 | 35             | 94 | 3 | 2.00           | B    | 334522 |
|        |            |                       |                   |                |    |   | 2.00           | C    | 334523 |
|        |            |                       |                   |                |    |   | 3.00           | A    | 334524 |
| S 1.00 | 0.250      | 45                    | 8                 | 35             | 94 | 3 | 3.00           | A    | 334525 |
| S 1.40 | 0.300      | 45                    | 8                 | 35             | 94 | 3 | 3.00           | A    | 334526 |

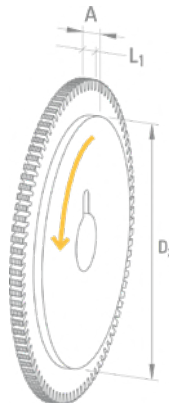
Ref. A



Ref. B

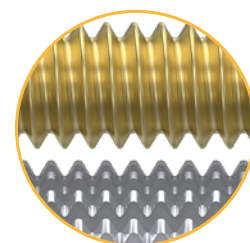


Ref. C



auf Anfrage erhältlich in Ø 8 und Ø 40

Gerundeter Grund



# DIXI 7910

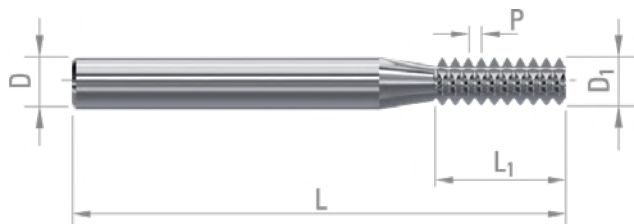
Z=2-4



GEWINDEFÄHRER, GERADE GENUTET

P.416 P.406/410

- Gewindefräser, gerade Genutet, Werkzeuge für die allgemeine Bearbeitung. Durch das Vollprofil keine Gratbildung.
- Gewinde nach der Norm ISO 965 (DIN 13).
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.



○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗ | ○                 | ○ | ○ | ○ | ○              | ○                | ○  | ○  | ○                                    | ○    | ○    | ○    | ⊗        | ⊗  | ⊗                | ⊗  | ⊗                  | ⊗  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊗                       | ⊗  | ⊗                       | ⊗  | ⊗  | ⊗                 | ⊗                      | ⊗  | ⊗            |         | ⊗          | ⊗    |                         |    |       | ○                        | ○  |                  |    |                  |    |

| D nom.  | Steigung P | D <sub>1</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | Z | VHM   | TiAlN |
|---------|------------|----------------|----------------|-----------------|----|---|-------|-------|
| M 1.40  | 0.30       | 0.90           | 2.10           | 3               | 38 | 2 | 41565 | 56990 |
| M 1.60  | 0.35       | 1.00           | 2.45           | 3               | 38 | 2 | 41566 | 56991 |
| M 2.00  | 0.40       | 1.30           | 3.20           | 3               | 38 | 2 | 41568 | 56993 |
| M 2.30  | 0.40       | 1.50           | 3.20           | 3               | 38 | 2 | 41569 | 56994 |
| M 2.50  | 0.35       | 1.30           | 2.80           | 3               | 38 | 2 | 41567 | 56992 |
| M 2.50  | 0.45       | 1.50           | 3.60           | 3               | 38 | 2 | 41570 | 56995 |
| M 3.00  | 0.50       | 2.10           | 4.50           | 3               | 38 | 3 | 41571 | 56996 |
| M 4.00  | 0.50       | 2.60           | 5.50           | 3               | 38 | 3 | 41572 | 56997 |
| M 4.00  | 0.70       | 2.60           | 6.30           | 3               | 38 | 3 | 41573 | 56998 |
| M 4.50  | 0.75       | 3.00           | 6.75           | 4               | 42 | 3 | 41574 | 56999 |
| M 5.00  | 0.80       | 3.60           | 8.00           | 4               | 42 | 3 | 41576 | 57001 |
| M 6.00  | 1.00       | 4.00           | 9.00           | 6               | 57 | 3 | 42578 | 55510 |
| M 8.00  | 0.75       | 5.90           | 15.00          | 6               | 57 | 3 | 42577 | 57000 |
| M 8.00  | 1.25       | 5.00           | 12.50          | 6               | 57 | 3 | 42579 | 57003 |
| M 10.00 | 1.50       | 5.90           | 15.00          | 6               | 57 | 3 | 42580 | 57004 |
| M 12.00 | 1.00       | 7.90           | 20.00          | 8               | 63 | 4 | 42554 | 57002 |
| M 12.00 | 1.75       | 7.90           | 19.25          | 8               | 63 | 4 | 42590 | 57007 |
| M 14.00 | 1.50       | 9.90           | 24.00          | 10              | 72 | 4 | 42561 | 57005 |
| M 14.00 | 2.00       | 9.90           | 24.00          | 10              | 72 | 4 | 42591 | 57008 |
| M 18.00 | 1.50       | 11.90          | 30.00          | 12              | 83 | 4 | 42589 | 57006 |

## DIXI 7910 E = Aussen

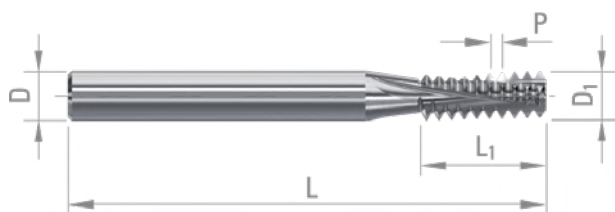
| D nom. | Steigung P | D <sub>1</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | Z | VHM   | TiAlN |
|--------|------------|----------------|----------------|-----------------|----|---|-------|-------|
| M 3.00 | 0.50       | 5.90           | 15.00          | 6               | 57 | 3 | 42597 | 57013 |
| M 4.50 | 0.75       | 7.90           | 19.50          | 8               | 63 | 4 | 42598 | 57014 |
| M 6.00 | 1.00       | 9.90           | 24.00          | 10              | 72 | 4 | 41471 | 57015 |



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GEWINDEFÄHRER, SPIRALISIERT

- Gewindefräser, spiralisiert, Werkzeuge für die allgemeine Bearbeitung. Durch das Vollprofil keine Gratbildung.
- Gewinde nach der Norm ISO 965 (DIN 13).
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.



○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  |              |         | ⊙          | ⊙    |                         |    |       | ○                        | ○  |                  |    |                  |    |

| D nom.  | Steigung P | D <sub>1</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | Z | VHM    | TiAlN  |
|---------|------------|----------------|----------------|-----------------|----|---|--------|--------|
| M 3.00  | 0.50       | 2.10           | 4.50           | 3               | 38 | 3 | 67420  | 952938 |
| M 4.00  | 0.50       | 2.60           | 5.50           | 3               | 38 | 3 | 951594 | 952939 |
| M 4.00  | 0.70       | 2.60           | 6.30           | 3               | 38 | 3 | 67452  | 952940 |
| M 4.50  | 0.75       | 3.00           | 6.75           | 4               | 42 | 3 | 67453  | 952941 |
| M 5.00  | 0.80       | 3.60           | 8.00           | 4               | 42 | 3 | 67454  | 952942 |
| M 6.00  | 1.00       | 4.00           | 9.00           | 6               | 57 | 3 | 67455  | 952013 |
| M 8.00  | 0.75       | 5.90           | 15.00          | 6               | 57 | 5 | 67461  | 952944 |
| M 8.00  | 1.25       | 5.00           | 12.50          | 6               | 57 | 3 | 67274  | 952014 |
| M 10.00 | 1.50       | 5.90           | 15.00          | 6               | 57 | 5 | 67456  | 952015 |
| M 12.00 | 0.50       | 9.90           | 10.00          | 10              | 50 | 5 | 957036 | 957037 |
| M 12.00 | 1.75       | 7.90           | 19.25          | 8               | 63 | 5 | 67457  | 952016 |
| M 14.00 | 1.50       | 9.90           | 24.00          | 10              | 72 | 5 | 67463  | 952948 |
| M 14.00 | 2.00       | 9.90           | 24.00          | 10              | 72 | 5 | 67459  | 952949 |
| M 18.00 | 1.50       | 11.90          | 30.00          | 12              | 83 | 5 | 67464  | 952951 |
| M 18.00 | 2.00       | 11.90          | 30.00          | 12              | 83 | 5 | 67465  | 952956 |
| M 18.00 | 2.50       | 11.90          | 30.00          | 12              | 83 | 5 | 67458  | 952851 |
| M 24.00 | 3.00       | 15.90          | 36.00          | 16              | 92 | 6 | 67460  | 952953 |

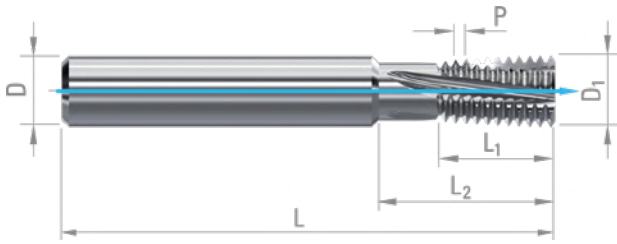
DIXI 7908 E = Aussen

| D nom.  | Steigung P | D <sub>1</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | Z | VHM   | TiAlN  |
|---------|------------|----------------|----------------|-----------------|----|---|-------|--------|
| M 3.00  | 0.50       | 5.90           | 15.00          | 6               | 57 | 5 | 67466 | 952943 |
| M 6.00  | 1.00       | 9.90           | 24.00          | 10              | 72 | 5 |       | 952947 |
| M 10.00 | 1.50       | 11.90          | 30.00          | 12              | 83 | 5 | 67469 | 952950 |
| M 14.00 | 2.00       | 11.90          | 30.00          | 12              | 83 | 5 | 67470 | 952952 |



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GEWINDEFÄHRER  
MIT INNENKÜHLUNG



- Gewindefräser mit Innenkühlung und Hinterschliff. Werkzeuge, die für Feingewinde und tiefe Gewinde entwickelt wurden. Die Innenkühlung verbessert den Abtransport der Späne.
- Gewinde nach ISO 965 (DIN 13).
- Die CUTINOX-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                   |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|-------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX /PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○                | ○  | ○  | ○                                   | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ⊙          | ⊙    |                         |    |       | ○                        | ○  |                  |    |                  |    |

| Steigung P | D nom. | D <sub>1</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L   | Z | VHM    | CUTINOX |
|------------|--------|----------------|----------------|----------------|-----------------|-----|---|--------|---------|
| 0.50       | M 10   | 7.95           | 16             | -              | 8               | 64  | 4 | 303435 | 303455  |
|            | M 14   | 11.95          | 20             | 31             | 12              | 80  | 4 | 303436 | 303456  |
| 0.75       | M 10   | 7.95           | 16             | -              | 8               | 64  | 4 | 303437 | 303457  |
|            | M 12   | 9.95           | 16             | 25             | 10              | 70  | 4 | 303438 | 303458  |
| 1.00       | M 14   | 11.95          | 20             | 31             | 12              | 80  | 4 | 303439 | 303459  |
|            | M 12   | 9.95           | 16             | 25             | 10              | 70  | 4 | 303440 | 303460  |
| 1.25       | M 16   | 11.95          | 20             | 31             | 12              | 80  | 4 | 303441 | 303461  |
|            | M 20   | 15.95          | 25             | 40             | 16              | 90  | 5 | 303442 | 303462  |
| 1.50       | M 24   | 19.95          | 33             | 50             | 20              | 105 | 5 | 303443 | 303463  |
|            | M 14   | 9.95           | 16             | 25             | 10              | 70  | 4 | 303444 | 303464  |
| 2.00       | M 16   | 11.95          | 20             | 31             | 12              | 80  | 4 | 303445 | 303465  |
|            | M 14   | 9.95           | 16             | 25             | 10              | 70  | 4 | 303446 | 303466  |
| 2.50       | M 16   | 11.95          | 20             | 31             | 12              | 80  | 4 | 303447 | 303467  |
|            | M 22   | 15.95          | 25             | 40             | 16              | 90  | 5 | 303448 | 303468  |
| 3.00       | M 26   | 19.95          | 33             | 50             | 20              | 105 | 5 | 303449 | 303469  |
|            | M 16   | 11.95          | 20             | 31             | 12              | 80  | 4 | 303450 | 303470  |
| 3.50       | M 22   | 15.95          | 25             | 40             | 16              | 90  | 5 | 303451 | 303471  |
|            | M 27   | 19.95          | 33             | 50             | 20              | 105 | 5 | 303452 | 303472  |
| 4.00       | M 22   | 15.95          | 25             | 40             | 16              | 90  | 5 | 303453 | 303473  |
|            | M 30   | 19.95          | 33             | 50             | 20              | 105 | 5 | 303454 | 303474  |

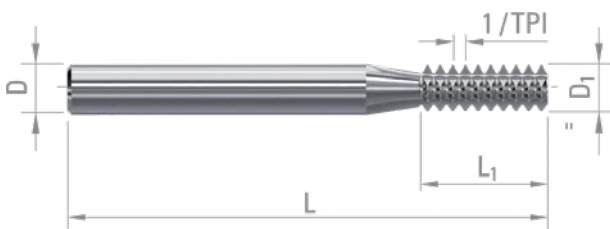
# DIXI 7920

Z=2-4



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GEWINDEFÄHRER, GERADE GENUTET



- UN Gewindefräser gerade Genutet, Werkzeuge für die allgemeine Bearbeitung. Durch das Vollprofil keine Gratbildung.
- Gewinde nach der Norm ISO 5864 (ASME B1.1).
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ⊙          | ⊙    |                         |    |       | ○                        | ○  |                  |    |                  |    |

| UNC   | UNF   | UNEF  | UN    | TPI | D <sub>1</sub> | L <sub>1</sub> | D <sub>h5</sub> | L <sub>1</sub> | Z | VHM   | TiAlN  |
|-------|-------|-------|-------|-----|----------------|----------------|-----------------|----------------|---|-------|--------|
| N°2   | N°3   |       |       | 56  | 1.50           | 3.17           | 3               | 38             | 2 | 41581 | 953797 |
| N°5   | N°6   |       |       | 40  | 2.10           | 4.44           | 3               | 38             | 3 | 41582 | 953798 |
|       | N°8   |       |       | 36  | 3.00           | 6.35           | 4               | 42             | 3 | 39811 | 953799 |
| N°8   | N°10  | N°12  |       | 32  | 3.00           | 6.35           | 4               | 42             | 3 | 41583 | 65997  |
|       |       | 5/16" | 7/16" | 32  | 5.90           | 14.28          | 6               | 57             | 3 | 39813 | 953806 |
|       | N°12  |       | 5/16" | 28  | 3.60           | 8.16           | 4               | 42             | 3 | 41584 | 64133  |
|       |       | 7/16" | 9/16" | 28  | 7.90           | 19.95          | 8               | 63             | 4 | 39815 | 953812 |
| N°12  | 5/16" |       |       | 24  | 4.00           | 8.46           | 6               | 57             | 3 | 41585 | 953802 |
| 5/16" |       |       |       | 18  | 5.00           | 12.70          | 6               | 57             | 3 | 41587 | 953803 |
| 3/8"  |       |       | 7/16" | 16  | 5.90           | 14.28          | 6               | 57             | 3 | 42600 | 953804 |
|       |       |       | 5/8"  | 16  | 11.90          | 28.57          | 12              | 83             | 4 | 42601 | 63605  |
| 1/2"  |       |       |       | 13  | 7.90           | 19.53          | 8               | 63             | 4 | 39824 | 953807 |
| 3/4"  |       |       |       | 10  | 11.90          | 27.94          | 12              | 83             | 4 | 39828 | 953820 |

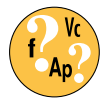
## DIXI 7920 E = Aussen

| D nom.    | TPI | D <sub>1</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | Z | VHM   | TiAlN  |
|-----------|-----|----------------|----------------|-----------------|----|---|-------|--------|
| UNF N°12  | 28  | 7.90           | 19.95          | 8               | 63 | 4 | 39851 | 953810 |
| UNC 1/4"  | 20  | 9.90           | 22.86          | 10              | 72 | 4 | 39852 | 953818 |
| UNC 5/16" | 18  | 9.90           | 23.98          | 10              | 72 | 4 | 39853 | 953816 |



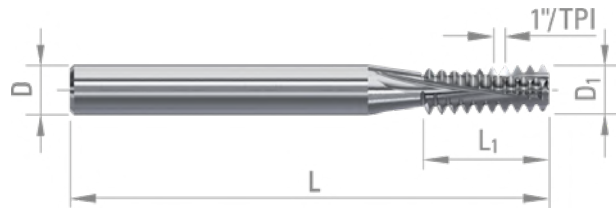
**DIXI 7918**

Z=3-5



GEWINDEFÄSER, SPIRALISIERT

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- UN Gewindefräser spiralisiert, Werkzeuge für die allgemeine Bearbeitung. Durch das Vollprofil keine Gratbildung.
- Gewinde nach der Norm ISO 5864 (ASME B1.1).
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○                | ○  | ○  | ○                                    | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ⊙          | ⊙    |                         |    |       | ○                        | ○  |                  |    |                  |    |

| UNC   | UNF   | UNEF  | UN      | TPI | D <sub>1</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | Z | VHM    | TiAlN  |
|-------|-------|-------|---------|-----|----------------|----------------|-----------------|----|---|--------|--------|
|       | N°2   |       |         | 64  | 1.50           | 3.17           | 3               | 38 | 3 | 951595 | 952964 |
| N°2   | N°3   |       |         | 56  | 1.50           | 3.17           | 3               | 38 | 3 | 67489  | 952963 |
|       | N°5   |       |         | 44  | 2.10           | 4.62           | 3               | 38 | 3 | 951482 | 952966 |
| N°5   | N°6   |       |         | 40  | 2.10           | 4.44           | 3               | 38 | 3 | 67491  | 952965 |
| N°8   | N°10  | N°12  | 5/16"   | 32  | 3.00           | 6.35           | 4               | 42 | 3 | 67493  | 952967 |
|       |       | 5/16" | 7/16"   | 32  | 5.90           | 14.28          | 6               | 57 | 5 | 67497  | 952975 |
|       | N°12  |       |         | 28  | 3.60           | 8.16           | 4               | 42 | 3 | 67494  | 952969 |
|       |       | 7/16" | 9/16"   | 28  | 7.90           | 19.95          | 8               | 63 | 5 | 67498  | 952979 |
| N°12  | 5/16" | 5/8"  |         | 24  | 4.00           | 8.46           | 6               | 57 | 3 | 67495  | 952971 |
| 1/4"  |       |       | 5/16"   | 20  | 4.00           | 10.16          | 6               | 57 | 3 | 67496  | 952970 |
|       | 1/2"  | 3/4"  | 9/16"   | 20  | 9.90           | 22.86          | 10              | 72 | 5 | 67499  | 952985 |
| 5/16" |       |       |         | 18  | 5.00           | 12.70          | 6               | 57 | 3 | 67500  | 952972 |
|       | 9/16" |       |         | 18  | 9.90           | 23.98          | 10              | 72 | 5 | 67501  | 952983 |
| 3/8"  |       |       | 7/16"   | 16  | 5.90           | 14.28          | 6               | 57 | 5 | 67502  | 952973 |
|       |       |       | 5/8"    | 16  | 11.90          | 28.57          | 12              | 83 | 5 | 67503  | 952990 |
| 1/2"  |       |       |         | 13  | 7.90           | 19.53          | 8               | 63 | 5 | 67505  | 952976 |
| 9/16" |       |       |         | 12  | 9.90           | 23.28          | 10              | 72 | 5 | 67512  | 952981 |
|       | 1"    |       | 1-1/16" | 12  | 11.90          | 29.63          | 12              | 83 | 5 | 67506  | 952988 |
| 5/8"  |       |       |         | 11  | 9.90           | 23.09          | 10              | 72 | 5 | 951597 | 952980 |
| 3/4"  |       |       |         | 10  | 11.90          | 27.94          | 12              | 83 | 5 | 951667 | 952986 |

**DIXI 7918 E = Aussen**

| D nom.    | TPI | D <sub>1</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | Z | VHM   | TiAlN  |
|-----------|-----|----------------|----------------|-----------------|----|---|-------|--------|
| UNC N°6   | 32  | 5.90           | 14.28          | 6               | 57 | 5 | 67507 | 952974 |
| UNF N°12  | 28  | 7.90           | 19.95          | 8               | 63 | 5 | 67508 | 952978 |
| UNC 1/4"  | 20  | 9.90           | 22.86          | 10              | 72 | 5 | 67509 | 952984 |
| UNC 5/16" | 18  | 9.90           | 23.98          | 10              | 72 | 5 | 67510 | 952982 |
| UNC 3/8"  | 16  | 11.90          | 28.57          | 12              | 83 | 5 | 67511 | 952989 |

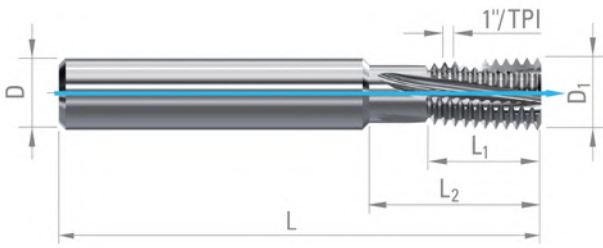
# DIXI 7914-TC

Z=4-5



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GEWINDEFÄHRER, SPIRALISIERT



- UN Gewindefräser mit Innenkühlung und Hinterschliff. Für Feingewinde und tiefe Gewinde entwickelt. Die Innenkühlung verbessert den Abtransport der Späne.
- Gewinde nach ISO 5864 (ASME B1.1).
- Die CUTINOX-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  |              |         | ⊙          | ⊙    |                         |    |       | ○                        | ○  |                  |    |                  |    |

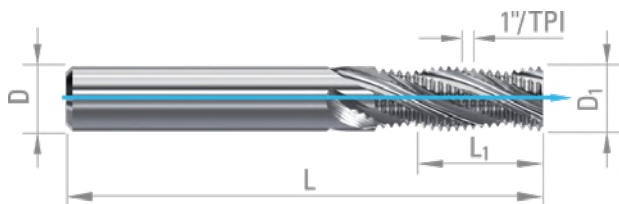
| TPI | D nom. | D <sub>1</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L   | Z | VHM    | CUTINOX |
|-----|--------|----------------|----------------|----------------|-----------------|-----|---|--------|---------|
| 32  | 1/2"   | 9.95           | 16             | 25             | 10              | 70  | 4 | 392460 | 392479  |
| 24  | 1/2"   | 9.95           | 16             | 25             | 10              | 70  | 4 | 392461 | 392480  |
|     | 5/8"   | 11.95          | 20             | 31             | 12              | 80  | 4 | 392462 | 392481  |
| 20  | 13/16" | 15.95          | 25             | 40             | 16              | 90  | 5 | 392463 | 392482  |
|     | 11/16" | 11.95          | 20             | 31             | 12              | 80  | 4 | 392464 | 392483  |
|     | 13/16" | 15.95          | 25             | 40             | 16              | 90  | 5 | 392465 | 392484  |
| 18  | 1"     | 19.95          | 33             | 50             | 20              | 105 | 5 | 392466 | 392485  |
|     | 5/8"   | 11.95          | 20             | 31             | 12              | 80  | 4 | 392467 | 392486  |
|     | 7/8"   | 15.95          | 25             | 40             | 16              | 90  | 5 | 392468 | 392487  |
| 16  | 1"     | 19.95          | 33             | 50             | 20              | 105 | 5 | 392469 | 392488  |
|     | 5/8"   | 11.95          | 20             | 31             | 12              | 80  | 4 | 392470 | 392489  |
|     | 7/8"   | 15.95          | 25             | 40             | 16              | 90  | 5 | 392471 | 392490  |
| 14  | 1"     | 19.95          | 33             | 50             | 20              | 105 | 5 | 392472 | 392491  |
|     | 7/8"   | 15.95          | 25             | 40             | 16              | 90  | 5 | 392473 | 392492  |
| 12  | 7/8"   | 15.95          | 25             | 40             | 16              | 90  | 5 | 392474 | 392493  |
|     | 1"     | 19.95          | 33             | 50             | 20              | 105 | 5 | 392475 | 392494  |
| 10  | 3/4"   | 11.95          | 20             | 31             | 12              | 80  | 4 | 392476 | 392495  |
|     | 7/8"   | 15.95          | 25             | 40             | 16              | 90  | 5 | 392477 | 392496  |
| 8   | 1"     | 19.95          | 33             | 50             | 20              | 105 | 5 | 392478 | 392497  |





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GEWINDEFÄHRER, SPIRALISIERT MIT INNENKÜHLUNG



- UNJF Gewindefräser. Zentrale Innenkühlung verbessert den Abtransport der Späne. Durch das Vollprofil keine Gratbildung.
- Gewinde nach ISO 3161 (ASME B1.15).

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                   |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|-------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX /PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○                | ○  | ○  | ○                                   | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

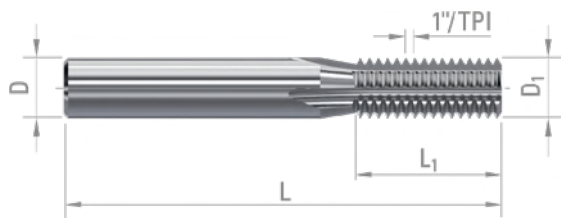
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      |                         | S  |       |                          |    |                  | H  |                  |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ⊙          | ⊙    |                         |    |       | ○                        | ○  |                  |    |                  |    |  |

| UNJF  | TPI | D <sub>1</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | Z | VHM    |
|-------|-----|----------------|----------------|-----------------|----|---|--------|
| N°10  | 32  | 3.90           | 11.50          | 6               | 54 | 3 | 303381 |
| 1/4"  | 28  | 5.20           | 14.00          | 6               | 54 | 3 | 303382 |
| 5/16" | 24  | 5.95           | 17.40          | 6               | 54 | 3 | 303383 |
| 3/8"  | 24  | 7.95           | 20.60          | 8               | 64 | 4 | 303384 |
| 7/16" | 20  | 7.95           | 24.70          | 8               | 64 | 4 | 303385 |
| 1/2"  | 20  | 9.95           | 27.30          | 10              | 74 | 4 | 303386 |



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GEWINDEFÄHRER, GERADE GENUTET



- BSP Gewindefräser gerade Genutet, Werkzeuge für die allgemeine Bearbeitung. Durch das Vollprofil keine Gratbildung.
- Gewinde nach der Norm ISO 228.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  |              |         | ⊙          | ⊙    |                         |    |       | ○                        | ○  |                  |    |                  |    |

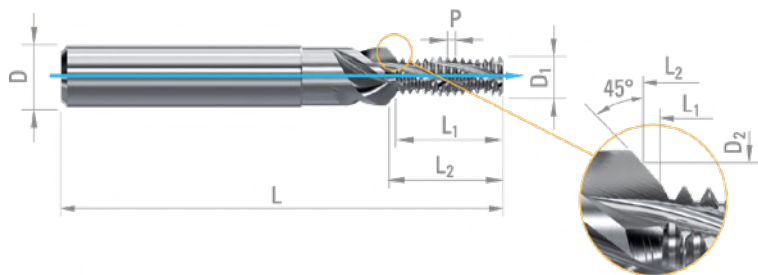
| BSP                           | TPI | D <sub>1</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | Z | VHM   |
|-------------------------------|-----|----------------|----------------|-----------------|----|---|-------|
| G1/16" – G1/8"                | 28  | 5.90           | 14.51          | 6               | 57 | 3 | 42603 |
| G1/4" – G3/8"                 | 19  | 7.90           | 18.71          | 8               | 63 | 4 | 42604 |
| G1/2" – G5/8" – G3/4" – G7/8" | 14  | 11.90          | 29.02          | 12              | 83 | 4 | 42605 |
| G1"                           | 11  | 15.90          | 34.63          | 16              | 92 | 4 | 42606 |

Für Innen- und Aussengewinde



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GEWINDEFÄRER MIT SENKSTUFE UND INNENKÜHLUNG



- Gewindefräser mit Senkstufe. Zentrale Innenkühlung verbessert den Abtransport der Späne. Durch das Vollprofil keine Gratbildung.
- Gewinde nach ISO 965 (DIN 13).
- Die CUTINOX-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |                                      |    | M    |      |          |                  | K  |                    |    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|--------------------------------------|----|------|------|----------|------------------|----|--------------------|----|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl | Aust. Rostfreier Stahl (DUPLEX / PH) |    |      |      | Grauguss | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12                                   | 13 | 14.1 | 14.2 | 14.3     | 14.4             | 15 | 16                 | 17 | 18 | 19 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○                | ○                                    | ○  | ○    | ○    | ○        | ○                | ⊙  | ⊙                  | ⊙  | ⊙  | ⊙  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      |                         | S  |       |                          |    |                  | H                |    |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|------------------|----|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl | Hartes Gusseisen |    |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39               | 40 | 41 |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            | ⊙    | ⊙                       | ○  | ○     | ○                        | ⊙  | ⊙                |                  |    |    |  |

| D nom.  | Steigung P | D <sub>1</sub> | D <sub>2</sub> | D <sub>h5</sub> | L   | Z | L <sub>1</sub> | L <sub>2</sub> | DIXI      | VHM    | CUTINOX |
|---------|------------|----------------|----------------|-----------------|-----|---|----------------|----------------|-----------|--------|---------|
| M 4.00  | 0.70       | 3.10           | 4.20           | 6               | 48  | 3 | 7.35           | 7.9            | 7915-1.5D | 392515 | 392532  |
|         |            |                |                |                 |     |   | 8.75           | 9.3            | 7915-2D   | 303387 | 303394  |
|         |            |                |                |                 |     |   | 10.85          | 11.4           | 7915-2.5D | 392524 | 392541  |
| M 5.00  | 0.80       | 3.90           | 5.30           | 6               | 54  | 3 | 9.15           | 9.9            | 7915-1.5D | 392516 | 392533  |
|         |            |                |                |                 |     |   | 10.75          | 11.5           | 7915-2D   | 303388 | 303395  |
|         |            |                |                |                 |     |   | 13.15          | 13.9           | 7915-2.5D | 392525 | 392542  |
| M 6.00  | 1.00       | 4.70           | 6.30           | 8               | 62  | 3 | 10.50          | 11.30          | 7915-1.5D | 392517 | 392534  |
|         |            |                |                |                 |     |   | 13.50          | 14.3           | 7915-2D   | 303389 | 303396  |
|         |            |                |                |                 |     |   | 16.50          | 17.3           | 7915-2.5D | 392526 | 392543  |
| M 8.00  | 1.25       | 6.40           | 8.40           | 10              | 74  | 3 | 13.10          | 14.1           | 7915-1.5D | 392518 | 392535  |
|         |            |                |                |                 |     |   | 18.10          | 19.1           | 7915-2D   | 303390 | 303397  |
|         |            |                |                |                 |     |   | 21.85          | 22.8           | 7915-2.5D | 392527 | 392544  |
| M 10.00 | 1.50       | 8.10           | 10.50          | 12              | 80  | 4 | 17.20          | 18.4           | 7915-1.5D | 392519 | 392536  |
|         |            |                |                |                 |     |   | 21.70          | 22.9           | 7915-2D   | 303391 | 303398  |
|         |            |                |                |                 |     |   | 26.20          | 27.4           | 7915-2.5D | 392528 | 392545  |
| M 12.00 | 1.75       | 9.95           | 12.60          | 14              | 90  | 4 | 20.05          | 21.5           | 7915-1.5D | 392520 | 392537  |
|         |            |                |                |                 |     |   | 25.30          | 26.7           | 7915-2D   | 303392 | 303399  |
|         |            |                |                |                 |     |   | 32.30          | 33.7           | 7915-2.5D | 392529 | 392546  |
| M 14.00 | 2.00       | 11.50          | 14.70          | 16              | 102 | 4 | 24.95          | 26.5           | 7915-1.5D | 392521 | 392538  |
|         |            |                |                |                 |     |   | 30.95          | 32.5           | 7915-2D   | 392523 | 392540  |
|         |            |                |                |                 |     |   | 36.95          | 38.5           | 7915-2.5D | 392530 | 392547  |
| M 16.00 | 2.00       | 13.40          | 16.80          | 18              | 102 | 4 | 26.95          | 28.6           | 7915-1.5D | 392522 | 392539  |
|         |            |                |                |                 |     |   | 34.95          | 36.6           | 7915-2D   | 303393 | 303400  |
|         |            |                |                |                 |     |   | 42.95          | 44.6           | 7915-2.5D | 392531 | 392548  |

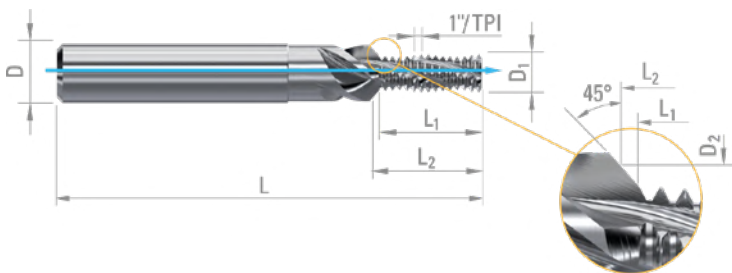
# DIXI 7925-xD-TC

Z=3-4



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## GEWINDEFÄHRER MIT SENKSTUFE UND INNENKÜHLUNG



- Gewindefräser mit Senkstufe. Zentrale Innenkühlung verbessert den Abtransport der Späne. Durch das Vollprofil keine Gratbildung.
- Gewinde nach ISO 5864 (ASME B1.1).
- Die CUTINOX-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |    | M                |      |      |                                    | K    |    |    |          |    |                  |    |                    |  |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|----|------------------|------|------|------------------------------------|------|----|----|----------|----|------------------|----|--------------------|--|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    |    | Rostfreier Stahl |      |      | Aust. Rostfreier Stahl (DUPLEX/PH) |      |    |    | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |  |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12 | 13               | 14.1 | 14.2 | 14.3                               | 14.4 | 15 | 16 | 17       | 18 | 19               | 20 |                    |  |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○  | ○  | ○                | ○    | ○    | ○                                  | ○    | ⊙  | ⊙  | ⊙        | ⊙  | ⊙                | ⊙  |                    |  |

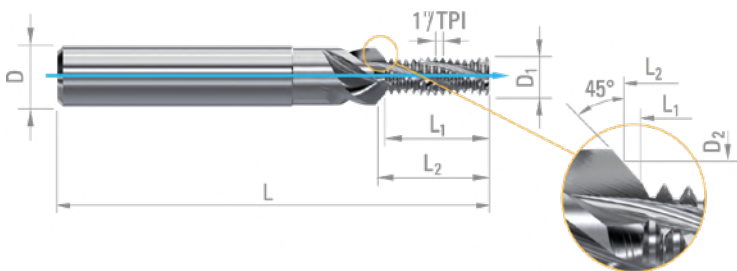
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |    |                          | H  |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|----|--------------------------|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       |    | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36 | 37                       | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ⊙          | ⊙    | ○                       | ○  | ○     | ⊙  | ⊙                        |    |                  |    |                  |  |

| UNC   | TPI | D <sub>1</sub> | D <sub>2</sub> | D <sub>h5</sub> | L   | Z | L <sub>1</sub> | L <sub>2</sub> | DIXI      | VHM    | CUTINOX |
|-------|-----|----------------|----------------|-----------------|-----|---|----------------|----------------|-----------|--------|---------|
| N°8   | 32  | 3.10           | 4.40           | 6               | 48  | 3 | 7.50           | 8.10           | 7925-1.5D | 394340 | 394359  |
|       |     |                |                |                 |     |   | 9.10           | 9.70           | 7925-2D   | 303401 | 303411  |
| N°10  | 24  | 3.60           | 5.10           | 6               | 54  | 3 | 10.00          | 10.80          | 7925-1.5D | 394341 | 394360  |
|       |     |                |                |                 |     |   | 11.00          | 11.90          | 7925-2D   | 303402 | 303412  |
|       |     |                |                |                 |     |   | 13.20          | 14.00          | 7925-2.5D | 394350 | 394369  |
| N°12  | 24  | 4.10           | 5.80           | 6               | 54  | 3 | 10.00          | 10.90          | 7925-1.5D | 394342 | 394361  |
|       |     |                |                |                 |     |   | 12.10          | 13.00          | 7925-2D   | 303403 | 303413  |
|       |     |                |                |                 |     |   | 14.25          | 15.10          | 7925-2.5D | 394351 | 394370  |
| 1/4"  | 20  | 4.80           | 6.70           | 8               | 62  | 3 | 12.00          | 13.00          | 7925-1.5D | 394343 | 394362  |
|       |     |                |                |                 |     |   | 14.50          | 15.60          | 7925-2D   | 303404 | 303414  |
|       |     |                |                |                 |     |   | 17.10          | 18.10          | 7925-2.5D | 394352 | 394371  |
| 5/16" | 18  | 5.95           | 8.30           | 10              | 74  | 3 | 14.75          | 15.90          | 7925-1.5D | 394344 | 394363  |
|       |     |                |                |                 |     |   | 17.60          | 18.70          | 7925-2D   | 303405 | 303415  |
|       |     |                |                |                 |     |   | 20.40          | 21.50          | 7925-2.5D | 394353 | 394372  |
| 3/8"  | 16  | 7.50           | 10.00          | 12              | 80  | 4 | 16.60          | 17.90          | 7925-1.5D | 394345 | 394364  |
|       |     |                |                |                 |     |   | 21.40          | 22.60          | 7925-2D   | 303406 | 303416  |
|       |     |                |                |                 |     |   | 24.55          | 25.80          | 7925-2.5D | 394354 | 394373  |
| 7/16" | 14  | 8.80           | 11.70          | 12              | 80  | 4 | 19.00          | 20.40          | 7925-1.5D | 394346 | 394365  |
|       |     |                |                |                 |     |   | 24.40          | 25.90          | 7925-2D   | 303407 | 303417  |
|       |     |                |                |                 |     |   | 28.05          | 29.50          | 7925-2.5D | 394355 | 394374  |
| 1/2"  | 13  | 10.30          | 13.30          | 14              | 90  | 4 | 22.40          | 23.90          | 7925-1.5D | 394347 | 394366  |
|       |     |                |                |                 |     |   | 28.20          | 29.80          | 7925-2D   | 303408 | 303418  |
|       |     |                |                |                 |     |   | 32.20          | 33.70          | 7925-2.5D | 394356 | 394375  |
| 9/16" | 12  | 10.80          | 15.00          | 16              | 102 | 4 | 24.25          | 26.00          | 7925-1.5D | 394348 | 394367  |
|       |     |                |                |                 |     |   | 30.60          | 32.30          | 7925-2D   | 303409 | 303419  |
|       |     |                |                |                 |     |   | 37.00          | 38.70          | 7925-2.5D | 394357 | 394376  |
| 5/8"  | 11  | 11.90          | 16.70          | 18              | 102 | 4 | 26.50          | 28.30          | 7925-1.5D | 394349 | 394368  |
|       |     |                |                |                 |     |   | 35.70          | 37.60          | 7925-2D   | 303410 | 303420  |
|       |     |                |                |                 |     |   | 40.35          | 42.20          | 7925-2.5D | 394358 | 394377  |



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GEWINDEFÄHRER MIT SENKSTUFE UND INNENKÜHLUNG



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- Gewinde nach ISO 5864 (ASME B1.1).
- Die CUTINOX-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |                                     |    | M    |      |          |                  | K  |                    |    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|-------------------------------------|----|------|------|----------|------------------|----|--------------------|----|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl | Aust. Rostfreier Stahl (DUPLEX /PH) |    |      |      | Grauguss | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12                                  | 13 | 14.1 | 14.2 | 14.3     | 14.4             | 15 | 16                 | 17 | 18 | 19 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ○                 | ○ | ○ | ○ | ○              | ○                | ○                                   | ○  | ○    | ○    | ○        | ○                | ⊙  | ⊙                  | ⊙  | ⊙  | ⊙  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      |                         | S  |       |                          |    |                  | H                |    |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|------------------|----|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl | Hartes Gusseisen |    |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39               | 40 | 41 |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            | ⊙    | ⊙                       | ○  | ○     | ○                        | ⊙  | ⊙                |                  |    |    |  |

| UNF   | TPI | D <sub>1</sub> | D <sub>2</sub> | D <sub>h5</sub> | L   | Z | L <sub>1</sub> | L <sub>2</sub> | DIXI      | VHM    | CUTINOX |
|-------|-----|----------------|----------------|-----------------|-----|---|----------------|----------------|-----------|--------|---------|
| N°10  | 32  | 3.60           | 5.10           | 6               | 54  | 3 | 8.30           | 9.00           | 7935-1.5D | 392576 | 392603  |
|       |     |                |                |                 |     |   | 10.70          | 11.30          | 7935-2D   | 392585 | 392612  |
|       |     |                |                |                 |     |   | 12.30          | 12.90          | 7935-2.5D | 392594 | 392621  |
| N°12  | 28  | 4.10           | 5.80           | 6               | 54  | 3 | 9.50           | 10.30          | 7935-1.5D | 392577 | 392604  |
|       |     |                |                |                 |     |   | 12.20          | 13.00          | 7935-2D   | 392586 | 392613  |
|       |     |                |                |                 |     |   | 14.00          | 14.80          | 7935-2.5D | 392595 | 392622  |
| 1/4"  | 28  | 4.80           | 6.70           | 8               | 62  | 3 | 11.30          | 12.10          | 7935-1.5D | 392578 | 392605  |
|       |     |                |                |                 |     |   | 14.05          | 14.80          | 7935-2D   | 392587 | 392614  |
|       |     |                |                |                 |     |   | 16.75          | 17.60          | 7935-2.5D | 392596 | 392623  |
| 5/16" | 24  | 5.95           | 8.30           | 10              | 74  | 3 | 13.20          | 14.10          | 7935-1.5D | 392579 | 392606  |
|       |     |                |                |                 |     |   | 17.40          | 18.30          | 7935-2D   | 392588 | 392615  |
|       |     |                |                |                 |     |   | 20.60          | 21.50          | 7935-2.5D | 392597 | 392624  |
| 3/8"  | 24  | 7.95           | 10.00          | 12              | 80  | 4 | 16.35          | 17.40          | 7935-1.5D | 392580 | 392607  |
|       |     |                |                |                 |     |   | 20.60          | 21.60          | 7935-2D   | 392589 | 392616  |
|       |     |                |                |                 |     |   | 24.85          | 25.80          | 7935-2.5D | 392598 | 392625  |
| 7/16" | 20  | 9.40           | 11.70          | 12              | 80  | 4 | 18.35          | 19.60          | 7935-1.5D | 392581 | 392608  |
|       |     |                |                |                 |     |   | 24.70          | 25.90          | 7935-2D   | 392590 | 392617  |
|       |     |                |                |                 |     |   | 28.55          | 29.70          | 7935-2.5D | 392599 | 392626  |
| 1/2"  | 20  | 10.90          | 13.30          | 14              | 90  | 4 | 20.90          | 22.10          | 7935-1.5D | 392582 | 392609  |
|       |     |                |                |                 |     |   | 27.25          | 28.50          | 7935-2D   | 392591 | 392618  |
|       |     |                |                |                 |     |   | 32.35          | 33.50          | 7935-2.5D | 392600 | 392627  |
| 9/16" | 18  | 10.80          | 15.00          | 16              | 102 | 4 | 23.25          | 24.60          | 7935-1.5D | 392583 | 392610  |
|       |     |                |                |                 |     |   | 30.30          | 31.60          | 7935-2D   | 392592 | 392619  |
|       |     |                |                |                 |     |   | 35.95          | 37.50          | 7935-2.5D | 392601 | 392628  |
| 5/8"  | 18  | 12.00          | 16.70          | 18              | 102 | 4 | 26.05          | 27.50          | 7935-1.5D | 392584 | 392611  |
|       |     |                |                |                 |     |   | 33.10          | 34.50          | 7935-2D   | 392593 | 392620  |
|       |     |                |                |                 |     |   | 40.15          | 41.60          | 7935-2.5D | 392602 | 392629  |

# DIXI 7985-HH

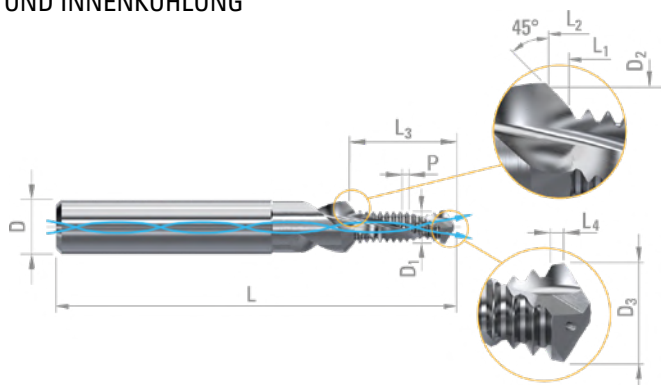
Z=2

$L_1 = 2 \times \varnothing \text{ nom.}$



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## BOHRGEWINDEFÄHRER MIT SENKSTUFE UND INNENKÜHLUNG



- Bohrgewindefräser mit Senkstufe. Zentrale Innenkühlung verbessert den Abtransport der Späne. Durch das Vollprofil keine Gratbildung.
- Gewinde nach ISO 965 (DIN 13).
- Die CUTINOX-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Werkstoffen.

○ gut    ⊙ ausgezeichnet

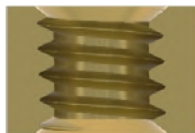
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                    |      |          | K  |                  |    |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX/PH) |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                               | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |                  |    |    |      |                                    |      |          | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            | ⊙    | ⊙                       |    |       |                          |    |                  |    |                  |    |  |

| D nom. | Steigung |                |                |                |                |                |                |                |                 |     |        | VHM    | CUTINOX |
|--------|----------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----|--------|--------|---------|
|        | P        | D <sub>1</sub> | D <sub>2</sub> | D <sub>3</sub> | L <sub>1</sub> | L <sub>2</sub> | L <sub>3</sub> | L <sub>4</sub> | D <sub>h5</sub> | L   |        |        |         |
| M 4    | 0.70     | 3.20           | 4.20           | 3.30           | 8.90           | 8.90           | 9.50           | 0.70           | 6               | 48  | 303421 | 303428 |         |
| M 5    | 0.80     | 4.00           | 5.30           | 4.20           | 11.10          | 11.00          | 11.80          | 0.80           | 6               | 54  | 303422 | 303429 |         |
| M 6    | 1.00     | 4.75           | 6.30           | 5.00           | 13.85          | 13.70          | 14.60          | 1.00           | 8               | 62  | 303423 | 303430 |         |
| M 8    | 1.25     | 6.35           | 8.40           | 6.75           | 18.60          | 18.40          | 19.60          | 1.30           | 10              | 74  | 303424 | 303431 |         |
| M 10   | 1.50     | 7.95           | 10.50          | 8.50           | 22.40          | 22.20          | 23.70          | 1.50           | 12              | 80  | 303425 | 303432 |         |
| M 12   | 1.75     | 9.95           | 12.60          | 10.25          | 26.00          | 25.50          | 27.40          | 1.50           | 14              | 90  | 303426 | 303433 |         |
| M 16   | 2.00     | 13.20          | 16.80          | 14.00          | 35.90          | 35.10          | 37.60          | 1.50           | 18              | 102 | 303427 | 303434 |         |

- Hochpräzisions-Gewindelehren, zur Überprüfung des Flankendurchmessers von 3G-Gewinden nach NIHS 06-10 (ISO 1501 / DIN 14).
- Toleranzen nach NIHS 06-12.

## Rechtsgewinde



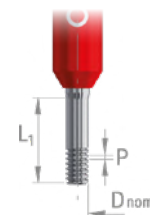
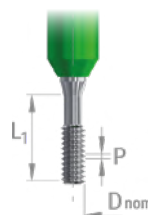
| D nom. | Steigung P | L <sub>1</sub> | Tol.     | 1718-S<br>GO     | 1718-S<br>GO<br>(flachen Boden) | Tol.  | 1719-S<br>NO GO |
|--------|------------|----------------|----------|------------------|---------------------------------|-------|-----------------|
| S 0.30 | 0.08       | 1.00           | 4H<br>3G | 965295<br>983114 | 978958<br>414460                | 4H/3G | 965312          |
| S 0.35 | 0.09       | 1.30           | 4H<br>3G | 965296<br>983468 | 978959<br>414461                | 4H/3G | 965313          |
| S 0.40 | 0.10       | 2.00           | 4H<br>3G | 965297<br>983115 | 978960<br>414462                | 4H/3G | 965314          |
| S 0.50 | 0.125      | 2.50           | 4H<br>3G | 965298<br>983116 | 978961<br>414463                | 4H/3G | 965315          |
| S 0.60 | 0.15       | 3.00           | 4H<br>3G | 965299<br>983117 | 978962<br>414464                | 4H/3G | 965316          |
| S 0.70 | 0.175      | 3.00           | 4H<br>3G | 965300<br>983236 | 978963<br>414465                | 4H/3G | 965317          |
| S 0.80 | 0.20       | 3.50           | 4H<br>3G | 965301<br>983118 | 978964<br>414466                | 4H/3G | 965318          |
| S 0.90 | 0.225      | 4.00           | 4H<br>3G | 965302<br>983119 | 978965<br>414467                | 4H/3G | 965319          |
| S 1.00 | 0.25       | 4.00           | 4H<br>3G | 965303<br>983120 | 978966<br>414468                | 4H/3G | 965320          |
| S 1.20 | 0.25       | 5.00           | 4H<br>3G | 965304<br>983121 | 978967<br>414469                | 4H/3G | 965321          |
| S 1.40 | 0.30       | 5.00           | 4H<br>3G | 965305<br>983122 | 978968<br>414470                | 4H/3G | 965322          |

## Linksgewinde



| D nom. | Steigung P | L <sub>1</sub> | Tol. | 1718-S L<br>GO | Tol.  | 1719-S L<br>NO GO |
|--------|------------|----------------|------|----------------|-------|-------------------|
| S 0.50 | 0.125      | 2.50           | 4H   | 968369         | 4H/3G | 968370            |
| S 0.60 | 0.15       | 3.00           | 4H   | 968345         | 4H/3G | 968346            |
| S 0.70 | 0.175      | 3.00           | 4H   | 968344         | 4H/3G | 968347            |
| S 0.80 | 0.20       | 3.50           | 4H   | 968343         | 4H/3G | 968348            |
| S 0.90 | 0.225      | 4.00           | 4H   | 968925         | 4H/3G | 968926            |
| S 1.00 | 0.25       | 4.00           | 4H   | 969395         | 4H/3G | 969396            |
| S 1.20 | 0.25       | 5.00           | 4H   | 982638         | 4H/3G | 982639            |

- Hochpräzisions-Gewindelehren, zur Prüfung des Flankendurchmessers von Gewinden nach ISO 965 (DIN 13).
- Toleranzen nach ISO 1502.



| D nom. | Steigung P | L <sub>1</sub> | Tol. | 1718-M<br>GO | 1719-M<br>NO GO |
|--------|------------|----------------|------|--------------|-----------------|
| M 1.00 | 0.25       | 5              | 5H   | 976633       | 976635          |
| M 1.20 | 0.20       | 5              | 4H   | 305894       | 305900          |
|        | 0.25       | 5              | 5H   | 976634       | 976636          |
| M 1.40 | 0.20       | 5              | 4H   | 305895       | 305901          |
|        | 0.30       | 6              | 5H   | 976693       | 976710          |
| M 1.50 | 0.30       | 6              | 6H   | 976694       | 976711          |
| M 1.60 | 0.20       | 5              | 4H   | 305896       | 305902          |
|        | 0.35       | 6              | 6H   | 975716       | 975717          |
| M 1.80 | 0.20       | 5              | 4H   | 305897       | 305903          |
|        | 0.35       | 6              | 6H   | 976024       | 976026          |
| M 2.00 | 0.20       | 5              | 4H   | 305898       | 305904          |
|        | 0.40       | 6              | 6H   | 976699       | 976716          |
| M 2.20 | 0.20       | 5              | 4H   | 305899       | 305905          |
|        | 0.25       | 5              | 5H   | 976701       | 976718          |
|        | 0.45       | 8              | 6H   | 976702       | 976719          |
| M 3.00 | 0.50       | 8              | 6H   | 976705       | 976722          |

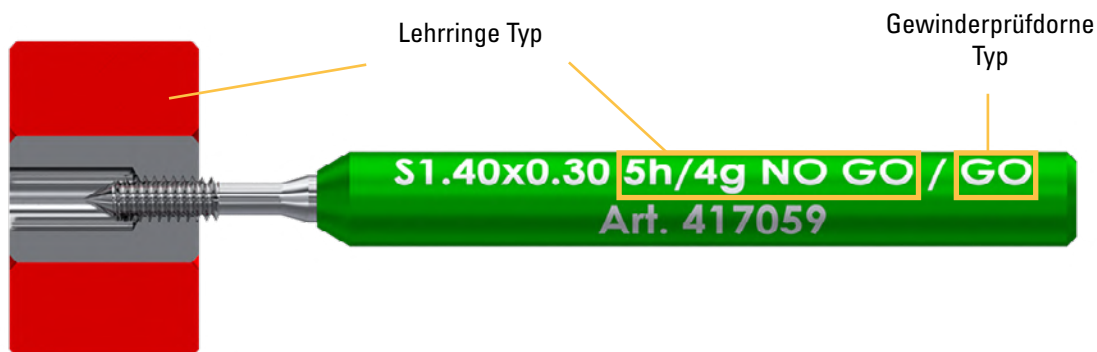


- VHM Gewindeprüfdorne, zur Überprüfung von Lehring für Aussengewinde nach NIHS 06-10 (ISO 1501 / DIN 14).
- Toleranzen nach NIHS 06-12.

| D nom. | Steigung<br>P | L <sub>1</sub> | Lehrringe<br>5h GO |        | Lehrringe<br>4g GO |        | Lehrringe<br>5h/4g NO GO |        |
|--------|---------------|----------------|--------------------|--------|--------------------|--------|--------------------------|--------|
|        |               |                | GO                 | NO GO  | GO                 | NO GO  | GO                       | NO GO  |
| S 0.30 | 0.08          | 1.00           | 417005             | 417016 | 417027             | 417038 | 417049                   | 417060 |
| S 0.35 | 0.09          | 1.30           | 417006             | 417017 | 417028             | 417039 | 417050                   | 417061 |
| S 0.40 | 0.10          | 2.00           | 417007             | 417018 | 417029             | 417040 | 417051                   | 417062 |
| S 0.50 | 0.125         | 2.50           | 417008             | 417019 | 417030             | 417041 | 417052                   | 417063 |
| S 0.60 | 0.15          | 3.00           | 417009             | 417020 | 417031             | 417042 | 417053                   | 417064 |
| S 0.70 | 0.175         | 3.00           | 417010             | 417021 | 417032             | 417043 | 417054                   | 417065 |
| S 0.80 | 0.20          | 3.50           | 417011             | 417022 | 417033             | 417044 | 417055                   | 417066 |
| S 0.90 | 0.225         | 4.00           | 417012             | 417023 | 417034             | 417045 | 417056                   | 417067 |
| S 1.00 | 0.25          | 4.00           | 417013             | 417024 | 417035             | 417046 | 417057                   | 417068 |
| S 1.20 | 0.25          | 5.00           | 417014             | 417025 | 417036             | 417047 | 417058                   | 417069 |
| S 1.40 | 0.30          | 5.00           | 417015             | 417026 | 417037             | 417048 | 417059                   | 417070 |



BEZEICHNUNG DER GEWINDEPRÜFDORNE



Quelle: NIHS 06-12

LEHRDORNE "GO" - "NO GO"  
FÜR DIE DURCHMESSERKONTROLLE  
VON INNENGEWINDE



**0418**  
**GO**

**0419**  
**NO GO**

| D nom. | Steigung<br>P | L <sub>1</sub> | Tol.     | 0418<br>GO       | Tol.     | 0419<br>NO GO    |
|--------|---------------|----------------|----------|------------------|----------|------------------|
| S 0.30 | 0.08          | 2.00           | 5H       | 308301           | 5H       | 308307           |
| S 0.35 | 0.09          | 2.00           | 5H       | 308300           | 5H       | 308306           |
| S 0.40 | 0.10          | 3.50           | 5H/6H    | 308299           | 5H<br>6H | 308305<br>308310 |
| S 0.50 | 0.125         | 3.50           | 5H/6H    | 308298           | 5H<br>6H | 308304<br>308309 |
| S 0.60 | 0.15          | 3.50           | 5H<br>6H | 308297<br>411747 | 5H<br>6H | 308302<br>308308 |
| S 0.70 | 0.175         | 5.00           | 5H<br>6H | 306719<br>411748 | 5H<br>6H | 306818<br>306824 |
| S 0.80 | 0.20          | 5.00           | 5H<br>6H | 306813<br>411749 | 5H<br>6H | 306819<br>306825 |
| S 0.90 | 0.225         | 5.00           | 5H/6H    | 306814           | 5H<br>6H | 306820<br>306826 |
| S 1.00 | 0.25          | 5.00           | 5H/6H    | 306815           | 5H<br>6H | 306821<br>306827 |
| S 1.20 | 0.25          | 5.00           | 5H/6H    | 306816           | 5H<br>6H | 306822<br>306828 |
| S 1.40 | 0.30          | 5.00           | 5H/6H    | 306817           | 5H<br>6H | 306823<br>306829 |

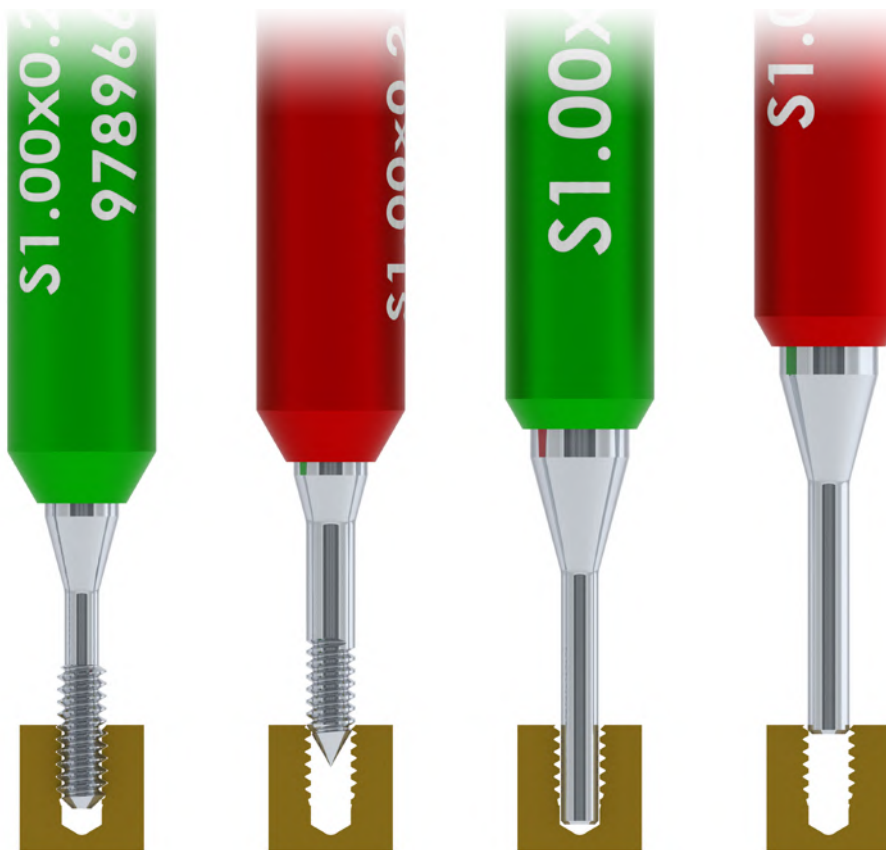


| Inhalt   | Art.   | Inhalt   | Art.   | Inhalt  | Art.   |
|--|--------|--|--------|---|--------|
| <b>DIXI 1718-S 4H GO</b><br>(S0.30-S1.40)<br><b>DIXI 1719-S 4H/3G NO GO</b><br>(S0.30-S1.40) | 305989 | <b>DIXI 1718-S 3G GO</b><br>(S0.30-S1.40)<br><b>DIXI 1719-S 4H/3G NO GO</b><br>(S0.30-S1.40) | 305990 | <b>DIXI 1718-S 4H GO</b><br>(S0.30-S1.40)<br><b>DIXI 1718-S 3G GO</b><br>(S0.30-S1.40)<br><b>DIXI 1719-S 4H/3G NO GO</b><br>(S0.30-S1.40) | 305991 |
| Leerer Kasten (NIHS 4H)  | 307437 | Leerer Kasten (NIHS 3G)  | 307438 | Leerer Kasten (NIHS 4H & 3G)  | 307439 |

## SATZ GEWINDELEHREN UND LEHRDORNE FÜR EINE VOLLSTÄNDIGE NIHS GEWINDEKONTROLLE

| Inhalt  | Art.   |
|---|--------|
| <b>DIXI 1718-S 4H GO</b><br>(S0.30-S1.40)<br><b>DIXI 1718-S 3G GO</b><br>(S0.30-S1.40)<br><b>DIXI 1719-S 4H/3G NO GO</b><br>(S0.30-S1.40) | 308313 |
| <b>DIXI 0418-5H/6H GO</b><br>(S0.30-S1.40)<br><b>DIXI 0419-5H NO GO</b><br>(S0.30-S1.40)<br><b>DIXI 0419-6H NO GO</b><br>(S0.40-S1.40)    |        |
| Leerer Kasten   | 312619 |





**Bild 1**  
**DIXI 1718**

**Bild 2**  
**DIXI 1719**

**Bild 3**  
**DIXI 0418**

**Bild 4**  
**DIXI 0419**

Die Gewindeüberprüfung muss mit Gewindelehren und Lehrdornen durchgeführt werden. Jede Lehre hat seine eigene Funktion, Gebrauchsmethode und Interpretation.

**Bild 1: Gewindelehre GO (DIXI 1718)**

Eine **GO** Gewindelehre überprüft die minimale Flankendurchmessergrenze, einschliesslich des Steigungsfehlers, der Flankenneigung, und der Formabweichung welche sichtbare Verkleinerungen des Flankendurchmessers erzeugen. Ausserdem prüft sie die minimale Ausserdurchmessergrenze des Gewindes und überprüft ob die Flanke ausreichend ist, welches zutrifft wenn die Rundung des Gewindegrundes das Flankenprofil nicht zu sehr überschneidet. Die **GO** Gewindelehre muss in der Lage sein, ohne grossen Kraftaufwand, sich auf die ganze Länge des Gewindes einschrauben zu lassen. Ist dies nicht der Fall, entspricht das Gewinde den Anforderungen nicht. Der Verschleiss der **GO** Gewindelehren muss je nach Verwendung innerhalb einem mehr oder weniger grossen Zeitraum kontrolliert werden. Wichtig: diese Gewindelehre kontrolliert nicht den Innendurchmesser des Gewindes.

**Bild 2: Gewindelehre NO GO (DIXI 1719)**

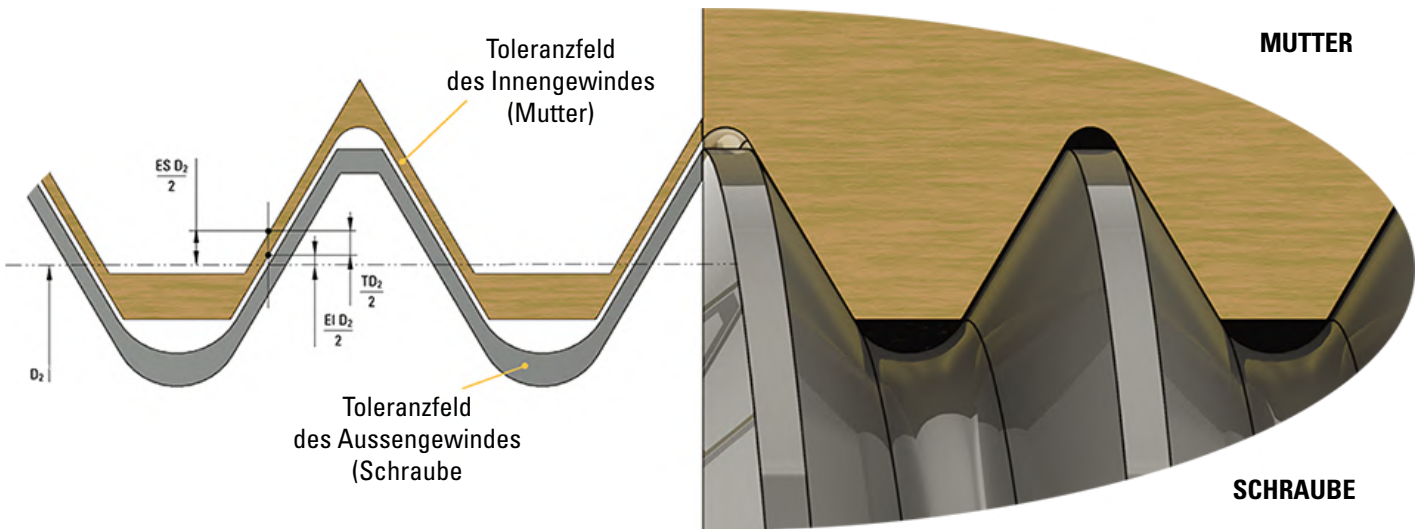
Eine **NO GO** Gewindelehre überprüft ob der Flankendurchmesser den angegebenen Maximalwert überschreitet. Die **NO GO** Gewindelehre sollte von Hand eingeschraubt werden und ohne grossen Kraftaufwand nicht mehr als 2 Gewindegänge erreichen. Falls sich die Gewindelehre weiter als 2 Gewindegänge einschrauben lässt, entspricht das Gewinde den Anforderungen nicht. Die **NO GO** Gewindelehre darf nicht durch ein Teil gedreht werden können, welches eine Dicke von 3 Umdrehungen oder weniger hat. Es ist empfohlen den Verschleiss der **NO GO** Gewindelehre zu überprüfen. Wichtig: diese Gewindelehre kontrolliert nicht den Innendurchmesser des Gewindes.

**Bild 3: Lehrdorn GO (DIXI 0418)**

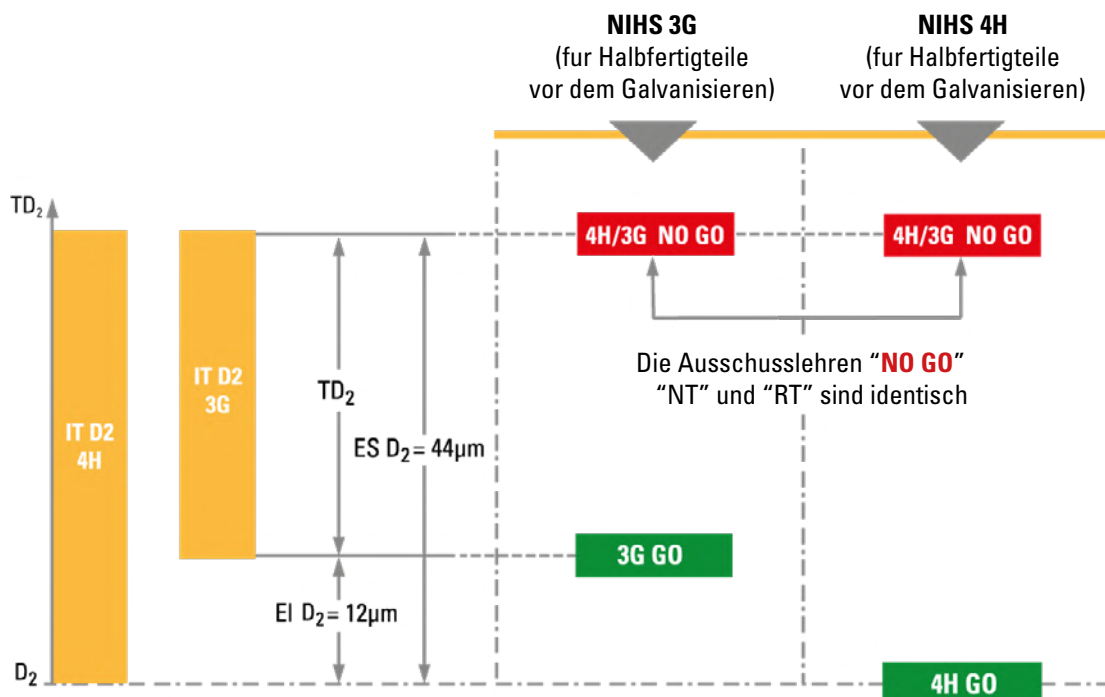
Der **GO** Lehrdorn überprüft den minimalen Grenzwert des Innendurchmessers des Gewindes (Kerndurchmesser). Von Hand eingedreht muss der **GO** Lehrdorn in der Lage sein, ohne en Kraftaufwand, durch das Gewinde hindurch zu gehen.

**Bild 4: Lehrdorn NO GO (DIXI 0419)**

Der **NO GO** Lehrdorn überprüft ob der Innendurchmesser (Kerndurchmesser) die maximal angegebene Dimension überschreitet. Der **NO GO** Lehrdorn kann an beiden Enden des Gewindes verwendet werden, jedoch nur in einer Zone welche sich über eine Steigung des Gewindeanfangs erstreckt.

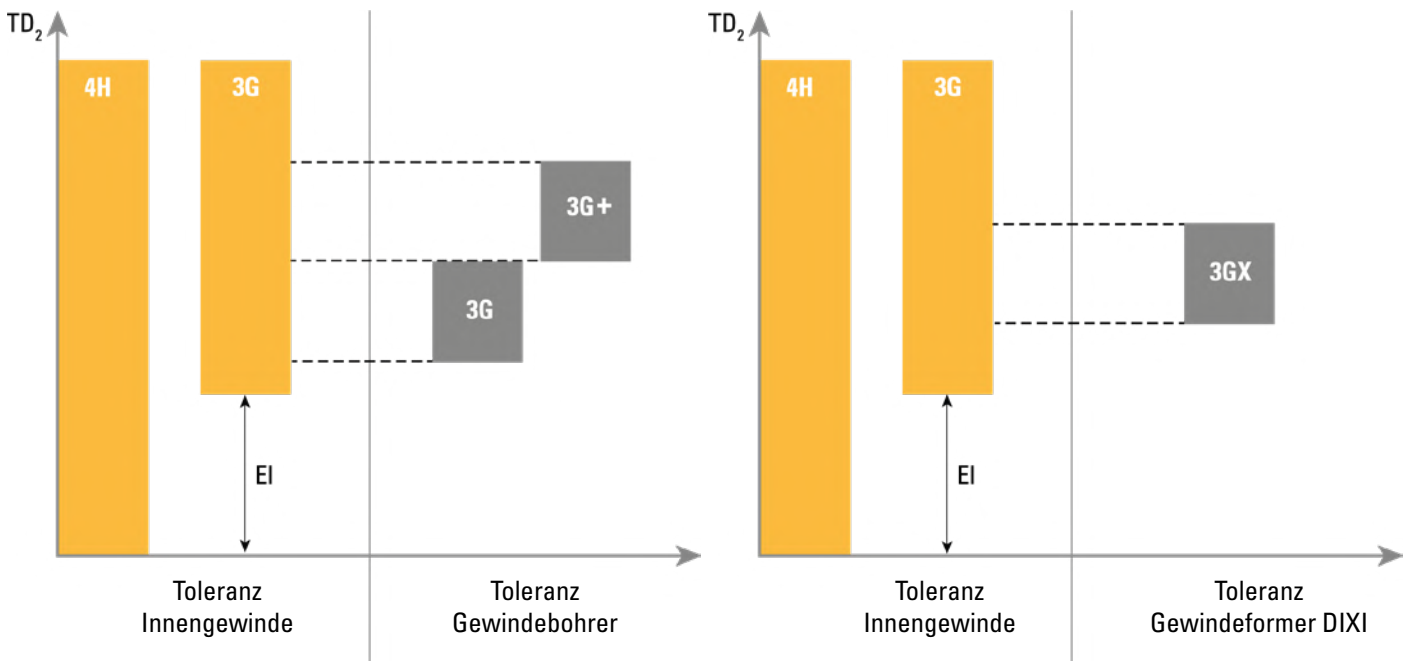


- $D_2$  Flankendurchmesser.
- Abstand  $EI D_2$  Kleinstspiel des Flankendurchmessers ( $D_2$ ).
- Abstand  $ES D_2$  Größtspiel des Flankendurchmessers ( $D_2$ ).
- Toleranz  $TD_2$  Toleranz des Flankendurchmessers ( $D_2$ ).  $TD_2 = ES D_2 - EI D_2$
- 4H **GO** -Lehren Sie werden zum Prüfen von S-Gewinden an fertigen Teilen (mit oder ohne galvanische Beschichtung oder Wärmebehandlung) in der Toleranz 4H nach NIHS 06-10 verwendet. Die NIHS 4H **GO**-Lehren ersetzen die bisherigen NIHS NT **GO**-Lehren.
- 3G **GO**-Lehren Sie werden zum Prüfen von S-Gewinden in Rohteilen (vor der galvanischen Beschichtung oder Wärmebehandlung) in der Toleranz 3G nach NIHS 06-10 verwendet. Die NIHS 3G **GO**-Lehren ersetzen die bisherigen NIHS RT **GO**-Lehren.
- NO GO**-Lehren Sie werden zur Prüfung von Rohteilen (im Herstellungsprozess) oder Fertigteilen (mit oder ohne galvanische Beschichtung oder Wärmebehandlung) verwendet. Die **NO GO**-Lehren sind identisch, egal ob in der 3G- oder 4H-Toleranz nach NIHS 06-10. Die NIHS 4H/3G **NO GO**-Lehren ersetzen die bisherigen NIHS NT/RT **NO GO**-Lehren.

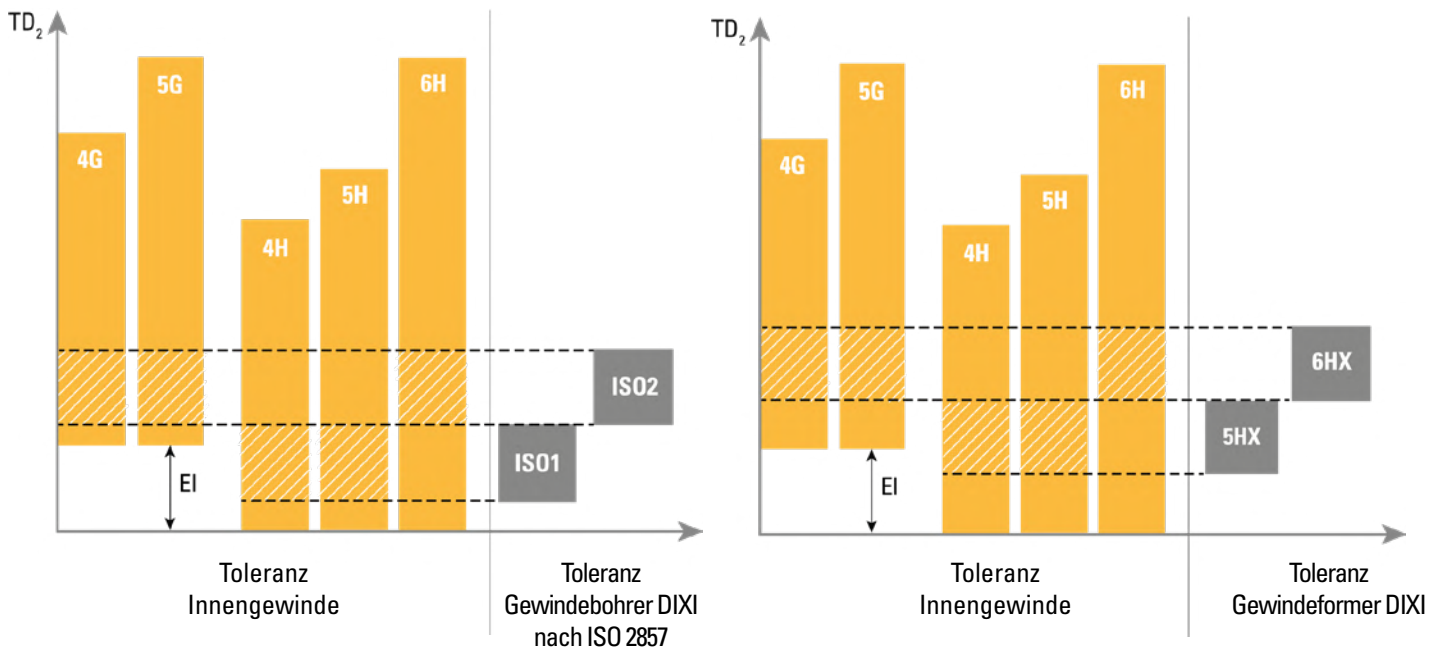


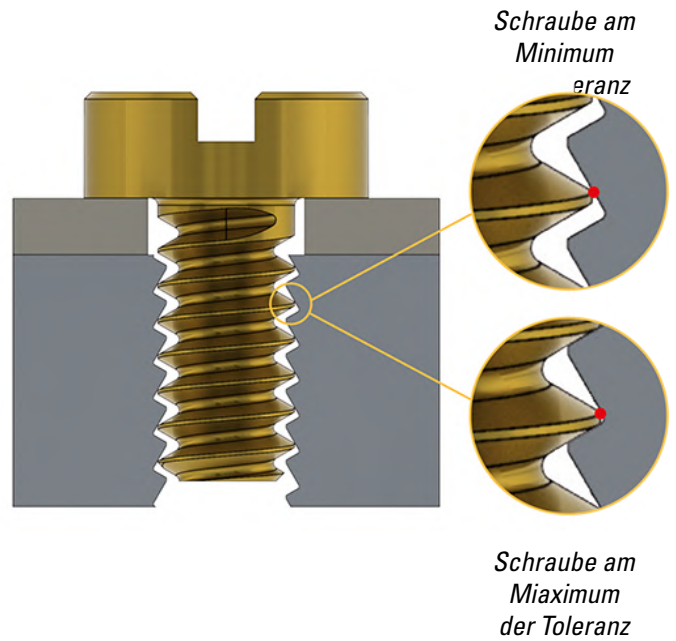
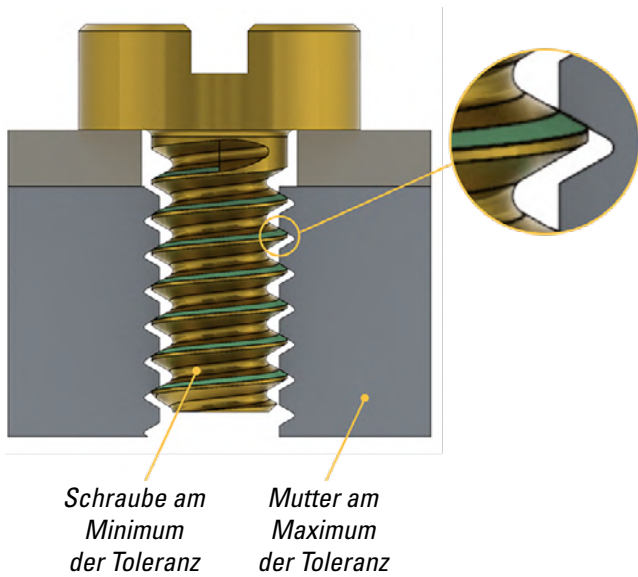
Lage der Ausschuss- und Gutlehren am Beispiel einer Gewindesteigung 0.25 mm

LAGE DER TOLERANZFELDER DES FLANKENDURCHMESSERS FÜR MINIATURGEWINDE S (ISO 1501 / NIHS 06-10 / DIN 14)



LAGE DER TOLERANZEN DER FLANKENDURCHMESSER FÜR METRISCHE INNENGEWINDE (ISO 965 / DIN 13)





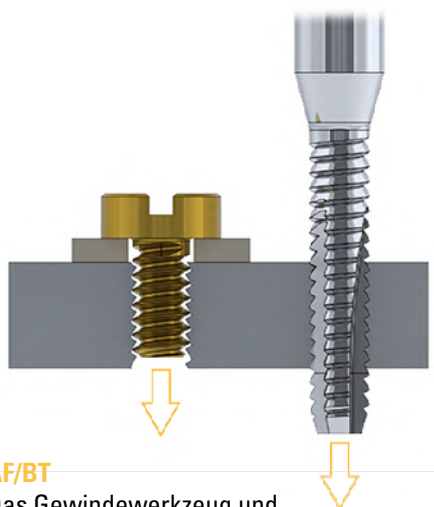
Aufgrund der Toleranzen kann bei einem S 1.00x0,25 Gewinde der freie Raum zwischen der Schraube und dem Innengewinde bis zu 0,05 mm betragen. Dieses Spiel erlaubt es der Schraube sich bei Vibrationen zu lösen. Dieses Phänomen wird dadurch verstärkt, daß die theoretische Kontaktfläche zwischen dem Innen- und Außengewinde klein ist. Um die Vibrationen und das Lösen des Gewindes zu vermeiden, kann ein Federring eingesetzt werden. Allerdings ist dies bei vielen Gewinden

nicht möglich. Mit einem selbstsichernden AF-Gewinde bleibt die Kontaktfläche gleich – egal ob sich die Schraube am unteren oder oberen Ende der Toleranz befindet. Die Fertigungstoleranzen haben keinen Einfluss auf die Stabilität der Gewindeverbindung.

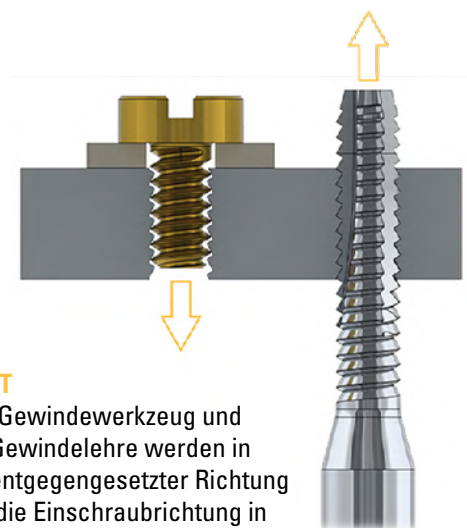
**Mit einem selbstsichernden AF-Gewinde wird kein Federring benötigt.**

## PROFILORIENTIERUNG – ARBEITSRICHTUNG

Das Profil eines AF-Gewindes ist nicht symmetrisch wie ein Standard ISO 60° Gewinde. Je nach Bohrrichtung in Z ändert sich die Profilorientierung.



Das Gewindewerkzeug und die Gewindelehre werden in die gleiche Richtung wie die Einschraubrichtung in das Material gebracht.  
**LAGERWERKZEUGE**



Das Gewindewerkzeug und die Gewindelehre werden in die entgegengesetzter Richtung wie die Einschraubrichtung in das Material gebracht.  
**SONDERWERKZEUGE**



**NIHS 06-10 (ISO 1501 / DIN 14)**

| Nominal Ø | Steigung | 5H Kern Ø |       |              | 6H Kern Ø |       |             |
|-----------|----------|-----------|-------|--------------|-----------|-------|-------------|
|           |          | Kern Ø    |       | Bohr. Ø      | Kern Ø    |       | Bohr. Ø     |
|           |          | min.      | max.  |              | min.      | max.  |             |
| S 0.30    | 0.08     | 0.223     | 0.240 | <b>0.23</b>  | -         | -     | -           |
| S 0.35    | 0.09     | 0.264     | 0.286 | <b>0.275</b> | -         | -     | -           |
| S 0.40    | 0.10     | 0.304     | 0.330 | <b>0.32</b>  | 0.304     | 0.342 | <b>0.34</b> |
| S 0.45    | 0.10     | 0.354     | 0.380 | <b>0.37</b>  | 0.354     | 0.392 | <b>0.39</b> |
| S 0.50    | 0.125    | 0.380     | 0.415 | <b>0.40</b>  | 0.380     | 0.435 | <b>0.42</b> |
| S 0.55    | 0.125    | 0.430     | 0.465 | <b>0.45</b>  | 0.430     | 0.485 | <b>0.47</b> |
| S 0.60    | 0.15     | 0.456     | 0.502 | <b>0.48</b>  | 0.456     | 0.522 | <b>0.50</b> |
| S 0.70    | 0.175    | 0.532     | 0.585 | <b>0.56</b>  | 0.532     | 0.605 | <b>0.58</b> |
| S 0.80    | 0.20     | 0.608     | 0.665 | <b>0.64</b>  | 0.608     | 0.685 | <b>0.66</b> |
| S 0.90    | 0.225    | 0.684     | 0.745 | <b>0.72</b>  | 0.684     | 0.765 | <b>0.74</b> |
| S 1.00    | 0.25     | 0.760     | 0.825 | <b>0.80</b>  | 0.760     | 0.845 | <b>0.82</b> |
| S 1.10    | 0.25     | 0.860     | 0.925 | <b>0.90</b>  | 0.860     | 0.945 | <b>0.92</b> |
| S 1.20    | 0.25     | 0.960     | 1.025 | <b>1.00</b>  | 0.960     | 1.045 | <b>1.02</b> |
| S 1.30    | 0.30     | 1.012     | 1.085 | <b>1.05</b>  | 1.012     | 1.105 | <b>1.07</b> |
| S 1.40    | 0.30     | 1.112     | 1.185 | <b>1.15</b>  | 1.112     | 1.205 | <b>1.17</b> |

**UN (ANSI B1.1 / ISO 5864)**

| Nominal Ø | TPI | Toleranz | Kern Ø |        | Bohr. Ø      |
|-----------|-----|----------|--------|--------|--------------|
|           |     |          | min.   | max.   |              |
| 5/16"     | 28  | 2B       | 6.955  | 7.169  | <b>7.10</b>  |
| 5/16'     | 20  | 2B       | 6.563  | 6.855  | <b>6.70</b>  |
| 3/8"      | 28  | 2B       | 8.543  | 8.756  | <b>8.60</b>  |
| 3/8"      | 20  | 2B       | 8.150  | 8.442  | <b>8.30</b>  |
| 7/16"     | 32  | 2B       | 10.253 | 10.441 | <b>10.30</b> |
| 7/16"     | 16  | 2B       | 9.394  | 9.752  | <b>9.60</b>  |
| 1/2"      | 32  | 2B       | 11.841 | 12.029 | <b>11.90</b> |
| 1/2"      | 16  | 2B       | 10.981 | 11.340 | <b>11.20</b> |
| 9/16"     | 32  | 2B       | 13.428 | 13.616 | <b>13.50</b> |
| 9/16"     | 28  | 2B       | 13.305 | 13.519 | <b>13.40</b> |
| 9/16"     | 20  | 2B       | 12.913 | 13.205 | <b>13.10</b> |
| 9/16"     | 16  | 2B       | 12.569 | 12.927 | <b>12.70</b> |
| 5/8"      | 32  | 2B       | 15.016 | 15.204 | <b>15.10</b> |
| 5/8"      | 28  | 2B       | 14.893 | 15.106 | <b>15.00</b> |
| 5/8"      | 20  | 2B       | 14.500 | 14.792 | <b>14.60</b> |
| 5/8"      | 16  | 2B       | 14.156 | 14.515 | <b>14.30</b> |
| 5/8"      | 12  | 2B       | 13.584 | 14.043 | <b>13.80</b> |
| 11/16"    | 32  | 2B       | 16.603 | 16.791 | <b>16.70</b> |
| 11/16"    | 28  | 2B       | 16.480 | 16.694 | <b>16.60</b> |
| 11/16"    | 20  | 2B       | 16.088 | 16.380 | <b>16.20</b> |
| 11/16"    | 16  | 2B       | 15.744 | 16.102 | <b>15.90</b> |
| 11/16"    | 12  | 2B       | 15.171 | 15.631 | <b>15.40</b> |
| 3/4"      | 32  | 2B       | 18.191 | 18.379 | <b>18.30</b> |
| 3/4"      | 28  | 2B       | 18.068 | 18.281 | <b>18.20</b> |
| 3/4"      | 12  | 2B       | 16.759 | 17.218 | <b>17.00</b> |
| 13/16"    | 32  | 2B       | 19.778 | 19.966 | <b>19.90</b> |
| 13/16"    | 28  | 2B       | 19.655 | 19.869 | <b>19.80</b> |
| 13/16"    | 16  | 2B       | 18.919 | 19.277 | <b>19.10</b> |
| 13/16"    | 12  | 2B       | 18.346 | 18.806 | <b>18.60</b> |
| 7/8"      | 32  | 2B       | 21.366 | 21.554 | <b>21.50</b> |
| 7/8"      | 28  | 2B       | 21.243 | 21.456 | <b>21.30</b> |
| 7/8"      | 16  | 2B       | 20.506 | 20.865 | <b>20.70</b> |
| 7/8"      | 12  | 2B       | 19.934 | 20.393 | <b>20.20</b> |
| 15/16"    | 32  | 2B       | 22.953 | 23.141 | <b>23.00</b> |
| 15/16"    | 28  | 2B       | 22.830 | 23.044 | <b>22.90</b> |
| 15/16"    | 16  | 2B       | 22.094 | 22.452 | <b>22.30</b> |
| 15/16"    | 12  | 2B       | 21.521 | 21.981 | <b>21.80</b> |
| 1"        | 32  | 2B       | 24.541 | 24.729 | <b>24.60</b> |
| 1"        | 28  | 2B       | 24.418 | 24.631 | <b>24.50</b> |
| 1"        | 16  | 2B       | 23.681 | 24.040 | <b>23.90</b> |
| 1 1/16"   | 28  | 2B       | 26.005 | 26.219 | <b>26.10</b> |
| 1 1/16"   | 20  | 2B       | 25.613 | 25.905 | <b>25.80</b> |
| 1 1/16"   | 18  | 2B       | 25.460 | 25.783 | <b>25.60</b> |
| 1 1/16"   | 16  | 2B       | 25.269 | 25.627 | <b>25.40</b> |
| 1 1/16"   | 12  | 2B       | 24.696 | 25.156 | <b>24.90</b> |

**UNF (ANSI B1.1 / ISO 5864)**

| Nominal Ø | TPI | Toleranz | Kern Ø |        | Bohr. Ø      |
|-----------|-----|----------|--------|--------|--------------|
|           |     |          | min.   | max.   |              |
| N°1       | 72  | 2B       | 1.474  | 1.612  | <b>1.50</b>  |
| N°2       | 64  | 2B       | 1.756  | 1.912  | <b>1.80</b>  |
| N°3       | 56  | 2B       | 2.025  | 2.198  | <b>2.10</b>  |
| N°4       | 48  | 2B       | 2.271  | 2.458  | <b>2.35</b>  |
| N°5       | 44  | 2B       | 2.551  | 2.740  | <b>2.60</b>  |
| N°6       | 40  | 2B       | 2.820  | 3.022  | <b>2.90</b>  |
| N°8       | 36  | 2B       | 3.404  | 3.606  | <b>3.50</b>  |
| N°10      | 32  | 2B       | 3.963  | 4.165  | <b>4.05</b>  |
| N°12      | 28  | 2B       | 4.496  | 4.724  | <b>4.60</b>  |
| 1/4"      | 28  | 2B       | 5.360  | 5.588  | <b>5.50</b>  |
| 5/16"     | 24  | 2B       | 6.782  | 7.035  | <b>6.90</b>  |
| 3/8"      | 24  | 2B       | 8.382  | 8.636  | <b>8.50</b>  |
| 7/16"     | 20  | 2B       | 9.729  | 10.033 | <b>9.80</b>  |
| 1/2"      | 20  | 2B       | 11.329 | 11.607 | <b>11.40</b> |
| 9/16"     | 18  | 2B       | 12.751 | 13.081 | <b>12.90</b> |
| 5/8"      | 18  | 2B       | 14.351 | 14.681 | <b>14.50</b> |
| 3/4"      | 16  | 2B       | 17.323 | 17.678 | <b>17.50</b> |
| 7/8"      | 14  | 2B       | 20.270 | 20.675 | <b>20.40</b> |





**ISO 965 (DIN 13)**

| Nominal Ø | TPI   | Toleranz | Kern Ø |        | Bohr. Ø      |
|-----------|-------|----------|--------|--------|--------------|
|           |       |          | min.   | max.   |              |
| M 0.8     | 0.20  | -        | 0.608  | 0.685  | <b>0.65</b>  |
| M 0.9     | 0.225 | -        | 0.684  | 0.765  | <b>0.70</b>  |
| M 1.0     | 0.25  | 5H       | 0.729  | 0.785  | <b>0.75</b>  |
| M 1.1     | 0.25  | 5H       | 0.829  | 0.885  | <b>0.85</b>  |
| M 1.2     | 0.25  | 5H       | 0.929  | 0.985  | <b>0.95</b>  |
| M 1.4     | 0.30  | 6H       | 1.075  | 1.142  | <b>1.10</b>  |
| M 1.6     | 0.35  | 6H       | 1.221  | 1.321  | <b>1.25</b>  |
| M 1.7     | 0.35  | 6H       | 1.321  | 1.421  | <b>1.35</b>  |
| M 1.8     | 0.35  | 6H       | 1.421  | 1.521  | <b>1.45</b>  |
| M 2.0     | 0.40  | 6H       | 1.567  | 1.679  | <b>1.60</b>  |
| M 2.2     | 0.45  | 6H       | 1.713  | 1.838  | <b>1.75</b>  |
| M 2.5     | 0.45  | 6H       | 2.031  | 2.138  | <b>2.05</b>  |
| M 3.0     | 0.50  | 6H       | 2.459  | 2.599  | <b>2.50</b>  |
| M 3.5     | 0.60  | 6H       | 2.850  | 3.010  | <b>2.90</b>  |
| M 4.0     | 0.70  | 6H       | 3.242  | 3.422  | <b>3.30</b>  |
| M 4.5     | 0.75  | 6H       | 3.688  | 3.878  | <b>3.70</b>  |
| M 5.0     | 0.80  | 6H       | 4.134  | 4.334  | <b>4.20</b>  |
| M 6.0     | 1.00  | 6H       | 4.917  | 5.153  | <b>5.00</b>  |
| M 7.0     | 1.00  | 6H       | 5.917  | 6.153  | <b>6.00</b>  |
| M 8.0     | 1.25  | 6H       | 6.647  | 6.912  | <b>6.80</b>  |
| M 9.0     | 1.25  | 6H       | 7.647  | 7.912  | <b>7.80</b>  |
| M 10.0    | 1.50  | 6H       | 8.376  | 8.676  | <b>8.50</b>  |
| M 11.0    | 1.50  | 6H       | 9.376  | 9.676  | <b>9.50</b>  |
| M 12.0    | 1.75  | 6H       | 10.106 | 10.441 | <b>10.20</b> |
| M 14.0    | 2.00  | 6H       | 11.835 | 12.210 | <b>12.00</b> |
| M 16.0    | 2.00  | 6H       | 13.835 | 14.210 | <b>14.00</b> |
| M 18.0    | 2.50  | 6H       | 15.294 | 15.744 | <b>15.50</b> |
| M 20.0    | 2.50  | 6H       | 17.294 | 17.744 | <b>17.50</b> |
| M 22.0    | 2.50  | 6H       | 19.294 | 19.744 | <b>19.50</b> |
| M 24.0    | 3.00  | 6H       | 20.752 | 21.252 | <b>21.00</b> |
| M 27.0    | 3.00  | 6H       | 23.752 | 24.252 | <b>24.00</b> |

**BSP (ISO 228)**

| Nominal Ø | TPI | Kern Ø |        | Bohr. Ø      |
|-----------|-----|--------|--------|--------------|
|           |     | min.   | max.   |              |
| G 1/16"   | 28  | 6.561  | 6.843  | <b>6.75</b>  |
| G 1/8"    | 28  | 8.566  | 8.848  | <b>8.75</b>  |
| G 1/4"    | 19  | 11.445 | 11.890 | <b>11.60</b> |
| G 3/8"    | 19  | 14.950 | 15.395 | <b>15.20</b> |
| G 1/2"    | 14  | 18.631 | 19.172 | <b>18.90</b> |
| G 5/8"    | 14  | 20.587 | 21.128 | <b>20.90</b> |
| G 3/4"    | 14  | 24.117 | 24.658 | <b>24.40</b> |
| G 7/8"    | 14  | 27.877 | 28.418 | <b>28.20</b> |
| G 1"      | 11  | 30.291 | 30.931 | <b>30.70</b> |

**UNC (ANSI B1.1 / ISO 5864)**

| Nominal Ø | TPI | Toleranz | Kern Ø |        | Bohr. Ø      |
|-----------|-----|----------|--------|--------|--------------|
|           |     |          | min.   | max.   |              |
| N°1       | 64  | 2B       | 1.425  | 1.582  | <b>1.50</b>  |
| N°2       | 56  | 2B       | 1.695  | 1.871  | <b>1.80</b>  |
| N°3       | 48  | 2B       | 1.941  | 2.146  | <b>2.00</b>  |
| N°4       | 40  | 2B       | 2.157  | 2.385  | <b>2.25</b>  |
| N°5       | 40  | 2B       | 2.487  | 2.697  | <b>2.60</b>  |
| N°6       | 32  | 2B       | 2.645  | 2.895  | <b>2.75</b>  |
| N°8       | 32  | 2B       | 3.302  | 3.530  | <b>3.50</b>  |
| N°10      | 24  | 2B       | 3.683  | 3.962  | <b>3.80</b>  |
| N°12      | 24  | 2B       | 4.344  | 4.597  | <b>4.50</b>  |
| 1/4"      | 20  | 2B       | 4.979  | 5.527  | <b>5.10</b>  |
| 5/16"     | 18  | 2B       | 6.401  | 6.731  | <b>6.50</b>  |
| 3/8"      | 16  | 2B       | 7.798  | 8.153  | <b>7.90</b>  |
| 7/16"     | 14  | 2B       | 9.144  | 9.550  | <b>9.30</b>  |
| 1/2"      | 13  | 2B       | 10.592 | 11.023 | <b>10.70</b> |
| 9/16"     | 12  | 2B       | 11.989 | 12.446 | <b>12.30</b> |
| 5/8"      | 11  | 2B       | 13.386 | 13.868 | <b>13.50</b> |
| 3/4"      | 10  | 2B       | 16.307 | 16.840 | <b>16.50</b> |

**UNEF (ANSI B1.1 / ISO 5864)**

| Nominal Ø | TPI | Toleranz | Kern Ø |        | Bohr. Ø      |
|-----------|-----|----------|--------|--------|--------------|
|           |     |          | min.   | max.   |              |
| N°12      | 32  | 2B       | 4.623  | 4.826  | <b>4.70</b>  |
| 1/4"      | 32  | 2B       | 5.487  | 5.689  | <b>5.60</b>  |
| 5/16"     | 32  | 2B       | 7.087  | 7.264  | <b>7.20</b>  |
| 3/8"      | 32  | 2B       | 8.662  | 8.864  | <b>8.75</b>  |
| 7/16"     | 28  | 2B       | 10.135 | 10.337 | <b>10.25</b> |
| 1/2"      | 28  | 2B       | 11.710 | 11.938 | <b>11.85</b> |
| 9/16"     | 24  | 2B       | 13.132 | 13.385 | <b>13.20</b> |
| 5/8"      | 24  | 2B       | 14.732 | 14.986 | <b>14.80</b> |
| 11/16"    | 24  | 2B       | 16.307 | 16.560 | <b>16.40</b> |
| 3/4"      | 20  | 2B       | 17.679 | 17.957 | <b>17.80</b> |

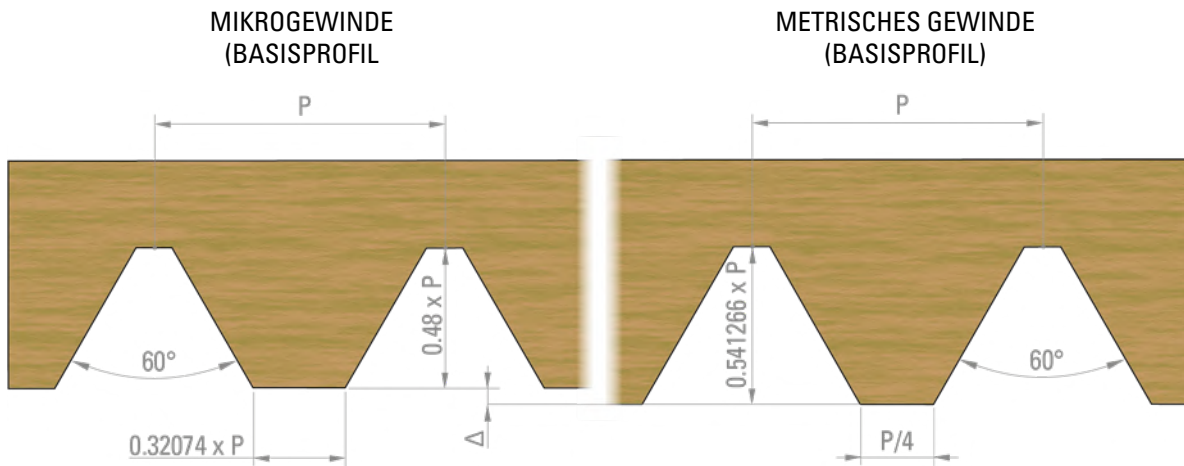
**UNJF (ISO 3161)**

| Nominal Ø | TPI | Toleranz | Kern Ø |        | Bohr. Ø      |
|-----------|-----|----------|--------|--------|--------------|
|           |     |          | min.   | max.   |              |
| N°10      | 32  | 3B       | 4.054  | 4.225  | <b>4.10</b>  |
| 1/4"      | 28  | 3B       | 5.466  | 5.662  | <b>5.55</b>  |
| 5/16"     | 24  | 3B       | 6.906  | 7.109  | <b>7.00</b>  |
| 3/8"      | 24  | 3B       | 8.494  | 8.679  | <b>8.60</b>  |
| 7/16"     | 20  | 3B       | 9.876  | 10.084 | <b>10.00</b> |
| 1/2"      | 20  | 3B       | 11.463 | 11.661 | <b>11.55</b> |

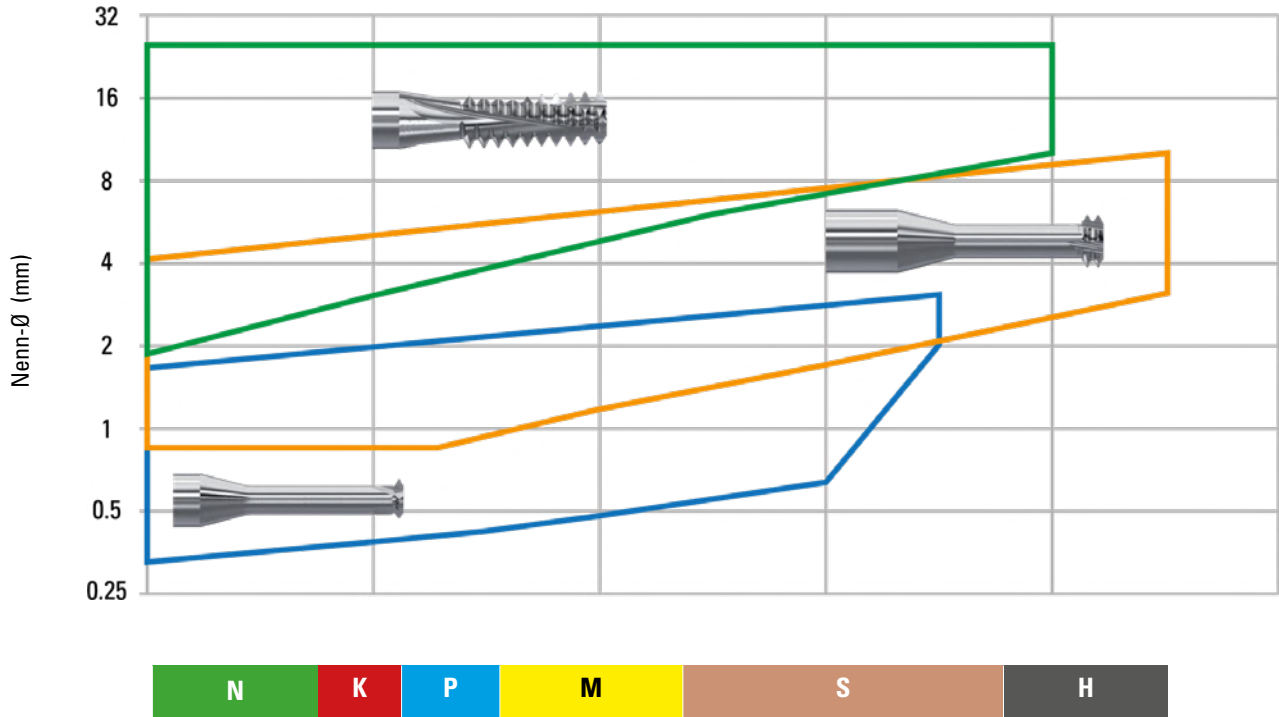


| Ø nom.  |        | 80    | 72    | 64    | 56    | 48    | 44    | 40    | 36    | 32    | 28    | 24    | 20    | 18    | 16    | 14    | 13    | 12    | 11    | 10   |     |
|---------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-----|
| inch    | mm     | 0.318 | 0.353 | 0.397 | 0.454 | 0.529 | 0.577 | 0.635 | 0.706 | 0.794 | 0.907 | 1.058 | 1.270 | 1.411 | 1.588 | 1.814 | 1.954 | 2.117 | 2.309 | 2.54 |     |
| N°0     | 1.524  | UNF   |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |     |
| N°1     | 1.854  |       | UNF   | UNC   |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |     |
| N°2     | 2.184  |       |       | UNF   | UNC   |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |     |
| N°3     | 2.515  |       |       |       | UNF   | UNC   |       |       |       |       |       |       |       |       |       |       |       |       |       |      |     |
| N°4     | 2.845  |       |       |       |       | UNF   |       | UNC   |       |       |       |       |       |       |       |       |       |       |       |      |     |
| N°5     | 3.175  |       |       |       |       |       | UNF   | UNC   |       |       |       |       |       |       |       |       |       |       |       |      |     |
| N°6     | 3.505  |       |       |       |       |       |       | UNF   |       | UNC   |       |       |       |       |       |       |       |       |       |      |     |
| N°8     | 4.166  |       |       |       |       |       |       |       | UNF   | UNC   |       |       |       |       |       |       |       |       |       |      |     |
| N°10    | 4.826  |       |       |       |       |       |       |       |       | UNF   |       | UNC   |       |       |       |       |       |       |       |      |     |
| N°12    | 5.486  |       |       |       |       |       |       |       |       | UNEF  | UNF   | UNC   |       |       |       |       |       |       |       |      |     |
| 1/4"    | 6.350  |       |       |       |       |       |       |       |       | UNEF  | UNF   |       | UNC   |       |       |       |       |       |       |      |     |
| 5/16"   | 7.938  |       |       |       |       |       |       |       |       | UNEF  | UN    | UNF   | UN    | UNC   |       |       |       |       |       |      |     |
| 3/8"    | 9.525  |       |       |       |       |       |       |       |       | UNEF  | UN    | UNF   | UN    |       | UNC   |       |       |       |       |      |     |
| 7/16"   | 11.113 |       |       |       |       |       |       |       |       | UN    | UNEF  |       | UNF   |       | UN    | UNC   |       |       |       |      |     |
| 1/2"    | 12.700 |       |       |       |       |       |       |       |       | UN    | UNEF  |       | UNF   |       | UN    |       | UNC   |       |       |      |     |
| 9/16"   | 14.288 |       |       |       |       |       |       |       |       | UN    | UN    | UNEF  | UN    | UNF   | UN    |       |       |       |       | UNC  |     |
| 5/8"    | 15.875 |       |       |       |       |       |       |       |       | UN    | UN    | UNEF  | UN    | UNF   | UN    |       |       |       |       | UN   | UNC |
| 11/16"  | 17.463 |       |       |       |       |       |       |       |       | UN    | UN    | UNEF  | UN    |       | UN    |       |       |       |       | UN   |     |
| 3/4"    | 19.050 |       |       |       |       |       |       |       |       | UN    | UN    |       | UNEF  |       | UNF   |       |       |       |       | UN   | UNC |
| 13/16"  | 20.638 |       |       |       |       |       |       |       |       | UN    | UN    |       | UNEF  |       | UN    |       |       |       |       | UN   |     |
| 7/8"    | 22.225 |       |       |       |       |       |       |       |       | UN    | UN    |       | UNEF  |       | UN    | UNF   |       |       |       | UN   |     |
| 15/16"  | 23.813 |       |       |       |       |       |       |       |       | UN    | UN    |       | UNEF  |       | UN    |       |       |       |       | UN   |     |
| 1"      | 25.400 |       |       |       |       |       |       |       |       | UN    | UN    |       | UNEF  |       | UN    |       |       |       |       | UNF  |     |
| 1-1/16" | 26.988 |       |       |       |       |       |       |       |       |       | UN    |       | UN    | UNEF  | UN    |       |       |       |       | UN   |     |

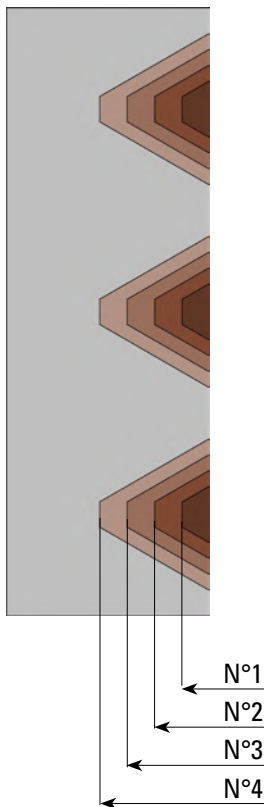
VERGLEICH ZWISCHEN "S" UND "M" GEWINDE



| Norm                 | Mikrogewinde    |                     |                   | Metrisches ISO Gewinde |
|----------------------|-----------------|---------------------|-------------------|------------------------|
|                      | ISO 1501        | NIHS 06-10 (Suisse) | ASME B1.10M (USA) | DIN 14 (Allemagne)     |
| Gewindezeichnen      | "S"             |                     | "UNM"             | "M"                    |
| Bezeichnungsbeispiel | S 0.60 x 0.15   |                     | UNM 0.60 x 0.15   | M 0.60 x 0.15          |
| Nennmaß              | 0.30mm à 1.40mm |                     | 0.30mm à 0.90mm   | 1.00mm à 355mm         |
| Steigungsbereich     | 0.08mm à 0.30mm |                     | 0.08mm à 0.225mm  | 0.20mm à 8.00mm        |



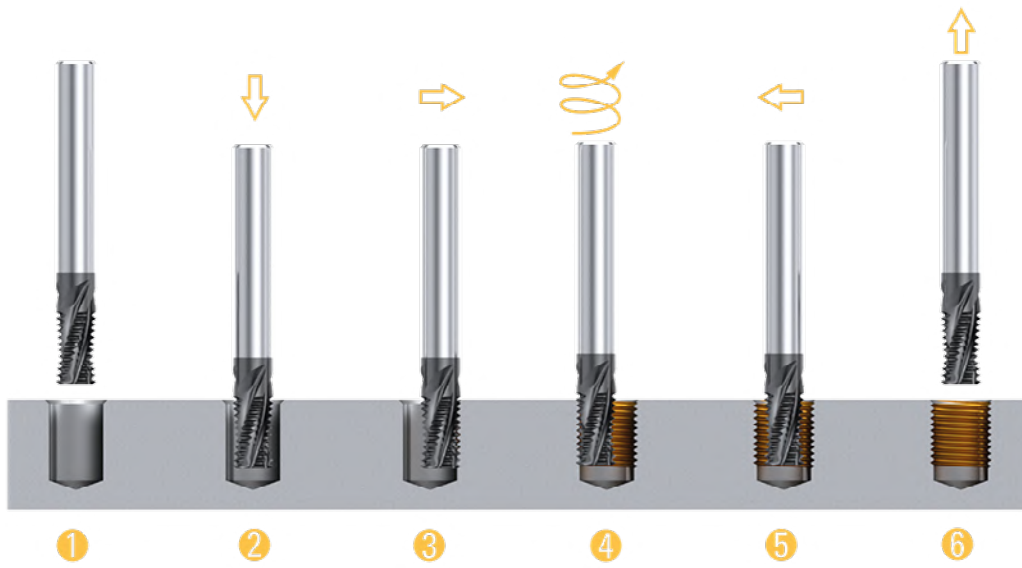
ANZAHL DER BENÖTIGTEN RADIALEN  
DURCHGÄNGE FÜR GEWINDEFÄHRER



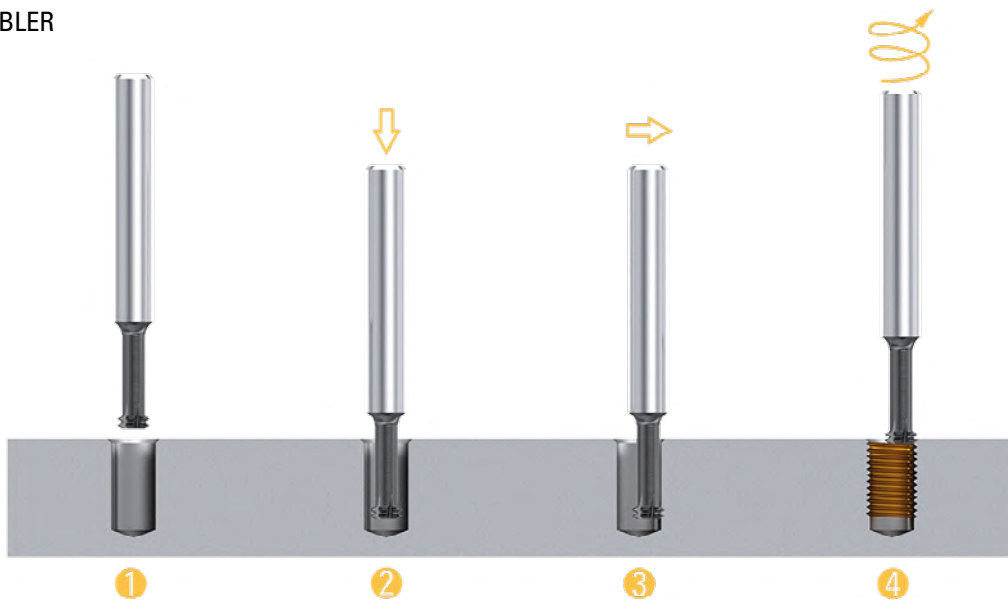
|   |   | Nenn-Ø    |       |        |       |
|---|---|-----------|-------|--------|-------|
|   |   | VDI 3323  | <3mm  | <3-6mm | <6mm  |
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5     | -     | 2 - 3  | 1 - 2 |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9     | -     | 3 - 5  | 1 - 2 |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13   | -     | 3 - 5  | 1 - 2 |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2 | -     | 3 - 5  | 2 - 3 |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                            | 14.3-14.4 | -     | 3 - 5  | 3 - 5 |
| K | Grauguss < 250 HB   | 15 - 16   | 1 - 2 | 1 - 2  | 1 - 2 |
|   | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20   | -     | 2 - 3  | 1 - 2 |
| N | Alu-Knetlegierung < 12% Si  | 21 - 22   | 1 - 2 | 1 - 2  | 1     |
|   | Alu-Gusslegierung >12% Si   | 23 - 25   | 1 - 2 | 1 - 2  | 1 - 2 |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26        | 1 - 2 | 1 - 2  | 1     |
|   | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28   | 1 - 2 | 1 - 2  | 1     |
|   | Kunststoff, Holz  | 29 - 30   | -     | 1      | 1 - 2 |
|   | Gold, Silber  | -         | 1 - 2 | 1 - 2  | 1 - 2 |
| S | Spezielle Nickel-Kobalt-Legierung   | 31- 35    | -     | 3 - 5  | 3 - 5 |
|   | Titan, Titanlegierung   | 36 - 37   | 1 - 2 | 2 - 3  | 2 - 3 |
| H | Gehärteter Stahl > 45 HRC, Hartguss   | 38 - 41   | -     | -      | 3 - 5 |



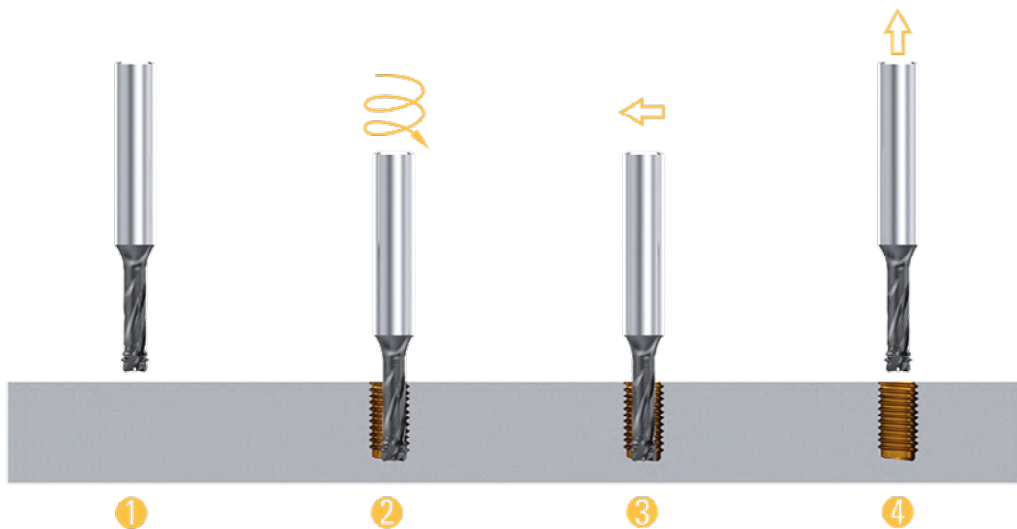
GEWINDEFÄSER



BOHRGEWINDEWIRBLER

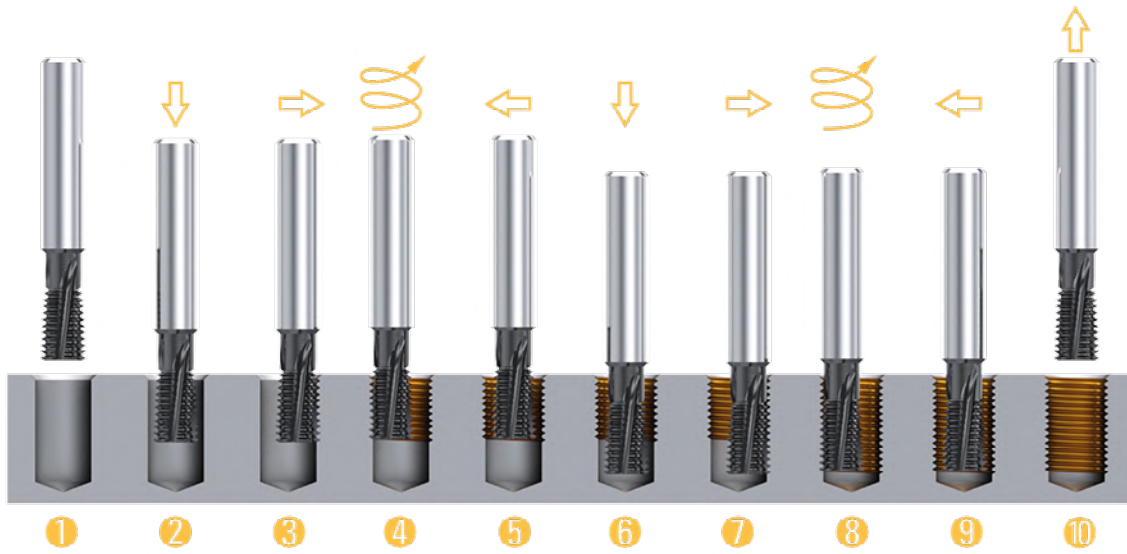


BOHRGEWINDEWIRBLER-BOHRER

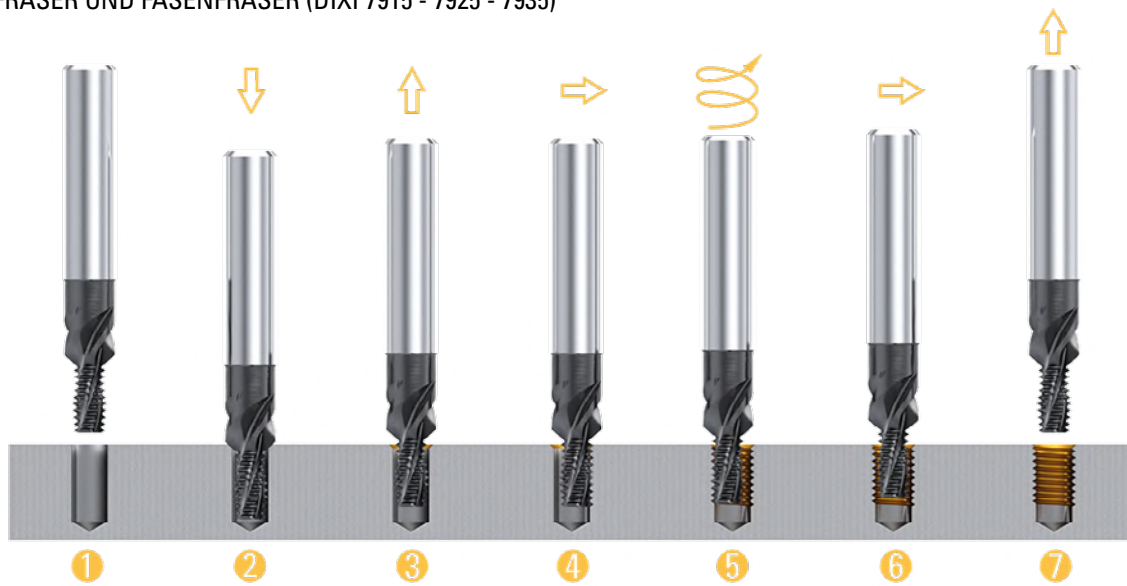




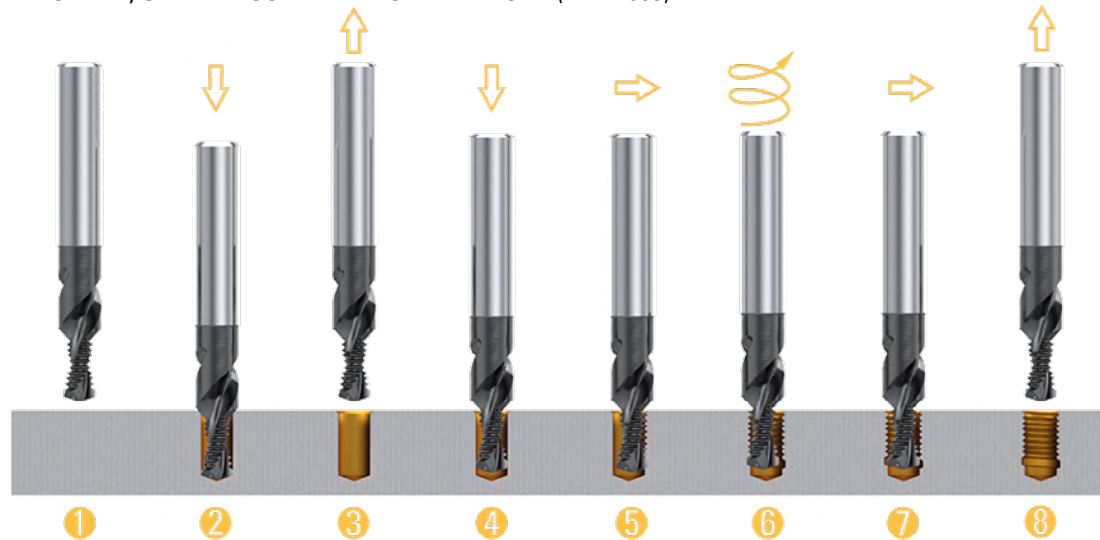
GEWINDEFÄSER MIT FEINER STEIGUNG (DIXI 7913 - 7914)



GEWINDEFÄSER UND FASENFRÄSER (DIXI 7915 - 7925 - 7935)



FRÄSER ZUM BOHREN, GEWINDESCHNEIDEN UND ANFASSEN (DIXI 7985)



|   |   | VDI 3323  |     | VHM Vc [m/min] | TiAlN Vc [m/min] | CUTINOX Vc [m/min] |
|---|---|-----------|-----|----------------|------------------|--------------------|
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |     | 70             | 115              | 135                |
|   | Niedrig legierter Stahl < 800 N/mm²                                       | 6 - 9     |     | 105            | 115              |                    |
|   | Hochlegierter Stahl > 800 N/mm², ferritischer / martensitischer Edelstahl | 10 - 13   |     | 90             | 100              |                    |
| M | Austenitischer rostfreier Stahl < 700 N/mm²                               | 14.1-14.2 |     | 85             | 95               |                    |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm²                        | 14.3-14.4 |     | 80             | 80               |                    |
| K | Grauguss < 250 HB   | 15 - 16   |     | 135            | 180              |                    |
|   | Duktiles Gusseisen, Temperguss > 250 HB                                   | 17 - 20   |     | 70             | 105              |                    |
| N | Alu-Knetlegierung < 12% Si  | 21 - 22   |     | 150            |                  |                    |
|   | Alu-Gusslegierung >12% Si   | 23 - 25   |     | 115            |                  |                    |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb                                | 26        |     | 140            |                  |                    |
|   | Kupferlegierung schwere Zerspanbarkeit                                    | 27 - 28   | 110 |                |                  |                    |
|   | Kunststoff, Holz  | 29 - 30   | 115 |                |                  |                    |
|   | Gold, Silber  | -         | 140 |                |                  |                    |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   | 35  | 45             |                  |                    |
|   | Titan, Titanlegierung   | 36 - 37   | 75  | 70             |                  |                    |

$$Vf \text{ Zentrum} = \frac{n \times fz \times Z \times (M - D_1)}{M}$$

DIXI 1737

|   |   | VDI 3323  |     | VHM Vc [m/min] | C-TOP Vc [m/min] | DRY CUT Vc [m/min] |
|---|---|-----------|-----|----------------|------------------|--------------------|
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |     | 70             | 130              |                    |
|   | Niedrig legierter Stahl < 800 N/mm²                                       | 6 - 9     |     | 115            |                  |                    |
|   | Hochlegierter Stahl > 800 N/mm², ferritischer / martensitischer Edelstahl | 10 - 13   |     | 105            |                  |                    |
| M | Austenitischer rostfreier Stahl < 700 N/mm²                               | 14.1-14.2 |     | 85             |                  |                    |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm²                        | 14.3-14.4 |     | 65             |                  |                    |
| K | Grauguss < 250 HB   | 15 - 16   |     | 90             |                  |                    |
|   | Duktiles Gusseisen, Temperguss > 250 HB                                   | 17 - 20   |     | 70             |                  |                    |
| N | Alu-Knetlegierung < 12% Si  | 21 - 22   |     | 150            | 185              |                    |
|   | Alu-Gusslegierung >12% Si   | 23 - 25   |     | 115            | 150              |                    |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb                                | 26        |     | 140            | 175              |                    |
|   | Kupferlegierung schwere Zerspanbarkeit                                    | 27 - 28   | 110 | 140            |                  |                    |
|   | Kunststoff, Holz  | 29 - 30   | 290 | 170            |                  |                    |
|   | Gold, Silber  | -         | 115 | 95             |                  |                    |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   | 40  |                |                  |                    |
|   | Titan, Titanlegierung   | 36 - 37   | 70  | 75             |                  |                    |

$$Vf \text{ Zentrum} = \frac{n \times fz \times Z \times (M - D_1)}{M}$$

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

Vorschub pro Zahn  $f_z$  [mm]

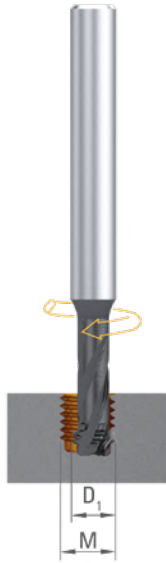
| $\varnothing D_1$<br>0.20 - 0.40 | $\varnothing D_1$<br>0.40 - 0.60 | $\varnothing D_1$<br>0.60 - 1.10 | $\varnothing D_1$<br>1.10 - 1.60 | $\varnothing D_1$<br>1.60 - 2.40 | $\varnothing D_1$<br>2.40 - 5.00 | $\varnothing D_1$<br>5.00 - 8.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| 0.0018 - 0.0040                  | 0.004 - 0.007                    | 0.007 - 0.012                    | 0.012 - 0.018                    | 0.018 - 0.026                    | 0.026 - 0.056                    | 0.055 - 0.080                    |
| 0.0016 - 0.0036                  | 0.004 - 0.006                    | 0.006 - 0.011                    | 0.011 - 0.016                    | 0.016 - 0.024                    | 0.024 - 0.050                    | 0.050 - 0.080                    |
| 0.0014 - 0.0032                  | 0.004 - 0.005                    | 0.005 - 0.010                    | 0.010 - 0.014                    | 0.014 - 0.022                    | 0.022 - 0.046                    | 0.045 - 0.070                    |
| 0.0014 - 0.0032                  | 0.004 - 0.005                    | 0.005 - 0.010                    | 0.010 - 0.014                    | 0.014 - 0.022                    | 0.022 - 0.046                    | 0.045 - 0.070                    |
| 0.0013 - 0.0029                  | 0.003 - 0.005                    | 0.005 - 0.009                    | 0.009 - 0.013                    | 0.013 - 0.019                    | 0.019 - 0.040                    | 0.040 - 0.060                    |
| 0.0022 - 0.0050                  | 0.006 - 0.008                    | 0.008 - 0.015                    | 0.015 - 0.022                    | 0.022 - 0.034                    | 0.034 - 0.070                    | 0.070 - 0.110                    |
| 0.0016 - 0.0036                  | 0.004 - 0.006                    | 0.006 - 0.011                    | 0.011 - 0.016                    | 0.016 - 0.024                    | 0.024 - 0.050                    | 0.050 - 0.080                    |
| 0.0027 - 0.0061                  | 0.007 - 0.010                    | 0.010 - 0.019                    | 0.019 - 0.027                    | 0.027 - 0.041                    | 0.041 - 0.086                    | 0.085 - 0.130                    |
| 0.0022 - 0.0050                  | 0.006 - 0.008                    | 0.008 - 0.015                    | 0.015 - 0.022                    | 0.022 - 0.034                    | 0.034 - 0.070                    | 0.070 - 0.110                    |
| 0.0027 - 0.0061                  | 0.007 - 0.010                    | 0.010 - 0.019                    | 0.019 - 0.027                    | 0.027 - 0.041                    | 0.041 - 0.086                    | 0.085 - 0.130                    |
| 0.0022 - 0.0050                  | 0.006 - 0.008                    | 0.008 - 0.015                    | 0.015 - 0.022                    | 0.022 - 0.034                    | 0.034 - 0.070                    | 0.070 - 0.110                    |
| 0.0032 - 0.0072                  | 0.008 - 0.012                    | 0.012 - 0.022                    | 0.022 - 0.032                    | 0.032 - 0.048                    | 0.048 - 0.100                    | 0.100 - 0.150                    |
| 0.0024 - 0.0054                  | 0.006 - 0.009                    | 0.009 - 0.017                    | 0.017 - 0.024                    | 0.024 - 0.036                    | 0.036 - 0.076                    | 0.075 - 0.110                    |
| 0.0008 - 0.0018                  | 0.002 - 0.003                    | 0.003 - 0.006                    | 0.006 - 0.008                    | 0.008 - 0.012                    | 0.012 - 0.026                    | 0.025 - 0.040                    |
| 0.0019 - 0.0043                  | 0.005 - 0.007                    | 0.007 - 0.013                    | 0.013 - 0.019                    | 0.019 - 0.029                    | 0.029 - 0.060                    | 0.060 - 0.090                    |

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>0.35 - 0.50 | $\varnothing D_1$<br>0.50 - 0.60 | $\varnothing D_1$<br>0.60 - 0.90 | $\varnothing D_1$<br>0.90 - 1.40 | $\varnothing D_1$<br>1.40 - 2.40 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| 0.004 - 0.006                    | 0.006 - 0.008                    | 0.008 - 0.011                    | 0.011 - 0.018                    | 0.018 - 0.030                    |
| 0.004 - 0.006                    | 0.006 - 0.007                    | 0.007 - 0.010                    | 0.010 - 0.016                    | 0.016 - 0.027                    |
| 0.004 - 0.005                    | 0.005 - 0.006                    | 0.006 - 0.009                    | 0.009 - 0.014                    | 0.014 - 0.024                    |
| 0.004 - 0.005                    | 0.005 - 0.006                    | 0.006 - 0.009                    | 0.009 - 0.014                    | 0.014 - 0.024                    |
| 0.003 - 0.005                    | 0.005 - 0.005                    | 0.005 - 0.008                    | 0.008 - 0.013                    | 0.013 - 0.022                    |
| 0.006 - 0.008                    | 0.008 - 0.010                    | 0.010 - 0.015                    | 0.015 - 0.023                    | 0.023 - 0.039                    |
| 0.004 - 0.006                    | 0.006 - 0.007                    | 0.007 - 0.010                    | 0.010 - 0.016                    | 0.016 - 0.027                    |
| 0.007 - 0.010                    | 0.010 - 0.012                    | 0.012 - 0.018                    | 0.018 - 0.028                    | 0.028 - 0.048                    |
| 0.006 - 0.008                    | 0.008 - 0.010                    | 0.010 - 0.015                    | 0.015 - 0.023                    | 0.023 - 0.039                    |
| 0.007 - 0.010                    | 0.010 - 0.012                    | 0.012 - 0.018                    | 0.018 - 0.028                    | 0.028 - 0.048                    |
| 0.006 - 0.008                    | 0.008 - 0.010                    | 0.010 - 0.015                    | 0.015 - 0.023                    | 0.023 - 0.039                    |
| 0.008 - 0.012                    | 0.012 - 0.014                    | 0.014 - 0.021                    | 0.021 - 0.033                    | 0.033 - 0.056                    |
| 0.006 - 0.009                    | 0.009 - 0.010                    | 0.010 - 0.016                    | 0.016 - 0.024                    | 0.024 - 0.042                    |
| 0.002 - 0.003                    | 0.003 - 0.003                    | 0.003 - 0.005                    | 0.005 - 0.008                    | 0.008 - 0.013                    |
| 0.005 - 0.007                    | 0.007 - 0.008                    | 0.008 - 0.012                    | 0.012 - 0.019                    | 0.019 - 0.033                    |

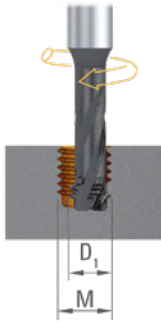
Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

## DIXI 1740

|          |   | VDI 3323  |  | VHM<br>Vc [m/min] | CUTINOX<br>Vc [m/min] |     |
|----------|---|-----------|--|-------------------|-----------------------|-----|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |  |                   | 150                   |     |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9     |  |                   | 130                   |     |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13   |  |                   | 120                   |     |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2 |  |                   | 70                    |     |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                            | 14.3-14.4 |  |                   | 50                    |     |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16   |  |                   | 150                   | 150 |
|          | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20   |  |                   | 120                   | 110 |
| <b>N</b> | Alu-Knetlegierung < 12% Si  | 21 - 22   |  |                   | 200                   |     |
|          | Alu-Gusslegierung > 12% Si  | 23 - 25   |  |                   | 180                   |     |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26        |  |                   | 150                   |     |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28   |  | 110               |                       |     |
|          | Kunststoff, Holz  | 29 - 30   |  | 120               |                       |     |
|          | Gold, Silber  | -         |  | 140               |                       |     |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   |  | 35                | 50                    |     |
|          | Titan, Titanlegierung   | 36 - 37   |  | 55                |                       |     |

$$V_f \text{ Zentrum} = \frac{n \times f_z \times Z \times (M - D_1)}{M}$$

## DIXI 1742-TC

|          |  | VDI 3323 |   | DAC<br>Vc [m/min] |
|----------|--|----------|---|-------------------|
| <b>N</b> | Alu-Knetlegierung < 12% Si                 | 21 - 22  |  | 250               |
|          | Alu-Gusslegierung > 12% Si                 | 23 - 25  |   | 200               |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb | 26 - 28  |   | 200               |
|          | Kupferlegierung schwere Zerspanbarkeit     | 27-28    |   | 150               |
|          | Kunststoff, Holz                           | 29 - 30  |   | 250               |
|          | Gold, Silber                               | -        |   | 200               |

$$V_f \text{ Zentrum} = \frac{n \times f_z \times Z \times (M - D_1)}{M}$$



$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

Vorschub pro Zahn  $f_z$  [mm]

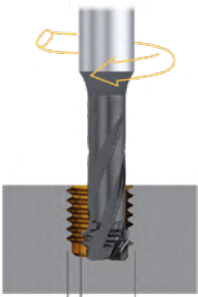
| $\varnothing D_1$<br>0.60 - 0.80 | $\varnothing D_1$<br>0.80 - 1.10 | $\varnothing D_1$<br>1.10 - 2.50 | $\varnothing D_1$<br>2.50 - 3.00 | $\varnothing D_1$<br>3.00 - 5.00 | $\varnothing D_1$<br>5.00 - 6.50 | $\varnothing D_1$<br>6.50 - 8.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| 0.007 - 0.010                    | 0.010 - 0.013                    | 0.013 - 0.029                    | 0.030 - 0.034                    | 0.034 - 0.055                    | 0.055 - 0.070                    | 0.070 - 0.085                    |
| 0.007 - 0.009                    | 0.009 - 0.012                    | 0.012 - 0.027                    | 0.026 - 0.032                    | 0.032 - 0.050                    | 0.050 - 0.065                    | 0.065 - 0.075                    |
| 0.006 - 0.008                    | 0.008 - 0.011                    | 0.011 - 0.024                    | 0.024 - 0.028                    | 0.028 - 0.045                    | 0.045 - 0.060                    | 0.060 - 0.070                    |
| 0.006 - 0.008                    | 0.008 - 0.011                    | 0.011 - 0.024                    | 0.024 - 0.028                    | 0.028 - 0.045                    | 0.045 - 0.060                    | 0.060 - 0.070                    |
| 0.005 - 0.007                    | 0.007 - 0.010                    | 0.010 - 0.022                    | 0.022 - 0.026                    | 0.026 - 0.040                    | 0.040 - 0.055                    | 0.055 - 0.065                    |
| 0.008 - 0.011                    | 0.011 - 0.015                    | 0.015 - 0.034                    | 0.034 - 0.040                    | 0.040 - 0.065                    | 0.065 - 0.080                    | 0.080 - 0.100                    |
| 0.007 - 0.010                    | 0.010 - 0.013                    | 0.013 - 0.029                    | 0.030 - 0.034                    | 0.034 - 0.055                    | 0.055 - 0.070                    | 0.070 - 0.085                    |
| 0.010 - 0.014                    | 0.014 - 0.019                    | 0.019 - 0.041                    | 0.042 - 0.048                    | 0.048 - 0.080                    | 0.080 - 0.100                    | 0.100 - 0.120                    |
| 0.009 - 0.012                    | 0.012 - 0.017                    | 0.017 - 0.037                    | 0.036 - 0.042                    | 0.042 - 0.070                    | 0.070 - 0.090                    | 0.090 - 0.105                    |
| 0.010 - 0.014                    | 0.014 - 0.019                    | 0.019 - 0.041                    | 0.042 - 0.048                    | 0.048 - 0.080                    | 0.080 - 0.100                    | 0.100 - 0.120                    |
| 0.008 - 0.011                    | 0.011 - 0.015                    | 0.015 - 0.034                    | 0.034 - 0.040                    | 0.040 - 0.065                    | 0.065 - 0.080                    | 0.080 - 0.100                    |
| 0.012 - 0.016                    | 0.016 - 0.022                    | 0.022 - 0.049                    | 0.048 - 0.058                    | 0.058 - 0.095                    | 0.095 - 0.115                    | 0.115 - 0.140                    |
| 0.007 - 0.010                    | 0.010 - 0.013                    | 0.013 - 0.029                    | 0.030 - 0.034                    | 0.034 - 0.055                    | 0.055 - 0.070                    | 0.070 - 0.085                    |
| 0.004 - 0.006                    | 0.006 - 0.008                    | 0.008 - 0.017                    | 0.018 - 0.020                    | 0.020 - 0.030                    | 0.030 - 0.040                    | 0.040 - 0.050                    |
| 0.007 - 0.010                    | 0.010 - 0.013                    | 0.013 - 0.029                    | 0.030 - 0.034                    | 0.034 - 0.055                    | 0.055 - 0.070                    | 0.070 - 0.085                    |

Werte basieren auf der Verwendung von Schneidöl und Emulsionsöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

Vorschub pro Zahn  $V_f$  [mm/min]


| M5    | M6    | M8    | M10   | M12   |
|-------|-------|-------|-------|-------|
| 1'200 | 1'275 | 1'360 | 1'360 | 1'120 |
| 800   | 1'000 | 1'100 | 1'100 | 990   |
| 1'200 | 1'275 | 1'360 | 1'360 | 1'120 |
| 800   | 1'000 | 1'100 | 1'100 | 990   |
| 1'200 | 1'275 | 1'360 | 1'360 | 1'120 |
| 800   | 1'000 | 1'100 | 1'100 | 990   |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

|   |   | VDI 3323  |  | CUTINOX Vc [m/min] |
|---|---|-----------|--|--------------------|
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |  | 170                |
|   | Niedrig legierter Stahl < 800 N/mm²                                       | 6 - 9     |  | 140                |
|   | Hochlegierter Stahl > 800 N/mm², ferritischer / martensitischer Edelstahl | 10 - 13   |  | 130                |
| M | Austenitischer rostfreier Stahl < 700 N/mm²                               | 14.1-14.2 |  | 70                 |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm²                        | 14.3-14.4 |  | 50                 |
| K | Grauguss < 250 HB   | 15 - 16   |  | 170                |
|   | Duktiles Gusseisen, Temperguss > 250 HB                                   | 17 - 20   |  | 120                |
| S | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   |  | 50                 |
|   | Titan, Titanlegierung   | 36 - 37   |  |                    |

$$V_f \text{ Zentrum} = \frac{n \times f_z \times Z \times (M - D_1)}{M}$$

DIXI 7910 - 7920 - 7940

|   |   | VDI 3323  |  | VHM Vc [m/min] | TAIN Vc [m/min] |     |
|---|---|-----------|--|----------------|-----------------|-----|
| P | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |  | 85             | 100             |     |
|   | Niedrig legierter Stahl < 800 N/mm²                                       | 6 - 9     |  |                | 80              |     |
|   | Hochlegierter Stahl > 800 N/mm², ferritischer / martensitischer Edelstahl | 10 - 13   |  |                | 50              |     |
| M | Austenitischer rostfreier Stahl < 700 N/mm²                               | 14.1-14.2 |  |                | 80              |     |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm²                        | 14.3-14.4 |  |                | 50              |     |
| K | Grauguss < 250 HB   | 15 - 16   |  |                | 85              | 100 |
|   | Duktiles Gusseisen, Temperguss > 250 HB                                   | 17 - 20   |  |                | 55              | 80  |
| N | Alu-Knetlegierung < 12% Si  | 21 - 22   |  |                | 220             | 285 |
|   | Alu-Gusslegierung > 12% Si  | 23 - 25   |  |                | 150             | 220 |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb                                | 26        |  |                | 150             | 210 |
|   | Kupferlegierung schwere Zerspanbarkeit                                    | 27 - 28   |  | 130            | 180             |     |
|   | Kunststoff, Holz  | 29 - 30   |  | 250            | 320             |     |
|   | Gold, Silber  | -         |  | 150            | 210             |     |
|   | Titan, Titanlegierung   | 36 - 37   |  | 40             | 50              |     |

$$V_f \text{ Zentrum} = \frac{n \times f_z \times Z \times (M - D_1)}{M}$$

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

Vorschub pro Zahn  $V_f$  [mm/min]

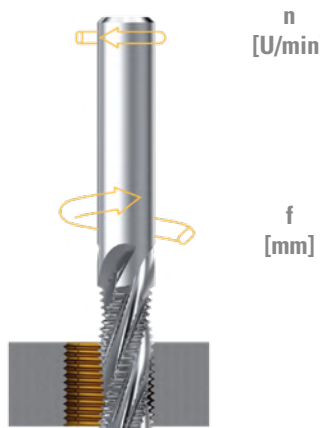
| $\varnothing D_1$<br>3.00 - 5.00 | $\varnothing D_1$<br>5.00 - 6.50 | $\varnothing D_1$<br>6.50 - 8.00 | $\varnothing D_1$<br>8.00 - 10.00 |
|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|
| 0.034 - 0.055                    | 0.055 - 0.070                    | 0.070 - 0.085                    | 0.086 - 0.096                     |
| 0.032 - 0.050                    | 0.050 - 0.065                    | 0.065 - 0.075                    | 0.079 - 0.088                     |
| 0.028 - 0.045                    | 0.045 - 0.060                    | 0.060 - 0.070                    | 0.072 - 0.080                     |
| 0.028 - 0.045                    | 0.045 - 0.060                    | 0.060 - 0.070                    | 0.072 - 0.080                     |
| 0.026 - 0.040                    | 0.040 - 0.055                    | 0.055 - 0.065                    | 0.065 - 0.072                     |
| 0.040 - 0.065                    | 0.065 - 0.080                    | 0.080 - 0.100                    | 0.100 - 0.112                     |
| 0.034 - 0.055                    | 0.055 - 0.070                    | 0.070 - 0.085                    | 0.086 - 0.096                     |
| 0.020 - 0.030                    | 0.030 - 0.040                    | 0.040 - 0.050                    | 0.050 - 0.056                     |
| 0.034 - 0.055                    | 0.055 - 0.070                    | 0.070 - 0.085                    | 0.086 - 0.096                     |

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>0.90 - 2.00 | $\varnothing D_1$<br>2.00 - 3.00 | $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>4.00 - 6.00 | $\varnothing D_1$<br>6.00 - 10.00 | $\varnothing D_1$<br>10.00 - 16.00 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|
| 0.005 - 0.012                    | 0.012 - 0.018                    | 0.018 - 0.024                    | 0.024 - 0.035                    | 0.035 - 0.060                     | 0.060 - 0.100                      |
| 0.005 - 0.011                    | 0.011 - 0.0165                   | 0.017 - 0.022                    | 0.022 - 0.035                    | 0.035 - 0.060                     | 0.060 - 0.090                      |
| 0.005 - 0.010                    | 0.010 - 0.015                    | 0.015 - 0.02                     | 0.020 - 0.030                    | 0.030 - 0.050                     | 0.050 - 0.080                      |
| 0.005 - 0.010                    | 0.010 - 0.015                    | 0.015 - 0.02                     | 0.020 - 0.030                    | 0.030 - 0.050                     | 0.050 - 0.080                      |
| 0.004 - 0.009                    | 0.009 - 0.014                    | 0.014 - 0.018                    | 0.018 - 0.025                    | 0.025 - 0.050                     | 0.050 - 0.070                      |
| 0.006 - 0.014                    | 0.014 - 0.021                    | 0.021 - 0.028                    | 0.028 - 0.040                    | 0.040 - 0.070                     | 0.070 - 0.110                      |
| 0.005 - 0.012                    | 0.012 - 0.018                    | 0.018 - 0.024                    | 0.024 - 0.035                    | 0.035 - 0.060                     | 0.060 - 0.100                      |
| 0.007 - 0.015                    | 0.015 - 0.023                    | 0.023 - 0.03                     | 0.030 - 0.045                    | 0.045 - 0.080                     | 0.080 - 0.120                      |
| 0.008 - 0.017                    | 0.017 - 0.026                    | 0.026 - 0.034                    | 0.034 - 0.050                    | 0.050 - 0.090                     | 0.090 - 0.140                      |
| 0.006 - 0.014                    | 0.014 - 0.021                    | 0.021 - 0.028                    | 0.028 - 0.040                    | 0.040 - 0.070                     | 0.070 - 0.110                      |
| 0.009 - 0.020                    | 0.020 - 0.030                    | 0.030 - 0.04                     | 0.040 - 0.060                    | 0.060 - 0.100                     | 0.100 - 0.160                      |
| 0.005 - 0.012                    | 0.012 - 0.018                    | 0.018 - 0.024                    | 0.024 - 0.035                    | 0.035 - 0.060                     | 0.060 - 0.100                      |
| 0.005 - 0.012                    | 0.012 - 0.018                    | 0.018 - 0.024                    | 0.024 - 0.035                    | 0.035 - 0.060                     | 0.060 - 0.100                      |
| 0.007 - 0.010                    | 0.010 - 0.013                    | 0.013 - 0.029                    | 0.030 - 0.034                    | 0.034 - 0.055                     | 0.055 - 0.070                      |

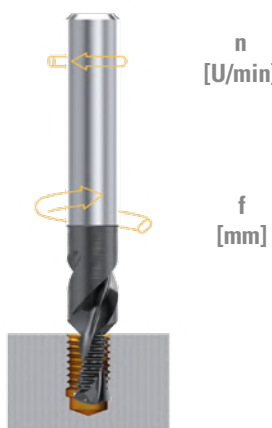
Werte basieren auf der Verwendung von Schneidöl und Emulsionsöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

**DIXI 7908 - 7913-TC - 7914-TC - 7915-TC  
7918 - 7923-TC - 7925-TC - 7935-TC**

|          |   | VDI<br>3323 |  | VHM<br>Vc [m/min] | TiAlN<br>Vc [m/min] |
|----------|---|-------------|--|-------------------|---------------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5       |  |                   | <b>100</b>          |
|          | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>   | 6 - 9       |  |                   | <b>105</b>          |
|          | Hochlegierter Stahl > 800 N/mm <sup>2</sup> ,<br>ferritischer / martensitischer Edelstahl | 10 - 13     |  |                   | <b>65</b>           |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                   | 14.1-14.2   |  | <b>60</b>         | <b>105</b>          |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                            | 14.3-14.4   |  |                   | <b>60</b>           |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16     |  | <b>100</b>        | <b>130</b>          |
|          | Duktiles Gusseisen, Temperguss > 250 HB   | 17 - 20     |  | <b>65</b>         | <b>105</b>          |
| <b>N</b> | Alu-Knetlegierung < 12% Si  | 21 - 22     |  | <b>265</b>        | <b>370</b>          |
|          | Alu-Gusslegierung >12% Si   | 23 - 25     |  | <b>180</b>        | <b>285</b>          |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb  | 26          |  | <b>180</b>        | <b>275</b>          |
|          | Kupferlegierung schwere Zerspanbarkeit  | 27 - 28     |  | <b>155</b>        | <b>235</b>          |
|          | Kunststoff, Holz  | 29 - 30     |  | <b>300</b>        | <b>415</b>          |
|          | Gold, Silber  | -           |  | <b>180</b>        | <b>275</b>          |
|          | Titan, Titanlegierung   | 36 - 37     |  | <b>45</b>         | <b>65</b>           |

$$V_f \text{ Zentrum} = \frac{n \times f_z \times Z \times (M - D_1)}{M}$$

**DIXI 7985-HH**

|          |  | VDI<br>3323 |  | VHM<br>Vc [m/min] | CUTINOX<br>Vc [m/min] |
|----------|--|-------------|--|-------------------|-----------------------|
| <b>K</b> | Grauguss < 250 HB                          | 15 - 16     |  |                   | <b>110</b>            |
| <b>N</b> | Alu-Knetlegierung < 12% Si                 | 21 - 22     |  | <b>250</b>        | <b>300</b>            |
|          | Alu-Gusslegierung >12% Si                  | 23 - 25     |  | <b>180</b>        | <b>210</b>            |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb | 26          |  | <b>180</b>        | <b>210</b>            |
|          | Kupferlegierung schwere Zerspanbarkeit     | 27 - 28     |  | <b>180</b>        | <b>210</b>            |
|          | Kunststoff, Holz                           | 29 - 30     |  | <b>250</b>        | <b>250</b>            |
|          | Gold, Silber                               | -           |  | <b>180</b>        | <b>180</b>            |

$$V_f \text{ Zentrum} = \frac{n \times f_z \times Z \times (M - D_1)}{M}$$

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>4.00 - 5.00 | $\varnothing D_1$<br>5.00 - 8.00 | $\varnothing D_1$<br>8.00 - 10.00 | $\varnothing D_1$<br>10.00 - 14.00 | $\varnothing D_1$<br>14.00 - 20.00 |
|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|------------------------------------|
| 0.022 - 0.029                    | 0.029 - 0.036                    | 0.036 - 0.057                    | 0.058 - 0.070                     | 0.070 - 0.100                      | 0.100 - 0.140                      |
| 0.020 - 0.026                    | 0.026 - 0.033                    | 0.033 - 0.052                    | 0.052 - 0.065                     | 0.065 - 0.090                      | 0.090 - 0.130                      |
| 0.018 - 0.024                    | 0.024 - 0.030                    | 0.030 - 0.048                    | 0.048 - 0.060                     | 0.060 - 0.080                      | 0.080 - 0.120                      |
| 0.018 - 0.024                    | 0.024 - 0.030                    | 0.030 - 0.048                    | 0.048 - 0.060                     | 0.060 - 0.080                      | 0.080 - 0.120                      |
| 0.016 - 0.022                    | 0.022 - 0.027                    | 0.027 - 0.043                    | 0.044 - 0.055                     | 0.055 - 0.080                      | 0.080 - 0.110                      |
| 0.025 - 0.034                    | 0.034 - 0.042                    | 0.042 - 0.067                    | 0.068 - 0.085                     | 0.085 - 0.120                      | 0.120 - 0.170                      |
| 0.022 - 0.029                    | 0.029 - 0.036                    | 0.036 - 0.057                    | 0.058 - 0.070                     | 0.070 - 0.100                      | 0.100 - 0.140                      |
| 0.031 - 0.041                    | 0.041 - 0.051                    | 0.051 - 0.081                    | 0.082 - 0.100                     | 0.100 - 0.140                      | 0.140 - 0.200                      |
| 0.027 - 0.036                    | 0.036 - 0.045                    | 0.045 - 0.072                    | 0.072 - 0.090                     | 0.090 - 0.130                      | 0.130 - 0.180                      |
| 0.031 - 0.041                    | 0.041 - 0.051                    | 0.051 - 0.081                    | 0.082 - 0.100                     | 0.100 - 0.140                      | 0.140 - 0.200                      |
| 0.025 - 0.034                    | 0.034 - 0.042                    | 0.042 - 0.067                    | 0.068 - 0.085                     | 0.085 - 0.120                      | 0.120 - 0.170                      |
| 0.036 - 0.048                    | 0.048 - 0.060                    | 0.060 - 0.096                    | 0.096 - 0.120                     | 0.120 - 0.170                      | 0.170 - 0.240                      |
| 0.022 - 0.029                    | 0.029 - 0.036                    | 0.036 - 0.057                    | 0.058 - 0.070                     | 0.070 - 0.100                      | 0.100 - 0.140                      |
| 0.022 - 0.029                    | 0.029 - 0.036                    | 0.036 - 0.057                    | 0.058 - 0.070                     | 0.070 - 0.100                      | 0.100 - 0.140                      |

**BOHREN**

Vorschub pro Runde  $f$  [mm]

| $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>5.00 - 7.00 | $\varnothing D_1$<br>8.00 - 14.00 | $\varnothing D_1$<br>3.00 - 4.00 | $\varnothing D_1$<br>5.00 - 7.00 | $\varnothing D_1$<br>8.00 - 14.00 |
|----------------------------------|----------------------------------|-----------------------------------|----------------------------------|----------------------------------|-----------------------------------|
| 0.042 - 0.056                    | 0.070 - 0.100                    | 0.100 - 0.160                     | 0.030 - 0.040                    | 0.050 - 0.070                    | 0.080 - 0.140                     |
| 0.074 - 0.098                    | 0.125 - 0.170                    | 0.180 - 0.280                     | 0.045 - 0.060                    | 0.075 - 0.105                    | 0.120 - 0.210                     |
| 0.053 - 0.070                    | 0.090 - 0.120                    | 0.140 - 0.200                     | 0.030 - 0.040                    | 0.050 - 0.070                    | 0.080 - 0.140                     |
| 0.063 - 0.084                    | 0.105 - 0.150                    | 0.160 - 0.240                     | 0.053 - 0.070                    | 0.087 - 0.122                    | 0.140 - 0.245                     |
| 0.042 - 0.056                    | 0.070 - 0.100                    | 0.100 - 0.160                     | 0.038 - 0.050                    | 0.062 - 0.087                    | 0.100 - 0.175                     |
| 0.084 - 0.112                    | 0.140 - 0.200                    | 0.200 - 0.320                     | 0.060 - 0.080                    | 0.100 - 0.140                    | 0.160 - 0.280                     |
| 0.042 - 0.056                    | 0.070 - 0.100                    | 0.100 - 0.160                     | 0.030 - 0.040                    | 0.050 - 0.070                    | 0.080 - 0.140                     |

**GEWINDE**

Vorschub pro Zahn  $f_z$  [mm]



## ÜBERSICHT REIBAHLEN UND AUSBOHRSTÄHLE

422



### VHM REIBAHLEN

426



### NACHSTELL-REIBAHLEN

446



### REIBAHLEN AUF ANFRAGE

461



### AUSBOHRSTÄHLE UND ENTGRATER

454



### AUSBOHRSTÄHLE

456



### SONDERWERKZEUGE

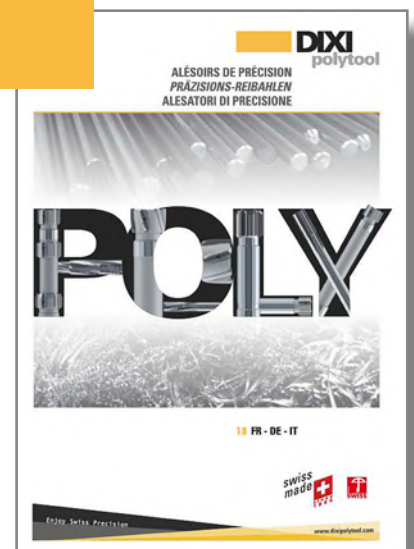
460



### SCHNITTBEDINGUNGEN

462

Reibahlen mit gelöteten Schneiden finden Sie in unserem POLYTOOL Katalog.



| VHM-REIBAHLEN  |  | Z     | Seite |  | Bohrungs-<br>toleranz | VHM<br>☐ | POLY-CUT<br>■ | TITAIN<br>■ | CERMET<br>☐ |
|--|--|-------|-------|--|-----------------------|----------|---------------|-------------|-------------|
| <b>POLY 4001</b><br>Ø0.40 - Ø12.02<br>mit IK > Ø2.98 |  | 3 - 6 | 426   |  | IT 7                  | ✓        |               |             |             |
| <b>POLY 4005-TC</b><br>Ø2.97 - Ø6.50                 |  | 4 - 6 | 434   |  | IT 7                  | ✓        |               |             |             |
| <b>POLY 4007</b><br>Ø0.37 - Ø12.02<br>mit IK > Ø2.97 |  | 3 - 6 | 436   |  | IT 7                  | ✓        |               |             |             |
| <b>POLY 4008-FC</b><br>Ø2.50 - Ø12.03                |  | 4 - 6 | 444   |  | IT 7                  |          | ✓             |             |             |

**NACHSTELL-REIBAHLEN MIT VHM ODER CERMET SCHNEIDEN**

CERMET einsetzen in den Materialgruppen Seite 464

|                                    |  |       |     |  |                      |   |  |   |   |
|------------------------------------|--|-------|-----|--|----------------------|---|--|---|---|
| <b>POLY 4361</b><br>Ø6.00 - Ø24.00 |  | 4 - 6 | 446 |  | IT 5<br>IT 6<br>IT 7 | ✓ |  | ✓ | ✓ |
| <b>POLY 4371</b><br>Ø6.00 - Ø24.00 |  | 4 - 6 | 448 |  | IT 5<br>IT 6<br>IT 7 | ✓ |  | ✓ | ✓ |

**REIBAHLEN AUF ANFRAGE - VHM ODER CERMET-SCHNEIDEN**

**FEST-REIBAHLEN**

CERMET einsetzen in den Materialgruppen Seite 464

|                                     |  |       |     |  |      |             |  |  |  |
|-------------------------------------|--|-------|-----|--|------|-------------|--|--|--|
| <b>POLY 4261</b><br>Ø5.80 - Ø120.00 |  | 4 - 6 | 450 |  | IT 7 | AUF ANFRAGE |  |  |  |
| <b>POLY 4271</b><br>Ø5.80 - Ø120.00 |  | 4 - 6 | 451 |  | IT 7 | AUF ANFRAGE |  |  |  |
| <b>POLY 4264</b><br>Ø5.80 - Ø120.00 |  | 4 - 6 | 450 |  | IT 7 | AUF ANFRAGE |  |  |  |
| <b>POLY 4274</b><br>Ø5.80 - Ø120.00 |  | 4 - 6 | 451 |  | IT 7 | AUF ANFRAGE |  |  |  |



| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |


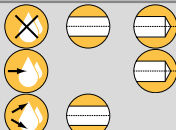

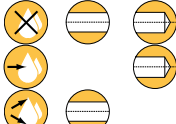



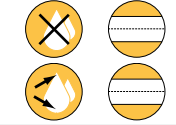
|              |                    |                |                        |           |               |              |                           |                                  |             |                    |                |                          |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|

|                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |
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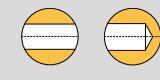

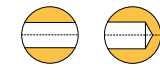
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|                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |
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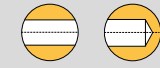

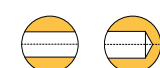




gut       ausgezeichnet

| NACHSTELL-REIBAHLEN                |   | Z     | Seite |   | Bohrungs-<br>toleranz | VHM<br><input type="checkbox"/> | POLYCUT<br><input type="checkbox"/> | TITAIN<br><input type="checkbox"/> | CERMET<br><input type="checkbox"/> |
|------------------------------------|---|-------|-------|---|-----------------------|---------------------------------|-------------------------------------|------------------------------------|------------------------------------|
| <b>POLY 4361</b><br>Ø5.80 - Ø55.00 |  | 4 - 6 | 452   |  | IT5<br>IT6<br>IT7     |                                 |                                     |                                    |                                    |
| <b>POLY 4371</b><br>Ø5.80 - Ø55.00 |  | 4 - 6 | 453   |  | IT5<br>IT6<br>IT7     |                                 |                                     |                                    |                                    |
| <b>POLY 4364</b><br>Ø5.80 - Ø55.00 |  | 4 - 6 | 452   |  | IT5<br>IT6<br>IT7     |                                 |                                     |                                    |                                    |
| <b>POLY 4374</b><br>Ø5.80 - Ø55.00 |  | 4 - 6 | 453   |  | IT5<br>IT6<br>IT7     |                                 |                                     |                                    |                                    |


**AUSBOHRSTÄHLE UND ENTGRATER**

|                                   |   |   |     |   |  |   |  |  |  |
|-----------------------------------|---|---|-----|---|--|---|--|--|--|
| <b>DIXI 2577</b><br>Ø0.26 - Ø0.86 |   | - | 454 |   |  | ✓ |  |  |  |
| <b>DIXI 2567</b><br>Ø0.20 - Ø1.00 |  | - | 455 |  |  | ✓ |  |  |  |

**AUSBOHRSTÄHLE**

|                                    |   |   |     |   |  |   |  |  |  |
|------------------------------------|---|---|-----|---|--|---|--|--|--|
| <b>DIXI 2578</b><br>Ø0.30 - Ø1.00  |  | 3 | 456 |  |  | ✓ |  |  |  |
| <b>DIXI 2579</b><br>Ø0.60 - Ø3.00  |  |   | 457 |  |  | ✓ |  |  |  |
| <b>DIXI 2580</b><br>Ø0.50 - Ø20.00 |  |   | 458 |  |  | ✓ |  |  |  |
| <b>DIXI 2581</b><br>Ø0.50 - Ø18.00 |  | - | 459 |  |  | ✓ |  |  |  |

**HALTER FÜR AUSBOHRSTÄHLE**

|                                    |   |   |     |  |  |  |  |  |  |
|------------------------------------|---|---|-----|--|--|--|--|--|--|
| <b>POLY 2764</b><br>Ø6.00 - Ø24.00 |  | - | 457 |  |  |  |  |  |  |
|------------------------------------|---|---|-----|--|--|--|--|--|--|

| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |

|              |                    |                |                        |           |               |              |                           |                                  |             |                    |                |                          |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|

|                                  |                                  |                       |                       |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                       |                                  |  |
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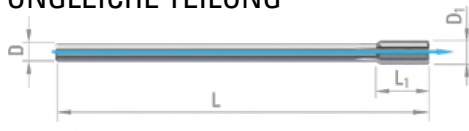
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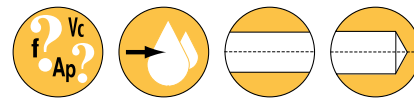
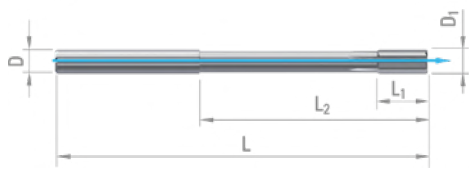
# POLY 4001 - 4001-TC

## REIBAHLEN, RECHTSSCHNEIDEND GERADE, UNGLEICHE TEILUNG

Ref. A



Ref. B



P.462 > Ø2.98

- VHM-Reibahlen mit ungleicher Teilung, gerade genutet und zentraler Innenkühlung, für Sackloch- und Durchgangsbohrungen. Für alle Materialien geeignet.
- Alle Ø mit Toleranz  $\pm 2 \mu\text{m}$  lieferbar durch unseren Express-Service

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLIX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          |    | H  |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            | ○       | ○          | ○    | ○                       | ○  | ○     | ⊙                        | ⊙  |    |                  |    |                  |  |

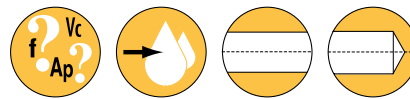
D nom. D<sub>1</sub> L<sub>1</sub> L<sub>2</sub> D<sub>h5</sub> L Z Ref. VHM  
H7 ± 1.5 µm

|              |   |   |   |    |   |   |        |
|--------------|---|---|---|----|---|---|--------|
| 0.40 (0.407) | 3 | 5 | 3 | 38 | 3 | B | 959801 |
| 0.41 (0.417) | 3 | 5 | 3 | 38 | 3 | B | 964623 |
| 0.42 (0.427) | 3 | 5 | 3 | 38 | 3 | B | 959802 |
| 0.43 (0.437) | 3 | 5 | 3 | 38 | 3 | B | 978100 |
| 0.44 (0.447) | 3 | 5 | 3 | 38 | 3 | B | 959803 |
| 0.45 (0.457) | 3 | 5 | 3 | 38 | 3 | B | 954360 |
| 0.46 (0.467) | 3 | 5 | 3 | 38 | 3 | B | 959804 |
| 0.47 (0.477) | 3 | 5 | 3 | 38 | 3 | B | 963057 |
| 0.48 (0.487) | 3 | 5 | 3 | 38 | 3 | B | 959805 |
| 0.49 (0.497) | 3 | 5 | 3 | 38 | 3 | B | 954359 |
| 0.50 (0.507) | 3 | 5 | 3 | 38 | 3 | B | 959662 |
| 0.51 (0.517) | 4 | 6 | 3 | 38 | 3 | B | 200007 |
| 0.52 (0.527) | 4 | 6 | 3 | 38 | 3 | B | 200000 |
| 0.53 (0.537) | 4 | 6 | 3 | 38 | 3 | B | 200004 |
| 0.54 (0.547) | 4 | 6 | 3 | 38 | 3 | B | 200005 |
| 0.55 (0.557) | 4 | 6 | 3 | 38 | 3 | B | 200001 |
| 0.56 (0.567) | 4 | 6 | 3 | 38 | 3 | B | 966312 |
| 0.57 (0.577) | 4 | 6 | 3 | 38 | 3 | B | 326970 |
| 0.58 (0.587) | 4 | 6 | 3 | 38 | 3 | B | 200003 |
| 0.59 (0.597) | 4 | 6 | 3 | 38 | 3 | B | 200006 |
| 0.60 (0.607) | 4 | 6 | 3 | 38 | 3 | B | 200002 |
| 0.61 (0.617) | 4 | 7 | 3 | 38 | 3 | B | 964889 |
| 0.62 (0.627) | 4 | 7 | 3 | 38 | 3 | B | 200010 |
| 0.63 (0.637) | 4 | 7 | 3 | 38 | 3 | B | 965815 |
| 0.64 (0.647) | 4 | 7 | 3 | 38 | 3 | B | 200015 |
| 0.65 (0.657) | 4 | 7 | 3 | 38 | 3 | B | 200008 |

D nom. D<sub>1</sub> L<sub>1</sub> L<sub>2</sub> D<sub>h5</sub> L Z Ref. VHM  
H7 ± 1.5 µm

|              |   |   |   |    |   |   |        |
|--------------|---|---|---|----|---|---|--------|
| 0.66 (0.667) | 4 | 7 | 3 | 38 | 3 | B | 200012 |
| 0.67 (0.677) | 4 | 7 | 3 | 38 | 3 | B | 200013 |
| 0.68 (0.687) | 4 | 7 | 3 | 38 | 3 | B | 200011 |
| 0.69 (0.697) | 4 | 7 | 3 | 38 | 3 | B | 200014 |
| 0.70 (0.707) | 4 | 7 | 3 | 38 | 3 | B | 200009 |
| 0.71 (0.717) | 4 | 8 | 3 | 38 | 3 | B | 955902 |
| 0.72 (0.727) | 4 | 8 | 3 | 38 | 3 | B | 200018 |
| 0.73 (0.737) | 4 | 8 | 3 | 38 | 3 | B | 959571 |
| 0.74 (0.747) | 4 | 8 | 3 | 38 | 3 | B | 200022 |
| 0.75 (0.757) | 4 | 8 | 3 | 38 | 3 | B | 200016 |
| 0.76 (0.767) | 4 | 8 | 3 | 38 | 3 | B | 961872 |
| 0.77 (0.777) | 4 | 8 | 3 | 38 | 3 | B | 200020 |
| 0.78 (0.787) | 4 | 8 | 3 | 38 | 3 | B | 200019 |
| 0.79 (0.797) | 4 | 8 | 3 | 38 | 3 | B | 200021 |
| 0.80 (0.807) | 4 | 8 | 3 | 38 | 3 | B | 200017 |
| 0.81 (0.817) | 5 | 9 | 3 | 38 | 3 | B | 964624 |
| 0.82 (0.827) | 5 | 9 | 3 | 38 | 3 | B | 200025 |
| 0.83 (0.837) | 5 | 9 | 3 | 38 | 3 | B | 200029 |
| 0.84 (0.847) | 5 | 9 | 3 | 38 | 3 | B | 200028 |
| 0.85 (0.857) | 5 | 9 | 3 | 38 | 3 | B | 200023 |
| 0.86 (0.867) | 5 | 9 | 3 | 38 | 3 | B | 200030 |
| 0.87 (0.877) | 5 | 9 | 3 | 38 | 3 | B | 200031 |
| 0.88 (0.887) | 5 | 9 | 3 | 38 | 3 | B | 200026 |
| 0.89 (0.897) | 5 | 9 | 3 | 38 | 3 | B | 200027 |
| 0.90 (0.907) | 5 | 9 | 3 | 38 | 3 | B | 200024 |

REIBAHLEN, RECHTSSCHNEIDEND  
GERADE, UNGLEICHE TEILUNG

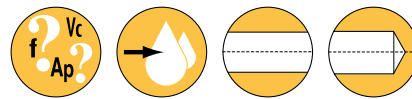


P.462 > Ø2.98

| D nom.<br>H7 | D <sub>1</sub><br>± 1.5 µm | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|--------------|----------------------------|----------------|----------------|-----------------|----|---|------|--------|
| 0.91         | (0.917)                    | 5              | 10             | 3               | 38 | 3 | B    | 200039 |
| 0.92         | (0.927)                    | 5              | 10             | 3               | 38 | 3 | B    | 200035 |
| 0.93         | (0.937)                    | 5              | 10             | 3               | 38 | 3 | B    | 960023 |
| 0.94         | (0.947)                    | 5              | 10             | 3               | 38 | 3 | B    | 963188 |
| 0.95         | (0.957)                    | 5              | 10             | 3               | 38 | 3 | B    | 200034 |
| 0.96         | (0.967)                    | 5              | 10             | 3               | 38 | 3 | B    | 200036 |
| 0.97         | (0.977)                    | 5              | 10             | 3               | 38 | 3 | B    | 200037 |
| 0.98         | (0.987)                    | 5              | 10             | 3               | 38 | 3 | B    | 200032 |
| 0.99         | (0.997)                    | 5              | 10             | 3               | 38 | 3 | B    | 200033 |
| 1.00         | (1.007)                    | 5              | 10             | 3               | 38 | 3 | B    | 200038 |
| 1.01         | (1.017)                    | 5              | 11             | 3               | 38 | 3 | B    | 959800 |
| 1.02         | (1.027)                    | 5              | 11             | 3               | 38 | 3 | B    | 200040 |
| 1.03         | (1.037)                    | 5              | 11             | 3               | 38 | 3 | B    | 966908 |
| 1.04         | (1.047)                    | 5              | 11             | 3               | 38 | 3 | B    | 962626 |
| 1.05         | (1.057)                    | 5              | 11             | 3               | 38 | 3 | B    | 200041 |
| 1.06         | (1.067)                    | 5              | 11             | 3               | 38 | 3 | B    | 966799 |
| 1.07         | (1.077)                    | 5              | 11             | 3               | 38 | 3 | B    | 968047 |
| 1.08         | (1.087)                    | 5              | 11             | 3               | 38 | 3 | B    | 200042 |
| 1.09         | (1.097)                    | 5              | 12             | 3               | 38 | 3 | B    | 955685 |
| 1.10         | (1.107)                    | 5              | 12             | 3               | 38 | 3 | B    | 200045 |
| 1.11         | (1.117)                    | 5              | 12             | 3               | 38 | 3 | B    | 951529 |
| 1.12         | (1.127)                    | 5              | 12             | 3               | 38 | 3 | B    | 951598 |
| 1.13         | (1.137)                    | 5              | 12             | 3               | 38 | 3 | B    | 968503 |
| 1.14         | (1.147)                    | 5              | 12             | 3               | 38 | 3 | B    | 968504 |
| 1.15         | (1.157)                    | 5              | 12             | 3               | 38 | 3 | B    | 200043 |
| 1.16         | (1.167)                    | 5              | 12             | 3               | 38 | 3 | B    | 967147 |
| 1.17         | (1.177)                    | 5              | 12             | 3               | 38 | 3 | B    | 956647 |
| 1.18         | (1.187)                    | 5              | 12             | 3               | 38 | 3 | B    | 67307  |
| 1.19         | (1.197)                    | 5              | 12             | 3               | 38 | 3 | B    | 960753 |
| 1.20         | (1.207)                    | 5              | 12             | 3               | 38 | 3 | B    | 200044 |
| 1.21         | (1.217)                    | 6              | 13             | 3               | 38 | 3 | B    | 67308  |
| 1.22         | (1.227)                    | 6              | 13             | 3               | 38 | 3 | B    | 968605 |
| 1.23         | (1.237)                    | 6              | 13             | 3               | 38 | 3 | B    | 968606 |
| 1.24         | (1.247)                    | 6              | 13             | 3               | 38 | 3 | B    | 968607 |
| 1.25         | (1.257)                    | 6              | 13             | 3               | 38 | 3 | B    | 200046 |
| 1.26         | (1.267)                    | 6              | 13             | 3               | 38 | 3 | B    | 968608 |
| 1.27         | (1.277)                    | 6              | 13             | 3               | 38 | 3 | B    | 964024 |
| 1.28         | (1.287)                    | 6              | 13             | 3               | 38 | 3 | B    | 200048 |
| 1.29         | (1.297)                    | 6              | 13             | 3               | 38 | 3 | B    | 950915 |
| 1.30         | (1.307)                    | 6              | 13             | 3               | 38 | 3 | B    | 200047 |
| 1.31         | (1.317)                    | 6              | 13             | 3               | 38 | 3 | B    | 959472 |
| 1.32         | (1.327)                    | 6              | 13             | 3               | 38 | 3 | B    | 961369 |
| 1.33         | (1.337)                    | 6              | 13             | 3               | 38 | 3 | B    | 961963 |
| 1.34         | (1.347)                    | 6              | 13             | 3               | 38 | 3 | B    | 326971 |
| 1.35         | (1.357)                    | 6              | 13             | 3               | 38 | 3 | B    | 200049 |
| 1.36         | (1.367)                    | 6              | 13             | 3               | 38 | 3 | B    | 968242 |
| 1.37         | (1.377)                    | 6              | 13             | 3               | 38 | 3 | B    | 960591 |

| D nom.<br>H7 | D <sub>1</sub><br>± 1.5 µm | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|--------------|----------------------------|----------------|----------------|-----------------|----|---|------|--------|
| 1.38         | (1.387)                    | 6              | 13             | 3               | 38 | 3 | B    | 966541 |
| 1.39         | (1.397)                    | 6              | 13             | 3               | 38 | 3 | B    | 960202 |
| 1.40         | (1.407)                    | 6              | 13             | 3               | 38 | 3 | B    | 200050 |
| 1.41         | (1.417)                    | 7              | 15             | 3               | 38 | 3 | B    | 957425 |
| 1.42         | (1.427)                    | 7              | 15             | 3               | 38 | 3 | B    | 955757 |
| 1.43         | (1.437)                    | 7              | 15             | 3               | 38 | 3 | B    | 955746 |
| 1.44         | (1.447)                    | 7              | 15             | 3               | 38 | 3 | B    | 961345 |
| 1.45         | (1.457)                    | 7              | 15             | 3               | 38 | 3 | B    | 200053 |
| 1.46         | (1.467)                    | 7              | 15             | 3               | 38 | 3 | B    | 66791  |
| 1.47         | (1.477)                    | 7              | 15             | 3               | 38 | 3 | B    | 961456 |
| 1.48         | (1.487)                    | 7              | 15             | 3               | 38 | 3 | B    | 200051 |
| 1.49         | (1.497)                    | 7              | 15             | 3               | 38 | 3 | B    | 200052 |
| 1.50         | (1.507)                    | 7              | 15             | 3               | 38 | 3 | B    | 200054 |
| 1.51         | (1.517)                    | 7              | 15             | 3               | 50 | 3 | B    | 200104 |
| 1.52         | (1.527)                    | 7              | 15             | 3               | 50 | 3 | B    | 200105 |
| 1.53         | (1.537)                    | 7              | 15             | 3               | 50 | 3 | B    | 960836 |
| 1.54         | (1.547)                    | 7              | 15             | 3               | 50 | 3 | B    | 63795  |
| 1.55         | (1.557)                    | 7              | 15             | 3               | 50 | 3 | B    | 200125 |
| 1.56         | (1.567)                    | 7              | 15             | 3               | 50 | 3 | B    | 973910 |
| 1.57         | (1.577)                    | 7              | 15             | 3               | 50 | 3 | B    | 963006 |
| 1.58         | (1.587)                    | 7              | 15             | 3               | 50 | 3 | B    | 961472 |
| 1.59         | (1.597)                    | 7              | 15             | 3               | 50 | 3 | B    | 959620 |
| 1.60         | (1.607)                    | 7              | 15             | 3               | 50 | 3 | B    | 200111 |
| 1.61         | (1.617)                    | 7              | 16             | 3               | 50 | 3 | B    | 59391  |
| 1.62         | (1.627)                    | 7              | 16             | 3               | 50 | 3 | B    | 955366 |
| 1.63         | (1.637)                    | 7              | 16             | 3               | 50 | 3 | B    | 326972 |
| 1.64         | (1.647)                    | 7              | 16             | 3               | 50 | 3 | B    | 326973 |
| 1.65         | (1.657)                    | 7              | 16             | 3               | 50 | 3 | B    | 200124 |
| 1.66         | (1.667)                    | 7              | 16             | 3               | 50 | 3 | B    | 991141 |
| 1.67         | (1.677)                    | 7              | 16             | 3               | 50 | 3 | B    | 965451 |
| 1.68         | (1.687)                    | 7              | 16             | 3               | 50 | 3 | B    | 326974 |
| 1.69         | (1.697)                    | 7              | 16             | 3               | 50 | 3 | B    | 952172 |
| 1.70         | (1.707)                    | 7              | 16             | 3               | 50 | 3 | B    | 200126 |
| 1.71         | (1.717)                    | 7              | 17             | 3               | 50 | 3 | B    | 66359  |
| 1.72         | (1.727)                    | 7              | 17             | 3               | 50 | 3 | B    | 959573 |
| 1.73         | (1.737)                    | 7              | 17             | 3               | 50 | 3 | B    | 326975 |
| 1.74         | (1.747)                    | 7              | 17             | 3               | 50 | 3 | B    | 968498 |
| 1.75         | (1.757)                    | 7              | 17             | 3               | 50 | 3 | B    | 200127 |
| 1.76         | (1.767)                    | 7              | 17             | 3               | 50 | 3 | B    | 974605 |
| 1.77         | (1.777)                    | 7              | 17             | 3               | 50 | 3 | B    | 961458 |
| 1.78         | (1.787)                    | 7              | 17             | 3               | 50 | 3 | B    | 63459  |
| 1.79         | (1.797)                    | 7              | 17             | 3               | 50 | 3 | B    | 200146 |
| 1.80         | (1.807)                    | 7              | 17             | 3               | 50 | 3 | B    | 200112 |
| 1.81         | (1.817)                    | 8              | 17             | 3               | 50 | 3 | B    | 962183 |
| 1.82         | (1.827)                    | 8              | 17             | 3               | 50 | 3 | B    | 960953 |
| 1.83         | (1.837)                    | 8              | 17             | 3               | 50 | 3 | B    | 951867 |
| 1.84         | (1.847)                    | 8              | 17             | 3               | 50 | 3 | B    | 326976 |

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GERADE, UNGLEICHE TEILUNG

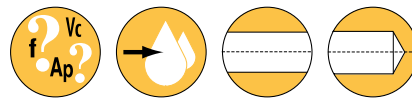


P.462 > Ø2.98

| D nom.<br>H7 | D <sub>1</sub><br>± 1.5 µm | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|--------------|----------------------------|----------------|----------------|-----------------|----|---|------|--------|
| 1.85         | (1.857)                    | 8              | 17             | 3               | 50 | 3 | B    | 200113 |
| 1.86         | (1.867)                    | 8              | 17             | 3               | 50 | 3 | B    | 964274 |
| 1.87         | (1.877)                    | 8              | 17             | 3               | 50 | 3 | B    | 326977 |
| 1.88         | (1.887)                    | 8              | 17             | 3               | 50 | 3 | B    | 954731 |
| 1.89         | (1.897)                    | 8              | 17             | 3               | 50 | 3 | B    | 200137 |
| 1.90         | (1.907)                    | 8              | 17             | 3               | 50 | 3 | B    | 200114 |
| 1.91         | (1.917)                    | 8              | 18             | 3               | 50 | 3 | B    | 982028 |
| 1.92         | (1.927)                    | 8              | 18             | 3               | 50 | 3 | B    | 326978 |
| 1.93         | (1.937)                    | 8              | 18             | 3               | 50 | 3 | B    | 326979 |
| 1.94         | (1.947)                    | 8              | 18             | 3               | 50 | 3 | B    | 67301  |
| 1.95         | (1.957)                    | 8              | 18             | 3               | 50 | 3 | B    | 200115 |
| 1.96         | (1.967)                    | 8              | 18             | 3               | 50 | 3 | B    | 200145 |
| 1.97         | (1.977)                    | 8              | 18             | 3               | 50 | 3 | B    | 200106 |
| 1.98         | (1.987)                    | 8              | 18             | 3               | 50 | 3 | B    | 200107 |
| 1.99         | (1.997)                    | 8              | 18             | 3               | 50 | 3 | B    | 200108 |
| 2.00         | (2.007)                    | 8              | 18             | 3               | 50 | 3 | B    | 200102 |
| 2.01         | (2.017)                    | 8              | 18             | 3               | 50 | 3 | B    | 200109 |
| 2.02         | (2.027)                    | 8              | 18             | 3               | 50 | 3 | B    | 200110 |
| 2.03         | (2.037)                    | 8              | 18             | 3               | 50 | 3 | B    | 63271  |
| 2.04         | (2.047)                    | 8              | 18             | 3               | 50 | 3 | B    | 200147 |
| 2.05         | (2.057)                    | 8              | 18             | 3               | 50 | 3 | B    | 200121 |
| 2.06         | (2.067)                    | 8              | 18             | 3               | 50 | 3 | B    | 954744 |
| 2.07         | (2.077)                    | 8              | 18             | 3               | 50 | 3 | B    | 63796  |
| 2.08         | (2.087)                    | 8              | 18             | 3               | 50 | 3 | B    | 57717  |
| 2.09         | (2.097)                    | 8              | 18             | 3               | 50 | 3 | B    | 957058 |
| 2.10         | (2.107)                    | 8              | 18             | 3               | 50 | 3 | B    | 200144 |
| 2.11         | (2.117)                    | 8              | 18             | 3               | 50 | 3 | B    | 952428 |
| 2.12         | (2.127)                    | 8              | 18             | 3               | 50 | 3 | B    | 952429 |
| 2.13         | (2.137)                    | 8              | 18             | 3               | 50 | 3 | B    | 967590 |
| 2.14         | (2.147)                    | 8              | 18             | 3               | 50 | 3 | B    | 968815 |
| 2.15         | (2.157)                    | 8              | 18             | 3               | 50 | 3 | B    | 200120 |
| 2.16         | (2.167)                    | 8              | 18             | 3               | 50 | 3 | B    | 968156 |
| 2.17         | (2.177)                    | 8              | 18             | 3               | 50 | 3 | B    | 959096 |
| 2.18         | (2.187)                    | 8              | 18             | 3               | 50 | 3 | B    | 968449 |
| 2.19         | (2.197)                    | 8              | 18             | 3               | 50 | 3 | B    | 952213 |
| 2.20         | (2.207)                    | 8              | 18             | 3               | 50 | 3 | B    | 200139 |
| 2.21         | (2.217)                    | 8              | 18             | 3               | 50 | 3 | B    | 968816 |
| 2.22         | (2.227)                    | 8              | 18             | 3               | 50 | 3 | B    | 953362 |
| 2.23         | (2.237)                    | 8              | 18             | 3               | 50 | 3 | B    | 326980 |
| 2.24         | (2.247)                    | 8              | 18             | 3               | 50 | 3 | B    | 326981 |
| 2.25         | (2.257)                    | 8              | 18             | 3               | 50 | 3 | B    | 200119 |
| 2.26         | (2.267)                    | 8              | 18             | 3               | 50 | 3 | B    | 326982 |
| 2.27         | (2.277)                    | 8              | 18             | 3               | 50 | 3 | B    | 956015 |
| 2.28         | (2.287)                    | 8              | 18             | 3               | 50 | 3 | B    | 326983 |
| 2.29         | (2.297)                    | 8              | 18             | 3               | 50 | 3 | B    | 985826 |
| 2.30         | (2.307)                    | 8              | 18             | 3               | 50 | 3 | B    | 200131 |
| 2.31         | (2.317)                    | 10             | 20             | 3               | 50 | 3 | B    | 951944 |

| D nom.<br>H7 | D <sub>1</sub><br>± 1.5 µm | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|--------------|----------------------------|----------------|----------------|-----------------|----|---|------|--------|
| 2.32         | (2.327)                    | 10             | 20             | 3               | 50 | 3 | B    | 200135 |
| 2.33         | (2.337)                    | 10             | 20             | 3               | 50 | 3 | B    | 957326 |
| 2.34         | (2.347)                    | 10             | 20             | 3               | 50 | 3 | B    | 956298 |
| 2.35         | (2.357)                    | 10             | 20             | 3               | 50 | 3 | B    | 200130 |
| 2.36         | (2.367)                    | 10             | 20             | 3               | 50 | 3 | B    | 955027 |
| 2.37         | (2.377)                    | 10             | 20             | 3               | 50 | 3 | B    | 958068 |
| 2.38         | (2.387)                    | 10             | 20             | 3               | 50 | 3 | B    | 962361 |
| 2.39         | (2.397)                    | 10             | 20             | 3               | 50 | 3 | B    | 965907 |
| 2.40         | (2.407)                    | 10             | 20             | 3               | 50 | 3 | B    | 200129 |
| 2.41         | (2.417)                    | 10             | 20             | 3               | 50 | 3 | B    | 950038 |
| 2.42         | (2.427)                    | 10             | 20             | 3               | 50 | 3 | B    | 950039 |
| 2.43         | (2.437)                    | 10             | 20             | 3               | 50 | 3 | B    | 955020 |
| 2.44         | (2.447)                    | 10             | 20             | 3               | 50 | 3 | B    | 962239 |
| 2.45         | (2.457)                    | 10             | 20             | 3               | 50 | 3 | B    | 200128 |
| 2.46         | (2.467)                    | 10             | 20             | 3               | 50 | 3 | B    | 326984 |
| 2.47         | (2.477)                    | 10             | 20             | 3               | 50 | 3 | B    | 959535 |
| 2.48         | (2.487)                    | 10             | 20             | 3               | 50 | 3 | B    | 200140 |
| 2.49         | (2.497)                    | 10             | 20             | 3               | 50 | 3 | B    | 200141 |
| 2.50         | (2.507)                    | 10             | 20             | 3               | 50 | 3 | B    | 200103 |
| 2.51         | (2.517)                    | 10             | 20             | 3               | 61 | 4 | B    | 200142 |
| 2.52         | (2.527)                    | 10             | 20             | 3               | 61 | 4 | B    | 200143 |
| 2.53         | (2.537)                    | 10             | 20             | 3               | 61 | 4 | B    | 954733 |
| 2.54         | (2.547)                    | 10             | 20             | 3               | 61 | 4 | B    | 955042 |
| 2.55         | (2.557)                    | 10             | 20             | 3               | 61 | 4 | B    | 200118 |
| 2.56         | (2.567)                    | 10             | 20             | 3               | 61 | 4 | B    | 326985 |
| 2.57         | (2.577)                    | 10             | 20             | 3               | 61 | 4 | B    | 326986 |
| 2.58         | (2.587)                    | 10             | 20             | 3               | 61 | 4 | B    | 958772 |
| 2.59         | (2.597)                    | 10             | 20             | 3               | 61 | 4 | B    | 971141 |
| 2.60         | (2.607)                    | 10             | 20             | 3               | 61 | 4 | B    | 200117 |
| 2.61         | (2.617)                    | 10             | 25             | 3               | 61 | 4 | B    | 970909 |
| 2.62         | (2.627)                    | 10             | 25             | 3               | 61 | 4 | B    | 952158 |
| 2.63         | (2.637)                    | 10             | 25             | 3               | 61 | 4 | B    | 326987 |
| 2.64         | (2.647)                    | 10             | 25             | 3               | 61 | 4 | B    | 962551 |
| 2.65         | (2.657)                    | 10             | 25             | 3               | 61 | 4 | B    | 200116 |
| 2.66         | (2.667)                    | 10             | 25             | 3               | 61 | 4 | B    | 954075 |
| 2.67         | (2.677)                    | 10             | 25             | 3               | 61 | 4 | B    | 200136 |
| 2.68         | (2.687)                    | 10             | 25             | 3               | 61 | 4 | B    | 954450 |
| 2.69         | (2.697)                    | 10             | 25             | 3               | 61 | 4 | B    | 991586 |
| 2.70         | (2.707)                    | 10             | 25             | 3               | 61 | 4 | B    | 200123 |
| 2.71         | (2.717)                    | 10             | 25             | 3               | 61 | 4 | B    | 954783 |
| 2.72         | (2.727)                    | 10             | 25             | 3               | 61 | 4 | B    | 326988 |
| 2.73         | (2.737)                    | 10             | 25             | 3               | 61 | 4 | B    | 326989 |
| 2.74         | (2.747)                    | 10             | 25             | 3               | 61 | 4 | B    | 969786 |
| 2.75         | (2.757)                    | 10             | 25             | 3               | 61 | 4 | B    | 200122 |
| 2.76         | (2.767)                    | 10             | 25             | 3               | 61 | 4 | B    | 326990 |
| 2.77         | (2.777)                    | 10             | 25             | 3               | 61 | 4 | B    | 326991 |
| 2.78         | (2.787)                    | 10             | 25             | 3               | 61 | 4 | B    | 954734 |

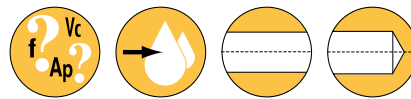
REIBAHLEN, RECHTSSCHNEIDEND  
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| D nom.<br>H7 | D <sub>1</sub><br>± 1.5 µm | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|--------------|----------------------------|----------------|----------------|-----------------|----|---|------|--------|
| 2.79         | (2.797)                    | 10             | 25             | 3               | 61 | 4 | B    | 965219 |
| 2.80         | (2.807)                    | 10             | 25             | 3               | 61 | 4 | B    | 200138 |
| 2.81         | (2.817)                    | 10             | 25             | 3               | 61 | 4 | B    | 953881 |
| 2.82         | (2.827)                    | 10             | 25             | 3               | 61 | 4 | B    | 960888 |
| 2.83         | (2.837)                    | 10             | 25             | 3               | 61 | 4 | B    | 326992 |
| 2.84         | (2.847)                    | 10             | 25             | 3               | 61 | 4 | B    | 326993 |
| 2.85         | (2.857)                    | 10             | 25             | 3               | 61 | 4 | B    | 200132 |
| 2.86         | (2.867)                    | 10             | 25             | 3               | 61 | 4 | B    | 326994 |
| 2.87         | (2.877)                    | 10             | 25             | 3               | 61 | 4 | B    | 326995 |
| 2.88         | (2.887)                    | 10             | 25             | 3               | 61 | 4 | B    | 326996 |
| 2.89         | (2.897)                    | 10             | 25             | 3               | 61 | 4 | B    | 953937 |
| 2.90         | (2.907)                    | 10             | 25             | 3               | 61 | 4 | B    | 200133 |
| 2.91         | (2.917)                    | 10             | 25             | 3               | 61 | 4 | B    | 964090 |
| 2.92         | (2.927)                    | 10             | 25             | 3               | 61 | 4 | B    | 66683  |
| 2.93         | (2.937)                    | 10             | 25             | 3               | 61 | 4 | B    | 326997 |
| 2.94         | (2.947)                    | 10             | 25             | 3               | 61 | 4 | B    | 326998 |
| 2.95         | (2.957)                    | 10             | 25             | 3               | 61 | 4 | B    | 200134 |
| 2.96         | (2.967)                    | 10             | 25             | 3               | 61 | 4 | B    | 961012 |
| 2.97         | (2.977)                    | 10             | 25             | 3               | 61 | 4 | B    | 959664 |
| 2.98         | (2.987)                    | 10             | 25             | 3               | 70 | 6 | B    | 321202 |
| 2.99         | (2.997)                    | 10             | 25             | 3               | 70 | 6 | B    | 321203 |
| 3.00         | (3.007)                    | 10             | 25             | 3               | 70 | 6 | B    | 321204 |
| 3.01         | (3.018)                    | 10             | 25             | 3               | 70 | 6 | B    | 321205 |
| 3.02         | (3.028)                    | 10             | 25             | 3               | 70 | 6 | B    | 321206 |
| 3.03         | (3.038)                    | 10             | 25             | 3               | 70 | 6 | B    | 321207 |
| 3.04         | (3.048)                    | 10             | 25             | 3               | 70 | 6 | B    | 321208 |
| 3.05         | (3.058)                    | 10             | 25             | 3               | 70 | 6 | B    | 321209 |
| 3.06         | (3.068)                    | 10             | 25             | 3               | 70 | 6 | B    | 321210 |
| 3.07         | (3.078)                    | 10             | 25             | 3               | 70 | 6 | B    | 321211 |
| 3.08         | (3.088)                    | 10             | 25             | 3               | 70 | 6 | B    | 321212 |
| 3.09         | (3.098)                    | 10             | 25             | 3               | 70 | 6 | B    | 321213 |
| 3.10         | (3.108)                    | 10             | -              | 3               | 70 | 6 | A    | 321214 |
| 3.11         | (3.118)                    | 10             | -              | 3               | 70 | 6 | A    | 321215 |
| 3.12         | (3.128)                    | 10             | -              | 3               | 70 | 6 | A    | 321216 |
| 3.13         | (3.138)                    | 10             | -              | 3               | 70 | 6 | A    | 321217 |
| 3.14         | (3.148)                    | 10             | -              | 3               | 70 | 6 | A    | 321218 |
| 3.15         | (3.158)                    | 10             | -              | 3               | 70 | 6 | A    | 321219 |
| 3.16         | (3.168)                    | 10             | -              | 3               | 70 | 6 | A    | 321220 |
| 3.17         | (3.178)                    | 10             | -              | 3               | 70 | 6 | A    | 321221 |
| 3.18         | (3.188)                    | 10             | -              | 3               | 70 | 6 | A    | 321222 |
| 3.19         | (3.198)                    | 10             | -              | 3               | 70 | 6 | A    | 321223 |
| 3.20         | (3.208)                    | 10             | -              | 3               | 70 | 6 | A    | 321224 |
| 3.21         | (3.218)                    | 10             | -              | 3               | 70 | 6 | A    | 321225 |
| 3.22         | (3.228)                    | 10             | -              | 3               | 70 | 6 | A    | 321226 |
| 3.23         | (3.238)                    | 10             | -              | 3               | 70 | 6 | A    | 321227 |
| 3.24         | (3.248)                    | 10             | -              | 3               | 70 | 6 | A    | 321228 |
| 3.25         | (3.258)                    | 10             | -              | 3               | 70 | 6 | A    | 321229 |

| D nom.<br>H7 | D <sub>1</sub><br>± 1.5 µm | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|--------------|----------------------------|----------------|----------------|-----------------|----|---|------|--------|
| 3.26         | (3.268)                    | 10             | -              | 3               | 70 | 6 | A    | 321230 |
| 3.27         | (3.278)                    | 10             | -              | 3               | 70 | 6 | A    | 321231 |
| 3.28         | (3.288)                    | 10             | -              | 3               | 70 | 6 | A    | 321232 |
| 3.29         | (3.298)                    | 10             | -              | 3               | 70 | 6 | A    | 321233 |
| 3.30         | (3.308)                    | 10             | -              | 3               | 70 | 6 | A    | 321234 |
| 3.31         | (3.318)                    | 10             | -              | 3               | 70 | 6 | A    | 321235 |
| 3.32         | (3.328)                    | 10             | -              | 3               | 70 | 6 | A    | 321236 |
| 3.33         | (3.338)                    | 10             | -              | 3               | 70 | 6 | A    | 321237 |
| 3.34         | (3.348)                    | 10             | -              | 3               | 70 | 6 | A    | 321238 |
| 3.35         | (3.358)                    | 10             | -              | 3               | 70 | 6 | A    | 321239 |
| 3.36         | (3.368)                    | 10             | -              | 3               | 70 | 6 | A    | 321240 |
| 3.37         | (3.378)                    | 10             | -              | 3               | 70 | 6 | A    | 321241 |
| 3.38         | (3.388)                    | 10             | -              | 3               | 70 | 6 | A    | 321242 |
| 3.39         | (3.398)                    | 10             | -              | 3               | 70 | 6 | A    | 321243 |
| 3.40         | (3.408)                    | 10             | -              | 3               | 70 | 6 | A    | 321244 |
| 3.41         | (3.418)                    | 10             | -              | 3               | 70 | 6 | A    | 321245 |
| 3.42         | (3.428)                    | 10             | -              | 3               | 70 | 6 | A    | 321246 |
| 3.43         | (3.438)                    | 10             | -              | 3               | 70 | 6 | A    | 321247 |
| 3.44         | (3.448)                    | 10             | -              | 3               | 70 | 6 | A    | 321248 |
| 3.45         | (3.458)                    | 10             | -              | 3               | 70 | 6 | A    | 321249 |
| 3.46         | (3.468)                    | 10             | -              | 3               | 70 | 6 | A    | 321250 |
| 3.47         | (3.478)                    | 10             | -              | 3               | 70 | 6 | A    | 321251 |
| 3.48         | (3.488)                    | 10             | -              | 3               | 70 | 6 | A    | 321252 |
| 3.49         | (3.498)                    | 10             | -              | 3               | 70 | 6 | A    | 321253 |
| 3.50         | (3.508)                    | 10             | -              | 3               | 70 | 6 | A    | 321254 |
| 3.51         | (3.518)                    | 10             | -              | 3               | 70 | 6 | A    | 321255 |
| 3.52         | (3.528)                    | 10             | -              | 3               | 70 | 6 | A    | 321256 |
| 3.53         | (3.538)                    | 10             | -              | 3               | 70 | 6 | A    | 321257 |
| 3.54         | (3.548)                    | 10             | -              | 3               | 70 | 6 | A    | 321258 |
| 3.55         | (3.558)                    | 10             | -              | 3               | 70 | 6 | A    | 321259 |
| 3.56         | (3.568)                    | 10             | -              | 3               | 70 | 6 | A    | 321260 |
| 3.57         | (3.578)                    | 10             | -              | 3               | 70 | 6 | A    | 321261 |
| 3.58         | (3.588)                    | 10             | -              | 3               | 70 | 6 | A    | 321262 |
| 3.59         | (3.598)                    | 10             | -              | 3               | 70 | 6 | A    | 321263 |
| 3.60         | (3.608)                    | 10             | -              | 3               | 70 | 6 | A    | 321264 |
| 3.61         | (3.618)                    | 10             | -              | 3               | 70 | 6 | A    | 321265 |
| 3.62         | (3.628)                    | 10             | -              | 3               | 70 | 6 | A    | 321266 |
| 3.63         | (3.638)                    | 10             | -              | 3               | 70 | 6 | A    | 321267 |
| 3.64         | (3.648)                    | 10             | -              | 3               | 70 | 6 | A    | 321268 |
| 3.65         | (3.658)                    | 10             | -              | 3               | 70 | 6 | A    | 321269 |
| 3.66         | (3.668)                    | 10             | -              | 3               | 70 | 6 | A    | 321270 |
| 3.67         | (3.678)                    | 10             | -              | 3               | 70 | 6 | A    | 321271 |
| 3.68         | (3.688)                    | 10             | -              | 3               | 70 | 6 | A    | 321272 |
| 3.69         | (3.698)                    | 10             | -              | 3               | 70 | 6 | A    | 321273 |
| 3.70         | (3.708)                    | 10             | -              | 3               | 70 | 6 | A    | 321274 |
| 3.71         | (3.718)                    | 10             | -              | 3               | 70 | 6 | A    | 321275 |
| 3.72         | (3.728)                    | 10             | -              | 3               | 70 | 6 | A    | 321276 |



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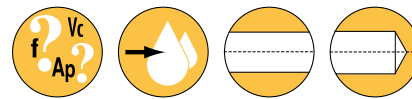
REIBAHLEN, RECHTSSCHNEIDEND  
GERADE, UNGLEICHE TEILUNG

| D nom.<br>H7 | D <sub>1</sub><br>± 1.5 µm | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|--------------|----------------------------|----------------|----------------|-----------------|----|---|------|--------|
| 3.73         | (3.738)                    | 10             | -              | 3               | 70 | 6 | A    | 321277 |
| 3.74         | (3.748)                    | 10             | -              | 3               | 70 | 6 | A    | 321278 |
| 3.75         | (3.758)                    | 10             | -              | 3               | 70 | 6 | A    | 321279 |
| 3.76         | (3.768)                    | 10             | -              | 3               | 70 | 6 | A    | 321280 |
| 3.77         | (3.778)                    | 10             | -              | 3               | 70 | 6 | A    | 321281 |
| 3.78         | (3.788)                    | 10             | -              | 3               | 70 | 6 | A    | 321282 |
| 3.79         | (3.798)                    | 10             | -              | 3               | 70 | 6 | A    | 321283 |
| 3.80         | (3.808)                    | 10             | -              | 3               | 70 | 6 | A    | 321284 |
| 3.81         | (3.818)                    | 10             | -              | 3               | 70 | 6 | A    | 321285 |
| 3.82         | (3.828)                    | 10             | -              | 3               | 70 | 6 | A    | 321286 |
| 3.83         | (3.838)                    | 10             | -              | 3               | 70 | 6 | A    | 321287 |
| 3.84         | (3.848)                    | 10             | -              | 3               | 70 | 6 | A    | 321288 |
| 3.85         | (3.858)                    | 10             | -              | 3               | 70 | 6 | A    | 321289 |
| 3.86         | (3.868)                    | 10             | -              | 3               | 70 | 6 | A    | 321290 |
| 3.87         | (3.878)                    | 10             | -              | 3               | 70 | 6 | A    | 321291 |
| 3.88         | (3.888)                    | 10             | -              | 3               | 70 | 6 | A    | 321292 |
| 3.89         | (3.898)                    | 10             | -              | 3               | 70 | 6 | A    | 321293 |
| 3.90         | (3.908)                    | 10             | -              | 3               | 70 | 6 | A    | 321294 |
| 3.91         | (3.918)                    | 10             | -              | 3               | 70 | 6 | A    | 321295 |
| 3.92         | (3.928)                    | 10             | -              | 3               | 70 | 6 | A    | 321296 |
| 3.93         | (3.938)                    | 10             | -              | 3               | 70 | 6 | A    | 321297 |
| 3.94         | (3.948)                    | 10             | -              | 3               | 70 | 6 | A    | 321298 |
| 3.95         | (3.958)                    | 10             | -              | 3               | 70 | 6 | A    | 321299 |
| 3.96         | (3.968)                    | 10             | -              | 3               | 70 | 6 | A    | 321300 |
| 3.97         | (3.978)                    | 10             | -              | 3               | 70 | 6 | A    | 321301 |
| 3.98         | (3.988)                    | 10             | -              | 3               | 70 | 6 | A    | 321302 |
| 3.99         | (3.998)                    | 10             | -              | 3               | 70 | 6 | A    | 321303 |
| 4.00         | (4.008)                    | 10             | -              | 3               | 70 | 6 | A    | 321304 |
| 4.01         | (4.018)                    | 10             | -              | 3               | 70 | 6 | A    | 321305 |
| 4.02         | (4.028)                    | 10             | -              | 3               | 70 | 6 | A    | 321306 |
| 4.03         | (4.038)                    | 10             | -              | 3               | 70 | 6 | A    | 321307 |
| 4.04         | (4.048)                    | 10             | -              | 3               | 70 | 6 | A    | 321308 |
| 4.05         | (4.058)                    | 10             | -              | 3               | 70 | 6 | A    | 321309 |
| 4.06         | (4.068)                    | 10             | -              | 3               | 70 | 6 | A    | 321310 |
| 4.07         | (4.078)                    | 10             | -              | 3               | 70 | 6 | A    | 321311 |
| 4.08         | (4.088)                    | 10             | -              | 3               | 70 | 6 | A    | 321312 |
| 4.09         | (4.098)                    | 10             | -              | 3               | 70 | 6 | A    | 321313 |
| 4.10         | (4.108)                    | 10             | -              | 3               | 70 | 6 | A    | 420528 |
| 4.11         | (4.118)                    | 10             | -              | 3               | 70 | 6 | A    | 420529 |
| 4.12         | (4.128)                    | 10             | -              | 3               | 70 | 6 | A    | 420530 |
| 4.13         | (4.138)                    | 10             | -              | 3               | 70 | 6 | A    | 420531 |
| 4.14         | (4.148)                    | 10             | -              | 3               | 70 | 6 | A    | 420532 |
| 4.15         | (4.158)                    | 10             | -              | 3               | 70 | 6 | A    | 420533 |
| 4.16         | (4.168)                    | 10             | -              | 3               | 70 | 6 | A    | 420534 |
| 4.17         | (4.178)                    | 10             | -              | 3               | 70 | 6 | A    | 420535 |
| 4.18         | (4.188)                    | 10             | -              | 3               | 70 | 6 | A    | 420536 |
| 4.19         | (4.198)                    | 10             | -              | 3               | 70 | 6 | A    | 420537 |

| D nom.<br>H7 | D <sub>1</sub><br>± 1.5 µm | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|--------------|----------------------------|----------------|----------------|-----------------|----|---|------|--------|
| 4.20         | (4.208)                    | 12             | -              | 4               | 80 | 6 | A    | 321324 |
| 4.21         | (4.218)                    | 12             | -              | 4               | 80 | 6 | A    | 321325 |
| 4.22         | (4.228)                    | 12             | -              | 4               | 80 | 6 | A    | 321326 |
| 4.23         | (4.238)                    | 12             | -              | 4               | 80 | 6 | A    | 321327 |
| 4.24         | (4.248)                    | 12             | -              | 4               | 80 | 6 | A    | 321328 |
| 4.25         | (4.258)                    | 12             | -              | 4               | 80 | 6 | A    | 321329 |
| 4.26         | (4.268)                    | 12             | -              | 4               | 80 | 6 | A    | 321330 |
| 4.27         | (4.278)                    | 12             | -              | 4               | 80 | 6 | A    | 321331 |
| 4.28         | (4.288)                    | 12             | -              | 4               | 80 | 6 | A    | 321332 |
| 4.29         | (4.298)                    | 12             | -              | 4               | 80 | 6 | A    | 321333 |
| 4.30         | (4.308)                    | 12             | -              | 4               | 80 | 6 | A    | 321334 |
| 4.31         | (4.318)                    | 12             | -              | 4               | 80 | 6 | A    | 321335 |
| 4.32         | (4.328)                    | 12             | -              | 4               | 80 | 6 | A    | 321336 |
| 4.33         | (4.338)                    | 12             | -              | 4               | 80 | 6 | A    | 321337 |
| 4.34         | (4.348)                    | 12             | -              | 4               | 80 | 6 | A    | 321338 |
| 4.35         | (4.358)                    | 12             | -              | 4               | 80 | 6 | A    | 321339 |
| 4.36         | (4.368)                    | 12             | -              | 4               | 80 | 6 | A    | 321340 |
| 4.37         | (4.378)                    | 12             | -              | 4               | 80 | 6 | A    | 321341 |
| 4.38         | (4.388)                    | 12             | -              | 4               | 80 | 6 | A    | 321342 |
| 4.39         | (4.398)                    | 12             | -              | 4               | 80 | 6 | A    | 321343 |
| 4.40         | (4.408)                    | 12             | -              | 4               | 80 | 6 | A    | 321344 |
| 4.41         | (4.418)                    | 12             | -              | 4               | 80 | 6 | A    | 321345 |
| 4.42         | (4.428)                    | 12             | -              | 4               | 80 | 6 | A    | 321346 |
| 4.43         | (4.438)                    | 12             | -              | 4               | 80 | 6 | A    | 321347 |
| 4.44         | (4.448)                    | 12             | -              | 4               | 80 | 6 | A    | 321348 |
| 4.45         | (4.458)                    | 12             | -              | 4               | 80 | 6 | A    | 321349 |
| 4.46         | (4.468)                    | 12             | -              | 4               | 80 | 6 | A    | 321350 |
| 4.47         | (4.478)                    | 12             | -              | 4               | 80 | 6 | A    | 321351 |
| 4.48         | (4.488)                    | 12             | -              | 4               | 80 | 6 | A    | 321352 |
| 4.49         | (4.498)                    | 12             | -              | 4               | 80 | 6 | A    | 321353 |
| 4.50         | (4.508)                    | 12             | -              | 4               | 80 | 6 | A    | 321354 |
| 4.51         | (4.518)                    | 12             | -              | 4               | 80 | 6 | A    | 321355 |
| 4.52         | (4.528)                    | 12             | -              | 4               | 80 | 6 | A    | 321356 |
| 4.53         | (4.538)                    | 12             | -              | 4               | 80 | 6 | A    | 321357 |
| 4.54         | (4.548)                    | 12             | -              | 4               | 80 | 6 | A    | 321358 |
| 4.55         | (4.558)                    | 12             | -              | 4               | 80 | 6 | A    | 321359 |
| 4.56         | (4.568)                    | 12             | -              | 4               | 80 | 6 | A    | 321360 |
| 4.57         | (4.578)                    | 12             | -              | 4               | 80 | 6 | A    | 321361 |
| 4.58         | (4.588)                    | 12             | -              | 4               | 80 | 6 | A    | 321362 |
| 4.59         | (4.598)                    | 12             | -              | 4               | 80 | 6 | A    | 321363 |
| 4.60         | (4.608)                    | 12             | -              | 4               | 80 | 6 | A    | 321364 |
| 4.61         | (4.618)                    | 12             | -              | 4               | 80 | 6 | A    | 321365 |
| 4.62         | (4.628)                    | 12             | -              | 4               | 80 | 6 | A    | 321366 |
| 4.63         | (4.638)                    | 12             | -              | 4               | 80 | 6 | A    | 321367 |
| 4.64         | (4.648)                    | 12             | -              | 4               | 80 | 6 | A    | 321368 |
| 4.65         | (4.658)                    | 12             | -              | 4               | 80 | 6 | A    | 321369 |
| 4.66         | (4.668)                    | 12             | -              | 4               | 80 | 6 | A    | 321370 |



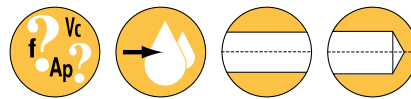
REIBAHLEN, RECHTSSCHNEIDEND  
GERADE, UNGLEICHE TEILUNG



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| D nom.<br>H7 | D <sub>1</sub><br>± 1.5 µm | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|--------------|----------------------------|----------------|----------------|-----------------|----|---|------|--------|
| 4.67         | (4.678)                    | 12             | -              | 4               | 80 | 6 | A    | 321371 |
| 4.68         | (4.688)                    | 12             | -              | 4               | 80 | 6 | A    | 321372 |
| 4.69         | (4.698)                    | 12             | -              | 4               | 80 | 6 | A    | 321373 |
| 4.70         | (4.708)                    | 12             | -              | 4               | 80 | 6 | A    | 321374 |
| 4.71         | (4.718)                    | 12             | -              | 4               | 80 | 6 | A    | 321375 |
| 4.72         | (4.728)                    | 12             | -              | 4               | 80 | 6 | A    | 321376 |
| 4.73         | (4.738)                    | 12             | -              | 4               | 80 | 6 | A    | 321377 |
| 4.74         | (4.748)                    | 12             | -              | 4               | 80 | 6 | A    | 321378 |
| 4.75         | (4.758)                    | 12             | -              | 4               | 80 | 6 | A    | 321379 |
| 4.76         | (4.768)                    | 12             | -              | 4               | 80 | 6 | A    | 321380 |
| 4.77         | (4.778)                    | 12             | -              | 4               | 80 | 6 | A    | 321381 |
| 4.78         | (4.788)                    | 12             | -              | 4               | 80 | 6 | A    | 321382 |
| 4.79         | (4.798)                    | 12             | -              | 4               | 80 | 6 | A    | 321383 |
| 4.80         | (4.808)                    | 12             | -              | 4               | 80 | 6 | A    | 321384 |
| 4.81         | (4.818)                    | 12             | -              | 4               | 80 | 6 | A    | 321385 |
| 4.82         | (4.828)                    | 12             | -              | 4               | 80 | 6 | A    | 321386 |
| 4.83         | (4.838)                    | 12             | -              | 4               | 80 | 6 | A    | 321387 |
| 4.84         | (4.848)                    | 12             | -              | 4               | 80 | 6 | A    | 321388 |
| 4.85         | (4.858)                    | 12             | -              | 4               | 80 | 6 | A    | 321389 |
| 4.86         | (4.868)                    | 12             | -              | 4               | 80 | 6 | A    | 321390 |
| 4.87         | (4.878)                    | 12             | -              | 4               | 80 | 6 | A    | 321391 |
| 4.88         | (4.888)                    | 12             | -              | 4               | 80 | 6 | A    | 321392 |
| 4.89         | (4.898)                    | 12             | -              | 4               | 80 | 6 | A    | 321393 |
| 4.90         | (4.908)                    | 12             | -              | 4               | 80 | 6 | A    | 321394 |
| 4.91         | (4.918)                    | 12             | -              | 4               | 80 | 6 | A    | 321395 |
| 4.92         | (4.928)                    | 12             | -              | 4               | 80 | 6 | A    | 321396 |
| 4.93         | (4.938)                    | 12             | -              | 4               | 80 | 6 | A    | 321397 |
| 4.94         | (4.948)                    | 12             | -              | 4               | 80 | 6 | A    | 321398 |
| 4.95         | (4.958)                    | 12             | -              | 4               | 80 | 6 | A    | 321399 |
| 4.96         | (4.968)                    | 12             | -              | 4               | 80 | 6 | A    | 321400 |
| 4.97         | (4.978)                    | 12             | -              | 4               | 80 | 6 | A    | 321401 |
| 4.98         | (4.988)                    | 12             | -              | 4               | 80 | 6 | A    | 321402 |
| 4.99         | (4.998)                    | 12             | -              | 4               | 80 | 6 | A    | 321403 |
| 5.00         | (5.008)                    | 12             | -              | 4               | 80 | 6 | A    | 321404 |
| 5.01         | (5.018)                    | 12             | -              | 4               | 80 | 6 | A    | 321405 |
| 5.02         | (5.028)                    | 12             | -              | 4               | 80 | 6 | A    | 321406 |
| 5.03         | (5.038)                    | 12             | -              | 4               | 80 | 6 | A    | 321407 |
| 5.04         | (5.048)                    | 12             | -              | 4               | 80 | 6 | A    | 321408 |
| 5.05         | (5.058)                    | 12             | -              | 4               | 80 | 6 | A    | 321409 |
| 5.06         | (5.068)                    | 12             | -              | 4               | 80 | 6 | A    | 321410 |
| 5.07         | (5.078)                    | 12             | -              | 4               | 80 | 6 | A    | 321411 |
| 5.08         | (5.088)                    | 12             | -              | 4               | 80 | 6 | A    | 321412 |
| 5.09         | (5.098)                    | 12             | -              | 4               | 80 | 6 | A    | 321413 |
| 5.10         | (5.108)                    | 12             | -              | 4               | 80 | 6 | A    | 321414 |
| 5.11         | (5.118)                    | 12             | -              | 4               | 80 | 6 | A    | 321415 |
| 5.12         | (5.128)                    | 12             | -              | 4               | 80 | 6 | A    | 321416 |
| 5.13         | (5.138)                    | 12             | -              | 4               | 80 | 6 | A    | 321417 |

| D nom.<br>H7 | D <sub>1</sub><br>± 1.5 µm | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|--------------|----------------------------|----------------|----------------|-----------------|----|---|------|--------|
| 5.14         | (5.148)                    | 12             | -              | 4               | 80 | 6 | A    | 321418 |
| 5.15         | (5.158)                    | 12             | -              | 4               | 80 | 6 | A    | 321419 |
| 5.16         | (5.168)                    | 12             | -              | 4               | 80 | 6 | A    | 321420 |
| 5.17         | (5.178)                    | 12             | -              | 4               | 80 | 6 | A    | 321421 |
| 5.18         | (5.188)                    | 12             | -              | 4               | 80 | 6 | A    | 321422 |
| 5.19         | (5.198)                    | 12             | -              | 4               | 80 | 6 | A    | 321423 |
| 5.20         | (5.208)                    | 12             | -              | 4               | 80 | 6 | A    | 321424 |
| 5.21         | (5.218)                    | 12             | -              | 4               | 80 | 6 | A    | 321425 |
| 5.22         | (5.228)                    | 12             | -              | 4               | 80 | 6 | A    | 321426 |
| 5.23         | (5.238)                    | 12             | -              | 4               | 80 | 6 | A    | 321427 |
| 5.24         | (5.248)                    | 12             | -              | 4               | 80 | 6 | A    | 321428 |
| 5.25         | (5.258)                    | 12             | -              | 4               | 80 | 6 | A    | 321429 |
| 5.26         | (5.268)                    | 12             | -              | 4               | 80 | 6 | A    | 321430 |
| 5.27         | (5.278)                    | 12             | -              | 4               | 80 | 6 | A    | 321431 |
| 5.28         | (5.288)                    | 12             | -              | 4               | 80 | 6 | A    | 321432 |
| 5.29         | (5.298)                    | 12             | -              | 4               | 80 | 6 | A    | 321433 |
| 5.30         | (5.308)                    | 12             | -              | 4               | 80 | 6 | A    | 321434 |
| 5.31         | (5.318)                    | 12             | -              | 4               | 80 | 6 | A    | 321435 |
| 5.32         | (5.328)                    | 12             | -              | 4               | 80 | 6 | A    | 321436 |
| 5.33         | (5.338)                    | 12             | -              | 4               | 80 | 6 | A    | 321437 |
| 5.34         | (5.348)                    | 12             | -              | 4               | 80 | 6 | A    | 321438 |
| 5.35         | (5.358)                    | 12             | -              | 4               | 80 | 6 | A    | 321439 |
| 5.36         | (5.368)                    | 12             | -              | 4               | 80 | 6 | A    | 321440 |
| 5.37         | (5.378)                    | 12             | -              | 4               | 80 | 6 | A    | 321441 |
| 5.38         | (5.388)                    | 12             | -              | 4               | 80 | 6 | A    | 321442 |
| 5.39         | (5.398)                    | 12             | -              | 4               | 80 | 6 | A    | 321443 |
| 5.40         | (5.408)                    | 12             | -              | 4               | 80 | 6 | A    | 321444 |
| 5.41         | (5.418)                    | 12             | -              | 4               | 80 | 6 | A    | 321445 |
| 5.42         | (5.428)                    | 12             | -              | 4               | 80 | 6 | A    | 321446 |
| 5.43         | (5.438)                    | 12             | -              | 4               | 80 | 6 | A    | 321447 |
| 5.44         | (5.448)                    | 12             | -              | 4               | 80 | 6 | A    | 321448 |
| 5.45         | (5.458)                    | 12             | -              | 4               | 80 | 6 | A    | 321449 |
| 5.46         | (5.468)                    | 12             | -              | 4               | 80 | 6 | A    | 321450 |
| 5.47         | (5.478)                    | 12             | -              | 4               | 80 | 6 | A    | 321451 |
| 5.48         | (5.488)                    | 12             | -              | 4               | 80 | 6 | A    | 321452 |
| 5.49         | (5.498)                    | 12             | -              | 4               | 80 | 6 | A    | 321453 |
| 5.50         | (5.508)                    | 12             | -              | 4               | 80 | 6 | A    | 321454 |
| 5.51         | (5.518)                    | 12             | -              | 4               | 80 | 6 | A    | 321455 |
| 5.52         | (5.528)                    | 12             | -              | 4               | 80 | 6 | A    | 321456 |
| 5.53         | (5.538)                    | 12             | -              | 4               | 80 | 6 | A    | 321457 |
| 5.54         | (5.548)                    | 12             | -              | 4               | 80 | 6 | A    | 321458 |
| 5.55         | (5.558)                    | 12             | -              | 4               | 80 | 6 | A    | 321459 |
| 5.56         | (5.568)                    | 12             | -              | 4               | 80 | 6 | A    | 321460 |
| 5.57         | (5.578)                    | 12             | -              | 4               | 80 | 6 | A    | 321461 |
| 5.58         | (5.588)                    | 12             | -              | 4               | 80 | 6 | A    | 321462 |
| 5.59         | (5.598)                    | 12             | -              | 4               | 80 | 6 | A    | 321463 |
| 5.60         | (5.608)                    | 12             | -              | 4               | 80 | 6 | A    | 321464 |



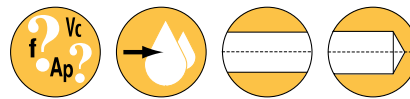
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REIBAHLEN, RECHTSSCHNEIDEND  
GERADE, UNGLEICHE TEILUNG

| D nom. | D <sub>1</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|--------|----------------|----------------|----------------|-----------------|----|---|------|--------|
| H7     | ± 1.5 µm       |                |                |                 |    |   |      |        |
| 5.61   | (5.618)        | 12             | -              | 4               | 80 | 6 | A    | 321465 |
| 5.62   | (5.628)        | 12             | -              | 4               | 80 | 6 | A    | 321466 |
| 5.63   | (5.638)        | 12             | -              | 4               | 80 | 6 | A    | 321467 |
| 5.64   | (5.648)        | 12             | -              | 4               | 80 | 6 | A    | 321468 |
| 5.65   | (5.658)        | 12             | -              | 4               | 80 | 6 | A    | 321469 |
| 5.66   | (5.668)        | 12             | -              | 4               | 80 | 6 | A    | 321470 |
| 5.67   | (5.678)        | 12             | -              | 4               | 80 | 6 | A    | 321471 |
| 5.68   | (5.688)        | 12             | -              | 4               | 80 | 6 | A    | 321472 |
| 5.69   | (5.698)        | 12             | -              | 4               | 80 | 6 | A    | 321473 |
| 5.70   | (5.708)        | 12             | -              | 4               | 80 | 6 | A    | 321474 |
| 5.71   | (5.718)        | 12             | -              | 4               | 80 | 6 | A    | 321475 |
| 5.72   | (5.728)        | 12             | -              | 4               | 80 | 6 | A    | 321476 |
| 5.73   | (5.738)        | 12             | -              | 4               | 80 | 6 | A    | 321477 |
| 5.74   | (5.748)        | 12             | -              | 4               | 80 | 6 | A    | 321478 |
| 5.75   | (5.758)        | 12             | -              | 4               | 80 | 6 | A    | 321479 |
| 5.76   | (5.768)        | 12             | -              | 4               | 80 | 6 | A    | 321480 |
| 5.77   | (5.778)        | 12             | -              | 4               | 80 | 6 | A    | 321481 |
| 5.78   | (5.788)        | 12             | -              | 4               | 80 | 6 | A    | 321482 |
| 5.79   | (5.798)        | 12             | -              | 4               | 80 | 6 | A    | 321483 |
| 5.80   | (5.808)        | 12             | -              | 4               | 80 | 6 | A    | 321484 |
| 5.81   | (5.818)        | 12             | -              | 4               | 80 | 6 | A    | 321485 |
| 5.82   | (5.828)        | 12             | -              | 4               | 80 | 6 | A    | 321486 |
| 5.83   | (5.838)        | 12             | -              | 4               | 80 | 6 | A    | 321487 |
| 5.84   | (5.848)        | 12             | -              | 4               | 80 | 6 | A    | 321488 |
| 5.85   | (5.858)        | 12             | -              | 4               | 80 | 6 | A    | 321489 |
| 5.86   | (5.868)        | 12             | -              | 4               | 80 | 6 | A    | 321490 |
| 5.87   | (5.878)        | 12             | -              | 4               | 80 | 6 | A    | 321491 |
| 5.88   | (5.888)        | 12             | -              | 4               | 80 | 6 | A    | 321492 |
| 5.89   | (5.898)        | 12             | -              | 4               | 80 | 6 | A    | 321493 |
| 5.90   | (5.908)        | 12             | -              | 4               | 80 | 6 | A    | 321494 |
| 5.91   | (5.918)        | 12             | -              | 4               | 80 | 6 | A    | 321495 |
| 5.92   | (5.928)        | 12             | -              | 4               | 80 | 6 | A    | 321496 |
| 5.93   | (5.938)        | 12             | -              | 4               | 80 | 6 | A    | 321497 |
| 5.94   | (5.948)        | 12             | -              | 4               | 80 | 6 | A    | 321498 |
| 5.95   | (5.958)        | 12             | -              | 4               | 80 | 6 | A    | 321499 |
| 5.96   | (5.968)        | 12             | -              | 4               | 80 | 6 | A    | 321500 |
| 5.97   | (5.978)        | 12             | -              | 4               | 80 | 6 | A    | 321501 |
| 5.98   | (5.988)        | 12             | -              | 4               | 80 | 6 | A    | 321502 |
| 5.99   | (5.998)        | 12             | -              | 4               | 80 | 6 | A    | 321503 |
| 6.00   | (6.008)        | 12             | -              | 4               | 80 | 6 | A    | 321504 |
| 6.01   | (6.020)        | 12             | -              | 4               | 80 | 6 | A    | 321505 |
| 6.02   | (6.030)        | 12             | -              | 4               | 80 | 6 | A    | 321506 |
| 6.03   | (6.040)        | 12             | -              | 4               | 80 | 6 | A    | 321507 |
| 6.04   | (6.050)        | 12             | -              | 4               | 80 | 6 | A    | 321508 |
| 6.05   | (6.060)        | 12             | -              | 4               | 80 | 6 | A    | 321509 |
| 6.06   | (6.070)        | 12             | -              | 4               | 80 | 6 | A    | 321510 |
| 6.07   | (6.080)        | 12             | -              | 4               | 80 | 6 | A    | 321511 |

| D nom. | D <sub>1</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L   | Z | Ref. | VHM    |
|--------|----------------|----------------|----------------|-----------------|-----|---|------|--------|
| H7     | ± 1.5 µm       |                |                |                 |     |   |      |        |
| 6.08   | (6.090)        | 12             | -              | 4               | 80  | 6 | A    | 321512 |
| 6.09   | (6.100)        | 12             | -              | 4               | 80  | 6 | A    | 321513 |
| 6.10   | (6.110)        | 12             | -              | 4               | 80  | 6 | A    | 321514 |
| 6.11   | (6.120)        | 12             | -              | 4               | 80  | 6 | A    | 321515 |
| 6.12   | (6.130)        | 12             | -              | 4               | 80  | 6 | A    | 321516 |
| 6.13   | (6.140)        | 12             | -              | 4               | 80  | 6 | A    | 321517 |
| 6.14   | (6.150)        | 12             | -              | 4               | 80  | 6 | A    | 321518 |
| 6.15   | (6.160)        | 12             | -              | 4               | 80  | 6 | A    | 321519 |
| 6.16   | (6.170)        | 12             | -              | 4               | 80  | 6 | A    | 321520 |
| 6.17   | (6.180)        | 12             | -              | 4               | 80  | 6 | A    | 321521 |
| 6.18   | (6.190)        | 12             | -              | 4               | 80  | 6 | A    | 321522 |
| 6.19   | (6.200)        | 12             | -              | 4               | 80  | 6 | A    | 321523 |
| 6.20   | (6.210)        | 16             | -              | 6               | 101 | 6 | A    | 341670 |
| 6.30   | (6.310)        | 16             | -              | 6               | 101 | 6 | A    | 341680 |
| 6.35   | (6.360)        | 16             | -              | 6               | 101 | 6 | A    | 341685 |
| 6.40   | (6.410)        | 16             | -              | 6               | 101 | 6 | A    | 341690 |
| 6.48   | (6.490)        | 16             | -              | 6               | 101 | 6 | A    | 341698 |
| 6.49   | (6.500)        | 16             | -              | 6               | 101 | 6 | A    | 341699 |
| 6.50   | (6.510)        | 16             | -              | 6               | 101 | 6 | A    | 341700 |
| 6.51   | (6.520)        | 16             | -              | 6               | 101 | 6 | A    | 341701 |
| 6.52   | (6.530)        | 16             | -              | 6               | 101 | 6 | A    | 341702 |
| 6.55   | (6.560)        | 16             | -              | 6               | 101 | 6 | A    | 341705 |
| 6.60   | (6.610)        | 16             | -              | 6               | 101 | 6 | A    | 341710 |
| 6.70   | (6.710)        | 16             | -              | 6               | 101 | 6 | A    | 341720 |
| 6.80   | (6.810)        | 16             | -              | 6               | 101 | 6 | A    | 341730 |
| 6.90   | (6.910)        | 16             | -              | 6               | 101 | 6 | A    | 341740 |
| 7.00   | (7.010)        | 16             | -              | 6               | 101 | 6 | A    | 341750 |
| 7.01   | (7.020)        | 16             | -              | 6               | 101 | 6 | A    | 341751 |
| 7.02   | (7.030)        | 16             | -              | 6               | 101 | 6 | A    | 341752 |
| 7.10   | (7.110)        | 16             | -              | 6               | 101 | 6 | A    | 341760 |
| 7.20   | (7.210)        | 16             | -              | 6               | 101 | 6 | A    | 341770 |
| 7.30   | (7.310)        | 16             | -              | 6               | 101 | 6 | A    | 341780 |
| 7.40   | (7.410)        | 16             | -              | 6               | 101 | 6 | A    | 341790 |
| 7.50   | (7.510)        | 16             | -              | 6               | 101 | 6 | A    | 341800 |
| 7.60   | (7.610)        | 16             | -              | 6               | 101 | 6 | A    | 341810 |
| 7.70   | (7.710)        | 16             | -              | 6               | 101 | 6 | A    | 341820 |
| 7.80   | (7.810)        | 16             | -              | 6               | 101 | 6 | A    | 341830 |
| 7.90   | (7.910)        | 16             | -              | 6               | 101 | 6 | A    | 341840 |
| 7.98   | (7.990)        | 16             | -              | 6               | 101 | 6 | A    | 341848 |
| 7.99   | (8.000)        | 16             | -              | 6               | 101 | 6 | A    | 341849 |
| 8.00   | (8.010)        | 16             | -              | 6               | 101 | 6 | A    | 341850 |
| 8.01   | (8.020)        | 16             | -              | 6               | 101 | 6 | A    | 341851 |
| 8.02   | (8.030)        | 16             | -              | 6               | 101 | 6 | A    | 341852 |
| 8.05   | (8.060)        | 16             | -              | 6               | 101 | 6 | A    | 341855 |
| 8.10   | (8.110)        | 16             | -              | 6               | 101 | 6 | A    | 420538 |
| 8.20   | (8.210)        | 16             | -              | 8               | 117 | 6 | A    | 420539 |
| 8.30   | (8.310)        | 16             | -              | 8               | 117 | 6 | A    | 420540 |

# POLY 4001 - 4001-TC



P.462 > Ø2.98

## REIBAHLEN, RECHTSSCHNEIDEND GERADE, UNGLEICHE TEILUNG

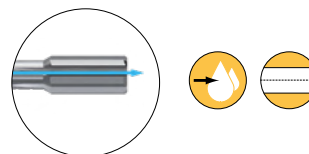
| D nom.<br>H7 | D <sub>1</sub><br>± 1.5 µm | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L   | Z | Ref. | VHM    |
|--------------|----------------------------|----------------|----------------|-----------------|-----|---|------|--------|
| 8.40         | (8.410)                    | 16             | -              | 8               | 117 | 6 | A    | 420541 |
| 8.50         | (8.510)                    | 16             | -              | 8               | 117 | 6 | A    | 420542 |
| 8.70         | (8.710)                    | 16             | -              | 8               | 117 | 6 | A    | 420543 |
| 9.00         | (9.010)                    | 16             | -              | 8               | 117 | 6 | A    | 420544 |
| 9.30         | (9.310)                    | 16             | -              | 8               | 117 | 6 | A    | 420545 |
| 9.50         | (9.510)                    | 16             | -              | 8               | 117 | 6 | A    | 420546 |
| 9.70         | (9.710)                    | 16             | -              | 8               | 117 | 6 | A    | 420547 |
| 9.98         | (9.990)                    | 16             | -              | 8               | 117 | 6 | A    | 420548 |
| 9.99         | (10.000)                   | 16             | -              | 8               | 117 | 6 | A    | 420549 |
| 10.00        | (10.010)                   | 16             | -              | 8               | 117 | 6 | A    | 420550 |
| 10.01        | (10.022)                   | 16             | -              | 8               | 117 | 6 | A    | 420551 |
| 10.02        | (10.032)                   | 16             | -              | 8               | 117 | 6 | A    | 420552 |
| 10.04        | (10.052)                   | 16             | -              | 8               | 117 | 6 | A    | 420553 |
| 10.05        | (10.062)                   | 16             | -              | 8               | 117 | 6 | A    | 420554 |
| 10.10        | (10.112)                   | 16             | -              | 8               | 117 | 6 | A    | 420555 |
| 10.40        | (10.412)                   | 19             | -              | 10              | 133 | 6 | A    | 420556 |
| 10.50        | (10.512)                   | 19             | -              | 10              | 133 | 6 | A    | 420557 |
| 10.60        | (10.612)                   | 19             | -              | 10              | 133 | 6 | A    | 420558 |
| 11.00        | (11.012)                   | 19             | -              | 10              | 133 | 6 | A    | 420559 |
| 11.50        | (11.512)                   | 19             | -              | 10              | 133 | 6 | A    | 420560 |
| 11.80        | (11.812)                   | 19             | -              | 10              | 133 | 6 | A    | 420561 |
| 12.00        | (12.012)                   | 19             | -              | 10              | 133 | 6 | A    | 420562 |
| 12.02        | (12.032)                   | 19             | -              | 10              | 133 | 6 | A    | 420563 |

Alle Ø mit Toleranz ±2 µm lieferbar  
durch unseren Express-Service

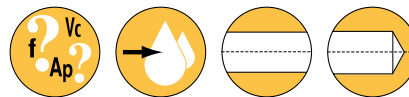
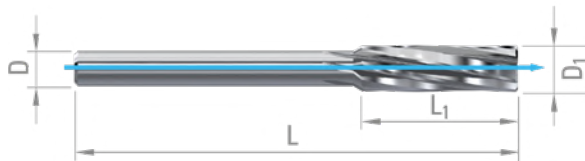
### POLY 4001



### POLY 4001-TC



AUTOMATENREIBAHLEN,  
RECHTSSCHNEIDEND, RECHTSSPIRALISIERT



P.462

- VHM-Reibahlen, Drallwinkel rechts, rechtsschneidend, ungleiche Teilung und zentraler Innenkühlung. Für Sacklochbohrungen und langspanende Materialien.
- Geeignet für Bohrungen mit Hinterschneidungen.
- Alle Ø mit Toleranz ±2 µm lieferbar durch unseren Express-Service

○ gut    ⊙ ausgezeichnet

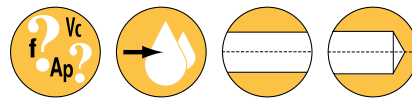
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                   |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|-------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX /PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ○                                   | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            | ⊙    | ⊙                       | ○  | ○     | ○                        | ⊙  | ⊙                |    |                  |    |  |

| D nom.<br>H7 | D <sub>1</sub><br>± 1.5 µm | L <sub>1</sub> | D <sub>h5</sub> | L  | Z | VHM    |
|--------------|----------------------------|----------------|-----------------|----|---|--------|
| 2.97         | (2.977)                    | 20             | 2.5             | 56 | 4 | 969074 |
| 2.99         | (2.997)                    | 20             | 2.5             | 56 | 4 | 969379 |
| 3.00         | (3.007)                    | 20             | 2.5             | 56 | 4 | 969382 |
| 3.01         | (3.018)                    | 20             | 2.5             | 56 | 4 | 969398 |
| 3.02         | (3.028)                    | 20             | 2.5             | 56 | 4 | 969399 |
| 3.05         | (3.058)                    | 20             | 2.5             | 56 | 4 | 969400 |
| 3.08         | (3.088)                    | 20             | 2.5             | 56 | 4 | 969401 |
| 3.10         | (3.108)                    | 20             | 2.5             | 56 | 4 | 969402 |
| 3.11         | (3.118)                    | 20             | 2.5             | 56 | 4 | 969403 |
| 3.15         | (3.158)                    | 20             | 2.5             | 56 | 4 | 969404 |
| 3.18         | (3.188)                    | 20             | 2.5             | 56 | 4 | 969405 |
| 3.20         | (3.208)                    | 20             | 2.5             | 56 | 4 | 969406 |
| 3.21         | (3.218)                    | 20             | 2.5             | 56 | 4 | 969407 |
| 3.25         | (3.258)                    | 20             | 2.5             | 56 | 4 | 969408 |
| 3.28         | (3.288)                    | 20             | 2.5             | 56 | 4 | 969409 |
| 3.30         | (3.308)                    | 20             | 2.5             | 56 | 4 | 969410 |
| 3.31         | (3.318)                    | 20             | 2.5             | 56 | 4 | 969411 |
| 3.35         | (3.358)                    | 20             | 2.5             | 56 | 4 | 969412 |
| 3.38         | (3.388)                    | 20             | 2.5             | 56 | 4 | 969413 |
| 3.40         | (3.408)                    | 20             | 2.5             | 56 | 4 | 969414 |
| 3.41         | (3.418)                    | 20             | 2.5             | 56 | 4 | 969415 |
| 3.45         | (3.458)                    | 20             | 2.5             | 56 | 4 | 969416 |
| 3.49         | (3.498)                    | 20             | 2.5             | 56 | 4 | 969417 |
| 3.50         | (3.508)                    | 20             | 3.0             | 56 | 4 | 969418 |
| 3.51         | (3.518)                    | 20             | 3.0             | 56 | 4 | 969421 |

| D nom.<br>H7 | D <sub>1</sub><br>± 1.5 µm | L <sub>1</sub> | D <sub>h5</sub> | L  | Z | VHM    |
|--------------|----------------------------|----------------|-----------------|----|---|--------|
| 3.55         | (3.558)                    | 20             | 3.0             | 56 | 4 | 969422 |
| 3.58         | (3.588)                    | 20             | 3.0             | 56 | 4 | 969423 |
| 3.60         | (3.608)                    | 20             | 3.0             | 56 | 4 | 969424 |
| 3.61         | (3.618)                    | 20             | 3.0             | 56 | 4 | 969425 |
| 3.65         | (3.658)                    | 20             | 3.0             | 56 | 4 | 969426 |
| 3.68         | (3.688)                    | 20             | 3.0             | 56 | 4 | 969427 |
| 3.70         | (3.708)                    | 20             | 3.0             | 56 | 4 | 969428 |
| 3.71         | (3.718)                    | 20             | 3.0             | 56 | 4 | 969429 |
| 3.75         | (3.758)                    | 20             | 3.0             | 56 | 4 | 969430 |
| 3.78         | (3.788)                    | 20             | 3.0             | 56 | 4 | 969431 |
| 3.80         | (3.808)                    | 20             | 3.0             | 56 | 4 | 969432 |
| 3.85         | (3.858)                    | 20             | 3.0             | 56 | 4 | 969433 |
| 3.90         | (3.908)                    | 20             | 3.0             | 56 | 4 | 969434 |
| 3.95         | (3.958)                    | 20             | 3.0             | 56 | 4 | 969435 |
| 4.00         | (4.008)                    | 20             | 3.0             | 56 | 4 | 969436 |
| 4.04         | (4.048)                    | 22             | 3.5             | 63 | 6 | 993718 |
| 4.10         | (4.108)                    | 22             | 3.5             | 63 | 6 | 969437 |
| 4.20         | (4.208)                    | 22             | 3.5             | 63 | 6 | 969438 |
| 4.30         | (4.308)                    | 22             | 3.5             | 63 | 6 | 969439 |
| 4.40         | (4.408)                    | 22             | 3.5             | 63 | 6 | 969440 |
| 4.50         | (4.508)                    | 22             | 4.0             | 63 | 6 | 969441 |
| 4.60         | (4.608)                    | 22             | 4.0             | 63 | 6 | 969442 |
| 4.70         | (4.708)                    | 22             | 4.0             | 63 | 6 | 969443 |
| 4.80         | (4.808)                    | 22             | 4.0             | 63 | 6 | 969444 |
| 4.90         | (4.908)                    | 22             | 4.0             | 63 | 6 | 969445 |

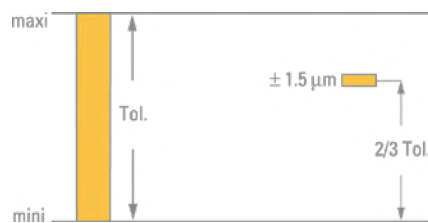
AUTOMATENREIBBAHLEN,  
RECHTSSCHNEIDEND, RECHTSSPIRALISIERT



P.462

| D nom.<br>H7 | D <sub>1</sub><br>± 1.5 µm | L <sub>1</sub> | D <sub>h5</sub> | L  | Z | VHM    |
|--------------|----------------------------|----------------|-----------------|----|---|--------|
| 5.00         | (5.008)                    | 22             | 4.0             | 63 | 6 | 969446 |
| 5.10         | (5.108)                    | 22             | 4.0             | 63 | 6 | 969447 |
| 5.20         | (5.208)                    | 22             | 4.0             | 63 | 6 | 969448 |
| 5.30         | (5.308)                    | 22             | 4.0             | 63 | 6 | 969449 |
| 5.40         | (5.408)                    | 22             | 4.0             | 63 | 6 | 969450 |
| 5.50         | (5.508)                    | 22             | 5.0             | 63 | 6 | 969451 |
| 5.60         | (5.608)                    | 22             | 5.0             | 63 | 6 | 969452 |
| 5.70         | (5.708)                    | 22             | 5.0             | 63 | 6 | 969453 |
| 5.80         | (5.808)                    | 22             | 5.0             | 63 | 6 | 969454 |
| 5.90         | (5.908)                    | 22             | 5.0             | 63 | 6 | 969455 |
| 6.00         | (6.008)                    | 22             | 5.0             | 63 | 6 | 969456 |
| 6.10         | (6.110)                    | 22             | 5.0             | 63 | 6 | 969457 |
| 6.20         | (6.210)                    | 22             | 5.0             | 63 | 6 | 969458 |
| 6.30         | (6.310)                    | 22             | 5.0             | 63 | 6 | 969459 |
| 6.40         | (6.410)                    | 22             | 5.0             | 63 | 6 | 969460 |
| 6.50         | (6.510)                    | 22             | 5.0             | 63 | 6 | 969461 |

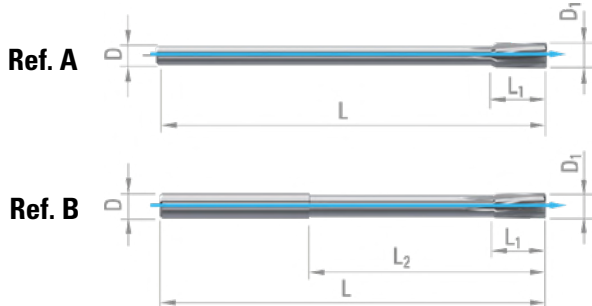
**Alle Ø mit Toleranz ±2 µm lieferbar  
durch unseren Express-Service**





P.462 > Ø2.97

REIBAHLEN, RECHTSSCHNEIDEND  
LINKS SPIRALISIERT



- VHM-Reibahlen, linker Drallwinkel, rechtsschneidend, ungleiche Teilung für Durchgangsbohrungen. Für alle Materialien geeignet.
- Alle Ø mit Toleranz ±2 µm lieferbar durch unseren Express-Service

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                   |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|-------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX /PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
|                        | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ○                                   | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |  |
|                        | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            | ⊙    | ⊙                       | ○  | ○     | ○                        | ○  | ⊙                | ⊙  |                  |    |  |  |

| D <sub>10/+0.003</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|------------------------|----------------|----------------|-----------------|----|---|------|--------|
| 0.37                   | 3              | 5              | 3               | 38 | 3 | B    | 983079 |
| 0.38                   | 3              | 5              | 3               | 38 | 3 | B    | 326999 |
| 0.39                   | 3              | 5              | 3               | 38 | 3 | B    | 969543 |
| 0.40                   | 3              | 5              | 3               | 38 | 3 | B    | 200716 |
| 0.41                   | 3              | 5              | 3               | 38 | 3 | B    | 963823 |
| 0.42                   | 3              | 5              | 3               | 38 | 3 | B    | 200717 |
| 0.43                   | 3              | 5              | 3               | 38 | 3 | B    | 327000 |
| 0.44                   | 3              | 5              | 3               | 38 | 3 | B    | 200718 |
| 0.45                   | 3              | 5              | 3               | 38 | 3 | B    | 965207 |
| 0.46                   | 3              | 5              | 3               | 38 | 3 | B    | 200719 |
| 0.47                   | 3              | 5              | 3               | 38 | 3 | B    | 327001 |
| 0.48                   | 3              | 5              | 3               | 38 | 3 | B    | 200720 |
| 0.49                   | 3              | 5              | 3               | 38 | 3 | B    | 963716 |
| 0.50                   | 3              | 5              | 3               | 38 | 3 | B    | 200746 |
| 0.51                   | 4              | 6              | 3               | 38 | 3 | B    | 200745 |
| 0.52                   | 4              | 6              | 3               | 38 | 3 | B    | 200738 |
| 0.53                   | 4              | 6              | 3               | 38 | 3 | B    | 200742 |
| 0.54                   | 4              | 6              | 3               | 38 | 3 | B    | 200743 |
| 0.55                   | 4              | 6              | 3               | 38 | 3 | B    | 200739 |
| 0.56                   | 4              | 6              | 3               | 38 | 3 | B    | 968834 |
| 0.57                   | 4              | 6              | 3               | 38 | 3 | B    | 973253 |
| 0.58                   | 4              | 6              | 3               | 38 | 3 | B    | 200741 |
| 0.59                   | 4              | 6              | 3               | 38 | 3 | B    | 200744 |
| 0.60                   | 4              | 6              | 3               | 38 | 3 | B    | 200740 |
| 0.61                   | 4              | 7              | 3               | 38 | 3 | B    | 964652 |
| 0.62                   | 4              | 7              | 3               | 38 | 3 | B    | 200750 |
| 0.63                   | 4              | 7              | 3               | 38 | 3 | B    | 327002 |
| 0.64                   | 4              | 7              | 3               | 38 | 3 | B    | 200755 |
| 0.65                   | 4              | 7              | 3               | 38 | 3 | B    | 200748 |
| 0.66                   | 4              | 7              | 3               | 38 | 3 | B    | 200752 |

| D <sub>10/+0.003</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|------------------------|----------------|----------------|-----------------|----|---|------|--------|
| 0.67                   | 4              | 7              | 3               | 38 | 3 | B    | 200753 |
| 0.68                   | 4              | 7              | 3               | 38 | 3 | B    | 200751 |
| 0.69                   | 4              | 7              | 3               | 38 | 3 | B    | 200754 |
| 0.70                   | 4              | 7              | 3               | 38 | 3 | B    | 200749 |
| 0.71                   | 4              | 8              | 3               | 38 | 3 | B    | 965167 |
| 0.72                   | 4              | 8              | 3               | 38 | 3 | B    | 200758 |
| 0.73                   | 4              | 8              | 3               | 38 | 3 | B    | 327003 |
| 0.74                   | 4              | 8              | 3               | 38 | 3 | B    | 200762 |
| 0.75                   | 4              | 8              | 3               | 38 | 3 | B    | 200756 |
| 0.76                   | 4              | 8              | 3               | 38 | 3 | B    | 327004 |
| 0.77                   | 4              | 8              | 3               | 38 | 3 | B    | 200760 |
| 0.78                   | 4              | 8              | 3               | 38 | 3 | B    | 200759 |
| 0.79                   | 4              | 8              | 3               | 38 | 3 | B    | 200761 |
| 0.80                   | 4              | 8              | 3               | 38 | 3 | B    | 200757 |
| 0.81                   | 5              | 9              | 3               | 38 | 3 | B    | 965168 |
| 0.82                   | 5              | 9              | 3               | 38 | 3 | B    | 200765 |
| 0.83                   | 5              | 9              | 3               | 38 | 3 | B    | 200769 |
| 0.84                   | 5              | 9              | 3               | 38 | 3 | B    | 200768 |
| 0.85                   | 5              | 9              | 3               | 38 | 3 | B    | 200763 |
| 0.86                   | 5              | 9              | 3               | 38 | 3 | B    | 200770 |
| 0.87                   | 5              | 9              | 3               | 38 | 3 | B    | 200771 |
| 0.88                   | 5              | 9              | 3               | 38 | 3 | B    | 200766 |
| 0.89                   | 5              | 9              | 3               | 38 | 3 | B    | 200767 |
| 0.90                   | 5              | 9              | 3               | 38 | 3 | B    | 200764 |
| 0.91                   | 5              | 10             | 3               | 38 | 3 | B    | 200733 |
| 0.92                   | 5              | 10             | 3               | 38 | 3 | B    | 200729 |
| 0.93                   | 5              | 10             | 3               | 38 | 3 | B    | 327005 |
| 0.94                   | 5              | 10             | 3               | 38 | 3 | B    | 327006 |
| 0.95                   | 5              | 10             | 3               | 38 | 3 | B    | 200728 |
| 0.96                   | 5              | 10             | 3               | 38 | 3 | B    | 200730 |

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| D <sub>10/+0.003</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|------------------------|----------------|----------------|-----------------|----|---|------|--------|
| 0.97                   | 5              | 10             | 3               | 38 | 3 | B    | 200731 |
| 0.98                   | 5              | 10             | 3               | 38 | 3 | B    | 200726 |
| 0.99                   | 5              | 10             | 3               | 38 | 3 | B    | 200727 |
| 1.00                   | 5              | 10             | 3               | 38 | 3 | B    | 200732 |
| 1.01                   | 5              | 11             | 3               | 38 | 3 | B    | 200715 |
| 1.02                   | 5              | 11             | 3               | 38 | 3 | B    | 200772 |
| 1.03                   | 5              | 11             | 3               | 38 | 3 | B    | 967191 |
| 1.04                   | 5              | 11             | 3               | 38 | 3 | B    | 327007 |
| 1.05                   | 5              | 11             | 3               | 38 | 3 | B    | 200773 |
| 1.06                   | 5              | 11             | 3               | 38 | 3 | B    | 327008 |
| 1.07                   | 5              | 11             | 3               | 38 | 3 | B    | 327009 |
| 1.08                   | 5              | 11             | 3               | 38 | 3 | B    | 200774 |
| 1.09                   | 5              | 11             | 3               | 38 | 3 | B    | 965169 |
| 1.10                   | 5              | 11             | 3               | 38 | 3 | B    | 200777 |
| 1.11                   | 5              | 12             | 3               | 38 | 3 | B    | 327010 |
| 1.12                   | 5              | 12             | 3               | 38 | 3 | B    | 327011 |
| 1.13                   | 5              | 12             | 3               | 38 | 3 | B    | 327012 |
| 1.14                   | 5              | 12             | 3               | 38 | 3 | B    | 327013 |
| 1.15                   | 5              | 12             | 3               | 38 | 3 | B    | 200775 |
| 1.16                   | 5              | 12             | 3               | 38 | 3 | B    | 327014 |
| 1.17                   | 5              | 12             | 3               | 38 | 3 | B    | 327015 |
| 1.18                   | 5              | 12             | 3               | 38 | 3 | B    | 63965  |
| 1.19                   | 5              | 12             | 3               | 38 | 3 | B    | 327016 |
| 1.20                   | 5              | 12             | 3               | 38 | 3 | B    | 200776 |
| 1.21                   | 6              | 13             | 3               | 38 | 3 | B    | 965171 |
| 1.22                   | 6              | 13             | 3               | 38 | 3 | B    | 327017 |
| 1.23                   | 6              | 13             | 3               | 38 | 3 | B    | 327018 |
| 1.24                   | 6              | 13             | 3               | 38 | 3 | B    | 327019 |
| 1.25                   | 6              | 13             | 3               | 38 | 3 | B    | 200778 |
| 1.26                   | 6              | 13             | 3               | 38 | 3 | B    | 963588 |
| 1.27                   | 6              | 13             | 3               | 38 | 3 | B    | 972014 |
| 1.28                   | 6              | 13             | 3               | 38 | 3 | B    | 200780 |
| 1.29                   | 6              | 13             | 3               | 38 | 3 | B    | 327020 |
| 1.30                   | 6              | 13             | 3               | 38 | 3 | B    | 200779 |
| 1.31                   | 6              | 13             | 3               | 38 | 3 | B    | 967299 |
| 1.32                   | 6              | 13             | 3               | 38 | 3 | B    | 327021 |
| 1.33                   | 6              | 13             | 3               | 38 | 3 | B    | 327022 |
| 1.34                   | 6              | 13             | 3               | 38 | 3 | B    | 973390 |
| 1.35                   | 6              | 13             | 3               | 38 | 3 | B    | 200734 |
| 1.36                   | 6              | 13             | 3               | 38 | 3 | B    | 327023 |
| 1.37                   | 6              | 13             | 3               | 38 | 3 | B    | 327024 |
| 1.38                   | 6              | 13             | 3               | 38 | 3 | B    | 327025 |
| 1.39                   | 6              | 13             | 3               | 38 | 3 | B    | 327026 |
| 1.40                   | 6              | 13             | 3               | 38 | 3 | B    | 200735 |
| 1.41                   | 7              | 15             | 3               | 38 | 3 | B    | 327027 |
| 1.42                   | 7              | 15             | 3               | 38 | 3 | B    | 327028 |
| 1.43                   | 7              | 15             | 3               | 38 | 3 | B    | 327029 |

| D <sub>10/+0.003</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|------------------------|----------------|----------------|-----------------|----|---|------|--------|
| 1.44                   | 7              | 15             | 3               | 38 | 3 | B    | 327030 |
| 1.45                   | 7              | 15             | 3               | 38 | 3 | B    | 200783 |
| 1.46                   | 7              | 15             | 3               | 38 | 3 | B    | 327031 |
| 1.47                   | 7              | 15             | 3               | 38 | 3 | B    | 327032 |
| 1.48                   | 7              | 15             | 3               | 38 | 3 | B    | 200781 |
| 1.49                   | 7              | 15             | 3               | 38 | 3 | B    | 200782 |
| 1.50                   | 7              | 15             | 3               | 38 | 3 | B    | 200784 |
| 1.51                   | 7              | 15             | 3               | 50 | 3 | B    | 200787 |
| 1.52                   | 7              | 15             | 3               | 50 | 3 | B    | 200788 |
| 1.53                   | 7              | 15             | 3               | 50 | 3 | B    | 327033 |
| 1.54                   | 7              | 15             | 3               | 50 | 3 | B    | 327034 |
| 1.55                   | 7              | 15             | 3               | 50 | 3 | B    | 200692 |
| 1.56                   | 7              | 15             | 3               | 50 | 3 | B    | 976176 |
| 1.57                   | 7              | 15             | 3               | 50 | 3 | B    | 964655 |
| 1.58                   | 7              | 15             | 3               | 50 | 3 | B    | 63966  |
| 1.59                   | 7              | 15             | 3               | 50 | 3 | B    | 965174 |
| 1.60                   | 7              | 15             | 3               | 50 | 3 | B    | 200794 |
| 1.61                   | 7              | 16             | 3               | 50 | 3 | B    | 965175 |
| 1.62                   | 7              | 16             | 3               | 50 | 3 | B    | 327035 |
| 1.63                   | 7              | 16             | 3               | 50 | 3 | B    | 327036 |
| 1.64                   | 7              | 16             | 3               | 50 | 3 | B    | 327037 |
| 1.65                   | 7              | 16             | 3               | 50 | 3 | B    | 200691 |
| 1.66                   | 7              | 16             | 3               | 50 | 3 | B    | 327038 |
| 1.67                   | 7              | 16             | 3               | 50 | 3 | B    | 327039 |
| 1.68                   | 7              | 16             | 3               | 50 | 3 | B    | 327040 |
| 1.69                   | 7              | 16             | 3               | 50 | 3 | B    | 965209 |
| 1.70                   | 7              | 16             | 3               | 50 | 3 | B    | 200693 |
| 1.71                   | 7              | 17             | 3               | 50 | 3 | B    | 327041 |
| 1.72                   | 7              | 17             | 3               | 50 | 3 | B    | 327042 |
| 1.73                   | 7              | 17             | 3               | 50 | 3 | B    | 327043 |
| 1.74                   | 7              | 17             | 3               | 50 | 3 | B    | 327044 |
| 1.75                   | 7              | 17             | 3               | 50 | 3 | B    | 200694 |
| 1.76                   | 7              | 17             | 3               | 50 | 3 | B    | 327045 |
| 1.77                   | 7              | 17             | 3               | 50 | 3 | B    | 327046 |
| 1.78                   | 7              | 17             | 3               | 50 | 3 | B    | 327047 |
| 1.79                   | 7              | 17             | 3               | 50 | 3 | B    | 200713 |
| 1.80                   | 7              | 17             | 3               | 50 | 3 | B    | 200795 |
| 1.81                   | 8              | 17             | 3               | 50 | 3 | B    | 327048 |
| 1.82                   | 8              | 17             | 3               | 50 | 3 | B    | 327049 |
| 1.83                   | 8              | 17             | 3               | 50 | 3 | B    | 971471 |
| 1.84                   | 8              | 17             | 3               | 50 | 3 | B    | 327050 |
| 1.85                   | 8              | 17             | 3               | 50 | 3 | B    | 200796 |
| 1.86                   | 8              | 17             | 3               | 50 | 3 | B    | 972720 |
| 1.87                   | 8              | 17             | 3               | 50 | 3 | B    | 964530 |
| 1.88                   | 8              | 17             | 3               | 50 | 3 | B    | 971918 |
| 1.89                   | 8              | 17             | 3               | 50 | 3 | B    | 200704 |
| 1.90                   | 8              | 17             | 3               | 50 | 3 | B    | 20079  |

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| D <sub>10/±0.003</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|------------------------|----------------|----------------|-----------------|----|---|------|--------|
| 1.91                   | 8              | 18             | 3               | 50 | 3 | B    | 965177 |
| 1.92                   | 8              | 18             | 3               | 50 | 3 | B    | 327051 |
| 1.93                   | 8              | 18             | 3               | 50 | 3 | B    | 327052 |
| 1.94                   | 8              | 18             | 3               | 50 | 3 | B    | 327053 |
| 1.95                   | 8              | 18             | 3               | 50 | 3 | B    | 200682 |
| 1.96                   | 8              | 18             | 3               | 50 | 3 | B    | 200712 |
| 1.97                   | 8              | 18             | 3               | 50 | 3 | B    | 200789 |
| 1.98                   | 8              | 18             | 3               | 50 | 3 | B    | 200790 |
| 1.99                   | 8              | 18             | 3               | 50 | 3 | B    | 200791 |
| 2.00                   | 8              | 18             | 3               | 50 | 3 | B    | 200785 |
| 2.01                   | 8              | 18             | 3               | 50 | 3 | B    | 200792 |
| 2.02                   | 8              | 18             | 3               | 50 | 3 | B    | 200793 |
| 2.03                   | 8              | 18             | 3               | 50 | 3 | B    | 327054 |
| 2.04                   | 8              | 18             | 3               | 50 | 3 | B    | 200714 |
| 2.05                   | 8              | 18             | 3               | 50 | 3 | B    | 200688 |
| 2.06                   | 8              | 18             | 3               | 50 | 3 | B    | 327055 |
| 2.07                   | 8              | 18             | 3               | 50 | 3 | B    | 327056 |
| 2.08                   | 8              | 18             | 3               | 50 | 3 | B    | 327057 |
| 2.09                   | 8              | 18             | 3               | 50 | 3 | B    | 968093 |
| 2.10                   | 8              | 18             | 3               | 50 | 3 | B    | 200711 |
| 2.11                   | 8              | 18             | 3               | 50 | 3 | B    | 327058 |
| 2.12                   | 8              | 18             | 3               | 50 | 3 | B    | 968735 |
| 2.13                   | 8              | 18             | 3               | 50 | 3 | B    | 327059 |
| 2.14                   | 8              | 18             | 3               | 50 | 3 | B    | 968737 |
| 2.15                   | 8              | 18             | 3               | 50 | 3 | B    | 200687 |
| 2.16                   | 8              | 18             | 3               | 50 | 3 | B    | 327060 |
| 2.17                   | 8              | 18             | 3               | 50 | 3 | B    | 327061 |
| 2.18                   | 8              | 18             | 3               | 50 | 3 | B    | 327062 |
| 2.19                   | 8              | 18             | 3               | 50 | 3 | B    | 967119 |
| 2.20                   | 8              | 18             | 3               | 50 | 3 | B    | 200706 |
| 2.21                   | 8              | 18             | 3               | 50 | 3 | B    | 327063 |
| 2.22                   | 8              | 18             | 3               | 50 | 3 | B    | 327064 |
| 2.23                   | 8              | 18             | 3               | 50 | 3 | B    | 327065 |
| 2.24                   | 8              | 18             | 3               | 50 | 3 | B    | 327066 |
| 2.25                   | 8              | 18             | 3               | 50 | 3 | B    | 200686 |
| 2.26                   | 8              | 18             | 3               | 50 | 3 | B    | 327067 |
| 2.27                   | 8              | 18             | 3               | 50 | 3 | B    | 327068 |
| 2.28                   | 8              | 18             | 3               | 50 | 3 | B    | 327069 |
| 2.29                   | 8              | 18             | 3               | 50 | 3 | B    | 327070 |
| 2.30                   | 8              | 18             | 3               | 50 | 3 | B    | 200698 |
| 2.31                   | 10             | 20             | 3               | 50 | 3 | B    | 327071 |
| 2.32                   | 10             | 20             | 3               | 50 | 3 | B    | 200702 |
| 2.33                   | 10             | 20             | 3               | 50 | 3 | B    | 327072 |
| 2.34                   | 10             | 20             | 3               | 50 | 3 | B    | 327073 |
| 2.35                   | 10             | 20             | 3               | 50 | 3 | B    | 200697 |
| 2.36                   | 10             | 20             | 3               | 50 | 3 | B    | 327074 |
| 2.37                   | 10             | 20             | 3               | 50 | 3 | B    | 327075 |

| D <sub>10/±0.003</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|------------------------|----------------|----------------|-----------------|----|---|------|--------|
| 2.38                   | 10             | 20             | 3               | 50 | 3 | B    | 327076 |
| 2.39                   | 10             | 20             | 3               | 50 | 3 | B    | 327077 |
| 2.40                   | 10             | 20             | 3               | 50 | 3 | B    | 200696 |
| 2.41                   | 10             | 20             | 3               | 50 | 3 | B    | 972007 |
| 2.42                   | 10             | 20             | 3               | 50 | 3 | B    | 327078 |
| 2.43                   | 10             | 20             | 3               | 50 | 3 | B    | 327079 |
| 2.44                   | 10             | 20             | 3               | 50 | 3 | B    | 327080 |
| 2.45                   | 10             | 20             | 3               | 50 | 3 | B    | 200695 |
| 2.46                   | 10             | 20             | 3               | 50 | 3 | B    | 327081 |
| 2.47                   | 10             | 20             | 3               | 50 | 3 | B    | 327082 |
| 2.48                   | 10             | 20             | 3               | 50 | 3 | B    | 200707 |
| 2.49                   | 10             | 20             | 3               | 50 | 3 | B    | 200708 |
| 2.50                   | 10             | 20             | 3               | 50 | 3 | B    | 200786 |
| 2.51                   | 10             | 20             | 3               | 61 | 4 | B    | 200709 |
| 2.52                   | 10             | 20             | 3               | 61 | 4 | B    | 200710 |
| 2.53                   | 10             | 20             | 3               | 61 | 4 | B    | 327083 |
| 2.54                   | 10             | 20             | 3               | 61 | 4 | B    | 327084 |
| 2.55                   | 10             | 20             | 3               | 61 | 4 | B    | 200685 |
| 2.56                   | 10             | 20             | 3               | 61 | 4 | B    | 327085 |
| 2.57                   | 10             | 20             | 3               | 61 | 4 | B    | 327086 |
| 2.58                   | 10             | 20             | 3               | 61 | 4 | B    | 327087 |
| 2.59                   | 10             | 20             | 3               | 61 | 4 | B    | 327088 |
| 2.60                   | 10             | 20             | 3               | 61 | 4 | B    | 200684 |
| 2.61                   | 10             | 25             | 3               | 61 | 4 | B    | 327089 |
| 2.62                   | 10             | 25             | 3               | 61 | 4 | B    | 327090 |
| 2.63                   | 10             | 25             | 3               | 61 | 4 | B    | 327091 |
| 2.64                   | 10             | 25             | 3               | 61 | 4 | B    | 327092 |
| 2.65                   | 10             | 25             | 3               | 61 | 4 | B    | 200683 |
| 2.66                   | 10             | 25             | 3               | 61 | 4 | B    | 327093 |
| 2.67                   | 10             | 25             | 3               | 61 | 4 | B    | 200703 |
| 2.68                   | 10             | 25             | 3               | 61 | 4 | B    | 327094 |
| 2.69                   | 10             | 25             | 3               | 61 | 4 | B    | 327095 |
| 2.70                   | 10             | 25             | 3               | 61 | 4 | B    | 200690 |
| 2.71                   | 10             | 25             | 3               | 61 | 4 | B    | 327096 |
| 2.72                   | 10             | 25             | 3               | 61 | 4 | B    | 327097 |
| 2.73                   | 10             | 25             | 3               | 61 | 4 | B    | 327098 |
| 2.74                   | 10             | 25             | 3               | 61 | 4 | B    | 327099 |
| 2.75                   | 10             | 25             | 3               | 61 | 4 | B    | 200689 |
| 2.76                   | 10             | 25             | 3               | 61 | 4 | B    | 327100 |
| 2.77                   | 10             | 25             | 3               | 61 | 4 | B    | 327101 |
| 2.78                   | 10             | 25             | 3               | 61 | 4 | B    | 327102 |
| 2.79                   | 10             | 25             | 3               | 61 | 4 | B    | 327103 |
| 2.80                   | 10             | 25             | 3               | 61 | 4 | B    | 200705 |
| 2.81                   | 10             | 25             | 3               | 61 | 4 | B    | 327104 |
| 2.82                   | 10             | 25             | 3               | 61 | 4 | B    | 327105 |
| 2.83                   | 10             | 25             | 3               | 61 | 4 | B    | 327106 |
| 2.84                   | 10             | 25             | 3               | 61 | 4 | B    | 327107 |



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| D <sub>10/+0.003</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|------------------------|----------------|----------------|-----------------|----|---|------|--------|
| 2.85                   | 10             | 25             | 3               | 61 | 4 | B    | 200699 |
| 2.86                   | 10             | 25             | 3               | 61 | 4 | B    | 327108 |
| 2.87                   | 10             | 25             | 3               | 61 | 4 | B    | 327109 |
| 2.88                   | 10             | 25             | 3               | 61 | 4 | B    | 327110 |
| 2.89                   | 10             | 25             | 3               | 61 | 4 | B    | 327111 |
| 2.90                   | 10             | 25             | 3               | 61 | 4 | B    | 200700 |
| 2.91                   | 10             | 25             | 3               | 61 | 4 | B    | 327112 |
| 2.92                   | 10             | 25             | 3               | 61 | 4 | B    | 327113 |
| 2.93                   | 10             | 25             | 3               | 61 | 4 | B    | 327114 |
| 2.94                   | 10             | 25             | 3               | 61 | 4 | B    | 327115 |
| 2.95                   | 10             | 25             | 3               | 61 | 4 | B    | 200701 |
| 2.96                   | 10             | 25             | 3               | 61 | 4 | B    | 327116 |
| 2.97                   | 10             | 25             | 3               | 61 | 4 | B    | 200747 |
| 2.98                   | 10             | 25             | 3               | 70 | 6 | B    | 321524 |
| 2.99                   | 10             | 25             | 3               | 70 | 6 | B    | 321525 |
| 3.00                   | 10             | 25             | 3               | 70 | 6 | B    | 321526 |
| 3.01                   | 10             | 25             | 3               | 70 | 6 | B    | 321527 |
| 3.02                   | 10             | 25             | 3               | 70 | 6 | B    | 321528 |
| 3.03                   | 10             | 25             | 3               | 70 | 6 | B    | 321529 |
| 3.04                   | 10             | 25             | 3               | 70 | 6 | B    | 321530 |
| 3.05                   | 10             | 25             | 3               | 70 | 6 | B    | 321531 |
| 3.06                   | 10             | 25             | 3               | 70 | 6 | B    | 321532 |
| 3.07                   | 10             | 25             | 3               | 70 | 6 | B    | 321533 |
| 3.08                   | 10             | 25             | 3               | 70 | 6 | B    | 321534 |
| 3.09                   | 10             | 25             | 3               | 70 | 6 | B    | 321535 |
| 3.10                   | 10             | -              | 3               | 70 | 6 | A    | 321536 |
| 3.11                   | 10             | -              | 3               | 70 | 6 | A    | 321537 |
| 3.12                   | 10             | -              | 3               | 70 | 6 | A    | 321538 |
| 3.13                   | 10             | -              | 3               | 70 | 6 | A    | 321539 |
| 3.14                   | 10             | -              | 3               | 70 | 6 | A    | 321540 |
| 3.15                   | 10             | -              | 3               | 70 | 6 | A    | 321541 |
| 3.16                   | 10             | -              | 3               | 70 | 6 | A    | 321542 |
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| 3.18                   | 10             | -              | 3               | 70 | 6 | A    | 321544 |
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| 3.20                   | 10             | -              | 3               | 70 | 6 | A    | 321546 |
| 3.21                   | 10             | -              | 3               | 70 | 6 | A    | 321547 |
| 3.22                   | 10             | -              | 3               | 70 | 6 | A    | 321548 |
| 3.23                   | 10             | -              | 3               | 70 | 6 | A    | 321549 |
| 3.24                   | 10             | -              | 3               | 70 | 6 | A    | 321550 |
| 3.25                   | 10             | -              | 3               | 70 | 6 | A    | 321551 |
| 3.26                   | 10             | -              | 3               | 70 | 6 | A    | 321552 |
| 3.27                   | 10             | -              | 3               | 70 | 6 | A    | 321553 |
| 3.28                   | 10             | -              | 3               | 70 | 6 | A    | 321554 |
| 3.29                   | 10             | -              | 3               | 70 | 6 | A    | 321555 |
| 3.30                   | 10             | -              | 3               | 70 | 6 | A    | 321556 |
| 3.31                   | 10             | -              | 3               | 70 | 6 | A    | 321557 |

| D <sub>10/+0.003</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|------------------------|----------------|----------------|-----------------|----|---|------|--------|
| 3.32                   | 10             | -              | 3               | 70 | 6 | A    | 321558 |
| 3.33                   | 10             | -              | 3               | 70 | 6 | A    | 321559 |
| 3.34                   | 10             | -              | 3               | 70 | 6 | A    | 321560 |
| 3.35                   | 10             | -              | 3               | 70 | 6 | A    | 321561 |
| 3.36                   | 10             | -              | 3               | 70 | 6 | A    | 321562 |
| 3.37                   | 10             | -              | 3               | 70 | 6 | A    | 321563 |
| 3.38                   | 10             | -              | 3               | 70 | 6 | A    | 321564 |
| 3.39                   | 10             | -              | 3               | 70 | 6 | A    | 321565 |
| 3.40                   | 10             | -              | 3               | 70 | 6 | A    | 321566 |
| 3.41                   | 10             | -              | 3               | 70 | 6 | A    | 321567 |
| 3.42                   | 10             | -              | 3               | 70 | 6 | A    | 321568 |
| 3.43                   | 10             | -              | 3               | 70 | 6 | A    | 321569 |
| 3.44                   | 10             | -              | 3               | 70 | 6 | A    | 321570 |
| 3.45                   | 10             | -              | 3               | 70 | 6 | A    | 321571 |
| 3.46                   | 10             | -              | 3               | 70 | 6 | A    | 321572 |
| 3.47                   | 10             | -              | 3               | 70 | 6 | A    | 321573 |
| 3.48                   | 10             | -              | 3               | 70 | 6 | A    | 321574 |
| 3.49                   | 10             | -              | 3               | 70 | 6 | A    | 321575 |
| 3.50                   | 10             | -              | 3               | 70 | 6 | A    | 321576 |
| 3.51                   | 10             | -              | 3               | 70 | 6 | A    | 321577 |
| 3.52                   | 10             | -              | 3               | 70 | 6 | A    | 321578 |
| 3.53                   | 10             | -              | 3               | 70 | 6 | A    | 321579 |
| 3.54                   | 10             | -              | 3               | 70 | 6 | A    | 321580 |
| 3.55                   | 10             | -              | 3               | 70 | 6 | A    | 321581 |
| 3.56                   | 10             | -              | 3               | 70 | 6 | A    | 321582 |
| 3.57                   | 10             | -              | 3               | 70 | 6 | A    | 321583 |
| 3.58                   | 10             | -              | 3               | 70 | 6 | A    | 321584 |
| 3.59                   | 10             | -              | 3               | 70 | 6 | A    | 321585 |
| 3.60                   | 10             | -              | 3               | 70 | 6 | A    | 321586 |
| 3.61                   | 10             | -              | 3               | 70 | 6 | A    | 321587 |
| 3.62                   | 10             | -              | 3               | 70 | 6 | A    | 321588 |
| 3.63                   | 10             | -              | 3               | 70 | 6 | A    | 321589 |
| 3.64                   | 10             | -              | 3               | 70 | 6 | A    | 321590 |
| 3.65                   | 10             | -              | 3               | 70 | 6 | A    | 321591 |
| 3.66                   | 10             | -              | 3               | 70 | 6 | A    | 321592 |
| 3.67                   | 10             | -              | 3               | 70 | 6 | A    | 321593 |
| 3.68                   | 10             | -              | 3               | 70 | 6 | A    | 321594 |
| 3.69                   | 10             | -              | 3               | 70 | 6 | A    | 321595 |
| 3.70                   | 10             | -              | 3               | 70 | 6 | A    | 321596 |
| 3.71                   | 10             | -              | 3               | 70 | 6 | A    | 321597 |
| 3.72                   | 10             | -              | 3               | 70 | 6 | A    | 321598 |
| 3.73                   | 10             | -              | 3               | 70 | 6 | A    | 321599 |
| 3.74                   | 10             | -              | 3               | 70 | 6 | A    | 321600 |
| 3.75                   | 10             | -              | 3               | 70 | 6 | A    | 321601 |
| 3.76                   | 10             | -              | 3               | 70 | 6 | A    | 321602 |
| 3.77                   | 10             | -              | 3               | 70 | 6 | A    | 321603 |
| 3.78                   | 10             | -              | 3               | 70 | 6 | A    | 321604 |

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| D <sub>10/±0.003</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|------------------------|----------------|----------------|-----------------|----|---|------|--------|
| 3.79                   | 10             | -              | 3               | 70 | 6 | A    | 321605 |
| 3.80                   | 10             | -              | 3               | 70 | 6 | A    | 321606 |
| 3.81                   | 10             | -              | 3               | 70 | 6 | A    | 321607 |
| 3.82                   | 10             | -              | 3               | 70 | 6 | A    | 321608 |
| 3.83                   | 10             | -              | 3               | 70 | 6 | A    | 321609 |
| 3.84                   | 10             | -              | 3               | 70 | 6 | A    | 321610 |
| 3.85                   | 10             | -              | 3               | 70 | 6 | A    | 321611 |
| 3.86                   | 10             | -              | 3               | 70 | 6 | A    | 321612 |
| 3.87                   | 10             | -              | 3               | 70 | 6 | A    | 321613 |
| 3.88                   | 10             | -              | 3               | 70 | 6 | A    | 321614 |
| 3.89                   | 10             | -              | 3               | 70 | 6 | A    | 321615 |
| 3.90                   | 10             | -              | 3               | 70 | 6 | A    | 321616 |
| 3.91                   | 10             | -              | 3               | 70 | 6 | A    | 321617 |
| 3.92                   | 10             | -              | 3               | 70 | 6 | A    | 321618 |
| 3.93                   | 10             | -              | 3               | 70 | 6 | A    | 321619 |
| 3.94                   | 10             | -              | 3               | 70 | 6 | A    | 321620 |
| 3.95                   | 10             | -              | 3               | 70 | 6 | A    | 321621 |
| 3.96                   | 10             | -              | 3               | 70 | 6 | A    | 321622 |
| 3.97                   | 10             | -              | 3               | 70 | 6 | A    | 321623 |
| 3.98                   | 10             | -              | 3               | 70 | 6 | A    | 321624 |
| 3.99                   | 10             | -              | 3               | 70 | 6 | A    | 321625 |
| 4.00                   | 10             | -              | 3               | 70 | 6 | A    | 321626 |
| 4.01                   | 10             | -              | 3               | 70 | 6 | A    | 321627 |
| 4.02                   | 10             | -              | 3               | 70 | 6 | A    | 321628 |
| 4.03                   | 10             | -              | 3               | 70 | 6 | A    | 321629 |
| 4.04                   | 10             | -              | 3               | 70 | 6 | A    | 321630 |
| 4.05                   | 10             | -              | 3               | 70 | 6 | A    | 321631 |
| 4.06                   | 10             | -              | 3               | 70 | 6 | A    | 321632 |
| 4.07                   | 10             | -              | 3               | 70 | 6 | A    | 321633 |
| 4.08                   | 10             | -              | 3               | 70 | 6 | A    | 321634 |
| 4.09                   | 10             | -              | 3               | 70 | 6 | A    | 321635 |
| 4.10                   | 10             | -              | 3               | 70 | 6 | A    | 420564 |
| 4.11                   | 10             | -              | 3               | 70 | 6 | A    | 420565 |
| 4.12                   | 10             | -              | 3               | 70 | 6 | A    | 420566 |
| 4.13                   | 10             | -              | 3               | 70 | 6 | A    | 420567 |
| 4.14                   | 10             | -              | 3               | 70 | 6 | A    | 420568 |
| 4.15                   | 10             | -              | 3               | 70 | 6 | A    | 420569 |
| 4.16                   | 10             | -              | 3               | 70 | 6 | A    | 420570 |
| 4.17                   | 10             | -              | 3               | 70 | 6 | A    | 420571 |
| 4.18                   | 10             | -              | 3               | 70 | 6 | A    | 420572 |
| 4.19                   | 10             | -              | 3               | 70 | 6 | A    | 420573 |
| 4.20                   | 12             | -              | 4               | 80 | 6 | A    | 321646 |
| 4.21                   | 12             | -              | 4               | 80 | 6 | A    | 321647 |
| 4.22                   | 12             | -              | 4               | 80 | 6 | A    | 321648 |
| 4.23                   | 12             | -              | 4               | 80 | 6 | A    | 321649 |
| 4.24                   | 12             | -              | 4               | 80 | 6 | A    | 321650 |
| 4.25                   | 12             | -              | 4               | 80 | 6 | A    | 321651 |

| D <sub>10/±0.003</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|------------------------|----------------|----------------|-----------------|----|---|------|--------|
| 4.26                   | 12             | -              | 4               | 80 | 6 | A    | 321652 |
| 4.27                   | 12             | -              | 4               | 80 | 6 | A    | 321653 |
| 4.28                   | 12             | -              | 4               | 80 | 6 | A    | 321654 |
| 4.29                   | 12             | -              | 4               | 80 | 6 | A    | 321655 |
| 4.30                   | 12             | -              | 4               | 80 | 6 | A    | 321656 |
| 4.31                   | 12             | -              | 4               | 80 | 6 | A    | 321657 |
| 4.32                   | 12             | -              | 4               | 80 | 6 | A    | 321658 |
| 4.33                   | 12             | -              | 4               | 80 | 6 | A    | 321659 |
| 4.34                   | 12             | -              | 4               | 80 | 6 | A    | 321660 |
| 4.35                   | 12             | -              | 4               | 80 | 6 | A    | 321661 |
| 4.36                   | 12             | -              | 4               | 80 | 6 | A    | 321662 |
| 4.37                   | 12             | -              | 4               | 80 | 6 | A    | 321663 |
| 4.38                   | 12             | -              | 4               | 80 | 6 | A    | 321664 |
| 4.39                   | 12             | -              | 4               | 80 | 6 | A    | 321665 |
| 4.40                   | 12             | -              | 4               | 80 | 6 | A    | 321666 |
| 4.41                   | 12             | -              | 4               | 80 | 6 | A    | 321667 |
| 4.42                   | 12             | -              | 4               | 80 | 6 | A    | 321668 |
| 4.43                   | 12             | -              | 4               | 80 | 6 | A    | 321669 |
| 4.44                   | 12             | -              | 4               | 80 | 6 | A    | 321670 |
| 4.45                   | 12             | -              | 4               | 80 | 6 | A    | 321671 |
| 4.46                   | 12             | -              | 4               | 80 | 6 | A    | 321672 |
| 4.47                   | 12             | -              | 4               | 80 | 6 | A    | 321673 |
| 4.48                   | 12             | -              | 4               | 80 | 6 | A    | 321674 |
| 4.49                   | 12             | -              | 4               | 80 | 6 | A    | 321675 |
| 4.50                   | 12             | -              | 4               | 80 | 6 | A    | 321676 |
| 4.51                   | 12             | -              | 4               | 80 | 6 | A    | 321677 |
| 4.52                   | 12             | -              | 4               | 80 | 6 | A    | 321678 |
| 4.53                   | 12             | -              | 4               | 80 | 6 | A    | 321679 |
| 4.54                   | 12             | -              | 4               | 80 | 6 | A    | 321680 |
| 4.55                   | 12             | -              | 4               | 80 | 6 | A    | 321681 |
| 4.56                   | 12             | -              | 4               | 80 | 6 | A    | 321682 |
| 4.57                   | 12             | -              | 4               | 80 | 6 | A    | 321683 |
| 4.58                   | 12             | -              | 4               | 80 | 6 | A    | 321684 |
| 4.59                   | 12             | -              | 4               | 80 | 6 | A    | 321685 |
| 4.60                   | 12             | -              | 4               | 80 | 6 | A    | 321686 |
| 4.61                   | 12             | -              | 4               | 80 | 6 | A    | 321687 |
| 4.62                   | 12             | -              | 4               | 80 | 6 | A    | 321688 |
| 4.63                   | 12             | -              | 4               | 80 | 6 | A    | 321689 |
| 4.64                   | 12             | -              | 4               | 80 | 6 | A    | 321690 |
| 4.65                   | 12             | -              | 4               | 80 | 6 | A    | 321691 |
| 4.66                   | 12             | -              | 4               | 80 | 6 | A    | 321692 |
| 4.67                   | 12             | -              | 4               | 80 | 6 | A    | 321693 |
| 4.68                   | 12             | -              | 4               | 80 | 6 | A    | 321694 |
| 4.69                   | 12             | -              | 4               | 80 | 6 | A    | 321695 |
| 4.70                   | 12             | -              | 4               | 80 | 6 | A    | 321696 |
| 4.71                   | 12             | -              | 4               | 80 | 6 | A    | 321697 |
| 4.72                   | 12             | -              | 4               | 80 | 6 | A    | 321698 |

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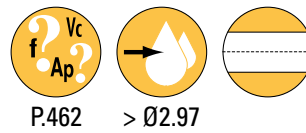


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| D <sub>10/+0.003</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
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| 4.75                   | 12             | -              | 4               | 80 | 6 | A    | 321701 |
| 4.76                   | 12             | -              | 4               | 80 | 6 | A    | 321702 |
| 4.77                   | 12             | -              | 4               | 80 | 6 | A    | 321703 |
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| 4.79                   | 12             | -              | 4               | 80 | 6 | A    | 321705 |
| 4.80                   | 12             | -              | 4               | 80 | 6 | A    | 321706 |
| 4.81                   | 12             | -              | 4               | 80 | 6 | A    | 321707 |
| 4.82                   | 12             | -              | 4               | 80 | 6 | A    | 321708 |
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| 4.84                   | 12             | -              | 4               | 80 | 6 | A    | 321710 |
| 4.85                   | 12             | -              | 4               | 80 | 6 | A    | 321711 |
| 4.86                   | 12             | -              | 4               | 80 | 6 | A    | 321712 |
| 4.87                   | 12             | -              | 4               | 80 | 6 | A    | 321713 |
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| 4.90                   | 12             | -              | 4               | 80 | 6 | A    | 321716 |
| 4.91                   | 12             | -              | 4               | 80 | 6 | A    | 321717 |
| 4.92                   | 12             | -              | 4               | 80 | 6 | A    | 321718 |
| 4.93                   | 12             | -              | 4               | 80 | 6 | A    | 321719 |
| 4.94                   | 12             | -              | 4               | 80 | 6 | A    | 321720 |
| 4.95                   | 12             | -              | 4               | 80 | 6 | A    | 321721 |
| 4.96                   | 12             | -              | 4               | 80 | 6 | A    | 321722 |
| 4.97                   | 12             | -              | 4               | 80 | 6 | A    | 321723 |
| 4.98                   | 12             | -              | 4               | 80 | 6 | A    | 321724 |
| 4.99                   | 12             | -              | 4               | 80 | 6 | A    | 321725 |
| 5.00                   | 12             | -              | 4               | 80 | 6 | A    | 321726 |
| 5.01                   | 12             | -              | 4               | 80 | 6 | A    | 321727 |
| 5.02                   | 12             | -              | 4               | 80 | 6 | A    | 321728 |
| 5.03                   | 12             | -              | 4               | 80 | 6 | A    | 321729 |
| 5.04                   | 12             | -              | 4               | 80 | 6 | A    | 321730 |
| 5.05                   | 12             | -              | 4               | 80 | 6 | A    | 321731 |
| 5.06                   | 12             | -              | 4               | 80 | 6 | A    | 321732 |
| 5.07                   | 12             | -              | 4               | 80 | 6 | A    | 321733 |
| 5.08                   | 12             | -              | 4               | 80 | 6 | A    | 321734 |
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| 5.10                   | 12             | -              | 4               | 80 | 6 | A    | 321736 |
| 5.11                   | 12             | -              | 4               | 80 | 6 | A    | 321737 |
| 5.12                   | 12             | -              | 4               | 80 | 6 | A    | 321738 |
| 5.13                   | 12             | -              | 4               | 80 | 6 | A    | 321739 |
| 5.14                   | 12             | -              | 4               | 80 | 6 | A    | 321740 |
| 5.15                   | 12             | -              | 4               | 80 | 6 | A    | 321741 |
| 5.16                   | 12             | -              | 4               | 80 | 6 | A    | 321742 |
| 5.17                   | 12             | -              | 4               | 80 | 6 | A    | 321743 |
| 5.18                   | 12             | -              | 4               | 80 | 6 | A    | 321744 |
| 5.19                   | 12             | -              | 4               | 80 | 6 | A    | 321745 |

| D <sub>10/+0.003</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|------------------------|----------------|----------------|-----------------|----|---|------|--------|
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| 5.21                   | 12             | -              | 4               | 80 | 6 | A    | 321747 |
| 5.22                   | 12             | -              | 4               | 80 | 6 | A    | 321748 |
| 5.23                   | 12             | -              | 4               | 80 | 6 | A    | 321749 |
| 5.24                   | 12             | -              | 4               | 80 | 6 | A    | 321750 |
| 5.25                   | 12             | -              | 4               | 80 | 6 | A    | 321751 |
| 5.26                   | 12             | -              | 4               | 80 | 6 | A    | 321752 |
| 5.27                   | 12             | -              | 4               | 80 | 6 | A    | 321753 |
| 5.28                   | 12             | -              | 4               | 80 | 6 | A    | 321754 |
| 5.29                   | 12             | -              | 4               | 80 | 6 | A    | 321755 |
| 5.30                   | 12             | -              | 4               | 80 | 6 | A    | 321756 |
| 5.31                   | 12             | -              | 4               | 80 | 6 | A    | 321757 |
| 5.32                   | 12             | -              | 4               | 80 | 6 | A    | 321758 |
| 5.33                   | 12             | -              | 4               | 80 | 6 | A    | 321759 |
| 5.34                   | 12             | -              | 4               | 80 | 6 | A    | 321760 |
| 5.35                   | 12             | -              | 4               | 80 | 6 | A    | 321761 |
| 5.36                   | 12             | -              | 4               | 80 | 6 | A    | 321762 |
| 5.37                   | 12             | -              | 4               | 80 | 6 | A    | 321763 |
| 5.38                   | 12             | -              | 4               | 80 | 6 | A    | 321764 |
| 5.39                   | 12             | -              | 4               | 80 | 6 | A    | 321765 |
| 5.40                   | 12             | -              | 4               | 80 | 6 | A    | 321766 |
| 5.41                   | 12             | -              | 4               | 80 | 6 | A    | 321767 |
| 5.42                   | 12             | -              | 4               | 80 | 6 | A    | 321768 |
| 5.43                   | 12             | -              | 4               | 80 | 6 | A    | 321769 |
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| 5.45                   | 12             | -              | 4               | 80 | 6 | A    | 321771 |
| 5.46                   | 12             | -              | 4               | 80 | 6 | A    | 321772 |
| 5.47                   | 12             | -              | 4               | 80 | 6 | A    | 321773 |
| 5.48                   | 12             | -              | 4               | 80 | 6 | A    | 321774 |
| 5.49                   | 12             | -              | 4               | 80 | 6 | A    | 321775 |
| 5.50                   | 12             | -              | 4               | 80 | 6 | A    | 321776 |
| 5.51                   | 12             | -              | 4               | 80 | 6 | A    | 321777 |
| 5.52                   | 12             | -              | 4               | 80 | 6 | A    | 321778 |
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| 5.54                   | 12             | -              | 4               | 80 | 6 | A    | 321780 |
| 5.55                   | 12             | -              | 4               | 80 | 6 | A    | 321781 |
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| 5.57                   | 12             | -              | 4               | 80 | 6 | A    | 321783 |
| 5.58                   | 12             | -              | 4               | 80 | 6 | A    | 321784 |
| 5.59                   | 12             | -              | 4               | 80 | 6 | A    | 321785 |
| 5.60                   | 12             | -              | 4               | 80 | 6 | A    | 321786 |
| 5.61                   | 12             | -              | 4               | 80 | 6 | A    | 321787 |
| 5.62                   | 12             | -              | 4               | 80 | 6 | A    | 321788 |
| 5.63                   | 12             | -              | 4               | 80 | 6 | A    | 321789 |
| 5.64                   | 12             | -              | 4               | 80 | 6 | A    | 321790 |
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| 5.66                   | 12             | -              | 4               | 80 | 6 | A    | 321792 |

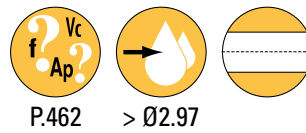
REIBAHLEN, RECHTSSCHNEIDEND  
LINKS SPIRALISIERT



P.462 > Ø2.97

| D <sub>10/+0.003</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | Z | Ref. | VHM    |
|------------------------|----------------|----------------|-----------------|----|---|------|--------|
| 5.67                   | 12             | -              | 4               | 80 | 6 | A    | 321793 |
| 5.68                   | 12             | -              | 4               | 80 | 6 | A    | 321794 |
| 5.69                   | 12             | -              | 4               | 80 | 6 | A    | 321795 |
| 5.70                   | 12             | -              | 4               | 80 | 6 | A    | 321796 |
| 5.71                   | 12             | -              | 4               | 80 | 6 | A    | 321797 |
| 5.72                   | 12             | -              | 4               | 80 | 6 | A    | 321798 |
| 5.73                   | 12             | -              | 4               | 80 | 6 | A    | 321799 |
| 5.74                   | 12             | -              | 4               | 80 | 6 | A    | 321800 |
| 5.75                   | 12             | -              | 4               | 80 | 6 | A    | 321801 |
| 5.76                   | 12             | -              | 4               | 80 | 6 | A    | 321802 |
| 5.77                   | 12             | -              | 4               | 80 | 6 | A    | 321803 |
| 5.78                   | 12             | -              | 4               | 80 | 6 | A    | 321804 |
| 5.79                   | 12             | -              | 4               | 80 | 6 | A    | 321805 |
| 5.80                   | 12             | -              | 4               | 80 | 6 | A    | 321806 |
| 5.81                   | 12             | -              | 4               | 80 | 6 | A    | 321807 |
| 5.82                   | 12             | -              | 4               | 80 | 6 | A    | 321808 |
| 5.83                   | 12             | -              | 4               | 80 | 6 | A    | 321809 |
| 5.84                   | 12             | -              | 4               | 80 | 6 | A    | 321810 |
| 5.85                   | 12             | -              | 4               | 80 | 6 | A    | 321811 |
| 5.86                   | 12             | -              | 4               | 80 | 6 | A    | 321812 |
| 5.87                   | 12             | -              | 4               | 80 | 6 | A    | 321813 |
| 5.88                   | 12             | -              | 4               | 80 | 6 | A    | 321814 |
| 5.89                   | 12             | -              | 4               | 80 | 6 | A    | 321815 |
| 5.90                   | 12             | -              | 4               | 80 | 6 | A    | 321816 |
| 5.91                   | 12             | -              | 4               | 80 | 6 | A    | 321817 |
| 5.92                   | 12             | -              | 4               | 80 | 6 | A    | 321818 |
| 5.93                   | 12             | -              | 4               | 80 | 6 | A    | 321819 |
| 5.94                   | 12             | -              | 4               | 80 | 6 | A    | 321820 |
| 5.95                   | 12             | -              | 4               | 80 | 6 | A    | 321821 |
| 5.96                   | 12             | -              | 4               | 80 | 6 | A    | 321822 |
| 5.97                   | 12             | -              | 4               | 80 | 6 | A    | 321823 |
| 5.98                   | 12             | -              | 4               | 80 | 6 | A    | 321824 |
| 5.99                   | 12             | -              | 4               | 80 | 6 | A    | 321825 |
| 6.00                   | 12             | -              | 4               | 80 | 6 | A    | 321826 |
| 6.01                   | 12             | -              | 4               | 80 | 6 | A    | 321827 |
| 6.02                   | 12             | -              | 4               | 80 | 6 | A    | 321828 |
| 6.03                   | 12             | -              | 4               | 80 | 6 | A    | 321829 |
| 6.04                   | 12             | -              | 4               | 80 | 6 | A    | 321830 |
| 6.05                   | 12             | -              | 4               | 80 | 6 | A    | 321831 |
| 6.06                   | 12             | -              | 4               | 80 | 6 | A    | 321832 |
| 6.07                   | 12             | -              | 4               | 80 | 6 | A    | 321833 |
| 6.08                   | 12             | -              | 4               | 80 | 6 | A    | 321834 |
| 6.09                   | 12             | -              | 4               | 80 | 6 | A    | 321835 |
| 6.10                   | 12             | -              | 4               | 80 | 6 | A    | 321836 |
| 6.11                   | 12             | -              | 4               | 80 | 6 | A    | 321837 |
| 6.12                   | 12             | -              | 4               | 80 | 6 | A    | 321838 |
| 6.13                   | 12             | -              | 4               | 80 | 6 | A    | 321839 |

| D <sub>10/+0.003</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L   | Z | Ref. | VHM    |
|------------------------|----------------|----------------|-----------------|-----|---|------|--------|
| 6.14                   | 12             | -              | 4               | 80  | 6 | A    | 321840 |
| 6.15                   | 12             | -              | 4               | 80  | 6 | A    | 321841 |
| 6.16                   | 12             | -              | 4               | 80  | 6 | A    | 321842 |
| 6.17                   | 12             | -              | 4               | 80  | 6 | A    | 321843 |
| 6.18                   | 12             | -              | 4               | 80  | 6 | A    | 321844 |
| 6.19                   | 12             | -              | 4               | 80  | 6 | A    | 321845 |
| 6.20                   | 16             | -              | 6               | 101 | 6 | A    | 342052 |
| 6.30                   | 16             | -              | 6               | 101 | 6 | A    | 342062 |
| 6.40                   | 16             | -              | 6               | 101 | 6 | A    | 342072 |
| 6.50                   | 16             | -              | 6               | 101 | 6 | A    | 342082 |
| 6.51                   | 16             | -              | 6               | 101 | 6 | A    | 342083 |
| 6.52                   | 16             | -              | 6               | 101 | 6 | A    | 342084 |
| 6.60                   | 16             | -              | 6               | 101 | 6 | A    | 342092 |
| 6.70                   | 16             | -              | 6               | 101 | 6 | A    | 342102 |
| 6.80                   | 16             | -              | 6               | 101 | 6 | A    | 342112 |
| 6.90                   | 16             | -              | 6               | 101 | 6 | A    | 342122 |
| 7.00                   | 16             | -              | 6               | 101 | 6 | A    | 342132 |
| 7.01                   | 16             | -              | 6               | 101 | 6 | A    | 342133 |
| 7.02                   | 16             | -              | 6               | 101 | 6 | A    | 342134 |
| 7.10                   | 16             | -              | 6               | 101 | 6 | A    | 342142 |
| 7.20                   | 16             | -              | 6               | 101 | 6 | A    | 342152 |
| 7.30                   | 16             | -              | 6               | 101 | 6 | A    | 342162 |
| 7.40                   | 16             | -              | 6               | 101 | 6 | A    | 342172 |
| 7.50                   | 16             | -              | 6               | 101 | 6 | A    | 342182 |
| 7.51                   | 16             | -              | 6               | 101 | 6 | A    | 342183 |
| 7.52                   | 16             | -              | 6               | 101 | 6 | A    | 342184 |
| 7.60                   | 16             | -              | 6               | 101 | 6 | A    | 342192 |
| 7.70                   | 16             | -              | 6               | 101 | 6 | A    | 342202 |
| 7.80                   | 16             | -              | 6               | 101 | 6 | A    | 342212 |
| 7.90                   | 16             | -              | 6               | 101 | 6 | A    | 342222 |
| 7.98                   | 16             | -              | 6               | 101 | 6 | A    | 342230 |
| 7.99                   | 16             | -              | 6               | 101 | 6 | A    | 342231 |
| 8.00                   | 16             | -              | 6               | 101 | 6 | A    | 342232 |
| 8.01                   | 16             | -              | 6               | 101 | 6 | A    | 342233 |
| 8.02                   | 16             | -              | 6               | 101 | 6 | A    | 342234 |
| 8.10                   | 16             | -              | 6               | 101 | 6 | A    | 420574 |
| 8.20                   | 16             | -              | 8               | 117 | 6 | A    | 420575 |
| 8.30                   | 16             | -              | 8               | 117 | 6 | A    | 420576 |
| 8.40                   | 16             | -              | 8               | 117 | 6 | A    | 420577 |
| 8.50                   | 16             | -              | 8               | 117 | 6 | A    | 420578 |
| 8.51                   | 16             | -              | 8               | 117 | 6 | A    | 420579 |
| 8.52                   | 16             | -              | 8               | 117 | 6 | A    | 420580 |
| 8.70                   | 16             | -              | 8               | 117 | 6 | A    | 420581 |
| 8.90                   | 16             | -              | 8               | 117 | 6 | A    | 420582 |
| 9.00                   | 16             | -              | 8               | 117 | 6 | A    | 420583 |
| 9.01                   | 16             | -              | 8               | 117 | 6 | A    | 420584 |
| 9.02                   | 16             | -              | 8               | 117 | 6 | A    | 420585 |



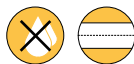
P.462 > Ø2.97

**REIBAHLEN, RECHTSSCHNEIDEND  
LINKS SPIRALISIERT**

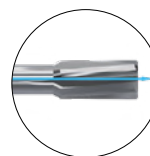
| D <sub>10/+0.003</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L   | Z | Ref. | VHM    |
|------------------------|----------------|----------------|-----------------|-----|---|------|--------|
| 9.10                   | 16             | -              | 8               | 117 | 6 | A    | 420586 |
| 9.50                   | 16             | -              | 8               | 117 | 6 | A    | 420587 |
| 9.70                   | 16             | -              | 8               | 117 | 6 | A    | 420588 |
| 10.00                  | 16             | -              | 8               | 117 | 6 | A    | 420589 |
| 10.01                  | 16             | -              | 8               | 117 | 6 | A    | 420590 |
| 10.02                  | 16             | -              | 8               | 117 | 6 | A    | 420591 |
| 10.03                  | 16             | -              | 8               | 117 | 6 | A    | 420592 |
| 10.10                  | 16             | -              | 8               | 117 | 6 | A    | 420593 |
| 10.48                  | 19             | -              | 10              | 133 | 6 | A    | 420594 |
| 10.49                  | 19             | -              | 10              | 133 | 6 | A    | 420595 |
| 10.50                  | 19             | -              | 10              | 133 | 6 | A    | 420596 |
| 10.51                  | 19             | -              | 10              | 133 | 6 | A    | 420597 |
| 10.52                  | 19             | -              | 10              | 133 | 6 | A    | 420598 |
| 10.60                  | 19             | -              | 10              | 133 | 6 | A    | 420599 |
| 10.98                  | 19             | -              | 10              | 133 | 6 | A    | 420600 |
| 10.99                  | 19             | -              | 10              | 133 | 6 | A    | 420601 |
| 11.00                  | 19             | -              | 10              | 133 | 6 | A    | 420602 |
| 11.01                  | 19             | -              | 10              | 133 | 6 | A    | 420603 |
| 11.02                  | 19             | -              | 10              | 133 | 6 | A    | 420604 |
| 11.48                  | 19             | -              | 10              | 133 | 6 | A    | 420605 |
| 11.49                  | 19             | -              | 10              | 133 | 6 | A    | 420606 |
| 11.50                  | 19             | -              | 10              | 133 | 6 | A    | 420607 |
| 11.51                  | 19             | -              | 10              | 133 | 6 | A    | 420608 |
| 11.52                  | 19             | -              | 10              | 133 | 6 | A    | 420609 |
| 11.80                  | 19             | -              | 10              | 133 | 6 | A    | 420610 |
| 11.98                  | 19             | -              | 10              | 133 | 6 | A    | 420611 |
| 11.99                  | 19             | -              | 10              | 133 | 6 | A    | 420612 |
| 12.00                  | 19             | -              | 10              | 133 | 6 | A    | 420613 |
| 12.01                  | 19             | -              | 10              | 133 | 6 | A    | 420614 |
| 12.02                  | 19             | -              | 10              | 133 | 6 | A    | 420615 |

**Alle Ø mit Toleranz ±2 µm lieferbar  
durch unseren Express-Service**

**POLY 4007**



**POLY 4007-TC**



# POLY 4008-FC



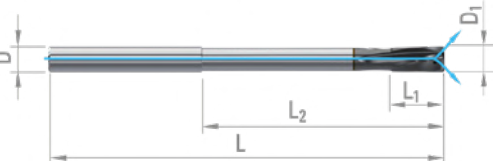
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## REIBAHLEN, RECHTSSCHNEIDEND LINKS SPIRALISIERT

Ref. A



Ref. B



- VHM-Reibahlen, linksdrall, rechtsschneidend, ungleiche Teilung und IK an der Schneide für Durchgangsbohrungen. Werkzeuge entwickelt für das Reiben aller Arten von Materialien.
- Die dropless POLY-CUT-Beschichtung verbessert die Standzeit auch bei hohen Temperaturen in schwer zerspanbaren Materialien.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ○                                    | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            | ○       | ○          | ○    | ○                       | ○  | ○     | ○                        | ⊙  | ⊙                |    |                  |    |  |

D nom. D<sub>1</sub> L<sub>1</sub> L<sub>2</sub> D<sub>h5</sub> L Z Ref. POLY-CUT  
H7 ± 1.5 µm

|              |    |    |   |    |   |   |        |
|--------------|----|----|---|----|---|---|--------|
| 2.50 (2.507) | 10 | 25 | 3 | 70 | 4 | B | 416681 |
| 2.51 (2.517) | 10 | 25 | 3 | 70 | 4 | B | 416682 |
| 2.52 (2.527) | 10 | 25 | 3 | 70 | 4 | B | 416683 |
| 2.53 (2.537) | 10 | 25 | 3 | 70 | 4 | B | 416684 |
| 2.60 (2.607) | 10 | 25 | 3 | 70 | 4 | B | 416685 |
| 2.70 (2.707) | 10 | 25 | 3 | 70 | 4 | B | 416686 |
| 2.80 (2.807) | 10 | 25 | 3 | 70 | 4 | B | 416687 |
| 2.90 (2.907) | 10 | 25 | 3 | 70 | 4 | B | 416688 |
| 2.97 (2.977) | 10 | 25 | 3 | 70 | 4 | B | 416689 |
| 2.98 (2.987) | 10 | 25 | 3 | 70 | 4 | B | 416690 |
| 2.99 (2.997) | 10 | 25 | 3 | 70 | 4 | B | 416691 |
| 3.00 (3.007) | 10 | 25 | 3 | 70 | 4 | B | 416692 |
| 3.01 (3.018) | 10 | 25 | 3 | 70 | 4 | B | 416693 |
| 3.02 (3.028) | 10 | 25 | 3 | 70 | 4 | B | 416694 |
| 3.03 (3.038) | 10 | 25 | 3 | 70 | 4 | B | 416695 |
| 3.10 (3.108) | 10 | 25 | 3 | 70 | 4 | B | 416696 |
| 3.20 (3.208) | 10 | -  | 3 | 70 | 4 | A | 416697 |
| 3.30 (3.308) | 10 | -  | 3 | 70 | 4 | A | 416698 |
| 3.40 (3.408) | 10 | -  | 3 | 70 | 4 | A | 416699 |
| 3.50 (3.508) | 10 | -  | 3 | 70 | 4 | A | 416700 |
| 3.60 (3.608) | 10 | -  | 3 | 70 | 4 | A | 416701 |
| 3.70 (3.708) | 10 | -  | 3 | 70 | 4 | A | 416702 |
| 3.80 (3.808) | 10 | -  | 3 | 70 | 4 | A | 416703 |
| 3.90 (3.908) | 10 | -  | 3 | 70 | 4 | A | 416704 |
| 3.97 (3.978) | 10 | -  | 3 | 70 | 4 | A | 416705 |
| 3.98 (3.988) | 10 | -  | 3 | 70 | 4 | A | 416706 |
| 3.99 (3.998) | 10 | -  | 3 | 70 | 4 | A | 416707 |
| 4.00 (4.008) | 10 | -  | 3 | 70 | 4 | A | 416708 |
| 4.01 (4.018) | 10 | -  | 3 | 70 | 4 | A | 416709 |
| 4.02 (4.028) | 10 | -  | 3 | 70 | 4 | A | 416710 |

D nom. D<sub>1</sub> L<sub>1</sub> L<sub>2</sub> D<sub>h5</sub> L Z Ref. POLY-CUT  
H7 ± 1.5 µm

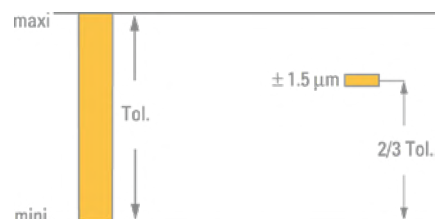
|              |    |   |   |     |   |   |        |
|--------------|----|---|---|-----|---|---|--------|
| 4.03 (4.038) | 10 | - | 3 | 70  | 4 | A | 416711 |
| 4.50 (4.508) | 12 | - | 4 | 80  | 4 | A | 416712 |
| 4.97 (4.978) | 12 | - | 4 | 80  | 4 | A | 416713 |
| 4.98 (4.988) | 12 | - | 4 | 80  | 4 | A | 416714 |
| 4.99 (4.998) | 12 | - | 4 | 80  | 4 | A | 416715 |
| 5.00 (5.008) | 12 | - | 4 | 80  | 4 | A | 416716 |
| 5.01 (5.018) | 12 | - | 4 | 80  | 4 | A | 416717 |
| 5.02 (5.028) | 12 | - | 4 | 80  | 4 | A | 416718 |
| 5.03 (5.038) | 12 | - | 4 | 80  | 4 | A | 416719 |
| 5.50 (5.508) | 12 | - | 4 | 80  | 4 | A | 416720 |
| 5.97 (5.978) | 12 | - | 4 | 80  | 4 | A | 416721 |
| 5.98 (5.988) | 12 | - | 4 | 80  | 4 | A | 416722 |
| 5.99 (5.998) | 12 | - | 4 | 80  | 4 | A | 416723 |
| 6.00 (6.008) | 12 | - | 4 | 80  | 4 | A | 416724 |
| 6.01 (6.020) | 12 | - | 4 | 80  | 4 | A | 416725 |
| 6.02 (6.030) | 12 | - | 4 | 80  | 4 | A | 416726 |
| 6.03 (6.040) | 12 | - | 4 | 80  | 4 | A | 416727 |
| 6.50 (6.510) | 16 | - | 6 | 101 | 6 | A | 416728 |
| 6.97 (6.980) | 16 | - | 6 | 101 | 6 | A | 416729 |
| 6.98 (6.990) | 16 | - | 6 | 101 | 6 | A | 416730 |
| 6.99 (7.000) | 16 | - | 6 | 101 | 6 | A | 416731 |
| 7.00 (7.010) | 16 | - | 6 | 101 | 6 | A | 416732 |
| 7.01 (7.020) | 16 | - | 6 | 101 | 6 | A | 416733 |
| 7.02 (7.030) | 16 | - | 6 | 101 | 6 | A | 416734 |
| 7.03 (7.040) | 16 | - | 6 | 101 | 6 | A | 416735 |
| 7.50 (7.510) | 16 | - | 6 | 101 | 6 | A | 416736 |
| 7.97 (7.980) | 16 | - | 6 | 101 | 6 | A | 416737 |
| 7.98 (7.990) | 16 | - | 6 | 101 | 6 | A | 416738 |
| 7.99 (8.000) | 16 | - | 6 | 101 | 6 | A | 416739 |
| 8.00 (8.010) | 16 | - | 6 | 101 | 6 | A | 416740 |

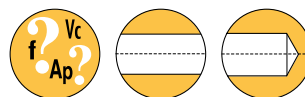


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REIBAHLEN, RECHTSSCHNEIDEND  
LINKS SPIRALISIERT

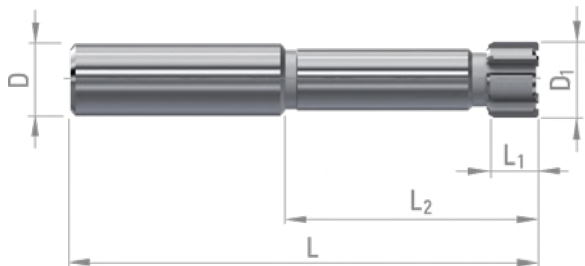
| D nom.<br>H7 | D <sub>1</sub><br>± 1.5 µm | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L   | Z | Ref. | POLYCUT |
|--------------|----------------------------|----------------|----------------|-----------------|-----|---|------|---------|
| 8.01         | (8.020)                    | 16             | -              | 6               | 101 | 6 | A    | 416741  |
| 8.02         | (8.030)                    | 16             | -              | 6               | 101 | 6 | A    | 416742  |
| 8.03         | (8.040)                    | 16             | -              | 6               | 101 | 6 | A    | 416743  |
| 8.50         | (8.510)                    | 16             | -              | 8               | 117 | 6 | A    | 416744  |
| 8.97         | (8.980)                    | 16             | -              | 8               | 117 | 6 | A    | 416745  |
| 8.98         | (8.990)                    | 16             | -              | 8               | 117 | 6 | A    | 416746  |
| 8.99         | (9.000)                    | 16             | -              | 8               | 117 | 6 | A    | 416747  |
| 9.00         | (9.010)                    | 16             | -              | 8               | 117 | 6 | A    | 416748  |
| 9.01         | (9.020)                    | 16             | -              | 8               | 117 | 6 | A    | 416749  |
| 9.02         | (9.030)                    | 16             | -              | 8               | 117 | 6 | A    | 416750  |
| 9.03         | (9.040)                    | 16             | -              | 8               | 117 | 6 | A    | 416751  |
| 9.50         | (9.510)                    | 16             | -              | 8               | 117 | 6 | A    | 421557  |
| 9.97         | (9.980)                    | 16             | -              | 8               | 117 | 6 | A    | 416752  |
| 9.98         | (9.990)                    | 16             | -              | 8               | 117 | 6 | A    | 416753  |
| 9.99         | (10.000)                   | 16             | -              | 8               | 117 | 6 | A    | 416754  |
| 10.00        | (10.010)                   | 16             | -              | 8               | 117 | 6 | A    | 416755  |
| 10.01        | (10.022)                   | 16             | -              | 8               | 117 | 6 | A    | 416756  |
| 10.02        | (10.032)                   | 16             | -              | 8               | 117 | 6 | A    | 416757  |
| 10.03        | (10.042)                   | 16             | -              | 8               | 117 | 6 | A    | 416758  |
| 10.50        | (10.512)                   | 19             | -              | 10              | 133 | 6 | A    | 416759  |
| 10.97        | (10.982)                   | 19             | -              | 10              | 133 | 6 | A    | 416760  |
| 10.98        | (10.992)                   | 19             | -              | 10              | 133 | 6 | A    | 416761  |
| 10.99        | (11.002)                   | 19             | -              | 10              | 133 | 6 | A    | 416762  |
| 11.00        | (11.012)                   | 19             | -              | 10              | 133 | 6 | A    | 416763  |
| 11.01        | (11.022)                   | 19             | -              | 10              | 133 | 6 | A    | 416764  |
| 11.02        | (11.032)                   | 19             | -              | 10              | 133 | 6 | A    | 416765  |
| 11.03        | (11.042)                   | 19             | -              | 10              | 133 | 6 | A    | 416766  |
| 11.50        | (11.512)                   | 19             | -              | 10              | 133 | 6 | A    | 416767  |
| 11.97        | (11.982)                   | 19             | -              | 10              | 133 | 6 | A    | 416768  |
| 11.98        | (12.992)                   | 19             | -              | 10              | 133 | 6 | A    | 416769  |
| 11.99        | (12.002)                   | 19             | -              | 10              | 133 | 6 | A    | 416770  |
| 12.00        | (12.012)                   | 19             | -              | 10              | 133 | 6 | A    | 416771  |
| 12.01        | (12.022)                   | 19             | -              | 10              | 133 | 6 | A    | 416772  |
| 12.02        | (12.032)                   | 19             | -              | 10              | 133 | 6 | A    | 416773  |
| 12.03        | (12.042)                   | 19             | -              | 10              | 133 | 6 | A    | 416774  |





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NACHSTELL-REIBBAHLEN



- Nachstell-Reibahlen, kurze Ausführung, gerade genutet für die Präzisionsbearbeitung.

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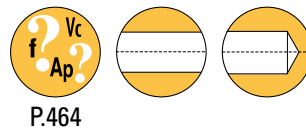
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                   |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|-------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX /PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ○                                   | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         |            | ⊙    | ⊙                       | ○  | ○     | ○                        | ⊙  | ⊙  |                  |    |                  |  |

| D nom.<br>H7 | D <sub>1</sub><br>± 1.5 µm | L <sub>1</sub> | L <sub>2</sub> | D <sub>h6</sub> | L | Z | POLY | VHM | TiAIN | CERMET |
|--------------|----------------------------|----------------|----------------|-----------------|---|---|------|-----|-------|--------|
|--------------|----------------------------|----------------|----------------|-----------------|---|---|------|-----|-------|--------|

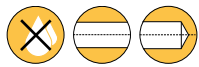
|       |          |    |    |    |     |   |                            |                            |                            |                            |
|-------|----------|----|----|----|-----|---|----------------------------|----------------------------|----------------------------|----------------------------|
| 6.00  | (6.006)  | 10 | 40 | 12 | 80  | 4 | 4361<br>4361-TC<br>4361-FC | 61859<br>61883<br>326753   | 965576<br>341107<br>955517 | 963287<br>964213<br>955527 |
| 7.00  | (7.007)  | 10 | 40 | 12 | 80  | 4 | 4361<br>4361-TC<br>4361-FC | 63863<br>341082<br>977363  | 341096<br>341108<br>955518 | 341122<br>964215<br>955528 |
| 8.00  | (8.007)  | 10 | 40 | 12 | 80  | 4 | 4361<br>4361-TC<br>4361-FC | 61860<br>61884<br>966766   | 341097<br>958621<br>955519 | 61594<br>62263<br>955529   |
| 9.00  | (9.007)  | 10 | 50 | 12 | 90  | 4 | 4361<br>4361-TC<br>4361-FC | 954994<br>974647<br>969137 | 341098<br>341109<br>955520 | 341123<br>61671<br>955530  |
| 10.00 | (10.007) | 10 | 50 | 12 | 90  | 6 | 4361<br>4361-TC<br>4361-FC | 61666<br>61885<br>970436   | 987470<br>985270<br>955521 | 971287<br>305651<br>955531 |
| 11.00 | (11.009) | 10 | 50 | 12 | 100 | 6 | 4361<br>4361-TC<br>4361-FC | 953002<br>341083<br>341089 | 341099<br>341110<br>982623 | 341124<br>952860<br>957205 |
| 12.00 | (12.009) | 10 | 50 | 12 | 100 | 6 | 4361<br>4361-TC<br>4361-FC | 61862<br>61886<br>961924   | 953717<br>957400<br>955522 | 956390<br>61823<br>955532  |
| 13.00 | (13.009) | 10 | 50 | 12 | 100 | 6 | 4361<br>4361-TC<br>4361-FC | 953441<br>951466<br>956383 | 953899<br>62899<br>994806  | 341125<br>951704<br>341139 |
| 14.00 | (14.009) | 10 | 50 | 12 | 100 | 6 | 4361<br>4361-TC<br>4361-FC | 61709<br>61045<br>965308   | 950932<br>957939<br>955523 | 341126<br>64881<br>955533  |
| 15.00 | (15.009) | 14 | 50 | 12 | 100 | 6 | 4361<br>4361-TC<br>4361-FC | 952323<br>955048<br>964856 | 953408<br>341111<br>341118 | 66609<br>62055<br>961253   |
| 16.00 | (16.009) | 14 | 50 | 16 | 110 | 6 | 4361<br>4361-TC<br>4361-FC | 61863<br>61044<br>959763   | 953900<br>341112<br>955524 | 990911<br>60455<br>955534  |



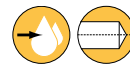


| D nom.<br>H7 | D <sub>1</sub><br>± 1.5 µm | L <sub>1</sub> | L <sub>2</sub> | D <sub>h6</sub> | L   | Z | POLY    | VHM    | TiAIN  | CERMET |
|--------------|----------------------------|----------------|----------------|-----------------|-----|---|---------|--------|--------|--------|
| 17.00        | (17.009)                   | 14             | 50             | 16              | 110 | 6 | 4361    | 67322  | 341100 | 341127 |
|              |                            |                |                |                 |     |   | 4361-TC | 320133 | 308083 | 341132 |
|              |                            |                |                |                 |     |   | 4361-FC | 341090 | 964572 | 959907 |
| 18.00        | (18.009)                   | 14             | 50             | 16              | 110 | 6 | 4361    | 61864  | 341101 | 965018 |
|              |                            |                |                |                 |     |   | 4361-TC | 61887  | 341113 | 341133 |
|              |                            |                |                |                 |     |   | 4361-FC | 964631 | 955525 | 955535 |
| 19.00        | (19.010)                   | 14             | 60             | 20              | 130 | 6 | 4361    | 971893 | 341102 | 341128 |
|              |                            |                |                |                 |     |   | 4361-TC | 341084 | 341114 | 341134 |
|              |                            |                |                |                 |     |   | 4361-FC | 341091 | 969769 | 985097 |
| 20.00        | (20.010)                   | 14             | 60             | 20              | 130 | 6 | 4361    | 61866  | 341103 | 965020 |
|              |                            |                |                |                 |     |   | 4361-TC | 61888  | 65708  | 341135 |
|              |                            |                |                |                 |     |   | 4361-FC | 965283 | 955526 | 955536 |
| 21.00        | (21.010)                   | 14             | 60             | 20              | 130 | 6 | 4361    | 959277 | 341104 | 341129 |
|              |                            |                |                |                 |     |   | 4361-TC | 341085 | 341115 | 341136 |
|              |                            |                |                |                 |     |   | 4361-FC | 983187 | 341119 | 959112 |
| 22.00        | (22.010)                   | 14             | 60             | 20              | 130 | 6 | 4361    | 61867  | 953901 | 965019 |
|              |                            |                |                |                 |     |   | 4361-TC | 341086 | 341116 | 341137 |
|              |                            |                |                |                 |     |   | 4361-FC | 341093 | 959097 | 965586 |
| 23.00        | (23.010)                   | 14             | 60             | 20              | 130 | 6 | 4361    | 956588 | 341105 | 341130 |
|              |                            |                |                |                 |     |   | 4361-TC | 341087 | 341117 | 341138 |
|              |                            |                |                |                 |     |   | 4361-FC | 341094 | 341120 | 341140 |
| 24.00        | (24.010)                   | 14             | 60             | 20              | 130 | 6 | 4361    | 61868  | 341106 | 341131 |
|              |                            |                |                |                 |     |   | 4361-TC | 341088 | 968505 | 969504 |
|              |                            |                |                |                 |     |   | 4361-FC | 341095 | 341121 | 962965 |

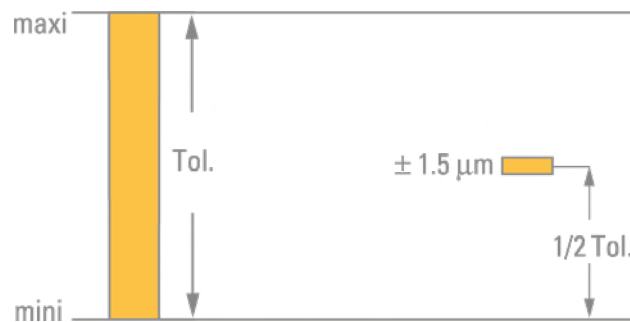
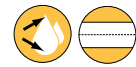
**POLY 4361**

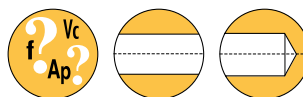


**POLY 4361-TC**



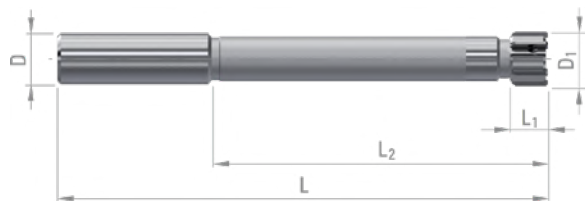
**POLY 4361-FC**





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NACHSTELL-REIBBAHLEN



- Nachstell-Reibbahlen, lange Ausführung, gerade genutet.
- Für die Präzisionsbearbeitung.

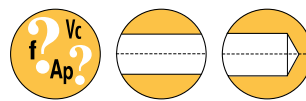
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| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                   |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|-------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX /PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
|                        | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ○                                   | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
|                        | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ⊙          | ⊙    | ○                       | ○  | ○     | ⊙                        | ⊙  |    |                  |    |                  |  |

| D nom.<br>H7 | D <sub>1</sub><br>± 1.5 µm | L <sub>1</sub> | L <sub>2</sub> | D <sub>h6</sub> | L | Z | POLY | VHM | TiAIN | CERMET |
|--------------|----------------------------|----------------|----------------|-----------------|---|---|------|-----|-------|--------|
|--------------|----------------------------|----------------|----------------|-----------------|---|---|------|-----|-------|--------|

|       |          |    |     |    |     |   |         |        |        |        |
|-------|----------|----|-----|----|-----|---|---------|--------|--------|--------|
| 6.00  | (6.006)  | 10 | 80  | 12 | 120 | 4 | 4371    | 61869  | 341156 | 341186 |
|       |          |    |     |    |     |   | 4371-TC | 958107 | 965969 | 341204 |
|       |          |    |     |    |     |   | 4371-FC | 976190 | 955537 | 955547 |
| 7.00  | (7.007)  | 10 | 80  | 12 | 120 | 4 | 4371    | 950528 | 341157 | 341187 |
|       |          |    |     |    |     |   | 4371-TC | 968331 | 341166 | 341205 |
|       |          |    |     |    |     |   | 4371-FC | 956371 | 955538 | 955548 |
| 8.00  | (8.007)  | 10 | 80  | 12 | 120 | 4 | 4371    | 61870  | 341158 | 341188 |
|       |          |    |     |    |     |   | 4371-TC | 341141 | 341167 | 967206 |
|       |          |    |     |    |     |   | 4371-FC | 973938 | 955539 | 955549 |
| 9.00  | (9.007)  | 10 | 90  | 12 | 130 | 4 | 4371    | 954860 | 341159 | 341189 |
|       |          |    |     |    |     |   | 4371-TC | 950120 | 341168 | 341206 |
|       |          |    |     |    |     |   | 4371-FC | 976838 | 955540 | 955550 |
| 10.00 | (10.007) | 10 | 90  | 12 | 130 | 6 | 4371    | 61871  | 310374 | 341190 |
|       |          |    |     |    |     |   | 4371-TC | 341142 | 341169 | 341207 |
|       |          |    |     |    |     |   | 4371-FC | 962768 | 955541 | 955551 |
| 11.00 | (11.009) | 10 | 100 | 12 | 150 | 6 | 4371    | 972464 | 982208 | 341191 |
|       |          |    |     |    |     |   | 4371-TC | 341143 | 341170 | 341208 |
|       |          |    |     |    |     |   | 4371-FC | 312249 | 959071 | 341221 |
| 12.00 | (12.009) | 10 | 100 | 12 | 150 | 6 | 4371    | 61872  | 310375 | 341192 |
|       |          |    |     |    |     |   | 4371-TC | 962624 | 341171 | 341209 |
|       |          |    |     |    |     |   | 4371-FC | 986143 | 955542 | 955552 |
| 13.00 | (13.009) | 10 | 100 | 12 | 150 | 6 | 4371    | 952545 | 341160 | 341193 |
|       |          |    |     |    |     |   | 4371-TC | 341144 | 341172 | 341210 |
|       |          |    |     |    |     |   | 4371-FC | 972342 | 977697 | 341222 |
| 14.00 | (14.009) | 10 | 100 | 12 | 150 | 6 | 4371    | 61873  | 310950 | 965516 |
|       |          |    |     |    |     |   | 4371-TC | 341145 | 341173 | 341211 |
|       |          |    |     |    |     |   | 4371-FC | 964796 | 955543 | 955553 |
| 15.00 | (15.009) | 14 | 100 | 12 | 150 | 6 | 4371    | 64404  | 304409 | 341194 |
|       |          |    |     |    |     |   | 4371-TC | 341146 | 341174 | 341212 |
|       |          |    |     |    |     |   | 4371-FC | 965648 | 976749 | 341223 |
| 16.00 | (16.009) | 14 | 100 | 16 | 160 | 6 | 4371    | 61874  | 964387 | 341195 |
|       |          |    |     |    |     |   | 4371-TC | 977762 | 341175 | 341213 |
|       |          |    |     |    |     |   | 4371-FC | 982330 | 955544 | 955554 |



| D nom.<br>H7 | D <sub>1</sub><br>± 1.5 µm | L <sub>1</sub> | L <sub>2</sub> | D <sub>h6</sub> | L   | Z | POLY    | VHM    | TiAIN  | CERMET |
|--------------|----------------------------|----------------|----------------|-----------------|-----|---|---------|--------|--------|--------|
| 17.00        | (17.009)                   | 14             | 100            | 16              | 160 | 6 | 4371    | 960993 | 59895  | 341196 |
|              |                            |                |                |                 |     |   | 4371-TC | 341147 | 341176 | 341214 |
|              |                            |                |                |                 |     |   | 4371-FC | 341152 | 341184 | 341224 |
| 18.00        | (18.009)                   | 14             | 100            | 16              | 160 | 6 | 4371    | 61875  | 310376 | 341197 |
|              |                            |                |                |                 |     |   | 4371-TC | 961483 | 341177 | 341215 |
|              |                            |                |                |                 |     |   | 4371-FC | 962767 | 955545 | 955555 |
| 19.00        | (19.010)                   | 14             | 120            | 20              | 190 | 6 | 4371    | 66588  | 341161 | 341198 |
|              |                            |                |                |                 |     |   | 4371-TC | 319972 | 341178 | 320656 |
|              |                            |                |                |                 |     |   | 4371-FC | 955676 | 967797 | 341225 |
| 20.00        | (20.010)                   | 14             | 120            | 20              | 190 | 6 | 4371    | 61876  | 341162 | 341199 |
|              |                            |                |                |                 |     |   | 4371-TC | 400483 | 341179 | 341216 |
|              |                            |                |                |                 |     |   | 4371-FC | 341153 | 955546 | 955556 |
| 21.00        | (21.010)                   | 14             | 120            | 20              | 190 | 6 | 4371    | 334784 | 341163 | 341200 |
|              |                            |                |                |                 |     |   | 4371-TC | 341148 | 341180 | 341217 |
|              |                            |                |                |                 |     |   | 4371-FC | 994332 | 310771 | 983957 |
| 22.00        | (22.010)                   | 14             | 120            | 20              | 190 | 6 | 4371    | 963583 | 964388 | 341201 |
|              |                            |                |                |                 |     |   | 4371-TC | 341149 | 341181 | 341218 |
|              |                            |                |                |                 |     |   | 4371-FC | 341154 | 965966 | 341226 |
| 23.00        | (23.010)                   | 14             | 120            | 20              | 190 | 6 | 4371    | 963174 | 341164 | 341202 |
|              |                            |                |                |                 |     |   | 4371-TC | 341150 | 341182 | 341219 |
|              |                            |                |                |                 |     |   | 4371-FC | 962757 | 310773 | 341227 |
| 24.00        | (24.010)                   | 14             | 120            | 20              | 190 | 6 | 4371    | 62827  | 341165 | 341203 |
|              |                            |                |                |                 |     |   | 4371-TC | 341151 | 341183 | 341220 |
|              |                            |                |                |                 |     |   | 4371-FC | 341155 | 341185 | 341228 |

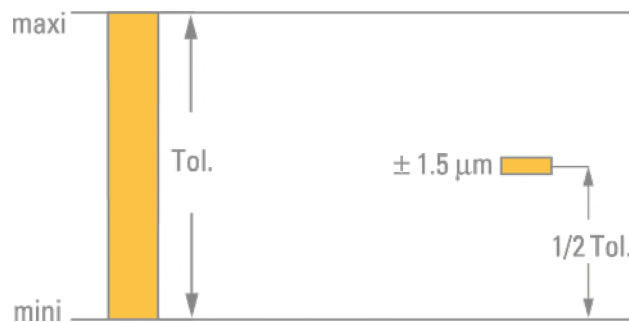
**POLY 4371**



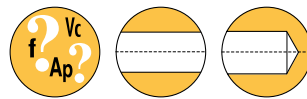
**POLY 4371-TC**



**POLY 4371-FC**

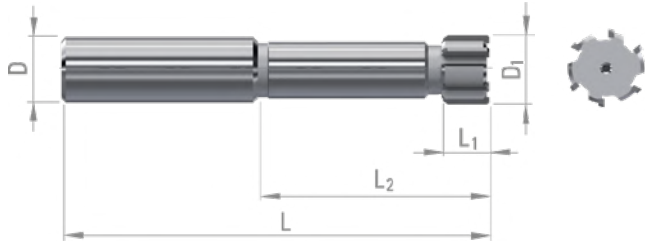


FEST-REIBAHLEN



P.464

- Gelötete Fest-Reibahlen, ungleiche Teilung, für Sackloch- und Durchgangsbohrungen. Werkzeuge entwickelt zum Reiben aller Arten von Materialien.
- CERMET verbessert Standzeit und Oberflächengüte von niedrig legierten Stählen.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.



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| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○                | ○  | ○  | ○    | ○                                    | ○    | ○        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  | ⊙  |

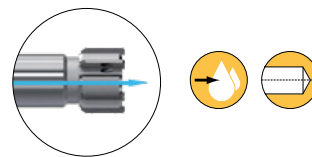
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ○            | ○       | ○          | ○    | ○                       | ○  | ○     | ○                        | ○  | ○                | ○  | ○                | ○  |

| D <sub>1</sub>   | L <sub>1</sub> | L <sub>2</sub> | D <sub>h6</sub> | L   | Z  | VHM | TiAlN | POLY-CUT | C-TOP | CERMET |
|------------------|----------------|----------------|-----------------|-----|----|-----|-------|----------|-------|--------|
| 5.800 - 7.609    | 10             | 40             | 12              | 80  | 4  | □   | ■     | ■        | ■     | □      |
| 7.610 - 8.609    | 10             | 40             | 12              | 80  | 4  | □   | ■     | ■        | ■     | □      |
| 8.610 - 9.609    | 10             | 50             | 12              | 90  | 4  | □   | ■     | ■        | ■     | □      |
| 9.610 - 10.609   | 10             | 50             | 12              | 90  | 6  | □   | ■     | ■        | ■     | □      |
| 10.610 - 14.609  | 10             | 50             | 12              | 100 | 6  | □   | ■     | ■        | ■     | □      |
| 14.610 - 15.609  | 14             | 50             | 12              | 100 | 6  | □   | ■     | ■        | ■     | □      |
| 15.610 - 18.609  | 14             | 50             | 16              | 110 | 6  | □   | ■     | ■        | ■     | □      |
| 18.610 - 21.109  | 14             | 60             | 20              | 130 | 6  | □   | ■     | ■        | ■     | □      |
| 21.110 - 25.109  | 14             | 60             | 20              | 130 | 6  | □   | ■     | ■        | ■     | □      |
| 25.110 - 26.109  | 14             | 75             | 25              | 145 | 6  | □   | ■     | ■        | ■     | □      |
| 26.110 - 28.109  | 18             | 75             | 25              | 145 | 6  | □   | ■     | ■        | ■     | □      |
| 28.110 - 33.109  | 18             | 75             | 25              | 145 | 6  | □   | ■     | ■        | ■     | □      |
| 33.110 - 45.109  | 18             | 75             | 25              | 145 | 6  | □   | ■     | ■        | ■     | □      |
| 45.110 - 65.109  | 18             | 90             | 32              | 160 | 8  | □   | ■     | ■        | ■     | □      |
| 65.110 - 90.109  | 18             | 90             | 32              | 160 | 10 | □   | ■     | ■        | ■     | □      |
| 90.110 - 130.000 | 18             | 90             | 32              | 160 | 12 | □   | ■     | ■        | ■     | □      |

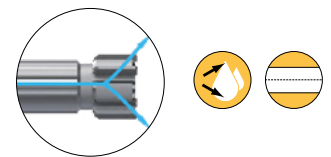
POLY 4261



POLY 4261-TC



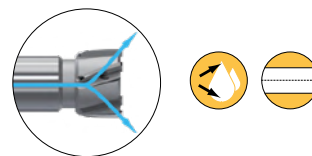
POLY 4261-FC



POLY 4264

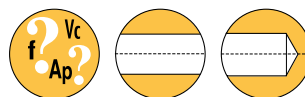


POLY 4264-FC



# POLY 4271 - 4274

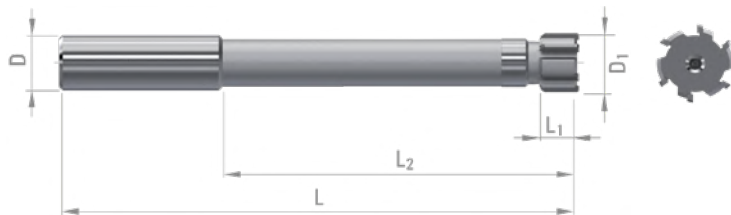
## FEST-REIBAHLEN



WERKZEUGE  
AUF ANFRAGE

P.464

- Gelötete Fest-Reibahlen, lange Ausführung ungleiche Teilung, für Sackloch- und Durchgangsbohrungen. Werkzeuge entwickelt zum Reiben aller Arten von Materialien.
- CERMET verbessert Standzeit und Oberflächengüte von niedrig legierten Stählen.
- TiAIN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.



○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |                                     |    | M    |      |          |                  | K  |                    |    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|-------------------------------------|----|------|------|----------|------------------|----|--------------------|----|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl | Aust. Rostfreier Stahl (DUPLEX /PH) |    |      |      | Grauguss | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12                                  | 13 | 14.1 | 14.2 | 14.3     | 14.4             | 15 | 16                 | 17 | 18 | 19 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○                | ○                                   | ○  | ○    | ○    | ○        | ○                | ⊙  | ⊙                  | ⊙  | ⊙  | ⊙  | ⊙  |

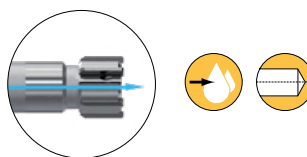
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |   |   |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|---|---|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |   |   |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |   |   |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ○          | ○    | ○                       | ○  | ○     | ○                        | ○  | ○                | ○  | ○                | ○  | ○ | ○ |

| D <sub>1</sub>   | L <sub>1</sub> | L <sub>2</sub> | D <sub>h6</sub> | L   | Z  | VHM | TiAIN | POLY-CUT | C-TOP | CERMET |
|------------------|----------------|----------------|-----------------|-----|----|-----|-------|----------|-------|--------|
| 5.800 - 7.609    | 10             | 80             | 12              | 120 | 4  | □   | ■     | ■        | ■     | □      |
| 7.610 - 8.609    | 10             | 80             | 12              | 120 | 4  | □   | ■     | ■        | ■     | □      |
| 8.610 - 9.609    | 10             | 90             | 12              | 130 | 4  | □   | ■     | ■        | ■     | □      |
| 9.610 - 10.609   | 10             | 90             | 12              | 130 | 6  | □   | ■     | ■        | ■     | □      |
| 10.610 - 14.609  | 10             | 100            | 12              | 150 | 6  | □   | ■     | ■        | ■     | □      |
| 14.610 - 15.609  | 14             | 100            | 12              | 150 | 6  | □   | ■     | ■        | ■     | □      |
| 15.610 - 18.609  | 14             | 100            | 16              | 160 | 6  | □   | ■     | ■        | ■     | □      |
| 18.610 - 21.109  | 14             | 120            | 20              | 190 | 6  | □   | ■     | ■        | ■     | □      |
| 21.110 - 25.109  | 14             | 120            | 20              | 190 | 6  | □   | ■     | ■        | ■     | □      |
| 25.110 - 26.109  | 14             | 150            | 25              | 220 | 6  | □   | ■     | ■        | ■     | □      |
| 26.110 - 28.109  | 18             | 150            | 25              | 220 | 6  | □   | ■     | ■        | ■     | □      |
| 28.110 - 33.109  | 18             | 150            | 25              | 220 | 6  | □   | ■     | ■        | ■     | □      |
| 33.110 - 45.109  | 18             | 150            | 25              | 220 | 6  | □   | ■     | ■        | ■     | □      |
| 45.110 - 65.109  | 18             | 180            | 32              | 250 | 8  | □   | ■     | ■        | ■     | □      |
| 65.110 - 90.109  | 18             | 180            | 32              | 250 | 10 | □   | ■     | ■        | ■     | □      |
| 90.110 - 130.000 | 18             | 180            | 32              | 250 | 12 | □   | ■     | ■        | ■     | □      |

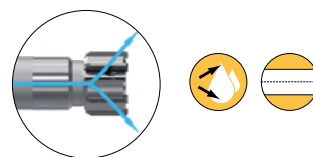
### POLY 4271



### POLY 4271-TC



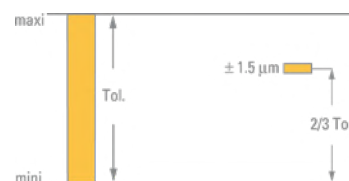
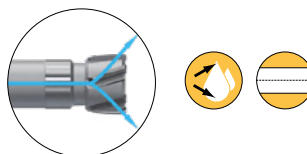
### POLY 4271-FC

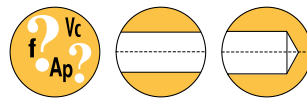


### POLY 4274



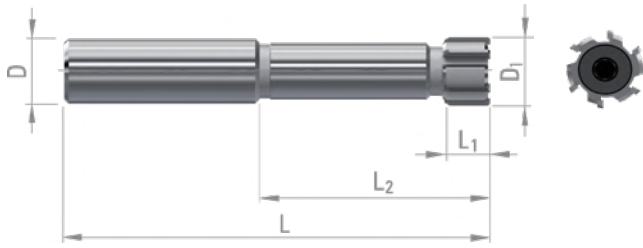
### POLY 4274-FC





NACHSTELL-REIBBAHLEN

P.464



- Gelötete Nachstell-Reibahlen, kurze Ausführung, ungleiche Teilung, für Sackloch- und Durchgangsbohrungen. Werkzeuge entwickelt zum Reiben aller Arten von Materialien.
- CERMET verbessert Standzeit und Oberflächengüte von niedrig legierten Stählen.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ○                                  | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ⊙          | ⊙    | ○                       | ○  | ○     | ⊙                        | ⊙  |                  |    |                  |    |

| D <sub>1</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h6</sub> | L   | Z | VHM | TiAlN | CERMET |
|----------------|----------------|----------------|-----------------|-----|---|-----|-------|--------|
| 5.80 - 7.60    | 10             | 40             | 12              | 80  | 4 | □   | ■     | □      |
| 7.61 - 8.60    | 10             | 40             | 12              | 80  | 4 | □   | ■     | □      |
| 8.61 - 9.60    | 10             | 50             | 12              | 90  | 4 | □   | ■     | □      |
| 9.61 - 10.60   | 10             | 50             | 12              | 90  | 6 | □   | ■     | □      |
| 10.61 - 14.60  | 10             | 50             | 12              | 100 | 6 | □   | ■     | □      |
| 14.61 - 15.60  | 14             | 50             | 12              | 100 | 6 | □   | ■     | □      |
| 15.61 - 18.60  | 14             | 50             | 16              | 110 | 6 | □   | ■     | □      |
| 18.61 - 21.10  | 14             | 60             | 20              | 130 | 6 | □   | ■     | □      |
| 21.11 - 25.10  | 14             | 60             | 20              | 130 | 6 | □   | ■     | □      |
| 25.11 - 28.10  | 18             | 75             | 25              | 145 | 6 | □   | ■     | □      |
| 28.11 - 45.00  | 18             | 75             | 25              | 145 | 6 | □   | ■     | □      |
| 45.00 - 55.00  | 18             | 90             | 32              | 160 | 8 | □   | ■     | □      |

POLY 4361-TC



POLY 4361-FC



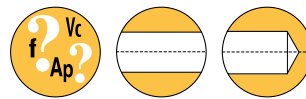
POLY 4364



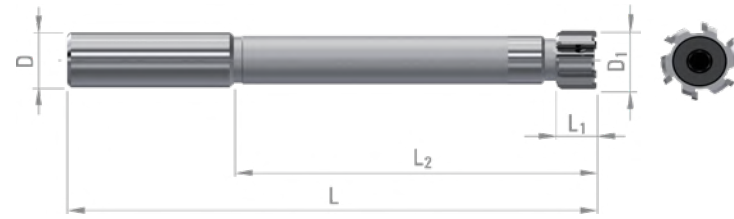
POLY 4364-FC



NACHSTELL-REIBBAHLEN



P.464



- Gelötete Nachstell-Reibbahlen, lange Ausführung, ungleiche Teilung, für Sackloch- und Durchgangsbohrungen. Werkzeuge entwickelt zum Reiben aller Arten von Materialien.
- CERMET verbessert Standzeit und Oberflächengüte von niedrig legierten Stählen.
- TiAlN-Beschichtung verbessert die Standzeit in Eisenwerkstoffen.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊙                 | ⊙ | ⊙ | ⊙ | ⊙ | ⊙                 | ⊙ | ⊙ | ⊙ | ○              | ○  | ○                | ○  | ○                                    | ○    | ○    | ○    | ⊙        | ⊙  | ⊙                | ⊙  | ⊙                  | ⊙  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ⊙                       | ⊙  | ⊙  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ⊙          | ⊙    | ○                       | ○  | ○     | ⊙                        | ⊙  |                  |    |                  |    |

| D <sub>1</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h6</sub> | L   | Z | VHM | TiAlN | CERMET |
|----------------|----------------|----------------|-----------------|-----|---|-----|-------|--------|
| 5.80 - 7.60    | 10             | 80             | 12              | 120 | 4 | □   | ■     | □      |
| 7.61 - 8.60    | 10             | 80             | 12              | 120 | 4 | □   | ■     | □      |
| 8.61 - 9.60    | 10             | 90             | 12              | 130 | 4 | □   | ■     | □      |
| 9.61 - 10.60   | 10             | 90             | 12              | 130 | 6 | □   | ■     | □      |
| 10.61 - 14.60  | 10             | 100            | 12              | 150 | 6 | □   | ■     | □      |
| 14.61 - 15.60  | 14             | 100            | 12              | 150 | 6 | □   | ■     | □      |
| 15.61 - 18.60  | 14             | 100            | 16              | 160 | 6 | □   | ■     | □      |
| 18.61 - 21.10  | 14             | 120            | 20              | 190 | 6 | □   | ■     | □      |
| 21.11 - 25.10  | 14             | 120            | 20              | 190 | 6 | □   | ■     | □      |
| 25.11 - 28.10  | 18             | 150            | 25              | 220 | 6 | □   | ■     | □      |
| 28.11 - 45.00  | 18             | 150            | 25              | 220 | 6 | □   | ■     | □      |
| 45.00 - 55.00  | 18             | 180            | 32              | 250 | 8 | □   | ■     | □      |

POLY 4371-TC

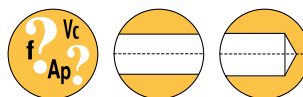
POLY 4371-FC



POLY 4374

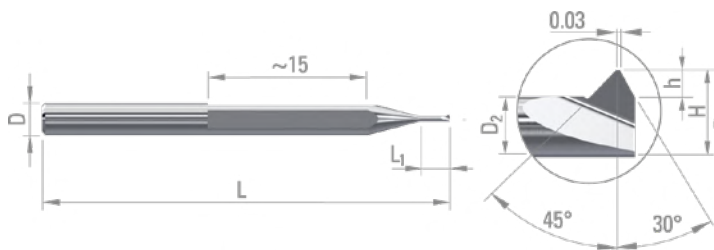
POLY 4374-FC





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- Ausdrehstahl und Faswerkzeug. Zum Aufbohren, Anfassen und Gegenwinkeldrehen von kleinen Drehteilen entwickelt.
- Geometrie angepasst an NIHS 06-10 Gewinde (DIN 14, ISO 1501).
- Empfohlene wird die Verwendung mit DIXI 2764 Halter.



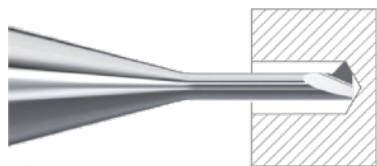
○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |                                    |    | M    |      |          |                  | K  |                    |    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|------------------------------------|----|------|------|----------|------------------|----|--------------------|----|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl | Aust. Rostfreier Stahl (DUPLEX/PH) |    |      |      | Grauguss | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12                                 | 13 | 14.1 | 14.2 | 14.3     | 14.4             | 15 | 16                 | 17 | 18 | 19 | 20 |
| Empfehlungen           | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗                 | ⊗ | ⊗ | ⊗ | ○              | ○                | ○                                  | ○  | ○    | ○    | ○        | ○                | ⊗  | ⊗                  | ⊗  | ⊗  | ⊗  | ⊗  |

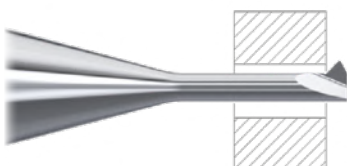
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      |                         | S  |       |                          |    |                  | H                |    |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|------------------|----|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl | Hartes Gusseisen |    |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39               | 40 | 41 |
| Empfehlungen           | ⊗                       | ⊗  | ⊗                       | ⊗  | ⊗  | ⊗                 | ⊗                      | ⊗  | ⊗            |         | ⊗          | ⊗    | ○                       | ○  | ○     | ⊗                        | ⊗  |                  |                  |    |    |

| D <sub>1</sub> | L <sub>1</sub> | D <sub>2</sub> | h    | H    | D <sub>h5</sub> | L  | für... | VHM    |
|----------------|----------------|----------------|------|------|-----------------|----|--------|--------|
| 0.26           | 0.84           | 0.14           | 0.06 | 0.20 | 3               | 46 | S 0.30 | 968880 |
| 0.35           | 1.04           | 0.21           | 0.07 | 0.28 | 3               | 46 | S 0.40 | 969086 |
| 0.44           | 1.35           | 0.28           | 0.08 | 0.36 | 3               | 46 | S 0.50 | 969087 |
| 0.53           | 1.66           | 0.33           | 0.10 | 0.43 | 3               | 46 | S 0.60 | 969088 |
| 0.66           | 2.04           | 0.36           | 0.15 | 0.51 | 3               | 46 | S 0.70 | 969089 |
| 0.75           | 2.30           | 0.43           | 0.16 | 0.59 | 3               | 46 | S 0.80 | 969090 |
| 0.86           | 2.72           | 0.46           | 0.20 | 0.66 | 3               | 46 | S 0.90 | 969091 |

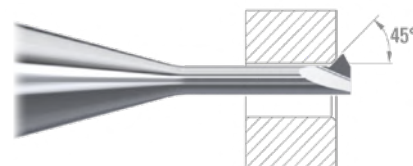
Sackloch ausdrehen



Durchgangsloch ausdrehen

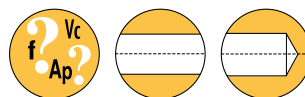


Fasen

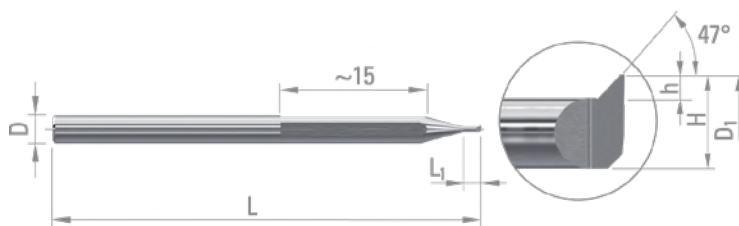


Halter S. 467





P.464



- Ausdrehstahl und Faswerkzeug. Entwickelt für das Aufbohren und Senken von kleinen Drehteilen.
- Empfohlen wird die Verwendung am Halter DIXI 2764.

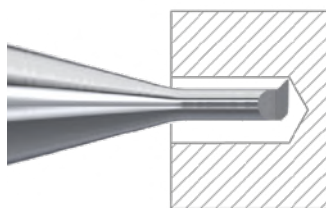
○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                  |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗                 | ⊗ | ⊗ | ⊗ | ○              | ○                | ○  | ○  | ○                                  | ○    | ○    | ○    | ⊗        | ⊗  | ⊗                | ⊗  | ⊗                  | ⊗  |

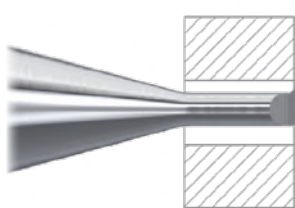
| ISO                    | N                       |    |                         |    |    |                   |    |                        |   |   | S            |         |            |      |                         |    | H  |                          |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|----|------------------------|---|---|--------------|---------|------------|------|-------------------------|----|----|--------------------------|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung |    | Cu-Legierung Schwierig |   |   | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |    | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27 | 28                     | - | - | 29           | 30      | 31         | 32   | 33-35                   | 36 | 37 | 38                       | 39 | 40               | 41 |                  |  |
| Empfehlungen           | ⊗                       | ⊗  | ⊗                       | ⊗  | ⊗  | ⊗                 | ⊗  | ⊗                      | ⊗ |   | ⊗            | ⊗       | ○          | ○    | ○                       | ⊗  | ⊗  |                          |    |                  |    |                  |  |

| D <sub>1</sub> | L <sub>1</sub> | h    | H    | D <sub>h5</sub> | L  | VHM              |
|----------------|----------------|------|------|-----------------|----|------------------|
| 0.20           | 0.20<br>0.40   | 0.04 | 0.16 | 3               | 46 | 997972<br>997973 |
| 0.30           | 0.30<br>0.60   | 0.06 | 0.24 | 3               | 46 | 997974<br>997975 |
| 0.40           | 0.40<br>0.80   | 0.08 | 0.32 | 3               | 46 | 997976<br>997977 |
| 0.50           | 0.50<br>1.00   | 0.10 | 0.40 | 3               | 46 | 997978<br>997979 |
| 0.60           | 0.60<br>1.20   | 0.12 | 0.48 | 3               | 46 | 997980<br>997981 |
| 0.70           | 0.70<br>1.40   | 0.14 | 0.56 | 3               | 46 | 997982<br>997983 |
| 0.80           | 0.80<br>1.60   | 0.16 | 0.64 | 3               | 46 | 997984<br>997985 |
| 0.90           | 0.90<br>1.80   | 0.18 | 0.72 | 3               | 46 | 997986<br>997987 |
| 1.00           | 1.00<br>2.00   | 0.20 | 0.80 | 3               | 46 | 997988<br>997989 |

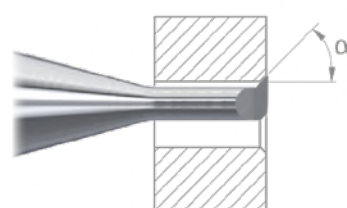
Sackloch ausdrehen



Durchgangsloch ausdrehen

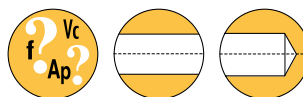


Fasen



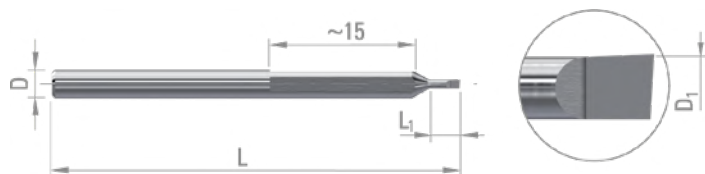
Halter S. 467

AUSBOHRSTÄHLE



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- Ausbohrstahl zum Aufbohren und für die Innenbearbeitung von kleinen Drehteilen entwickelt.
- Verstärkte Geometrie für eine höhere Standzeiten..
- Empfohlen wird die Verwendung im Halter DIXI 2764.

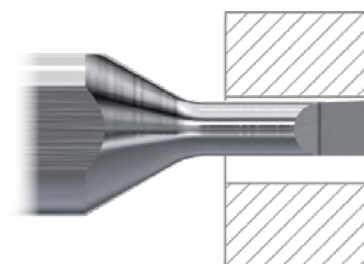
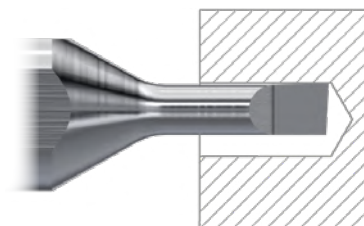


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| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |                                     |    | M    |      |          |                  | K                  |    |    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|-------------------------------------|----|------|------|----------|------------------|--------------------|----|----|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl | Aust. Rostfreier Stahl (DUPLEX /PH) |    |      |      | Grauguss | KugelgraphitGuss | Gusseisen, formbar |    |    |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12                                  | 13 | 14.1 | 14.2 | 14.3     | 14.4             | 15                 | 16 | 17 | 18 | 19 | 20 |
| Empfehlungen           | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗                 | ⊗ | ⊗ | ⊗ | ○              | ○                | ○                                   | ○  | ○    | ○    | ○        | ○                | ⊗                  | ⊗  | ⊗  | ⊗  | ⊗  | ⊗  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊗                       | ⊗  | ⊗                       | ⊗  | ⊗  | ⊗                 | ⊗                      | ⊗  | ⊗            |         | ⊗          | ⊗    | ○                       | ○  | ○     | ⊗                        | ⊗  |                  |    |                  |    |

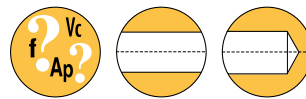
| D <sub>1</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM    |
|----------------|----------------|-----------------|----|--------|
| 0.30           | 0.60           | 3               | 46 | 997948 |
|                | 0.90           |                 |    | 997949 |
|                | 1.20           |                 |    | 997950 |
| 0.40           | 0.80           | 3               | 46 | 997951 |
|                | 1.20           |                 |    | 997952 |
|                | 1.60           |                 |    | 997953 |
| 0.50           | 1.00           | 3               | 46 | 997954 |
|                | 1.50           |                 |    | 997955 |
|                | 2.00           |                 |    | 997956 |
| 0.60           | 1.20           | 3               | 46 | 997957 |
|                | 1.80           |                 |    | 997958 |
|                | 2.40           |                 |    | 997959 |
| 0.70           | 1.40           | 3               | 46 | 997960 |
|                | 2.10           |                 |    | 997961 |
|                | 2.80           |                 |    | 997962 |
| 0.80           | 1.60           | 3               | 46 | 997963 |
|                | 2.40           |                 |    | 997964 |
|                | 3.60           |                 |    | 997965 |
| 0.90           | 1.80           | 3               | 46 | 997966 |
|                | 2.70           |                 |    | 997967 |
|                | 3.60           |                 |    | 997968 |
| 1.00           | 2.00           | 3               | 46 | 997969 |
|                | 3.00           |                 |    | 997970 |
|                | 4.00           |                 |    | 997971 |



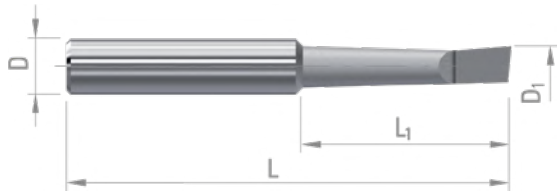


**DIXI 2579**

**AUSBOHRSTÄHLE**



P.464



- Ausbohrstahl zum Aufbohren und Innenbearbeitung von Drehteilen. Verstärkte Geometrie für höhere Standzeiten.

○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗                 | ⊗ | ⊗ | ⊗ | ○              | ○                | ○  | ○  | ○                                    | ○    | ○    | ○    | ⊗        | ⊗  | ⊗                | ⊗  | ⊗                  | ⊗  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊗                       | ⊗  | ⊗                       | ⊗  | ⊗  | ⊗                 | ⊗                      | ⊗  | ⊗            |         | ⊗          | ⊗    | ○                       | ○  | ○     | ⊗                        | ⊗  |                  |    |                  |    |

| D <sub>1</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM   |
|----------------|----------------|-----------------|----|-------|
| 0.60           | 3              | 4               | 25 | 53197 |
| 0.80           | 4              | 4               | 25 | 53198 |
| 1.00           | 5              | 4               | 25 | 53199 |
| 1.20           | 6              | 4               | 25 | 53200 |
| 1.50           | 8              | 4               | 32 | 53201 |
| 1.80           | 9              | 4               | 32 | 53202 |
| 2.00           | 10             | 4               | 32 | 53203 |
| 2.50           | 12             | 4               | 32 | 53204 |
| 3.00           | 15             | 4               | 32 | 53205 |



**POLY 2764**

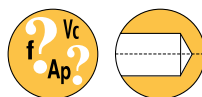
**HALTER FÜR AUSBOHRSTÄHLE**



- Halter für Ausdrehstähe. Entwickelt für die Montage von Ausdrehstähe DIXI 2567, DIXI 2577 und DIXI 2578 auf Langdrehautomaten

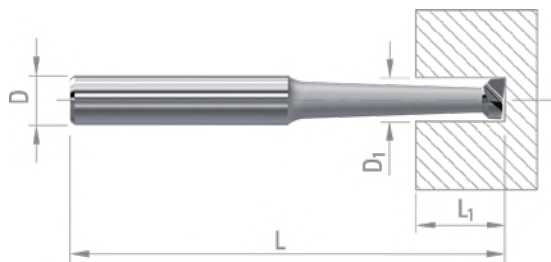
| S     | D <sub>1</sub> | L   | C  | Art.   |
|-------|----------------|-----|----|--------|
| 7×7   | 3              | 146 | 7  | 305008 |
| 8×8   | 3              | 146 | 8  | 305009 |
| 10×10 | 3              | 150 | 10 | 305010 |





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AUSBOHRSTÄHLE  
SACKLOCHBOHRUNG



- Ausbohrstahl. Werkzeug zum Reiben und Aufbohren für Sacklochbohrungen mit geradem Grund.
- Wird in einer festen Position beim Drehen verwendet oder in einem Ausdrehkopf montiert.

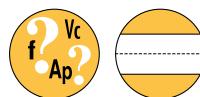
○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                    |      |          | K  |                  |    |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX/PH) |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                               | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen           | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗                 | ⊗ | ⊗ | ⊗ | ○              | ○                | ○  | ○  | ○    | ○                                  | ○    | ○        | ⊗  | ⊗                | ⊗  | ⊗                  | ⊗  | ⊗  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊗                       | ⊗  | ⊗                       | ⊗  | ⊗  | ⊗                 | ⊗                      | ⊗  | ⊗            |         | ⊗          | ⊗    | ○                       | ○  | ○     | ⊗                        | ⊗  |                  |    |                  |    |

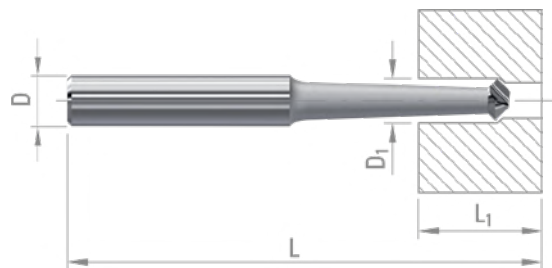
| D <sub>1</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM   |
|----------------|----------------|-----------------|----|-------|
| 0.50           | 3              | 4               | 25 | 36091 |
| 0.80           | 4              | 4               | 25 | 36092 |
| 1.00           | 4              | 4               | 25 | 33855 |
| 1.20           | 6              | 4               | 25 | 33856 |
| 1.50           | 7              | 4               | 28 | 33857 |
| 1.70           | 7              | 4               | 28 | 33858 |
| 2.00           | 9              | 4               | 30 | 33859 |
| 2.20           | 9              | 4               | 30 | 33860 |
| 2.50           | 12             | 4               | 33 | 33861 |
| 3.00           | 14             | 4               | 35 | 33862 |
| 3.50           | 14             | 4               | 35 | 33863 |
| 4.00           | 17             | 4               | 38 | 33864 |
| 5.00           | 23             | 4               | 38 | 794   |
| 2.00           | 9              | 6               | 38 | 33865 |
| 2.50           | 12             | 6               | 40 | 33866 |
| 3.00           | 14             | 6               | 42 | 33867 |
| 4.00           | 17             | 6               | 45 | 33868 |
| 5.00           | 22             | 6               | 52 | 795   |
| 6.00           | 24             | 6               | 52 | 796   |
| 7.00           | 30             | 6               | 52 | 797   |
| 8.00           | 32             | 6               | 52 | 798   |
| 10.00          | 40             | 6               | 60 | 800   |
| 3.00           | 17             | 8               | 47 | 790   |
| 4.00           | 21             | 8               | 51 | 791   |
| 5.00           | 22             | 8               | 52 | 801   |
| 6.00           | 25             | 8               | 55 | 802   |
| 7.00           | 28             | 8               | 60 | 803   |

| D <sub>1</sub> | L <sub>1</sub> | D <sub>h5</sub> | L   | VHM  |
|----------------|----------------|-----------------|-----|------|
| 10.00          | 45             | 8               | 65  | 804  |
| 12.00          | 54             | 8               | 70  | 805  |
| 13.00          | 54             | 8               | 78  | 5603 |
| 3.00           | 17             | 10              | 45  | 792  |
| 4.00           | 21             | 10              | 49  | 793  |
| 5.00           | 22             | 10              | 50  | 806  |
| 6.00           | 25             | 10              | 54  | 807  |
| 7.00           | 28             | 10              | 56  | 808  |
| 9.00           | 32             | 10              | 65  | 809  |
| 10.00          | 32             | 10              | 65  | 810  |
| 12.00          | 45             | 10              | 70  | 811  |
| 13.00          | 55             | 10              | 80  | 812  |
| 15.00          | 75             | 10              | 100 | 813  |
| 18.00          | 75             | 10              | 100 | 814  |
| 8.00           | 30             | 12              | 70  | 815  |
| 10.00          | 40             | 12              | 80  | 816  |
| 13.00          | 60             | 12              | 90  | 817  |
| 15.00          | 70             | 12              | 100 | 818  |
| 18.00          | 70             | 12              | 100 | 819  |
| 13.00          | 60             | 16              | 115 | 820  |
| 15.00          | 60             | 16              | 115 | 821  |
| 18.00          | 75             | 16              | 115 | 822  |
| 20.00          | 75             | 16              | 115 | 824  |



P.464

# AUSBOHRSTÄHLE DURCHGANGSBOHRUNG



- Ausbohrstahl. Werkzeug, das zum Aufbohren von Bohrungen entwickelt wurde.
- Wird in einer festen Position beim Drehen verwendet oder in einem Ausdrehkopf montiert.

○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                  |      |      |      | K        |    |                  |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------------------------------------|------|------|------|----------|----|------------------|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX/PH) |      |      |      | Grauguss |    | KugelgraphitGuss | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                               | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18                 | 19 | 20 |
| Empfehlungen           | ⊗                 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗                 | ⊗ | ⊗ | ⊗ | ○              | ○                | ○  | ○  | ○                                  | ○    | ○    | ○    | ⊗        | ⊗  | ⊗                | ⊗                  | ⊗  | ⊗  |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊗                       | ⊗  | ⊗                       | ⊗  | ⊗  | ⊗                 | ⊗                      | ⊗  | ⊗            |         | ⊗          | ⊗    | ○                       | ○  | ○     | ⊗                        | ⊗  |                  |    |                  |    |

| D <sub>1</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | VHM   |
|----------------|----------------|-----------------|----|-------|
| 0.50           | 3              | 4               | 25 | 36093 |
| 0.80           | 4              | 4               | 25 | 36094 |
| 1.00           | 4              | 4               | 25 | 33869 |
| 1.20           | 6              | 4               | 25 | 33870 |
| 1.50           | 7              | 4               | 28 | 33871 |
| 1.70           | 7              | 4               | 28 | 33872 |
| 2.00           | 9              | 4               | 30 | 33873 |
| 2.20           | 9              | 4               | 30 | 33874 |
| 2.50           | 12             | 4               | 33 | 33875 |
| 3.00           | 14             | 4               | 35 | 33876 |
| 3.50           | 14             | 4               | 35 | 33877 |
| 4.00           | 17             | 4               | 38 | 33878 |
| 5.00           | 23             | 4               | 38 | 745   |
| 2.00           | 9              | 6               | 38 | 33879 |
| 2.50           | 12             | 6               | 40 | 33880 |
| 3.00           | 14             | 6               | 42 | 33881 |
| 4.00           | 17             | 6               | 45 | 33882 |
| 5.00           | 22             | 6               | 52 | 746   |
| 6.00           | 24             | 6               | 52 | 747   |
| 8.00           | 32             | 6               | 52 | 749   |
| 10.00          | 40             | 6               | 60 | 751   |
| 3.00           | 17             | 8               | 47 | 740   |
| 4.00           | 21             | 8               | 51 | 741   |
| 5.00           | 22             | 8               | 52 | 752   |
| 6.00           | 25             | 8               | 55 | 753   |
| 7.00           | 28             | 8               | 60 | 754   |

| D <sub>1</sub> | L <sub>1</sub> | D <sub>h5</sub> | L   | VHM |
|----------------|----------------|-----------------|-----|-----|
| 9.00           | 45             | 8               | 65  | 755 |
| 11.00          | 54             | 8               | 70  | 756 |
| 3.00           | 17             | 10              | 45  | 742 |
| 4.00           | 21             | 10              | 49  | 743 |
| 5.00           | 22             | 10              | 50  | 757 |
| 6.00           | 25             | 10              | 54  | 758 |
| 7.00           | 28             | 10              | 56  | 759 |
| 9.00           | 32             | 10              | 65  | 760 |
| 10.00          | 32             | 10              | 65  | 761 |
| 12.00          | 45             | 10              | 70  | 762 |
| 13.00          | 55             | 10              | 80  | 763 |
| 15.00          | 75             | 10              | 100 | 764 |
| 18.00          | 75             | 10              | 100 | 765 |
| 8.00           | 30             | 12              | 70  | 766 |
| 10.00          | 40             | 12              | 80  | 767 |
| 13.00          | 60             | 12              | 90  | 768 |
| 15.00          | 70             | 12              | 100 | 769 |
| 18.00          | 70             | 12              | 100 | 770 |
| 20.00          | 80             | 12              | 110 | 825 |
| 13.00          | 60             | 16              | 115 | 771 |
| 15.00          | 60             | 16              | 115 | 772 |
| 18.00          | 75             | 16              | 115 | 773 |



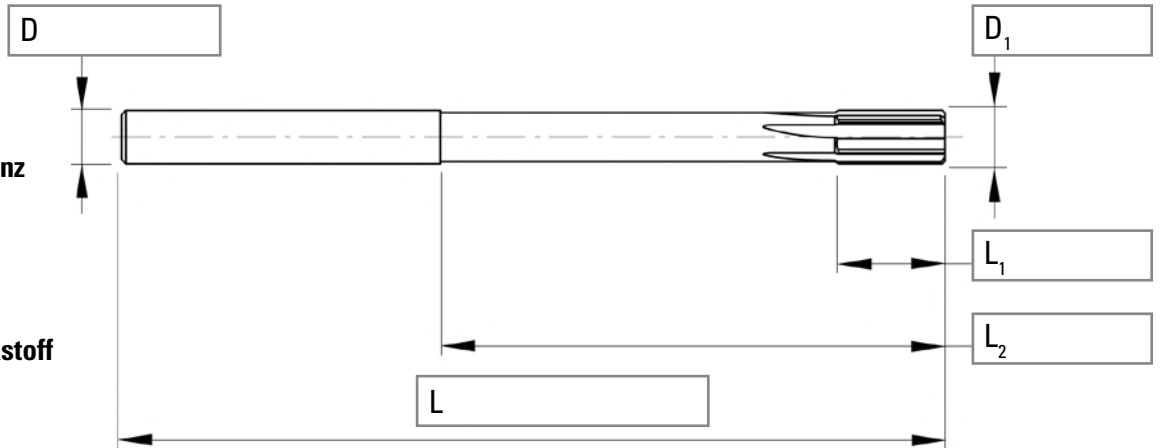
**POLY 4001 SP**

Z =

Menge

Durchmesser und Toleranz  
der Bohrung

Zu bearbeitender Werkstoff



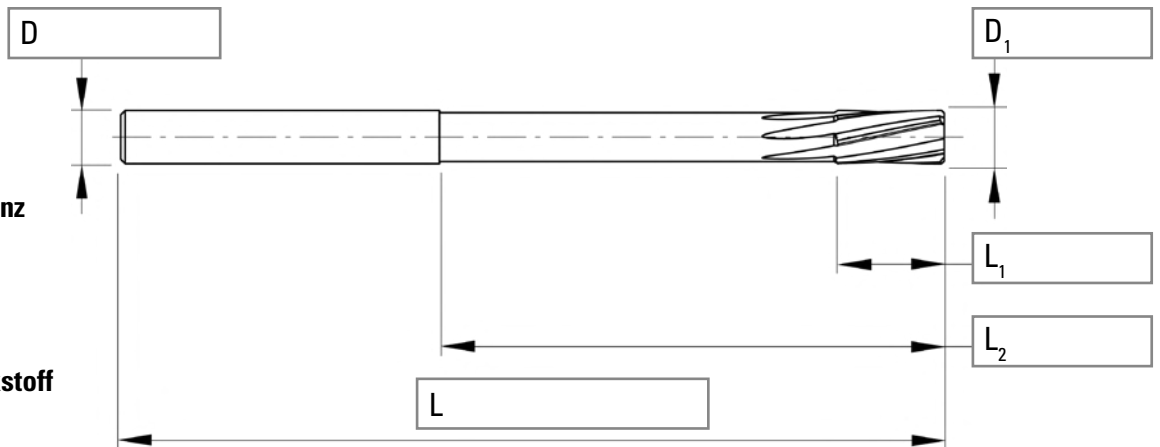
**POLY 4007 SP**

Z =

Menge

Durchmesser und Toleranz  
der Bohrung

Zu bearbeitender Werkstoff



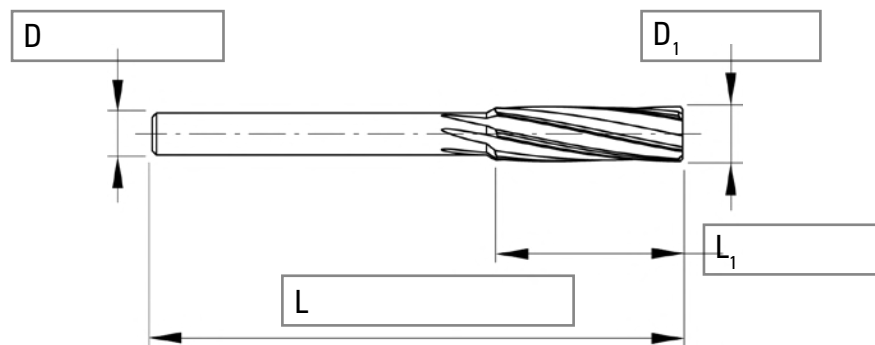
**POLY 4005 SP**

Z =

Menge

Durchmesser und Toleranz  
der Bohrung

Zu bearbeitender Werkstoff



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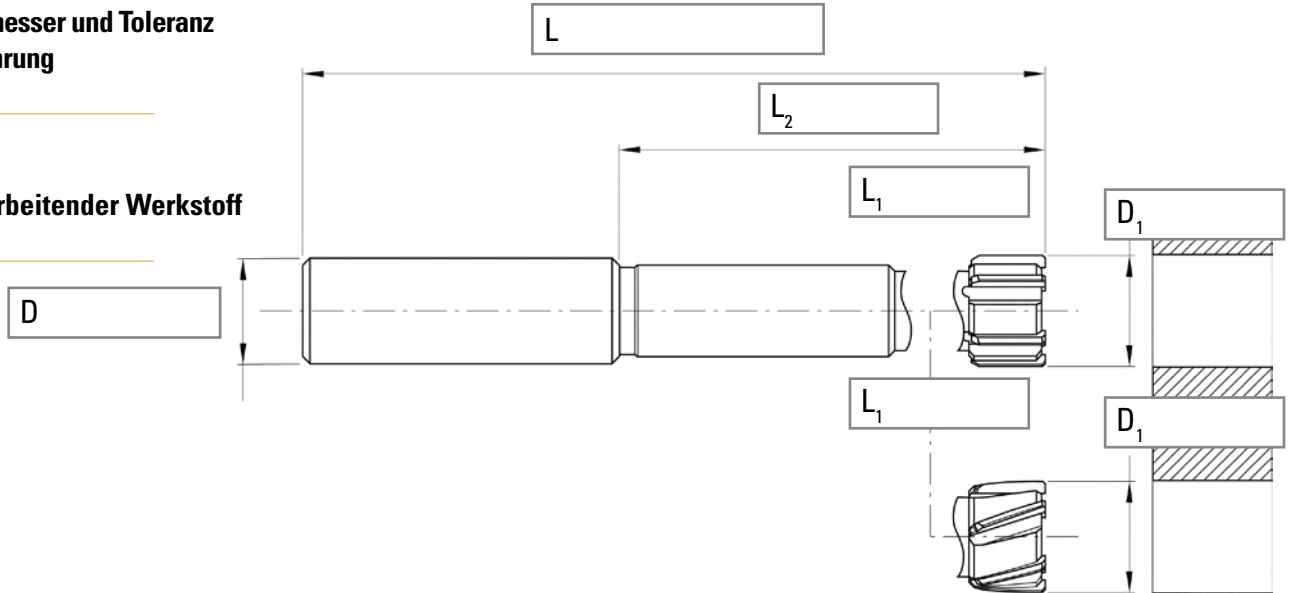


**REIBAHLEN MIT GELÖTETEN SCHNEIDEN**

Menge

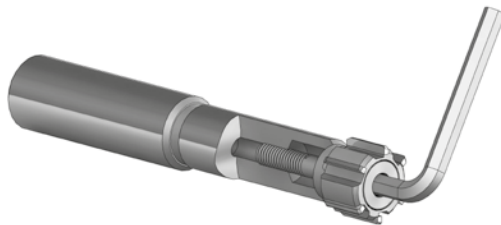
Durchmesser und Toleranz der Bohrung

Zu bearbeitender Werkstoff



Nachstellbar

Fest



| D <sub>1</sub> | Aufweitung         |
|----------------|--------------------|
| 5.80 - 9.60    | +10° = D1 + 0.0025 |
| 9.61 - 21.10   | +10° = D1 + 0.0035 |
| 21.11 - 51.10  | +10° = D1 + 0.0050 |

Zu bearbeitender Werkstoff

VHM

VHM + TiAlN

CERMET

Andere: \_\_\_\_\_

Kühlung



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## POLY 4001 - 4005 - 4007

|   |  | VDI 3323  |    |                | feste Werkzeuge Vc [m/min] |
|---|--|-----------|----|----------------|----------------------------|
| P | Unlegierter Stahl, Automaten Stahl   | 1 - 5     |    | $n$<br>[U/min] | 30                         |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>  | 6 - 9     |    |                | 25                         |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> , ferritischer / martensitischer Edelstahl | 10 - 13   |    |                | 20                         |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                | 14.1-14.2 |    |                | 25                         |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                         | 14.3-14.4 |    |                | 20                         |
| K | Grauguss < 250 HB  | 15 - 16   |    |                | 30                         |
|   | Duktiles Gusseisen, Temperguss > 250 HB  | 17 - 20   |    |                | 25                         |
| N | Alu-Knetlegierung < 12% Si   | 21 - 22   |    |                | 50                         |
|   | Alu-Gusslegierung >12% Si  | 23 - 25   |    |                | 40                         |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb   | 26        |    |                | 40                         |
|   | Kupferlegierung schwere Zerspanbarkeit   | 27 - 28   | 40 |                |                            |
|   | Kunststoff, Holz   | 29 - 30   | 40 |                |                            |
|   | Gold, Silber   | -         | 30 |                |                            |
| S | Spezielle Nickel-Kobalt-Legierung  | 31- 35    | 10 |                |                            |
|   | Titan, Titanlegierung  | 36 - 37   | 15 |                |                            |

## POLY 4008

|   |  | VDI 3323  |     |                | feste Werkzeuge Vc [m/min] |
|---|--|-----------|-----|----------------|----------------------------|
| P | Unlegierter Stahl, Automaten Stahl   | 1 - 5     |     | $n$<br>[U/min] | 120                        |
|   | Niedrig legierter Stahl < 800 N/mm <sup>2</sup>  | 6 - 9     |     |                | 120                        |
|   | Hochlegierter Stahl > 800 N/mm <sup>2</sup> , ferritischer / martensitischer Edelstahl | 10 - 13   |     |                | 30                         |
| M | Austenitischer rostfreier Stahl < 700 N/mm <sup>2</sup>                                | 14.1-14.2 |     |                | 40                         |
|   | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm <sup>2</sup>                         | 14.3-14.4 |     |                | 30                         |
| K | Grauguss < 250 HB  | 15 - 16   |     |                | 120                        |
|   | Duktiles Gusseisen, Temperguss > 250 HB  | 17 - 20   |     |                | 120                        |
| N | Alu-Knetlegierung < 12% Si   | 21 - 22   |     |                | 180                        |
|   | Alu-Gusslegierung >12% Si  | 23 - 25   |     |                | 160                        |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb   | 26        |     |                | 180                        |
|   | Kupferlegierung schwere Zerspanbarkeit   | 27 - 28   | 180 |                |                            |
|   | Kunststoff, Holz   | 29 - 30   | 100 |                |                            |
|   | Gold, Silber   | -         | 160 |                |                            |
| S | Spezielle Nickel-Kobalt-Legierung  | 31- 35    | 15  |                |                            |
|   | Titan, Titanlegierung  | 36 - 37   | 15  |                |                            |



$$n \text{ [U/min]} = \frac{Vc \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$Vf \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]}$$

Vorschub pro Umdrehung  $f \text{ [mm]}$

| $\emptyset D_1$<br>0.40 - 0.80 |           | $\emptyset D_1$<br>0.80 - 1.20 |           | $\emptyset D_1$<br>1.20 - 2.50 |           | $\emptyset D_1$<br>2.50 - 4.20 |           | $\emptyset D_1$<br>4.20 - 6.20 |           | $\emptyset D_1$<br>6.20 - 8.00 |           | $\emptyset D_1$<br>8.00 - 12.00 |           |
|--------------------------------|-----------|--------------------------------|-----------|--------------------------------|-----------|--------------------------------|-----------|--------------------------------|-----------|--------------------------------|-----------|---------------------------------|-----------|
| f (mm/U)                       | R-Zg (mm) | f (mm/U)                       | R-Zg (mm) | f (mm/U)                       | R-Zg (mm) | f (mm/U)                       | R-Zg (mm) | f (mm/U)                       | R-Zg (mm) | f (mm/U)                       | R-Zg (mm) | f (mm/U)                        | R-Zg (mm) |
| 0.02-0.03                      | 0.05      | 0.03-0.04                      | 0.05      | 0.05-0.06                      | 0.05      | 0.08-0.10                      | 0.1       | 0.15-0.20                      | 0.1       | 0.18-0.25                      | 0.2       | 0.25-0.30                       | 0.2       |
| 0.02-0.03                      | 0.05      | 0.03-0.04                      | 0.05      | 0.05-0.06                      | 0.05      | 0.08-0.10                      | 0.1       | 0.15-0.20                      | 0.1       | 0.18-0.25                      | 0.2       | 0.25-0.30                       | 0.2       |
| 0.01-0.02                      | 0.05      | 0.02-0.03                      | 0.05      | 0.04-0.05                      | 0.05      | 0.08-0.10                      | 0.1       | 0.08-0.10                      | 0.1       | 0.08-0.10                      | 0.2       | 0.08-0.10                       | 0.2       |
| 0.02-0.03                      | 0.05      | 0.03-0.04                      | 0.05      | 0.05-0.06                      | 0.05      | 0.08-0.10                      | 0.1       | 0.15-0.20                      | 0.1       | 0.18-0.25                      | 0.2       | 0.18-0.25                       | 0.2       |
| 0.02-0.03                      | 0.05      | 0.03-0.04                      | 0.05      | 0.05-0.06                      | 0.05      | 0.08-0.10                      | 0.1       | 0.15-0.20                      | 0.1       | 0.15-0.20                      | 0.2       | 0.15-0.20                       | 0.2       |
| 0.02-0.03                      | 0.05      | 0.03-0.04                      | 0.05      | 0.05-0.06                      | 0.05      | 0.08-0.10                      | 0.1       | 0.15-0.20                      | 0.1       | 0.18-0.25                      | 0.2       | 0.25-0.30                       | 0.2       |
| 0.02-0.03                      | 0.05      | 0.03-0.04                      | 0.05      | 0.05-0.06                      | 0.05      | 0.08-0.10                      | 0.1       | 0.15-0.20                      | 0.1       | 0.18-0.25                      | 0.2       | 0.25-0.30                       | 0.2       |
| 0.03-0.04                      | 0.05      | 0.04-0.06                      | 0.05      | 0.06-0.08                      | 0.1       | 0.10-0.15                      | 0.1       | 0.20-0.25                      | 0.1       | 0.25-0.30                      | 0.2       | 0.30-0.40                       | 0.2       |
| 0.03-0.04                      | 0.05      | 0.04-0.06                      | 0.05      | 0.06-0.08                      | 0.1       | 0.10-0.15                      | 0.1       | 0.20-0.25                      | 0.1       | 0.25-0.30                      | 0.2       | 0.30-0.40                       | 0.2       |
| 0.03-0.04                      | 0.05      | 0.04-0.06                      | 0.05      | 0.06-0.08                      | 0.1       | 0.10-0.15                      | 0.1       | 0.20-0.25                      | 0.1       | 0.25-0.30                      | 0.2       | 0.30-0.40                       | 0.2       |
| 0.03-0.04                      | 0.05      | 0.04-0.06                      | 0.05      | 0.06-0.08                      | 0.1       | 0.10-0.15                      | 0.1       | 0.20-0.25                      | 0.15      | 0.25-0.30                      | 0.2       | 0.30-0.40                       | 0.2       |
| 0.03-0.04                      | 0.05      | 0.04-0.06                      | 0.05      | 0.06-0.08                      | 0.1       | 0.10-0.15                      | 0.1       | 0.20-0.25                      | 0.1       | 0.25-0.30                      | 0.2       | 0.30-0.40                       | 0.2       |
| 0.02-0.03                      | 0.05      | 0.03-0.04                      | 0.05      | 0.05-0.06                      | 0.05      | 0.08-0.10                      | 0.05      | 0.08-0.10                      | 0.1       | 0.10-0.12                      | 0.1       | 0.12-0.015                      | 0.15      |
| 0.02-0.03                      | 0.05      | 0.03-0.04                      | 0.05      | 0.05-0.06                      | 0.05      | 0.08-0.10                      | 0.05      | 0.08-0.10                      | 0.1       | 0.10-0.12                      | 0.1       | 0.12-0.15                       | 0.15      |

| $\emptyset D_1$<br>2.50 - 4.20 |           | $\emptyset D_1$<br>4.20 - 6.20 |           | $\emptyset D_1$<br>6.20 - 8.00 |           | $\emptyset D_1$<br>8.00 - 12.00 |           |
|--------------------------------|-----------|--------------------------------|-----------|--------------------------------|-----------|---------------------------------|-----------|
| f (mm/U)                       | R-Zg (mm) | f (mm/U)                       | R-Zg (mm) | f (mm/U)                       | R-Zg (mm) | f (mm/U)                        | R-Zg (mm) |
| 0.200 - 0.300                  | 0.1       | 0.300 - 0.400                  | 0.1       | 0.500 - 0.600                  | 0.2       | 0.600 - 0.800                   | 0.2       |
| 0.200 - 0.300                  | 0.1       | 0.300 - 0.400                  | 0.1       | 0.500 - 0.600                  | 0.2       | 0.600 - 0.800                   | 0.2       |
| 0.120 - 0.150                  | 0.1       | 0.150 - 0.200                  | 0.1       | 0.200 - 0.250                  | 0.2       | 0.250 - 0.300                   | 0.2       |
| 0.100 - 0.150                  | 0.1       | 0.150 - 0.200                  | 0.1       | 0.300 - 0.400                  | 0.2       | 0.400 - 0.500                   | 0.2       |
| 0.100 - 0.150                  | 0.1       | 0.150 - 0.200                  | 0.1       | 0.300 - 0.400                  | 0.2       | 0.400 - 0.500                   | 0.2       |
| 0.250 - 0.300                  | 0.1       | 0.300 - 0.400                  | 0.1       | 0.500 - 0.600                  | 0.2       | 0.600 - 0.800                   | 0.2       |
| 0.250 - 0.300                  | 0.1       | 0.300 - 0.400                  | 0.1       | 0.500 - 0.600                  | 0.2       | 0.600 - 0.800                   | 0.2       |
| 0.300 - 0.400                  | 0.1       | 0.500 - 0.600                  | 0.1       | 0.800 - 1.000                  | 0.2       | 1.000 - 1.200                   | 0.2       |
| 0.300 - 0.400                  | 0.1       | 0.500 - 0.600                  | 0.1       | 0.800 - 1.000                  | 0.2       | 1.000 - 1.200                   | 0.2       |
| 0.300 - 0.400                  | 0.1       | 0.500 - 0.600                  | 0.1       | 0.800 - 1.000                  | 0.2       | 1.000 - 1.200                   | 0.2       |
| 0.200 - 0.300                  | 0.1       | 0.300 - 0.400                  | 0.15      | 0.600 - 0.800                  | 0.2       | 0.800 - 1.000                   | 0.2       |
| 0.300 - 0.400                  | 0.1       | 0.500 - 0.600                  | 0.1       | 0.800 - 1.000                  | 0.2       | 1.000 - 1.200                   | 0.2       |
| 0.080 - 0.100                  | 0.05      | 0.100 - 0.120                  | 0.1       | 0.150 - 0.200                  | 0.1       | 0.150 - 0.200                   | 0.15      |
| 0.080 - 0.100                  | 0.05      | 0.100 - 0.120                  | 0.1       | 0.150 - 0.200                  | 0.1       | 0.150 - 0.200                   | 0.15      |



**POLY 4261-4264-4271-4274**  
**4361-4364-4371-4374**

|          |   | VDI 3323  |           | HM<br>Vc [m/min] | HM+<br>BESCHICHTUNG<br>Vc [m/min] | CERMET<br>Vc [m/min] |
|----------|---|-----------|-----------|------------------|-----------------------------------|----------------------|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |           | <b>50</b>        | <b>120</b>                        | <b>140</b>           |
|          | Niedrig legierter Stahl < 800 N/mm²                                       | 6 - 9     |           | <b>40</b>        | <b>120</b>                        | <b>140</b>           |
|          | Hochlegierter Stahl > 800 N/mm², ferritischer / martensitischer Edelstahl | 10 - 13   |           | <b>30</b>        | <b>30</b>                         |                      |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm²                               | 14.1-14.2 |           | <b>25</b>        | <b>40</b>                         |                      |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm²                        | 14.3-14.4 |           | <b>20</b>        | <b>30</b>                         |                      |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16   |           | <b>50</b>        | <b>120</b>                        | <b>120</b>           |
|          | Duktiles Gusseisen, Temperguss > 250 HB                                   | 17 - 20   |           | <b>50</b>        | <b>120</b>                        | <b>120</b>           |
| <b>N</b> | Alu-Knetlegierung < 12% Si  | 21 - 22   |           | <b>70</b>        | <b>180</b>                        |                      |
|          | Alu-Gusslegierung >12% Si   | 23 - 25   |           | <b>60</b>        | <b>160</b>                        |                      |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb                                | 26        |           | <b>60</b>        | <b>180</b>                        |                      |
|          | Kupferlegierung schwere Zerspanbarkeit                                    | 27 - 28   | <b>60</b> | <b>180</b>       |                                   |                      |
|          | Kunststoff, Holz  | 29 - 30   | <b>60</b> | <b>100</b>       |                                   |                      |
|          | Gold, Silber  | -         | <b>60</b> | <b>180</b>       |                                   |                      |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   | <b>15</b> | <b>15</b>        |                                   |                      |
|          | Titan, Titanlegierung   | 36 - 37   | <b>15</b> | <b>15</b>        |                                   |                      |

**DIXI 2567 - 2577 - 2578 - 2579 - 2580 - 2581**

|          |   | VDI 3323  |                  | feste Werkzeuge<br>Vc [m/min] | angetriebene<br>Werkzeuge<br>Vc [m/min] |
|----------|---|-----------|------------------|-------------------------------|---|
| <b>P</b> | Unlegierter Stahl, Automaten Stahl  | 1 - 5     |                  | <b>100 - 150</b>              | <b>70 - 110</b>                         |
|          | Niedrig legierter Stahl < 800 N/mm²                                       | 6 - 9     |                  | <b>70 - 120</b>               | <b>50 - 80</b>                          |
|          | Hochlegierter Stahl > 800 N/mm², ferritischer / martensitischer Edelstahl | 10 - 13   |                  | <b>30 - 70</b>                | <b>20 - 50</b>                          |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm²                               | 14.1-14.2 |                  | <b>50 - 80</b>                | <b>40 - 60</b>                          |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm²                        | 14.3-14.4 |                  | <b>30 - 70</b>                | <b>20 - 50</b>                          |
| <b>K</b> | Grauguss < 250 HB   | 15 - 16   |                  | <b>60 - 150</b>               | <b>40 - 110</b>                         |
|          | Duktiles Gusseisen, Temperguss > 250 HB                                   | 17 - 20   |                  | <b>30 - 90</b>                | <b>20 - 60</b>                          |
| <b>N</b> | Alu-Knetlegierung < 12% Si  | 21 - 22   |                  | <b>200 - 400</b>              | <b>140 - 280</b>                        |
|          | Alu-Gusslegierung >12% Si   | 23 - 25   |                  | <b>180 - 350</b>              | <b>130 - 250</b>                        |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb                                | 26        |                  | <b>150 - 250</b>              | <b>110 - 180</b>                        |
|          | Kupferlegierung schwere Zerspanbarkeit                                    | 27 - 28   | <b>120 - 160</b> | <b>80 - 110</b>               |   |
|          | Kunststoff, Holz  | 29 - 30   | <b>200 - 300</b> | <b>140 - 210</b>              |   |
|          | Gold, Silber  | -         | <b>150 - 250</b> | <b>110 - 180</b>              |   |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung   | 31 - 35   | <b>10 - 20</b>   | <b>10 - 10</b>                |   |
|          | Titan, Titanlegierung   | 36 - 37   | <b>15 - 40</b>   | <b>10 - 30</b>                |   |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f \text{ [mm]}$$

Vorschub pro Umdrehung  $f \text{ [mm]}$

| $\emptyset D_1$<br>5.80 - 9.609 |           | $\emptyset D_1$<br>9.610 - 18.609 |           | $\emptyset D_1$<br>18.610 - 23.109 |           | $\emptyset D_1$<br>23.110 - 31.109 |           | $\emptyset D_1$<br>31.110 - 45.109 |           | $\emptyset D_1$<br>45.110 - 70.00 |           |
|---------------------------------|-----------|-----------------------------------|-----------|------------------------------------|-----------|------------------------------------|-----------|------------------------------------|-----------|-----------------------------------|-----------|
| f (mm/U)                        | R-Zg (mm) | f (mm/U)                          | R-Zg (mm) | f (mm/U)                           | R-Zg (mm) | f (mm/U)                           | R-Zg (mm) | f (mm/U)                           | R-Zg (mm) | f (mm/U)                          | R-Zg (mm) |
| 0.40 - 0.50                     | 0.2       | 0.60 - 0.80                       | 0.2       | 0.60 - 0.80                        | 0.2       | 0.60 - 0.80                        | 0.2       | 0.80 - 1.00                        | 0.3       | 0.80 - 1.00                       | 0.3       |
| 0.40 - 0.50                     | 0.2       | 0.60 - 0.80                       | 0.2       | 0.60 - 0.80                        | 0.2       | 0.60 - 0.80                        | 0.2       | 0.80 - 1.00                        | 0.3       | 0.80 - 1.00                       | 0.3       |
| 0.20 - 0.25                     | 0.2       | 0.25 - 0.30                       | 0.2       | 0.25 - 0.30                        | 0.2       | 0.25 - 0.30                        | 0.2       | 0.25 - 0.30                        | 0.3       | 0.35 - 0.40                       | 0.3       |
| 0.20 - 0.30                     | 0.2       | 0.30 - 0.40                       | 0.2       | 0.30 - 0.40                        | 0.2       | 0.40 - 0.50                        | 0.2       | 0.40 - 0.50                        | 0.3       | 0.50 - 0.60                       | 0.3       |
| 0.20 - 0.30                     | 0.2       | 0.30 - 0.40                       | 0.2       | 0.30 - 0.40                        | 0.2       | 0.40 - 0.50                        | 0.2       | 0.40 - 0.50                        | 0.3       | 0.50 - 0.60                       | 0.3       |
| 0.40 - 0.50                     | 0.2       | 0.60 - 0.80                       | 0.2       | 0.60 - 0.80                        | 0.2       | 0.80 - 1.00                        | 0.2       | 0.80 - 1.00                        | 0.3       | 1.00 - 1.20                       | 0.3       |
| 0.40 - 0.50                     | 0.2       | 0.60 - 0.80                       | 0.2       | 0.60 - 0.80                        | 0.2       | 0.80 - 1.00                        | 0.2       | 0.80 - 1.00                        | 0.3       | 1.00 - 1.20                       | 0.3       |
| 0.60 - 0.80                     | 0.2       | 1.00 - 1.20                       | 0.2       | 1.00 - 1.20                        | 0.2       | 1.00 - 1.20                        | 0.3       | 1.00 - 1.20                        | 0.3       | 1.20 - 1.40                       | 0.3       |
| 0.60 - 0.80                     | 0.2       | 1.00 - 1.20                       | 0.2       | 1.00 - 1.20                        | 0.2       | 1.00 - 1.20                        | 0.3       | 1.00 - 1.20                        | 0.3       | 1.20 - 1.40                       | 0.3       |
| 0.60 - 0.80                     | 0.2       | 1.00 - 1.20                       | 0.2       | 1.00 - 1.20                        | 0.2       | 1.00 - 1.20                        | 0.3       | 1.00 - 1.20                        | 0.3       | 1.20 - 1.40                       | 0.3       |
| 0.60 - 0.80                     | 0.2       | 1.00 - 1.20                       | 0.2       | 1.00 - 1.20                        | 0.2       | 1.00 - 1.20                        | 0.3       | 1.00 - 1.20                        | 0.3       | 1.20 - 1.40                       | 0.3       |
| 0.40 - 0.60                     | 0.2       | 0.80 - 1.00                       | 0.2       | 0.80 - 1.00                        | 0.2       | 0.80 - 1.00                        | 0.3       | 0.80 - 1.00                        | 0.3       | 1.00 - 1.20                       | 0.3       |
| 0.60 - 0.80                     | 0.2       | 1.00 - 1.20                       | 0.2       | 1.00 - 1.20                        | 0.2       | 1.00 - 1.20                        | 0.3       | 1.00 - 1.20                        | 0.3       | 1.20 - 1.40                       | 0.3       |
| 0.15 - 0.20                     | 0.1       | 0.15 - 0.20                       | 0.15      | 0.20 - 0.25                        | 0.15      | 0.20 - 0.25                        | 0.2       | 0.20 - 0.25                        | 0.2       | 0.25 - 0.30                       | 0.2       |
| 0.15 - 0.20                     | 0.1       | 0.15 - 0.20                       | 0.15      | 0.20 - 0.25                        | 0.15      | 0.20 - 0.25                        | 0.2       | 0.20 - 0.25                        | 0.2       | 0.25 - 0.30                       | 0.2       |

Vorschub pro Zahn  $f_z \text{ [mm]}$

| $\emptyset D_1$<br>0.20 - 0.50 | $\emptyset D_1$<br>0.50 - 0.80 | $\emptyset D_1$<br>08.00 - 1.00 | $\emptyset D_1$<br>1.00 - 3.00 | $\emptyset D_1$<br>3.00 - 6.00 | $\emptyset D_1$<br>6.00 - 10.00 | $\emptyset D_1$<br>10.00 - 20.00 |
|--------------------------------|--------------------------------|---------------------------------|--------------------------------|--------------------------------|---------------------------------|----------------------------------|
| 0.002 - 0.005                  | 0.005 - 0.008                  | 0.008 - 0.010                   | 0.010 - 0.030                  | 0.024 - 0.049                  | 0.036 - 0.060                   | 0.040 - 0.080                    |
| 0.002 - 0.005                  | 0.004 - 0.007                  | 0.007 - 0.009                   | 0.009 - 0.027                  | 0.027 - 0.053                  | 0.054 - 0.060                   | 0.030 - 0.070                    |
| 0.002 - 0.004                  | 0.004 - 0.006                  | 0.006 - 0.008                   | 0.008 - 0.024                  | 0.024 - 0.047                  | 0.048 - 0.050                   | 0.030 - 0.070                    |
| 0.001 - 0.004                  | 0.004 - 0.006                  | 0.006 - 0.007                   | 0.007 - 0.022                  | 0.022 - 0.044                  | 0.044 - 0.050                   | 0.030 - 0.060                    |
| 0.001 - 0.003                  | 0.003 - 0.005                  | 0.005 - 0.006                   | 0.006 - 0.018                  | 0.018 - 0.035                  | 0.036 - 0.040                   | 0.020 - 0.050                    |
| 0.003 - 0.008                  | 0.007 - 0.012                  | 0.012 - 0.015                   | 0.015 - 0.044                  | 0.044 - 0.089                  | 0.088 - 0.090                   | 0.060 - 0.120                    |
| 0.002 - 0.006                  | 0.006 - 0.009                  | 0.009 - 0.012                   | 0.012 - 0.035                  | 0.035 - 0.071                  | 0.070 - 0.070                   | 0.050 - 0.100                    |
| 0.004 - 0.011                  | 0.011 - 0.017                  | 0.017 - 0.022                   | 0.022 - 0.065                  | 0.065 - 0.130                  | 0.130 - 0.140                   | 0.080 - 0.180                    |
| 0.004 - 0.010                  | 0.010 - 0.016                  | 0.016 - 0.020                   | 0.020 - 0.059                  | 0.059 - 0.118                  | 0.118 - 0.120                   | 0.080 - 0.170                    |
| 0.004 - 0.010                  | 0.010 - 0.016                  | 0.016 - 0.020                   | 0.020 - 0.059                  | 0.059 - 0.118                  | 0.118 - 0.120                   | 0.080 - 0.170                    |
| 0.002 - 0.006                  | 0.006 - 0.010                  | 0.010 - 0.012                   | 0.012 - 0.037                  | 0.037 - 0.074                  | 0.074 - 0.080                   | 0.050 - 0.100                    |
| 0.004 - 0.011                  | 0.011 - 0.017                  | 0.017 - 0.022                   | 0.022 - 0.065                  | 0.065 - 0.130                  | 0.130 - 0.140                   | 0.080 - 0.180                    |
| 0.004 - 0.010                  | 0.010 - 0.016                  | 0.016 - 0.020                   | 0.020 - 0.059                  | 0.059 - 0.118                  | 0.118 - 0.120                   | 0.080 - 0.170                    |
| 0.001 - 0.003                  | 0.002 - 0.004                  | 0.004 - 0.005                   | 0.005 - 0.015                  | 0.015 - 0.030                  | 0.030 - 0.030                   | 0.020 - 0.040                    |
| 0.002 - 0.006                  | 0.006 - 0.009                  | 0.009 - 0.012                   | 0.012 - 0.035                  | 0.035 - 0.071                  | 0.070 - 0.070                   | 0.050 - 0.100                    |





## ÜBERSICHT DIAMANT- UND PKD-WERKZEUGE

468



### FRÄSER

474



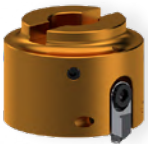
### GRAVIERSTICHEL

484



### KANTENFRÄSER

487



### PLANFRÄSKÖPFE

489



### DREHWERKZEUGE

496



### DIADIX ABRICHTWERKZEUGE

500




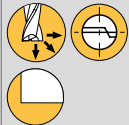

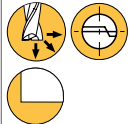



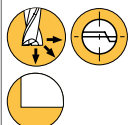




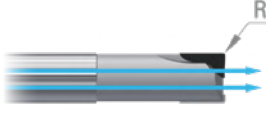
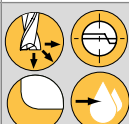

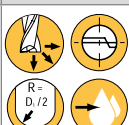

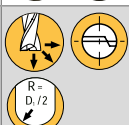

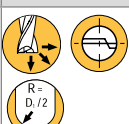
### WERKZEUGE AUF ANFRAGE

498



### SCHNITTBEDINGUNGEN

504

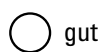
| FRÄSER                                     |   | Z     | Seite |   | PKD<br>● | CVD<br>■ | DIA<br>◆ | CBN<br>▲ |
|--|---|-------|-------|---|----------|----------|----------|----------|
| <b>DIXI 70600 PCD</b><br>Ø0.50 - Ø10.00    |    | 1     | 474   |    | ✓        |          |          |          |
| <b>DIXI 70630 PCD</b><br>Ø3.00 - Ø12.00    |    | 1     | 475   |    | ✓        |          |          |          |
| <b>DIXI 70600 DIA</b><br>Ø3.00 - Ø6.00     |    | 1     | 476   |    |          |          | ✓        |          |
| <b>DIXI 72310 DIA</b><br>Ø0.40 - Ø2.00     |    | 1     | 477   |    |          |          | ✓        |          |
| <b>DIXI 72421-SH DIA</b><br>Ø6.00 - Ø12.00 |    | 1     | 478   |    |          |          | ✓        |          |
| <b>DIXI 72420-SH</b><br>Ø1.00 - Ø20.00     |  | 1 - 2 | 479   |  | ✓        | ✓        |          |          |
| <b>DIXI 70520-SH</b><br>Ø1.00 - Ø20.00     |  | 1 - 2 | 480   |  | ✓        | ✓        |          |          |
| <b>DIXI 70320-SH PCD</b><br>Ø2.00 - Ø20.00 |  | 1 - 2 | 481   |  | ✓        |          |          |          |
| <b>DIXI 70320 DIA</b><br>Ø2.00 - Ø10.00    |  | 1     | 482   |  |          |          | ✓        |          |
| <b>DIXI 70330 DIA</b><br>Ø0.40 - Ø1.50     |  | 1     | 483   |  |          |          | ✓        |          |

| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |

| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|

|  |  |  |  |  |   |   |   |    |   |  |  |  |
|--|--|--|--|--|---|---|---|----|---|--|--|--|
|  |  |  |  |  | ☉ | ○ | ☉ | ☉* | ☉ |  |  |  |
|  |  |  |  |  |   |   |   | ☉* |   |  |  |  |
|  |  |  |  |  | ☉ | ○ | ☉ | ○* | ☉ |  |  |  |
|  |  |  |  |  | ☉ | ○ | ☉ | ○* | ☉ |  |  |  |
|  |  |  |  |  | ☉ | ○ | ☉ | ○* | ☉ |  |  |  |
|  |  |  |  |  | ☉ | ○ | ☉ | ☉  | ☉ |  |  |  |
|  |  |  |  |  | ☉ | ○ | ☉ | ☉  | ☉ |  |  |  |
|  |  |  |  |  | ☉ | ○ | ☉ | ☉  | ☉ |  |  |  |
|  |  |  |  |  | ☉ | ○ | ☉ | ☉* | ☉ |  |  |  |
|  |  |  |  |  | ☉ | ○ | ☉ | ☉* | ☉ |  |  |  |


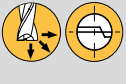

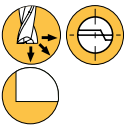

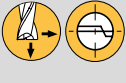
\* Kunststoff


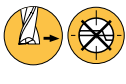

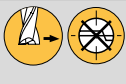



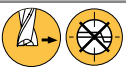

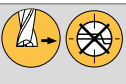


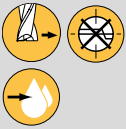
gut



ausgezeichnet

| GRAVIERSTICHEL                         |   | Z | Seite |   | PKD<br>● | CVD<br>■ | DIA<br>◆ | CBN<br>▲ |
|--|---|---|-------|---|----------|----------|----------|----------|
| <b>DIXI 70170 PCD</b><br>Ø0.10 - Ø0.20 |  | 1 | 484   |  | ✓        |          |          |          |
| <b>DIXI 70070 PCD</b><br>Ø0.05 - Ø0.20 |  | 1 | 485   |  | ✓        |          |          |          |
| <b>DIXI 70170 DIA</b><br>Ø0.05 - Ø0.10 |  | 1 | 486   |  |          |          | ✓        |          |

| KANTENFRÄSER                           |   | Z | Seite |   |  |  |   |  |
|--|---|---|-------|---|--|--|---|--|
| <b>DIXI 76230 DIA</b><br>Ø0.10 - Ø0.30 |    | 1 | 487   |    |  |  | ✓ |  |
| <b>DIXI 76231 DIA</b>                  |  | 1 | 488   |  |  |  | ✓ |  |

| PLAN- UND GLANZFRÄSKÖPFE        |   | Z    | Seite |   |   |  |   |  |
|---------------------------------|---|------|-------|---|---|--|---|--|
| <b>DIXI 81000</b><br>Ø40 - Ø125 |  | 2    | 489   |  |   |  | ✓ |  |
| <b>DIXI 82000</b><br>Ø18 - Ø30  |  | 2    | 491   |  |   |  | ✓ |  |
| <b>DIXI 20470</b><br>Ø8         |  | -    | 492   |   | ✓ |  | ✓ |  |
| <b>DIXI 80000</b><br>Ø40 - Ø125 |  | 6-16 | 493   |  | ✓ |  |   |  |



| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |

| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|

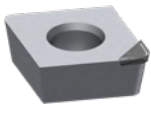








|  |  |  |  |  |   |   |   |    |   |  |  |  |
|--|--|--|--|--|---|---|---|----|---|--|--|--|
|  |  |  |  |  | ⊙ | ○ | ⊙ | ⊙  | ⊙ |  |  |  |
|  |  |  |  |  | ⊙ | ○ | ⊙ | ○  | ⊙ |  |  |  |
|  |  |  |  |  | ⊙ | ○ | ⊙ | ⊙* | ⊙ |  |  |  |

|  |  |  |  |  |   |   |   |    |   |  |  |  |
|--|--|--|--|--|---|---|---|----|---|--|--|--|
|  |  |  |  |  | ⊙ | ○ | ⊙ | ⊙* | ⊙ |  |  |  |
|  |  |  |  |  | ⊙ | ○ | ⊙ | ⊙* | ⊙ |  |  |  |



|  |  |  |  |  |   |   |   |    |   |  |  |  |
|--|--|--|--|--|---|---|---|----|---|--|--|--|
|  |  |  |  |  | ⊙ | ○ | ⊙ | ⊙* | ⊙ |  |  |  |
|  |  |  |  |  | ⊙ | ○ | ⊙ | ⊙* | ⊙ |  |  |  |
|  |  |  |  |  | ⊙ | ○ | ⊙ | ⊙* | ⊙ |  |  |  |
|  |  |  |  |  | ⊙ | ○ | ⊙ | ⊙* | ⊙ |  |  |  |

\* Kunststoff

○ gut      ⊙ ausgezeichnet

| DREHWERKZEUGE |   | Z | Seite |   | PKD<br>●    | CVD<br>■ | DIA<br>◆ | CBN<br>▲ |
|---------------|---|---|-------|---|-------------|----------|----------|----------|
| DIXI 26420    |  | - | 494   |   | ✓           | ✓        | ✓        | ✓        |
| DIXI 26500 AV |  | - | 496   |  | ✓           |          |          |          |
| DIXI 26500 AR |  | - | 496   |  | ✓           |          |          |          |
| DIXI 26500 TR |  | - | 496   |  | AUF ANFRAGE |          |          |          |
| DIXI 26500 FT |  | - | 496   |  | AUF ANFRAGE |          |          |          |

DIADIX® ABRICHTWERKZEUGE

|           |   |   |     |  |   |   |  |  |
|-----------|---|---|-----|--|---|---|--|--|
| DIXI 1973 |  | - | 500 |  |   |   |  |  |
| DIXI 1978 |  | - | 500 |  | ✓ | ✓ |  |  |

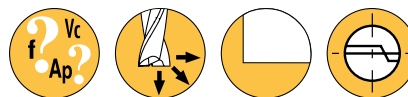
| ISO      | P   |     |       | M         | K     | N     |       |       |       |   | S     | H     |       |
|----------|-----|-----|-------|-----------|-------|-------|-------|-------|-------|---|-------|-------|-------|
| VDI 3323 | 1-5 | 6-9 | 10-13 | 14.1-14.4 | 15-20 | 21-22 | 23-25 | 26-28 | 29-30 | - | 31-35 | 36-37 | 38-41 |

| Unleg. Stahl | Niedrig leg. Stahl | Hochleg. Stahl | Aust. Rostfreier Stahl | Gusseisen | Alu.-Knetleg. | Aluguss (Si) | Kupferleg. Bronze Messing | Kunststoff Komposit Graphit Holz | Silber Gold | Sonderleg. Ni / Co | Titan Titanleg | Stahl Gusseisen > 45 HRC |
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|
|--------------|--------------------|----------------|------------------------|-----------|---------------|--------------|---------------------------|----------------------------------|-------------|--------------------|----------------|--------------------------|

|  |  |  |  |  |   |   |   |   |   |  |  |  |
|--|--|--|--|--|---|---|---|---|---|--|--|--|
|  |  |  |  |  | ☉ | ○ | ☉ | ☉ | ☉ |  |  |  |
|  |  |  |  |  | ☉ | ○ | ☉ | ☉ | ☉ |  |  |  |
|  |  |  |  |  | ☉ | ○ | ☉ | ☉ | ☉ |  |  |  |
|  |  |  |  |  | ☉ | ○ | ☉ | ☉ | ☉ |  |  |  |
|  |  |  |  |  | ☉ | ○ | ☉ | ☉ | ☉ |  |  |  |

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

○ gut      ☉ ausgezeichnet



LANGLOCHFRÄSER, MIT ZENTRUMSCHNITT FÜR FEINBEARBEITUNG



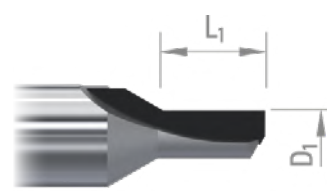
- PKD Langlochfräser mit Zentrumschnitt für die Feinbearbeitung. Werkzeuge für die grat- und deformationsfreie Bearbeitung von NE-Metallen. Eine typische Anwendung: die Endbearbeitung von Uhrenkomponenten.
- PKD verbessert die Standzeit und Produktivität.

○ gut    ⊗ ausgezeichnet

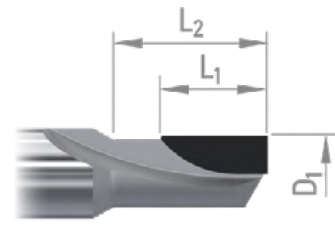
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                      |      |      |      |          |    |                  |    |                    |    |

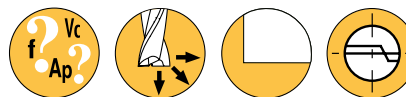
| ISO                    | N                       |    |                         |    |    |                   |    |                        |   |              | S       |            |    |      |       |                         | H  |    |    |                          |    |                  |  |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|----|------------------------|---|--------------|---------|------------|----|------|-------|-------------------------|----|----|----|--------------------------|----|------------------|--|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung |    | Cu-Legierung Schwierig |   | Gold, Silber | Graphit | Kunststoff |    | Holz |       | Sonderlegierung Ni / Co |    |    |    | Titan / Titanlegierungen |    | Gehärteter Stahl |  | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27 | 28                     | - | -            | 29      | 30         | 31 | 32   | 33-35 | 36                      | 37 | 38 | 39 | 40                       | 41 |                  |  |                  |  |
| Empfehlungen           | ⊗                       | ⊗  | ○                       | ○  | ○  | ⊗                 | ⊗  | ⊗                      | ⊗ |              | ○       |            |    |      |       |                         |    |    |    |                          |    |                  |  |                  |  |

| $D_{1 \pm 0.01}$ | $L_1$ | $D_{h5}$ | L  | PKD    |
|------------------|-------|----------|----|--------|
| 0.50             | 1.00  | 3        | 38 | 398840 |
| 0.60             | 1.20  | 3        | 38 | 398841 |
| 0.70             | 1.40  | 3        | 38 | 398842 |
| 0.80             | 1.60  | 3        | 38 | 398843 |
| 0.90             | 1.80  | 3        | 38 | 398844 |
| 1.00             | 2.00  | 3        | 38 | 398845 |
| 1.10             | 2.20  | 3        | 38 | 398846 |
| 1.20             | 2.40  | 3        | 38 | 398847 |
| 1.30             | 2.60  | 3        | 38 | 398848 |
| 1.40             | 2.80  | 3        | 38 | 398849 |
| 1.50             | 3.00  | 3        | 38 | 398850 |
| 1.60             | 3.20  | 3        | 38 | 398851 |
| 1.70             | 3.40  | 3        | 38 | 398853 |
| 1.80             | 3.60  | 3        | 38 | 398854 |
| 1.90             | 3.80  | 3        | 38 | 398855 |
| 2.00             | 4.00  | 3        | 42 | 398856 |
| 2.50             | 5.00  | 6        | 42 | 398857 |
| 3.00             | 6.00  | 6        | 42 | 398858 |

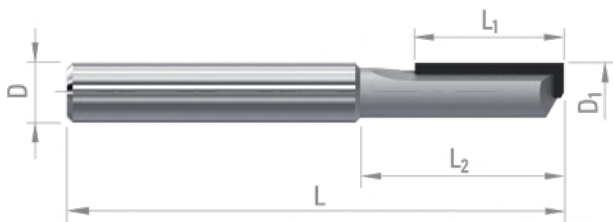


| $D_{1 \pm 0.01}$ | $L_1$ | $D_{h5}$ | L  | PKD |        |
|------------------|-------|----------|----|-----|--------|
| 4.00             | 6.50  | 10.00    | 6  | 42  | 302390 |
| 5.00             | 6.50  | 10.00    | 6  | 50  | 302391 |
| 6.00             | 8.00  | 12.00    | 6  | 50  | 302393 |
| 8.00             | 10.00 | 15.00    | 8  | 60  | 339191 |
| 10.00            | 12.00 | 20.00    | 10 | 60  | 339192 |





PKD EINZAHNFRÄSER POLIERSCHLIFF



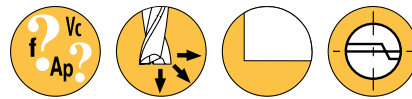
- PKD-Superfinisch-Fräser entwickelt, um transparente Flächen in Kunststoffen zu erhalten.

○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |                  |    |    |      |                                      |      |          |    |                  |    |                    |    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           |                         |    |                         |    |    |                   |                        |    |              |         |            | ⊗    |                         |    |       |                          |    |                  |    |                  |    |

| $D_{1 \pm 0.01}$ | $L_1$ | $L_2$ | $D_{h5}$ | L  | PKD Schlichten | PKD Geschärf |
|------------------|-------|-------|----------|----|----------------|--------------|
| 3                | 6     | 11.50 | 6        | 38 | 381663         | 381670       |
| 4                | 10    | 15.50 | 6        | 50 | 381665         | 381671       |
| 6                | 15    | 20.50 | 6        | 50 | 381666         | 381672       |
| 8                | 19    | 29.00 | 8        | 60 | 381667         | 381673       |
| 10               | 22    | 32.00 | 10       | 60 | 381668         | 381675       |
| 12               | 26    | 36.00 | 12       | 60 | 381669         | 381676       |



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MONOKRISTALLINER DIAMANT  
SCHAFTFRÄSER MIT ZENTRUMSCHNITT



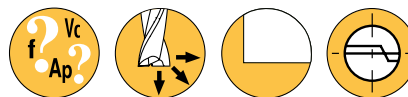
- Langlochfräser mit Zentrumschnitt für die Feinbearbeitung. Werkzeuge für die grat- und deformationsfreie Bearbeitung von NE-Metallen. Eine typische Anwendung: die Endbearbeitung von Uhrenkomponenten.
- Der DIA wird für die Herstellung von Hochglanzoberflächen verwendet.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |                  |    |    |      |                                      |      |          |    |                  |    |                    |    |    |

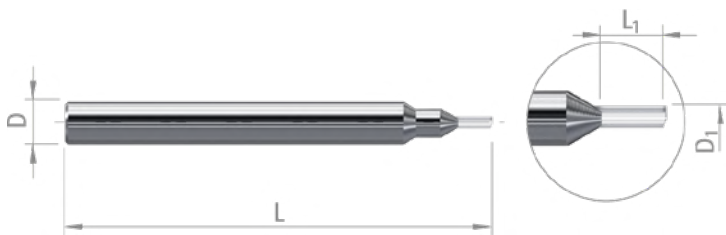
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |
| Empfehlungen           | ⊙                       | ⊙  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ○          |      |                         |    |       |                          |    |    |                  |    |                  |

| D <sub>1 h10</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | DIA    |
|--------------------|----------------|-----------------|----|--------|
| 3                  | 2.50           | 6               | 30 | 302394 |
| 4                  | 2.50           | 6               | 30 | 302395 |
| 5                  | 2.50           | 6               | 30 | 302396 |
| 6                  | 2.50           | 6               | 30 | 302397 |



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MONOKRISTALLINER DIAMANT  
MIKROFRÄSER



- DIA Mikrofräser mit Zentrumschnitt, für Nichteisenwerkstoffe, Edelmetalle.
- Der DIA wird für die Glanzbearbeitung von Oberflächen verwendet.

○ gut    ⊗ ausgezeichnet

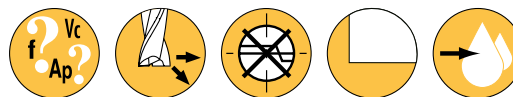
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |          |      | K                |    |                    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|----------|------|------------------|----|--------------------|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |      | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3     | 14.4 | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                      |      |          |      |                  |    |                    |    |    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      |                         | S  |       |                          |    |                  | H  |                  |    |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |
| Empfehlungen           | ⊗                       | ⊗  | ○                       | ○  | ○  | ⊗                 | ⊗                      | ⊗  | ⊗            |         | ○          |      |                         |    |       |                          |    |                  |    |                  |    |  |

| D <sub>1 h10</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | DIA    |
|--------------------|----------------|-----------------|----|--------|
| 0.40               | 0.80           | 3               | 30 | 953424 |
| 0.50               | 1.00           | 3               | 30 | 953425 |
| 0.60               | 1.20           | 3               | 30 | 953426 |
| 0.70               | 1.40           | 3               | 30 | 953427 |
| 0.80               | 1.60           | 3               | 30 | 953428 |
| 0.90               | 1.80           | 3               | 30 | 953429 |
| 1.00               | 2.50           | 3               | 30 | 953430 |
| 1.10               | 2.50           | 3               | 30 | 953431 |
| 1.20               | 2.50           | 3               | 30 | 953432 |
| 1.30               | 2.50           | 3               | 30 | 953433 |
| 1.40               | 2.50           | 3               | 30 | 953434 |
| 1.50               | 2.50           | 3               | 30 | 953435 |
| 1.60               | 2.50           | 3               | 30 | 953436 |
| 1.70               | 2.50           | 3               | 30 | 953437 |
| 1.80               | 2.50           | 3               | 30 | 953438 |
| 1.90               | 2.50           | 3               | 30 | 953439 |
| 2.00               | 2.50           | 3               | 30 | 953440 |

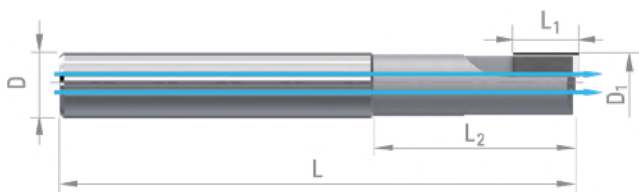
# DIXI 72421-SH DIA

Z = 1



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## MONOKRISTALLINER DIAMANT SCHAFTFRÄSER FÜR GLANZBEARBEITUNG



- DIA-Fräser, ohne Zentrumschnitt, mit Innenkühlung. Für die Schlichtbearbeitung von NE-Metallen.
- Der DIA wird für die Glanzbearbeitung von Oberflächen verwendet.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                      |      |      |      |          |    |                  |    |                    |    |

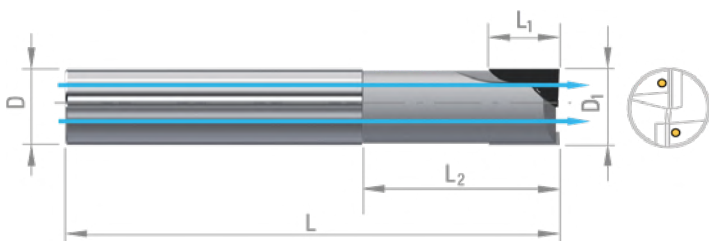
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ○          |      |                         |    |       |                          |    |                  |    |                  |    |

| D <sub>1h10</sub> | L <sub>2</sub> | D <sub>h5</sub> | L <sub>1</sub> | L  | DIA Kunststoff | DIA    |
|-------------------|----------------|-----------------|----------------|----|----------------|--------|
| 6                 | 25             | 6               | 4              | 57 | 970120         | 341428 |
|                   |                |                 | 6              | 57 | 970122         | 341429 |
|                   |                |                 | 8              | 57 | 974360         | 341430 |
| 8                 | 25             | 8               | 4              | 63 | 970126         | 341432 |
|                   |                |                 | 6              | 63 | 970128         | 341434 |
| 10                | 25             | 10              | 4              | 75 | 974317         | 341436 |
|                   |                |                 | 6              | 75 | 974318         | 341437 |
| 12                | 25             | 12              | 4              | 83 | 974321         | 341439 |
|                   |                |                 | 6              | 83 | 974322         | 341440 |





SCHAFTFRÄSER MIT ZENTRUMSCHNITT UND INNENKÜHLUNG



- PKD-Schaftfräser mit Zentrumschnitt und Kühlmittelbohrungen. Für die allgemeine Bearbeitung von NE-Metallen, Edelmetallen, Verbundwerkstoffen.
- PKD verbessert Standzeit und Produktivität
- CVD verbessert die Standzeit im Vergleich zu PKD. Nicht für unterbrochenen Schnitt geeignet.

○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |          |      | K                |    |                    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|----------|------|------------------|----|--------------------|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |      | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3     | 14.4 | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                      |      |          |      |                  |    |                    |    |    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      |                         | S  |                          |    |                  | H  |                  |    |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|--------------------------|----|------------------|----|------------------|----|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35                    | 36 | 37               | 38 | 39               | 40 | 41 |
| Empfehlungen           | ⊗                       | ⊗  | ○                       | ○  | ○  | ⊗                 | ⊗                      | ⊗  | ⊗            | ⊗       | ○          | ○    |                         |    |                          |    |                  |    |                  |    |    |

| D <sub>1h10</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L   | Z | PKD    | CVD    |
|-------------------|----------------|----------------|-----------------|-----|---|--------|--------|
| 1.00              | 2.00           | -              | 6               | 42  | 1 | 979179 |        |
| 1.50              | 3.00           | -              | 6               | 42  | 1 | 977382 |        |
| 2.00              | 3.00           | 6              | 6               | 42  | 1 | 66785  |        |
| 2.00              | 3.00           | 20             | 6               | 75  | 1 | 970175 |        |
| 3.00              | 4.00           | 6              | 6               | 42  | 1 | 67540  | 301958 |
| 3.00              | 4.00           | 15             | 6               | 75  | 2 | 970176 |        |
| 3.00              | 4.00           | 20             | 6               | 75  | 2 | 970177 |        |
| 4.00              | 4.00           | 8              | 6               | 50  | 1 | 957593 |        |
| 4.00              | 6.50           | 10             | 6               | 50  | 1 | 67541  |        |
| 4.00              | 6.50           | 15             | 6               | 75  | 2 | 970178 | 301959 |
| 4.00              | 6.50           | 25             | 6               | 75  | 2 | 970179 |        |
| 5.00              | 5.00           | 10             | 6               | 50  | 2 | 957595 |        |
| 5.00              | 6.50           | 10             | 6               | 50  | 2 | 53153  |        |
| 5.00              | 6.50           | 35             | 6               | 75  | 2 | 970166 |        |
| 6.00              | 6.00           | 12             | 6               | 57  | 2 | 976391 | 301960 |
| 6.00              | 8.00           | 34             | 6               | 75  | 2 | 976392 | 301961 |
| 6.00              | 8.00           | 50             | 6               | 100 | 2 | 976393 |        |
| 7.00              | 8.00           | 34             | 8               | 75  | 2 | 976394 |        |
| 8.00              | 7.00           | 14             | 8               | 63  | 2 | 976395 | 301962 |

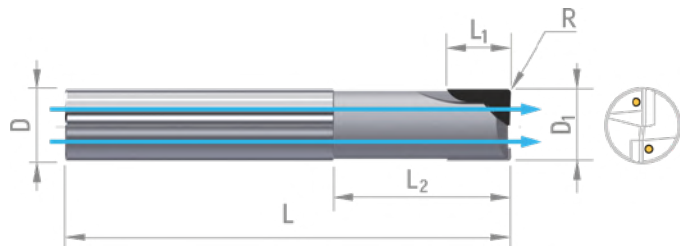
| D <sub>1h10</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L   | Z | PKD    | CVD    |
|-------------------|----------------|----------------|-----------------|-----|---|--------|--------|
| 8.00              | 10.00          | 34             | 8               | 75  | 2 | 976396 | 301963 |
| 8.00              | 10.00          | 50             | 8               | 100 | 2 | 976397 |        |
| 8.00              | 10.00          | 75             | 8               | 125 | 2 | 976398 |        |
| 9.00              | 10.00          | 35             | 10              | 75  | 2 | 976399 |        |
| 10.00             | 8.00           | 16             | 10              | 75  | 2 | 976410 |        |
| 10.00             | 12.00          | 35             | 10              | 75  | 2 | 976411 | 301965 |
| 10.00             | 12.00          | 75             | 10              | 125 | 2 | 976412 |        |
| 11.00             | 12.00          | 38             | 12              | 83  | 2 | 976413 |        |
| 12.00             | 10.00          | 20             | 12              | 83  | 2 | 976414 |        |
| 12.00             | 12.00          | 38             | 12              | 83  | 2 | 976415 | 301966 |
| 12.00             | 12.00          | 75             | 12              | 125 | 2 | 976416 |        |
| 14.00             | 12.00          | 24             | 14              | 83  | 2 | 976417 | 338991 |
| 14.00             | 12.00          | 38             | 14              | 83  | 2 | 976418 |        |
| 14.00             | 12.00          | 75             | 14              | 125 | 2 | 976419 |        |
| 16.00             | 14.00          | 28             | 16              | 92  | 2 | 976420 | 338992 |
| 16.00             | 14.00          | 42             | 16              | 92  | 2 | 976421 |        |
| 16.00             | 14.00          | 75             | 16              | 125 | 2 | 976422 |        |
| 20.00             | 18.00          | 36             | 20              | 104 | 2 | 976423 |        |
| 20.00             | 18.00          | 50             | 20              | 125 | 2 | 976424 |        |



Auf Anfrage



TORISCHE PKD FRÄSER MIT ZENTRUMSCHNITT UND INNENKÜHLUNG



- PKD Torischer Schaftfräser mit Zentrumschnitt und Kühlmittelbohrungen. Für die allgemeine Bearbeitung von NE-Metallen, Edelmetallen, Verbundwerkstoffen.
- PKD verbessert Standzeit und Produktivität
- CVD verbessert die Standzeit im Vergleich zu PKD. Nicht für unterbrochenen Schnitt geeignet.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |          |      | K                |    |                    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|----------|------|------------------|----|--------------------|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |      | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3     | 14.4 | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                      |      |          |      |                  |    |                    |    |    |    |

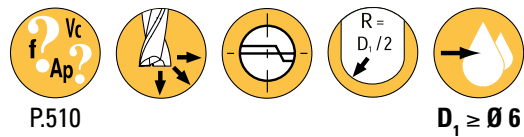
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ⊙            | ⊙       | ○          | ○    |                         |    |       |                          |    |                  |    |                  |    |

| D <sub>1h10</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | R    | Z | PKD    | CVD    |
|-------------------|----------------|----------------|-----------------|----|------|---|--------|--------|
| 1.00              | 2.00           | -              | 6               | 42 | 0.10 | 1 | 984384 |        |
| 2.00              | 3.00           | 6              | 6               | 42 | 0.10 | 1 | 967923 |        |
| 2.00              | 3.00           | 6              | 6               | 42 | 0.20 | 1 | 973528 |        |
| 3.00              | 4.00           | 15             | 6               | 75 | 0.10 | 2 | 987438 | 338995 |
| 3.00              | 4.00           | 15             | 6               | 75 | 0.30 | 2 | 305810 |        |
| 4.00              | 4.00           | 8              | 6               | 50 | 0.10 | 1 | 967925 |        |
| 4.00              | 6.50           | 10             | 6               | 50 | 0.50 | 1 | 971465 |        |
| 4.00              | 6.50           | 15             | 6               | 75 | 0.10 | 2 | 305811 |        |
| 4.00              | 6.50           | 15             | 6               | 75 | 0.50 | 2 | 302378 |        |
| 5.00              | 5.00           | 10             | 6               | 50 | 0.10 | 2 | 305812 |        |
| 5.00              | 5.00           | 10             | 6               | 50 | 0.50 | 2 | 975839 |        |
| 6.00              | 6.00           | 12             | 6               | 57 | 0.10 | 2 | 967926 | 338996 |
| 6.00              | 6.00           | 12             | 6               | 57 | 0.50 | 2 | 968992 |        |
| 6.00              | 8.00           | 34             | 6               | 75 | 0.10 | 2 | 995208 |        |
| 6.00              | 8.00           | 34             | 6               | 75 | 0.50 | 2 | 974475 |        |
| 6.00              | 8.00           | 34             | 6               | 75 | 1.00 | 2 | 974476 |        |
| 8.00              | 7.00           | 14             | 8               | 63 | 0.10 | 2 | 967927 | 339000 |
| 8.00              | 10.00          | 34             | 8               | 75 | 0.50 | 2 | 974477 |        |
| 8.00              | 10.00          | 50             | 8               | 75 | 1.00 | 2 | 974478 |        |

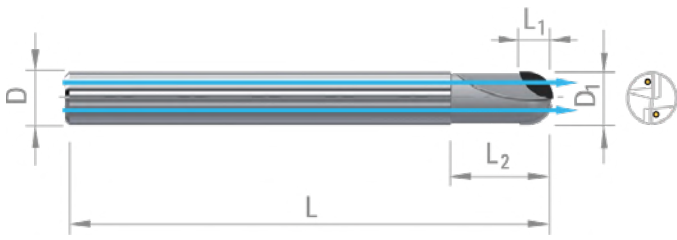
| D <sub>1h10</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L   | R    | Z | PKD    | CVD    |
|-------------------|----------------|----------------|-----------------|-----|------|---|--------|--------|
| 10.00             | 12.00          | 35             | 10              | 75  | 0.10 | 2 | 953153 | 339001 |
| 10.00             | 12.00          | 35             | 10              | 75  | 0.50 | 2 | 974479 |        |
| 10.00             | 12.00          | 35             | 10              | 75  | 1.00 | 2 | 974480 |        |
| 10.00             | 12.00          | 75             | 10              | 125 | 0.50 | 2 | 974482 |        |
| 10.00             | 12.00          | 75             | 10              | 125 | 1.00 | 2 | 974481 |        |
| 12.00             | 10.00          | 20             | 12              | 83  | 0.10 | 2 | 984083 | 339004 |
| 12.00             | 12.00          | 38             | 12              | 83  | 0.50 | 2 | 974483 |        |
| 12.00             | 12.00          | 38             | 12              | 83  | 1.00 | 2 | 974484 |        |
| 12.00             | 12.00          | 75             | 12              | 125 | 0.50 | 2 | 974485 |        |
| 12.00             | 12.00          | 75             | 12              | 125 | 1.00 | 2 | 974486 |        |
| 14.00             | 12.00          | 24             | 14              | 83  | 0.10 | 2 | 305814 |        |
| 14.00             | 12.00          | 24             | 14              | 83  | 0.50 | 2 | 305816 | 339012 |
| 14.00             | 12.00          | 24             | 14              | 83  | 1.00 | 2 | 305817 |        |
| 16.00             | 14.00          | 28             | 16              | 92  | 0.50 | 2 | 993052 |        |
| 16.00             | 14.00          | 42             | 16              | 92  | 0.10 | 2 | 305818 | 339014 |
| 16.00             | 14.00          | 42             | 16              | 92  | 1.00 | 2 | 305139 |        |
| 20.00             | 18.00          | 36             | 20              | 104 | 0.10 | 2 | 987718 |        |
| 20.00             | 18.00          | 36             | 20              | 104 | 0.50 | 2 | 305819 |        |
| 20.00             | 18.00          | 36             | 20              | 104 | 1.00 | 2 | 305820 |        |

# DIXI 70320-SH PCD

Z = 1-2



## PKD STIRNRADIUSFRÄSER MIT INNENKÜHLUNG



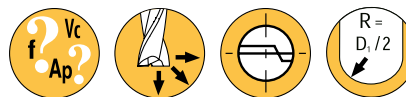
- PKD Stirnradiusfräser mit Innenkühlung, für die Formbearbeitung von NE-Metallen, Edelmetallen, Verbundwerkstoffen.
- PKD verbessert Standzeit und Produktivität.

○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |                  |    |    |      |                                      |      |          |    |                  |    |                    |    |    |

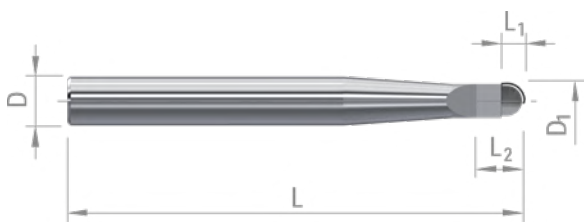
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊗                       | ⊗  | ○                       | ○  | ○  | ⊗                 | ⊗                      | ⊗  | ⊗            | ⊗       | ○          | ○    |                         |    |       |                          |    |                  |    |                  |    |

| D <sub>h10</sub> | L <sub>1</sub> | D  | L <sub>2</sub> | L   | Z | PKD    |
|------------------|----------------|----|----------------|-----|---|--------|
| 2                | 2.00           | 6  | 6              | 42  | 1 | 953442 |
|                  |                |    | 25             | 75  | 1 | 970874 |
| 3                | 2.50           | 6  | 6              | 42  | 1 | 953443 |
|                  |                |    | 25             | 75  | 1 | 970875 |
|                  |                |    | 25             | 75  | 2 | 970876 |
| 4                | 3.00           | 6  | 8              | 50  | 1 | 959468 |
|                  |                |    | 10             | 50  | 1 | 953444 |
|                  |                |    | 10             | 50  | 2 | 970877 |
|                  |                |    | 25             | 75  | 2 | 970878 |
|                  |                |    | 35             | 75  | 2 | 981585 |
| 5                | 4.00           | 6  | 10             | 50  | 2 | 953445 |
|                  |                |    | 25             | 75  | 2 | 970883 |
| 6                | 4.00           | 6  | 12             | 57  | 2 | 976433 |
|                  |                |    | 34             | 75  | 2 | 976434 |
|                  |                |    | 50             | 100 | 2 | 976435 |
| 8                | 5.00           | 8  | 14             | 63  | 2 | 976436 |
|                  |                |    | 34             | 75  | 2 | 976437 |
|                  |                |    | 75             | 125 | 2 | 976438 |
| 10               | 6.00           | 10 | 16             | 72  | 2 | 976439 |
|                  |                |    | 35             | 75  | 2 | 976440 |
|                  |                |    | 75             | 125 | 2 | 976441 |
| 12               | 7.00           | 12 | 20             | 83  | 2 | 976442 |
|                  |                |    | 38             | 83  | 2 | 976443 |
|                  |                |    | 75             | 125 | 2 | 976444 |
| 14               | 8.00           | 14 | 24             | 83  | 2 | 305821 |
| 16               | 9.00           | 16 | 28             | 92  | 2 | 300800 |
| 20               | 11.00          | 20 | 36             | 104 | 2 | 305822 |



P.510

STIRNRADIUSFRÄSER  
MONOKRISTALLINER DIAMANT BESTÜCKT



- Stirnradiusfräser DIA, für die Formbearbeitung von NE-Metallen, Edelmetallen.
- Der DIA wird für Herstellung von Hochglanzoberflächen verwendet.

○ gut    ⊙ ausgezeichnet

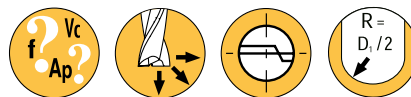
| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                      |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ⊙          |      |                         |    |       |                          |    |                  |    |                  |    |

| D <sub>1 h10</sub> | L <sub>1</sub> | L <sub>2</sub> | D <sub>h5</sub> | L  | DIA    |
|--------------------|----------------|----------------|-----------------|----|--------|
| 2                  | 2.00           | 4              | 6               | 57 | 341443 |
| 3                  | 2.50           | 6              | 6               | 75 | 341445 |
| 4                  | 3.00           | 8              | 6               | 75 | 341447 |
| 6                  | 4.00           | 12             | 8               | 75 | 341449 |
| 8                  | 5.00           | 16             | 10              | 75 | 341450 |
| 10                 | 6.00           | 20             | 12              | 75 | 341451 |

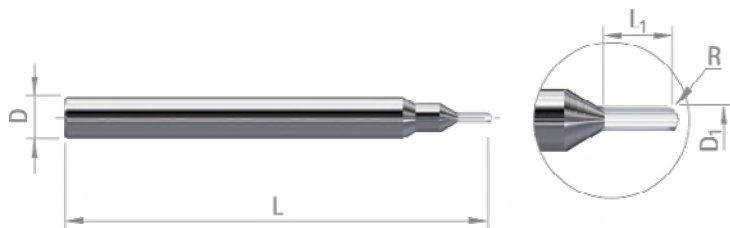
# DIXI 70330 DIA

Z = 1



P.506

## STIRNRADIUSFRÄSER MONOKRISTALLINER DIAMANT BESTÜCKT



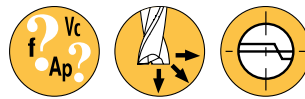
- Stirnradiusfräser DIA entwickelt für die Endbearbeitung komplexer Formen in Nichteisenmaterialien.
- Der DIA wird für Herstellung von Hochglanzoberflächen verwendet.

○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |                  |    |    |                                      |      |      |      |          |    |                  |    |                    |    |

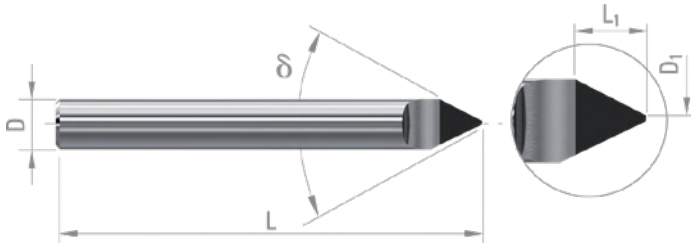
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊗                       | ⊗  | ○                       | ○  | ○  | ⊗                 | ⊗                      | ⊗  | ⊗            |         | ⊗          |      |                         |    |       |                          |    |                  |    |                  |    |

| D <sub>1 h10</sub> | L <sub>1</sub> | D <sub>h5</sub> | L  | DIA    |
|--------------------|----------------|-----------------|----|--------|
| 0.40               | 0.80           | 3               | 30 | 417114 |
| 0.50               | 1.00           | 3               | 30 | 417115 |
| 0.60               | 1.20           | 3               | 30 | 417116 |
| 0.70               | 1.40           | 3               | 30 | 417117 |
| 0.80               | 1.60           | 3               | 30 | 417118 |
| 0.90               | 1.80           | 3               | 30 | 417119 |
| 1.00               | 2.50           | 3               | 30 | 417120 |
| 1.50               | 2.50           | 3               | 30 | 417150 |



P.512

GRAVIERSTICHEL PKD BESTÜCKT



- Gravierstichel PKD bestückt, entwickelt für die Gravur von NE-Metallen, Edelmetallen und Verbundwerkstoffen.
- PKD verbessert Standzeit und Produktivität.

○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                      |      |      |      |          |    |                  |    |                    |    |

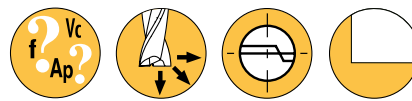
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ⊗                       | ⊗  | ○                       | ○  | ○  | ⊗                 | ⊗                      | ⊗  | ⊗            | ⊗       | ○          | ○    |                         |    |       |                          |    |    |                  |    |                  |  |

| delta | L1 | Dh5 | L  | D1   | PKD    |
|-------|----|-----|----|------|--------|
| 60°   | 5  | 6   | 50 | 0.10 | 303081 |
|       |    |     |    | 0.20 | 303082 |
| 90°   | 3  | 6   | 50 | 0.10 | 303083 |
|       |    |     |    | 0.20 | 303084 |



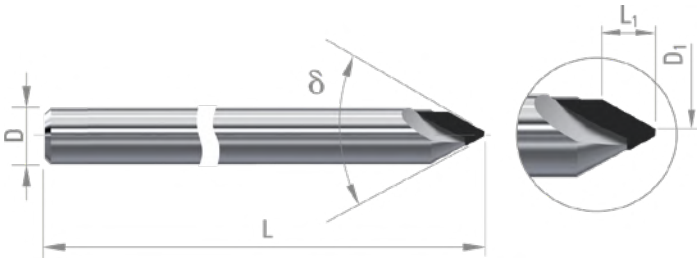
# DIXI 70070 PCD

Z = 1



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## 3/4 GRAVIERSTICHEL PKD



- Gravierstichel PKD bestückt, entwickelt für die Feingravuren von NE-Metallen, Edelmetallen und Verbundwerkstoffen.
- PKD wird für eine matte Gravur verwendet.

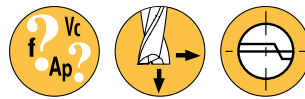
○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M    |                                      |      |          | K  |                  |    |                    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|------|--------------------------------------|------|----------|----|------------------|----|--------------------|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    |      | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1 | 14.2                                 | 14.3 | 14.4     | 15 | 16               | 17 | 18                 | 19 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |                  |    |    |      |                                      |      |          |    |                  |    |                    |    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ⊙            | ○       | ○          |      |                         |    |       |                          |    |                  |    |                  |    |

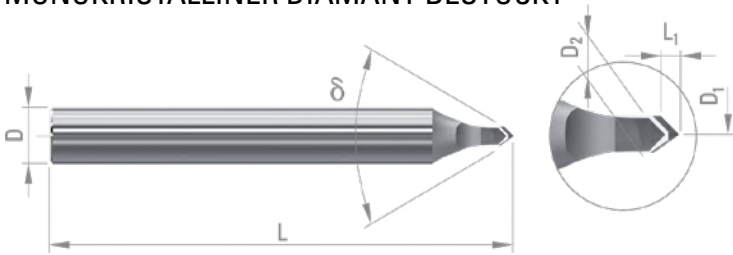
| δ   | L <sub>1</sub> | D <sub>h5</sub> | L  | D <sub>1</sub> | PKD    |
|-----|----------------|-----------------|----|----------------|--------|
| 40° | 3.50           | 3               | 38 | 0.05           | 345623 |
|     |                |                 |    | 0.10           | 413445 |
| 50° | 2.70           | 3               | 38 | 0.05           | 367069 |
|     |                |                 |    | 0.10           | 367070 |
| 60° | 2.20           | 3               | 38 | 0.05           | 413446 |
|     |                |                 |    | 0.10           | 413447 |
| 90° | 1.20           | 3               | 38 | 0.10           | 413448 |
|     |                |                 |    | 0.20           | 413449 |





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**GRAVIERSTICHEL  
MONOKRISTALLINER DIAMANT BESTÜCKT**



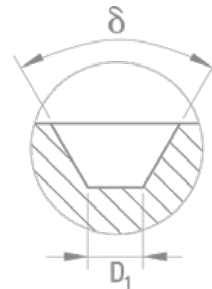
- Gravierstichel DIA bestückt, für die Gravur von Buntmetallen, Edelmetallen.
- Der DIA wird für die Glanzbearbeitung von Oberflächen verwendet.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |          |      | K                |    |                    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|----------|------|------------------|----|--------------------|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |      | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3     | 14.4 | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                      |      |          |      |                  |    |                    |    |    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|--|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |  |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |  |  |
| Empfehlungen           | ⊙                       | ⊙  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ⊙          |      |                         |    |       |                          |    |                  |    |                  |    |  |  |

| δ   | L <sub>1</sub> | D <sub>h5</sub> | L  | D <sub>1</sub> | DIA    |
|-----|----------------|-----------------|----|----------------|--------|
| 60° | 1.40           | 6               | 50 | 0.05           | 302597 |
|     |                |                 |    | 0.10           | 302598 |
| 90° | 0.80           | 6               | 50 | 0.05           | 302599 |
|     |                |                 |    | 0.10           | 302600 |

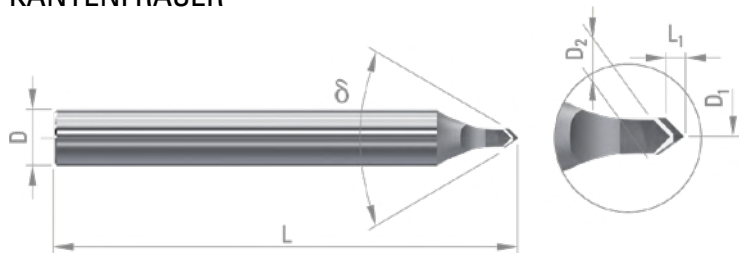






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MONOKRISTALLINER DIAMANT  
KANTENFRÄSER



- Kantenfräser DIA, für die Bearbeitung von Nichteisenwerkstoffe, Edelmetalle.
- Der DIA wird für die Glanzbearbeitung von Oberflächen verwendet.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |                  |    |    |                                      |      |      |      |          |    |                  |    |                    |    |

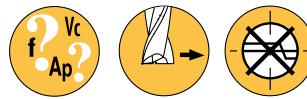
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            |      | S                       |    |       |                          |    | H                |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ⊙          |      |                         |    |       |                          |    |                  |    |                  |    |

| δ   | L <sub>1</sub> | D <sub>2</sub> | D <sub>1</sub> | D <sub>h5</sub> | L  | DIA    |
|-----|----------------|----------------|----------------|-----------------|----|--------|
| 30° | 2.80           | 2              | *0.30          | 6               | 50 | 978382 |
| 60° | 1.40           | 3              | *0.10          | 6               | 50 | 302596 |
|     | 1.30           | 3              | *0.30          | 6               | 50 | 978381 |
| 90° | 0.80           | 3              | *0.10          | 6               | 50 | 302595 |
|     | 0.70           | 3              | *0.30          | 6               | 50 | 977871 |

\* nicht schneidend

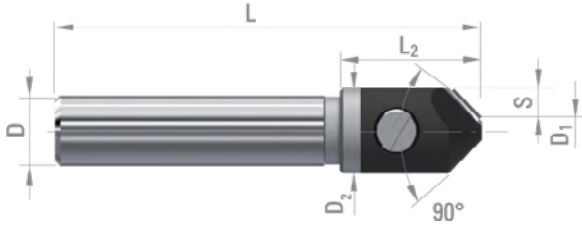
# DIXI 76231 DIA

Z = 1



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## MONOKRISTALLINER DIAMANT KANTENFRÄSER



- DIA Kantenfräser, Werkzeuge entwickelt für Nichteisenwerkstoffe, Edelmetalle.
- Der DIA wird für die Glanzbearbeitung von Oberflächen verwendet.

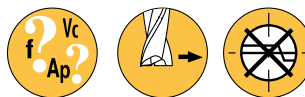
○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                   |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|-------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX /PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                     |      |      |      |          |    |                  |    |                    |    |

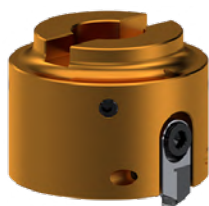
| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |    |                  |    |                  |  |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|----|------------------|----|------------------|--|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    |    | Gehärteter Stahl |    | Hartes Gusseisen |  |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38 | 39               | 40 | 41               |  |
| Empfehlungen           | ⊙                       | ⊙  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ⊙          |      |                         |    |       |                          |    |    |                  |    |                  |  |

| D <sub>1</sub> | D <sub>2</sub> | L <sub>2</sub> | S <sub>1</sub> | S <sub>2</sub> | D <sub>h5</sub> | L  | DIA    |
|----------------|----------------|----------------|----------------|----------------|-----------------|----|--------|
| 4              | 10             | -              | 3              | 4.10           | 10              | 60 | 974354 |
| 4              | 12             | 20             | 4              | 5.50           | 10              | 60 | 974355 |
| 4              | 14             | 20             | 5              | 7.00           | 10              | 60 | 974356 |
| 4              | 16             | 20             | 6              | 8.50           | 10              | 60 | 974357 |

HOCHGLANZFRÄSKÖPFE



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- Planfräskopf, entwickelt für die Hochglanzbearbeitung von NE- und Edelmetallen.
- Die Köpfe werden komplett mit PKD-Vorschneider DIXI 20370 (Schruppen) und DIA-Nachsneider DIXI 20370 (Schlichten) voreingestellt geliefert.

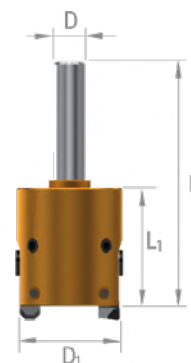
○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |          |      | K                |    |                    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|----------|------|------------------|----|--------------------|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |      | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3     | 14.4 | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                      |      |          |      |                  |    |                    |    |    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ⊙          |      |                         |    |       |                          |    |                  |    |                  |    |

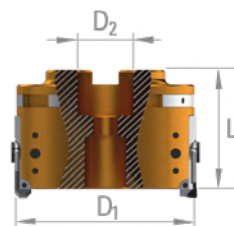
HOCHGLANZFRÄSKÖPFE MIT SCHAFT

| D <sub>1</sub> | L <sub>1</sub> | D <sub>h6</sub> | L  | KUNSTSTOFF | ALU/KUPFER | MESSING |
|----------------|----------------|-----------------|----|------------|------------|---------|
| 40             | 45             | 8               | 76 | 423639     | 423641     | 423643  |
| 40             | 45             | 12              | 76 | 423640     | 423642     | 423644  |



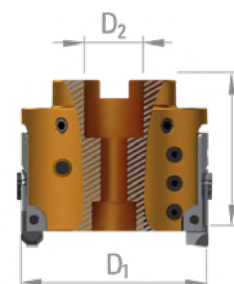
HOCHGLANZFRÄSKÖPFE

| D <sub>1</sub> | D <sub>2</sub> | L  | KUNSTSTOFF | ALU/KUPFER | MESSING |
|----------------|----------------|----|------------|------------|---------|
| 40             | 16             | 45 | 423645     | 423648     | 423651  |
| 50             | 16             | 45 | 423646     | 423649     | 423652  |
| 60             | 22             | 45 | 423647     | 423650     | 423653  |



HOCHGLANZFRÄSKÖPFE MIT WINKELEINSTELLUNG

| D <sub>1</sub> | D <sub>2</sub> | L  | KUNSTSTOFF | ALU/KUPFER | MESSING |
|----------------|----------------|----|------------|------------|---------|
| 60             | 22             | 50 | 423654     | 423658     | 423662  |
| 85             | 27             | 55 | 423655     | 423659     | 423663  |
| 100            | 27             | 55 | 423656     | 423660     | 423664  |
| 125            | 40             | 58 | 423657     | 423661     | 423665  |



## ERSATZTEILE FÜR DIXI 81000

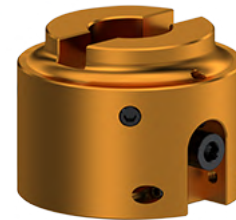
### HOCHGLANZFRÄSKÖPFE MIT SHAFT

| $D_1$ | $L_1$ | $D_{h6}$ | L  | Art.   |
|-------|-------|----------|----|--------|
| 40    | 45    | 8        | 76 | 384364 |
| 40    | 45    | 12       | 76 | 964273 |



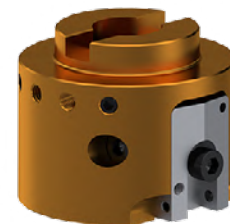
### HOCHGLANZFRÄSKÖPFE

| $D_1$ | $D_2$ | L  | Art.   |
|-------|-------|----|--------|
| 40    | 16    | 45 | 970446 |
| 50    | 16    | 45 | 971872 |
| 60    | 22    | 45 | 962823 |



### HOCHGLANZFRÄSKÖPFE MIT WINKELEINSTELLUNG

| $D_1$ | $D_2$ | L  | Art.   |
|-------|-------|----|--------|
| 60    | 22    | 50 | 996583 |
| 85    | 27    | 55 | 962824 |
| 100   | 27    | 55 | 964272 |
| 125   | 40    | 58 | 994652 |



### EINSATZ SCHRUPPEN PKD

| Zu bearbeitendes Material          | PKD    |
|------------------------------------|--------|
| Alle Materialien nicht eisenhaltig | 968117 |



### EINSATZ SCHLICHTEN DIA

| Zu bearbeitendes Material | DIA    |
|---------------------------|--------|
| Kunststoff                | 968111 |
| Aluminium / Kupfer        | 969556 |
| Messing                   | 969557 |



HOCHGLANZFRÄSKÖPFE MIT SCHAFT



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- Planfräskopf, entwickelt für die Hochglanzbearbeitung von NE- und Edelmetallen.
- Die Köpfe werden komplett mit PKD-Vorschneider DIXI 20470 (Schruppen) und DIA-Nachsneider DIXI 20470 (Schlichten) voreingestellt geliefert.

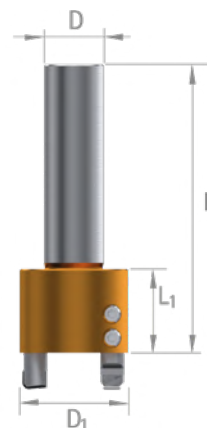
○ gut    ⊗ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |          |      | K                |    |                    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|----------|------|------------------|----|--------------------|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |      | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3     | 14.4 | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                      |      |          |      |                  |    |                    |    |    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊗                       | ⊗  | ○                       | ○  | ○  | ⊗                 | ⊗                      | ⊗  | ⊗            |         |            | ⊗    |                         |    |       |                          |    |                  |    |                  |    |

**SUPERFINISH-FRÄSER ZUM PLANFRÄSEN MIT SPANNSCHAFT**

| D <sub>1</sub> | L <sub>1</sub> | D <sub>h6</sub> | L  | KUNSTSTOFF | ALU/KUPFER | MESSING |
|----------------|----------------|-----------------|----|------------|------------|---------|
| 18             | 14             | 10              | 48 | 423666     | 423669     | 423672  |
| 30             | 14             | 10              | 48 | 423667     | 423670     | 423673  |
| 30             | 14             | 16              | 48 | 423668     | 423671     | 423674  |



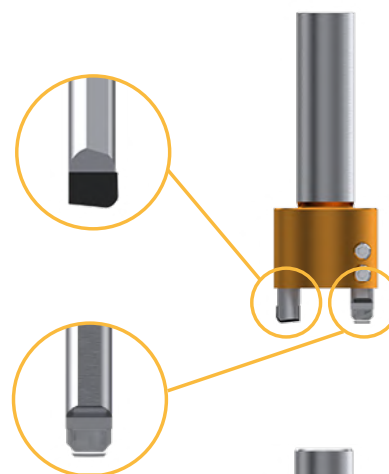
**ERSATZTEILE FÜR DIXI 82000**

**EINSATZ SCHRUPPEN PKD**

|                                    |        |
|------------------------------------|--------|
| Zu bearbeitendes Material          | PKD    |
| Alle Materialien nicht eisenhaltig | 398877 |

**EINSATZ SCHLICHTEN DIA**

|                           |        |
|---------------------------|--------|
| Zu bearbeitendes Material | DIA    |
| Kunststoff                | 391750 |
| Aluminium / Kupfer        | 419761 |
| Messing                   | 419763 |



**HOCHGLANZFRÄSKÖPFE**

| D <sub>1</sub> | L <sub>1</sub> | D <sub>h6</sub> | L  | Art.   |
|----------------|----------------|-----------------|----|--------|
| 18             | 14             | 10              | 48 | 398876 |
| 30             | 14             | 10              | 48 | 427108 |
| 30             | 14             | 16              | 48 | 410354 |



EINSÄTZE FÜR POLIERMASCHINEN



- Diamant-Einsätze, die für das Polieren von Kunststoffen und Acryl in einem Arbeitsgang auf speziellen Maschinen entwickelt wurden.
- Ein Farbcode erleichtert die Auswahl der Einsätze je nach gewünschter Bearbeitung.
- Nach dem Nachschleifen sorgt DIXI für die Höheneinstellung des Einsatzes in seiner Kassette (falls mitgeliefert).

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | KugelgraphitGuss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                      |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          | H  |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ⊙          |      |                         |    |       |                          |    |                  |    |                  |    |

| Farbe | Aspekt | D | L | Art. |
|-------|--------|---|---|------|
|-------|--------|---|---|------|

|                |           |   |    |        |
|----------------|-----------|---|----|--------|
| <b>Schwarz</b> | Schruppen | 8 | 31 | 968179 |
|----------------|-----------|---|----|--------|



|            |          |   |    |        |
|------------|----------|---|----|--------|
| <b>Rot</b> | Brillant | 8 | 31 | 968181 |
|------------|----------|---|----|--------|



|             |           |   |    |        |
|-------------|-----------|---|----|--------|
| <b>Grün</b> | Satiniert | 8 | 31 | 974193 |
|-------------|-----------|---|----|--------|



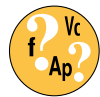
|             |             |   |    |        |
|-------------|-------------|---|----|--------|
| <b>Blau</b> | Transparent | 8 | 31 | 968178 |
|-------------|-------------|---|----|--------|





**DIXI 80000**

Z = 6-16



P.514

**PLANFRÄSKÖPFE  
HÖHENEINSTELLBAR**



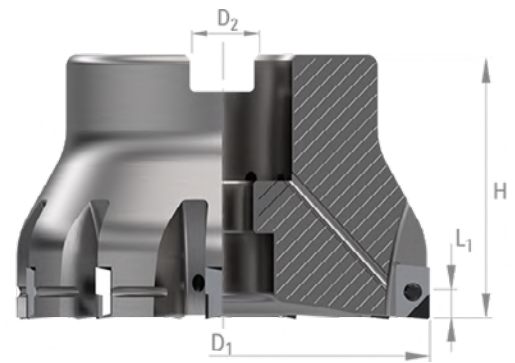
- Planfräskopf mit einstellbarer Höhe der Wendeschneidplatte.  
Nur mit APKT-Wendeschneidplatten verwenden.

○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |                  |    |    | M                                    |      |      |      | K        |    |                  |    |                    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|------------------|----|----|--------------------------------------|------|------|------|----------|----|------------------|----|--------------------|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl | Rostfreier Stahl |    |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      |      |      | Grauguss |    | Kugelgraphitguss |    | Gusseisen, formbar |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11               | 12 | 13 | 14.1                                 | 14.2 | 14.3 | 14.4 | 15       | 16 | 17               | 18 | 19                 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |                  |    |    |                                      |      |      |      |          |    |                  |    |                    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         |            | S    |                         |    |       |                          | H  |                  |                  |    |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|------------------|----|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl | Hartes Gusseisen |    |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39               | 40 | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ⊙            |         | ○          |      |                         |    |       |                          |    |                  |                  |    |    |

| D <sub>1</sub> | L <sub>1</sub> | H  | D <sub>2</sub> | Z  | Gewicht [kg] | Art.   |
|----------------|----------------|----|----------------|----|--------------|--------|
| 40.00          | 3              | 40 | 16             | 6  | 0.20         | 955446 |
| 50.00          | 3              | 40 | 22             | 7  | 0.35         | 955447 |
| 63.00          | 3              | 40 | 22             | 8  | 0.60         | 955448 |
| 80.00          | 3              | 50 | 27             | 11 | 1.20         | 955449 |
| 100.00         | 3              | 50 | 32             | 13 | 2.00         | 955451 |
| 125.00         | 3              | 50 | 32             | 16 | 2.20         | 955452 |



**Wendeschneidplatten separat bestellen.**



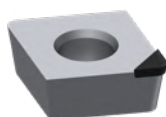
**DIXI 2642 - 26420**

**ISO WSP FÜR DIXI 80000**

| ISO         | D    | S    | D <sub>2</sub> | R    | VHM    | TiAlN  | PKD    |
|-------------|------|------|----------------|------|--------|--------|--------|
| APKT 100305 | 6.35 | 3.18 | 3.40           | 0.50 | 996517 | 996516 | 955606 |



ISO WENDENSCHNEIDPLATTEN



- ISO Wendenschneidplatten entwickelt, um die Produktivität zu steigern.
- PKD wird für das Hochgeschwindigkeitsdrehen erwendet. DIA für die Erzielung einer spiegelblanken Oberfläche. CBN wird zum Drehen von harten Materialien (> 55 HRC) verwendet.

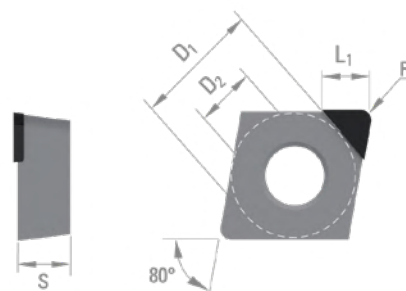
○ gut    ⊙ ausgezeichnet

| ISO                    | P                 |   |   |   |   |                   |   |   |   |                |    |                  |    | M                                    |      |          |      | K                |    |                    |    |    |    |
|------------------------|-------------------|---|---|---|---|-------------------|---|---|---|----------------|----|------------------|----|--------------------------------------|------|----------|------|------------------|----|--------------------|----|----|----|
| Werkstoff Beschreibung | Unlegierter Stahl |   |   |   |   | Niedrigleg. Stahl |   |   |   | Hochleg. Stahl |    | Rostfreier Stahl |    | Aust. Rostfreier Stahl (DUPLEX / PH) |      | Grauguss |      | KugelgraphitGuss |    | Gusseisen, formbar |    |    |    |
| VDI 3323               | 1                 | 2 | 3 | 4 | 5 | 6                 | 7 | 8 | 9 | 10             | 11 | 12               | 13 | 14.1                                 | 14.2 | 14.3     | 14.4 | 15               | 16 | 17                 | 18 | 19 | 20 |
| Empfehlungen           |                   |   |   |   |   |                   |   |   |   |                |    |                  |    |                                      |      |          |      |                  |    |                    |    |    |    |

| ISO                    | N                       |    |                         |    |    |                   |                        |    |              |         | S          |      |                         |    |       | H                        |    |                  |    |                  |    |
|------------------------|-------------------------|----|-------------------------|----|----|-------------------|------------------------|----|--------------|---------|------------|------|-------------------------|----|-------|--------------------------|----|------------------|----|------------------|----|
| Werkstoff Beschreibung | Aluminium-Knetlegierung |    | Aluminium-Gusslegierung |    |    | Cu + Pb Legierung | Cu-Legierung Schwierig |    | Gold, Silber | Graphit | Kunststoff | Holz | Sonderlegierung Ni / Co |    |       | Titan / Titanlegierungen |    | Gehärteter Stahl |    | Hartes Gusseisen |    |
| VDI 3323               | 21                      | 22 | 23                      | 24 | 25 | 26                | 27                     | 28 | -            | -       | 29         | 30   | 31                      | 32 | 33-35 | 36                       | 37 | 38               | 39 | 40               | 41 |
| Empfehlungen           | ⊙                       | ⊙  | ○                       | ○  | ○  | ⊙                 | ⊙                      | ⊙  | ⊙            | ⊙       | ○          | ○    |                         |    |       |                          |    |                  |    |                  |    |

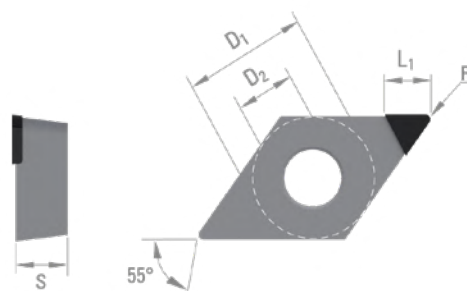
| ISO         | D <sub>1</sub> | L <sub>1</sub> | S    | D <sub>2</sub> | R    | PKD    | CVD    | DIA    | CBN*   |
|-------------|----------------|----------------|------|----------------|------|--------|--------|--------|--------|
| CCGW 060202 | 6.35           | 2              | 2.38 | 2.80           | 0.20 | 992915 | 394994 | 394973 | 395128 |
| CCGW 060204 | 6.35           | 2              | 2.38 | 2.80           | 0.40 | 993323 | 410101 | 410106 | 395130 |
| CCGW 09T302 | 9.525          | 2              | 3.97 | 4.40           | 0.20 | 302726 |        |        |        |
| CCGW 09T304 | 9.525          | 2              | 3.97 | 4.40           | 0.40 | 302728 | 394995 | 394974 |        |
| CCGW 09T308 | 9.525          | 2              | 3.97 | 4.40           | 0.80 | 302730 | 394996 | 394978 |        |
| CCGW 120404 | 12.70          | 2              | 4.76 | 5.50           | 0.20 | 993755 | 342927 | 345678 |        |

\* für eisenhaltige Werkstoffe



| ISO         | D <sub>1</sub> | L <sub>1</sub> | S    | D <sub>2</sub> | R    | PKD    | CVD    | DIA    | CBN*   |
|-------------|----------------|----------------|------|----------------|------|--------|--------|--------|--------|
| DCGW 070202 | 6.35           | 2              | 2.38 | 2.80           | 0.20 | 993320 | 394999 | 394979 | 395131 |
| DCGW 070204 | 6.35           | 2              | 2.38 | 2.80           | 0.40 | 996026 | 410102 | 410107 |        |
| DCGW 070208 | 6.35           | 2              | 2.38 | 2.80           | 0.80 | 302748 |        |        |        |
| DCGW 11T302 | 9.525          | 2              | 3.18 | 3.40           | 0.20 | 302750 | 395000 | 394980 | 395132 |
| DCGW 11T304 | 9.525          | 2              | 3.18 | 3.40           | 0.40 | 302752 | 395001 | 394981 | 395133 |
| DCGW 11T308 | 9.525          | 2              | 3.18 | 3.40           | 0.80 | 302754 | 395002 | 394982 | 395134 |

\* für eisenhaltige Werkstoffe

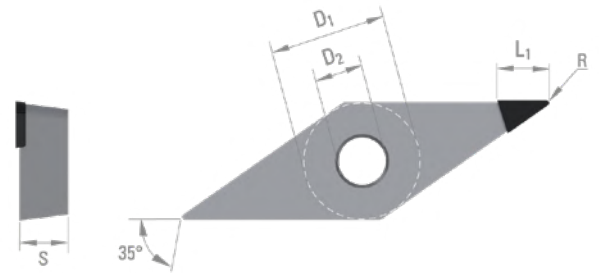






ISO WENDENSCHNEIDPLATTEN

| ISO         | D <sub>1</sub> | L <sub>1</sub> | S    | D <sub>2</sub> | R    | PKD    | CVD    | DIA    | CBN*   |
|-------------|----------------|----------------|------|----------------|------|--------|--------|--------|--------|
| VCGW 070202 | 3.97           | 2              | 2.38 | 2.25           | 0.20 | 302785 | 410103 | 410108 |        |
| VCGW 110302 | 6.35           | 2              | 3.18 | 2.80           | 0.20 | 302787 | 395003 | 394984 | 395135 |
| VCGW 110304 | 6.35           | 2              | 3.18 | 2.80           | 0.40 | 301634 | 395004 | 394985 | 395136 |
| VCGW 110308 | 6.35           | 2              | 3.18 | 3.40           | 0.80 | 302788 |        |        |        |
| VCGW 130302 | 7.94           | 2              | 3.18 | 3.40           | 0.20 |        | 395005 | 394987 |        |
| VCGW 130304 | 7.94           | 2              | 3.18 | 3.40           | 0.40 |        | 395006 | 394988 |        |
| VCGW 160402 | 9.525          | 2              | 4.67 | 4.40           | 0.20 | 302789 | 410104 | 410109 |        |
| VCGW 160404 | 9.525          | 2              | 4.67 | 4.40           | 0.40 | 302791 | 410105 | 410110 | 395137 |
| VCGW 160408 | 9.525          | 2              | 4.67 | 4.40           | 0.80 | 302792 | 395007 | 394992 | 395138 |
| VCGW 160412 | 9.525          | 2              | 4.67 | 4.40           | 1.20 | 302794 |        |        |        |
| VCGW 220530 | 12.70          | 2              | 5.56 | 5.50           | 3.00 |        | 395008 | 394993 |        |



\* für eisenhaltige Werkstoffe

SCHNITTBEDINGUNGEN

|   |  | VDI 3323 | Vc m/min | ap (mm)     | Vorschub pro Zahn fz [mm] |
|---|--|----------|----------|-------------|---------------------------|
| N | Alu-Knetlegierung < 12% Si                 | 21 - 22  | 150      | 0.02 - 0.10 | 0.045 - 0.108             |
|   | Alu-Gusslegierung ≤8% Si                   | 23       | 200      | 0.02 - 0.10 | 0.039 - 0.094             |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26       | 300      | 0.02 - 0.10 | 0.045 - 0.108             |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27-28    | 300      | 0.02 - 0.10 | 0.036 - 0.086             |
|   | Kunststoff                                 | 29       | 600      | 0.05 - 0.20 | 0.045 - 0.108             |
|   | Gold, Silber                               | -        | 250      | 0.02 - 0.10 | 0.030 - 0.072             |

|   |  | VDI 3323 | Vc m/min | ap (mm)     | Vorschub pro Zahn fz [mm] |
|---|--|----------|----------|-------------|---------------------------|
| N | Alu-Knetlegierung < 12% Si                 | 21 - 22  | 225      | 0.10 - 4.00 | 0.108 - 0.360             |
|   | Alu-Gusslegierung ≤8% Si                   | 23       | 300      | 0.10 - 4.00 | 0.039 - 0.094             |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26       | 400      | 0.10 - 4.00 | 0.045 - 0.108             |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27-28    | 400      | 0.10 - 4.00 | 0.036 - 0.086             |
|   | Kunststoff                                 | 29       | 500      | 0.10 - 4.00 | 0.045 - 0.108             |
|   | Gold, Silber                               | -        | 350      | 0.10 - 4.00 | 0.030 - 0.072             |



**DIXI 26500 R**



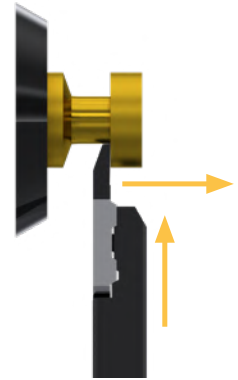
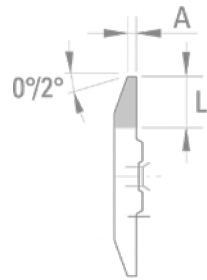
P.495

**DREHBEARBEITUNG  
RECHTSSCHNEIDEND**

**RÜCKWÄRTSDREHEN**

**DIXI 26500 AR R PKD (BIMU 060R)**

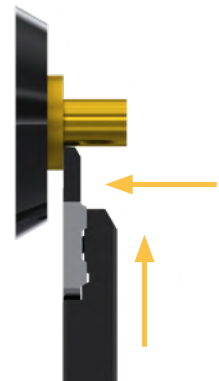
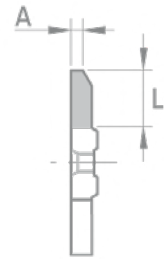
| A    | L <sub>1</sub> | 0° / PKD | 2° / PKD |
|------|----------------|----------|----------|
| 0.80 | 2.50           | 342916   | 345668   |
| 1.00 | 2.50           | 342917   | 345669   |
| 1.20 | 2.50           | 342918   | 345670   |
| 1.20 | 3.00           | 342919   | 345671   |
| 1.50 | 3.00           | 342920   | 345672   |
| 1.80 | 4.50           | 342922   | 345673   |
| 2.00 | 4.50           | 342923   | 345674   |



**VORWÄRTSDREHEN**

**DIXI 26500 AV R PKD (BIMU 064R)**

| A    | L <sub>1</sub> | PKD    |
|------|----------------|--------|
| 1.50 | 5.00           | 342931 |

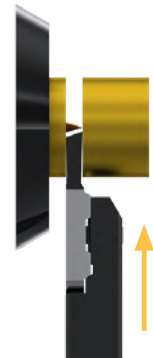
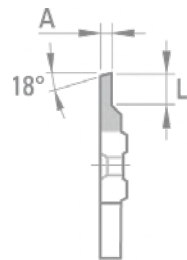


**WERKZEUGE AUF ANFRAGE**

**ABSTECHEN**

**DIXI 26500 TR R PKD SP (BIMU 050R)**

| A    | L <sub>1</sub> |
|------|----------------|
| 0.80 | 4.00           |
| 1.00 | 4.00           |
| 1.20 | 5.00           |
| 1.50 | 6.50           |
| 1.80 | 6.50           |
| 2.00 | 6.50           |

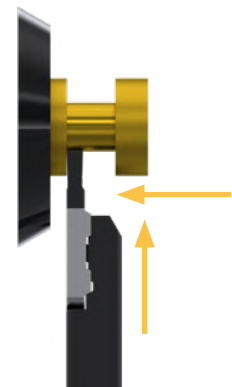
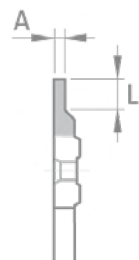


**WERKZEUGE AUF ANFRAGE**

**EINSTECHEN/LÄNGDRHEN**

**DIXI 26500 FT R PKD SP (BIMU 060RP)**

| A    | L <sub>1</sub> |
|------|----------------|
| 0.80 | 1.50           |
| 0.90 | 2.00           |
| 1.00 | 2.50           |
| 1.10 | 2.50           |
| 1.20 | 2.50           |
| 1.30 | 2.50           |

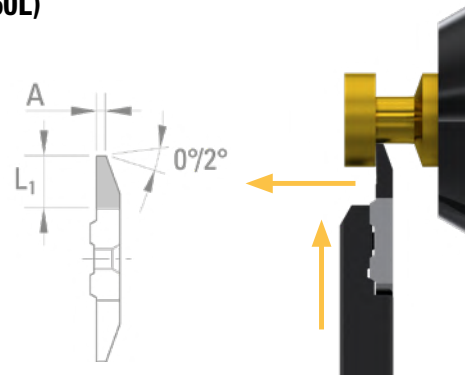


DREHBEARBEITUNG  
LINKSSCHNEIDEND

RÜCKWÄRTSDREHEN

DIXI 26500 AR L PKD (BIMU 060L)

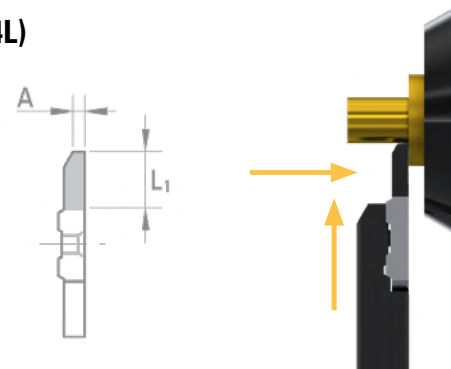
| A    | L <sub>1</sub> | 0° / PKD | 2° / PKD |
|------|----------------|----------|----------|
| 0.80 | 2.50           | 342924   | 345675   |
| 1.00 | 2.50           | 342925   | 345676   |
| 1.20 | 2.50           | 342926   | 345677   |
| 1.20 | 3.00           | 342927   | 345678   |
| 1.50 | 3.00           | 342928   | 345679   |
| 1.80 | 4.50           | 342929   | 345680   |
| 2.00 | 4.50           | 342930   | 345681   |



VORWÄRTSDREHEN

DIXI 26500 AV L PKD (BIMU 064L)

| A    | L <sub>1</sub> | PKD    |
|------|----------------|--------|
| 1.50 | 5.00           | 342932 |

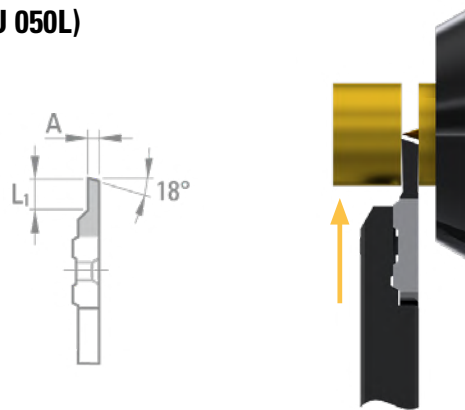


WERKZEUGE AUF ANFRAGE

ABSTECHEN

DIXI 26500 TR L PKD SP (BIMU 050L)

| A    | L <sub>1</sub> |
|------|----------------|
| 0.80 | 4.00           |
| 1.00 | 4.00           |
| 1.20 | 5.00           |
| 1.50 | 6.50           |
| 1.80 | 6.50           |
| 2.00 | 6.50           |

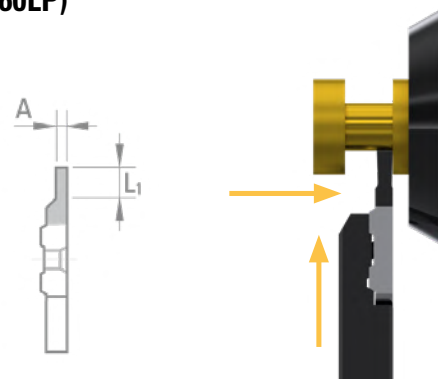


WERKZEUGE AUF ANFRAGE

EINSTECHEN/LÄNGDRHEN

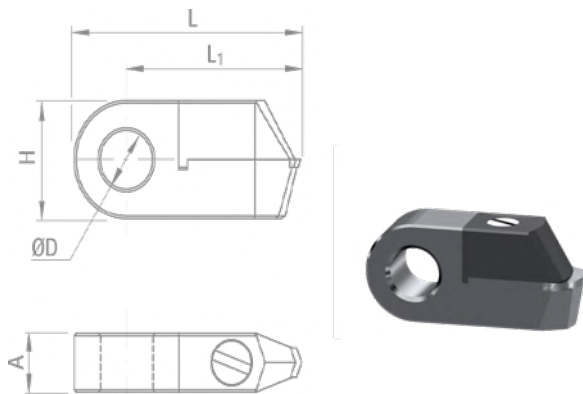
DIXI 26500 FT L PKD SP (BIMU 060LP)

| A    | L <sub>1</sub> |
|------|----------------|
| 0.80 | 1.50           |
| 0.90 | 2.00           |
| 1.00 | 2.50           |
| 1.10 | 2.50           |
| 1.20 | 2.50           |
| 1.30 | 2.50           |

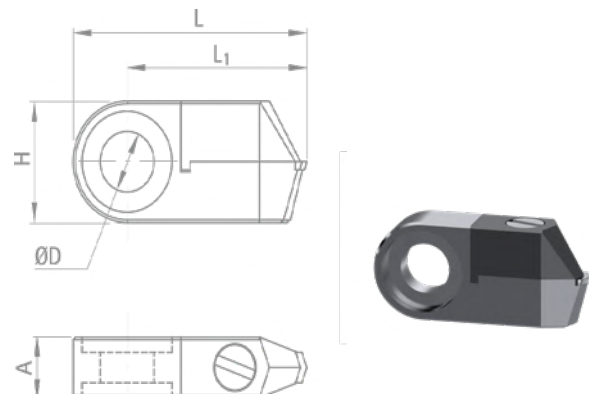


## DREH- UND FRÄSDIAMANTEN

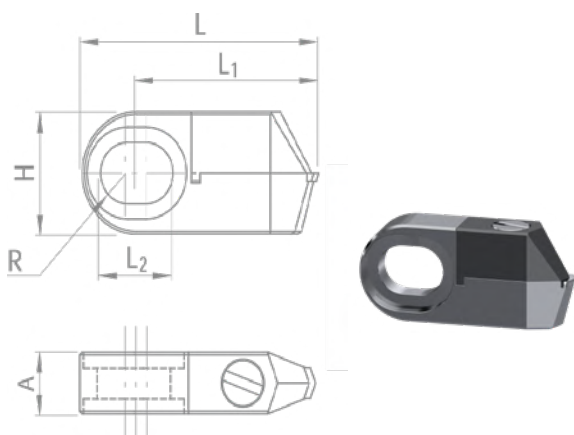
Ref. A



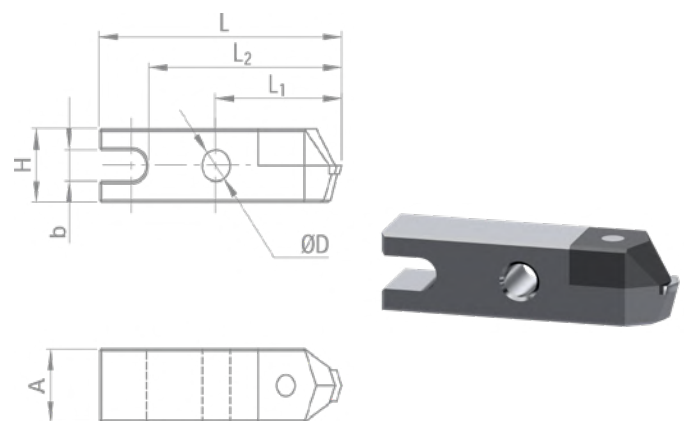
Ref. B



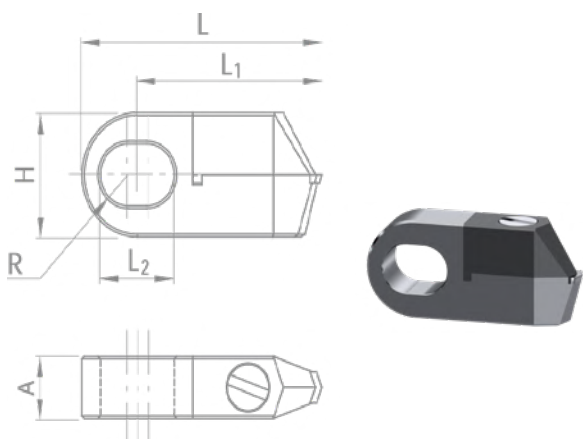
Ref. C



Ref. D

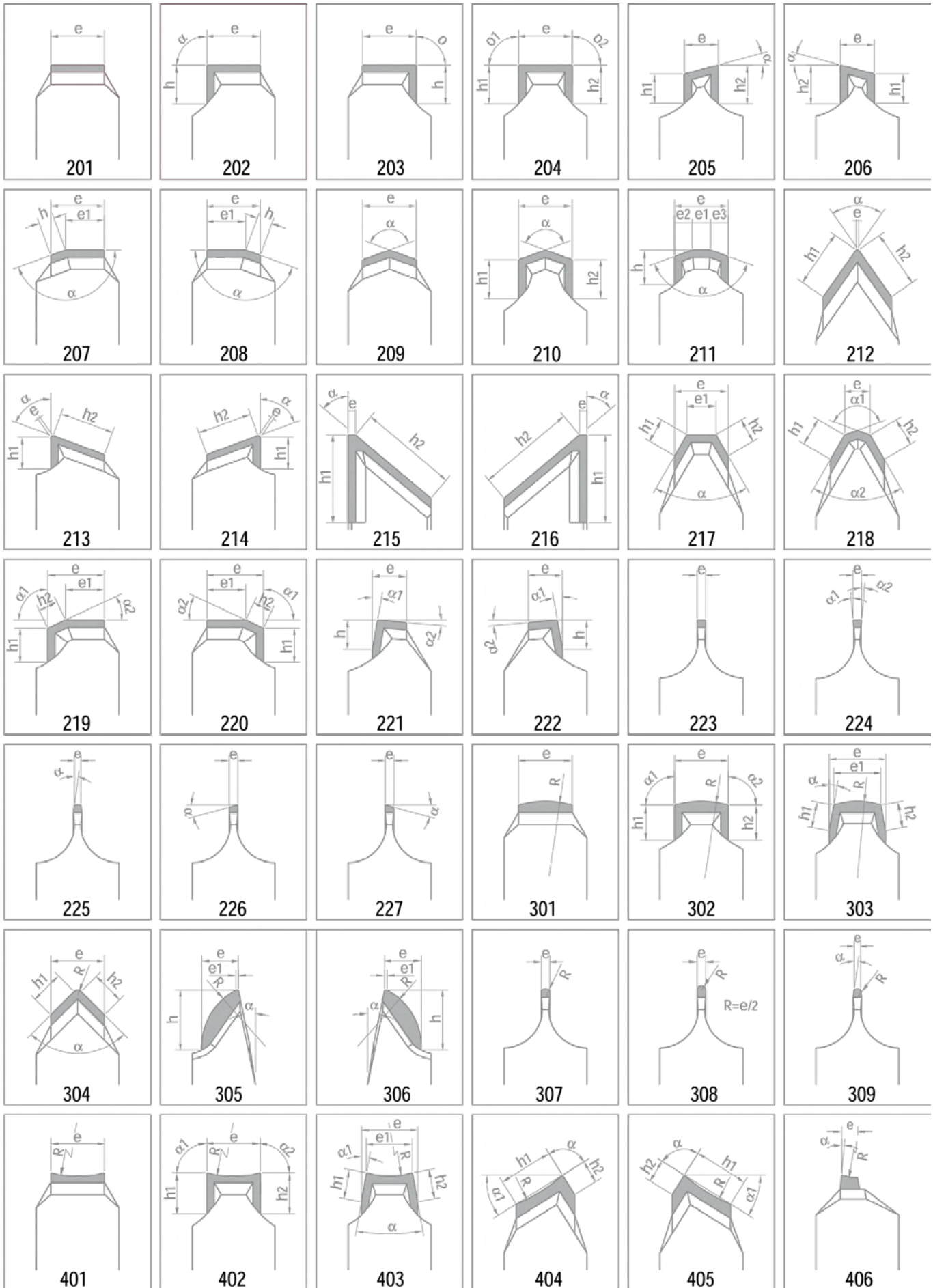


Ref. E



Bei der Bestellung Schneidstoff (PKD, DIA oder CVD) und zu bearbeitender Werkstoff angeben.  
Die Schneidgeometrien können nach Wunsch gefertigt werden siehe Seite 499.

# SHNEIDENGEOMETRIEN



## DIXI 1973

### DIADIX® ABRICHTWERKZEUGE

| Ref.           | D  | Art.  |
|----------------|----|-------|
| DIXI 1973.0823 | 8  | 19459 |
| DIXI 1973.1023 | 10 | 18512 |
| DIXI 1973.1223 | 12 | 19979 |

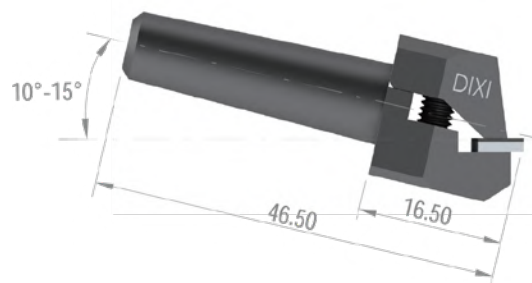
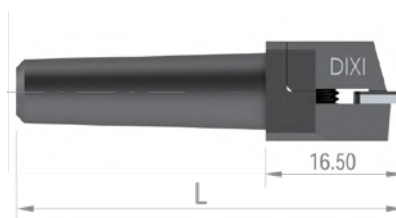
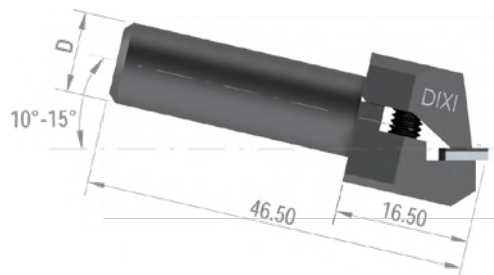
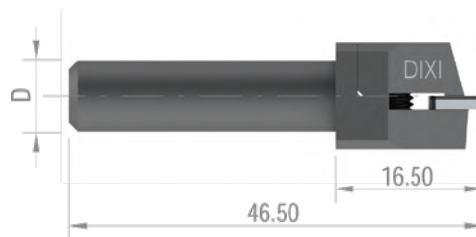
| Ref.           | D  | Art.  |
|----------------|----|-------|
| DIXI 1973.1013 | 10 | 23707 |

Durch unser patentiertes Befestigungssystem einschliesslich Schneidplattenpositionierung wird die oft "negative" Stellung der Halteraufnahme an der Schleifmaschine korrigiert, d. h. der gewünschte Anstellwinkel von 0° wird erreicht.

| Ref.           | Morsekonus | L     | Art.  |
|----------------|------------|-------|-------|
| DIXI 1973.0023 | CM0        | 46.50 | 18737 |
| DIXI 1973.0123 | CM1        | 59.50 | 18514 |

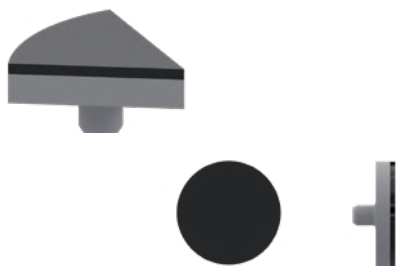
| Ref.           | Morsekonus | Art.  |
|----------------|------------|-------|
| DIXI 1973.0013 | CM0        | 23850 |
| DIXI 1973.0113 | CM1        | 23727 |

Durch unser patentiertes Befestigungssystem einschliesslich Schneidplattenpositionierung wird die oft "negative" Stellung der Halteraufnahme an der Schleifmaschine korrigiert, d. h. der gewünschte Anstellwinkel von 0° wird erreicht.



## DIXI 1978

### SCHNEIDPLATTEN ZUM ABRICHTEN



| Ref.           | PKD   |
|----------------|-------|
| DIXI 1978.360° | 23829 |



| Ref.         | PKD   |
|--------------|-------|
| DIXI 1978.23 | 18814 |

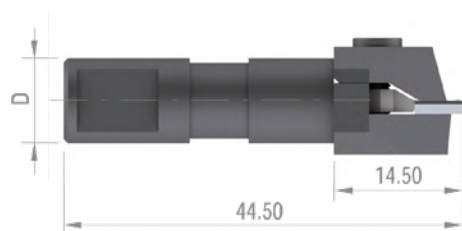
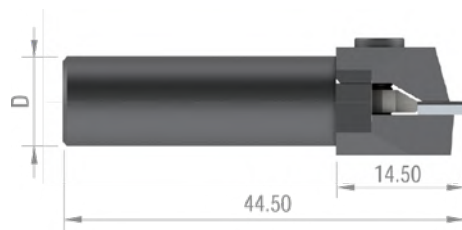
## DIXI 1973

### DIADIX® ABRICHTWERKZEUGE HALTER FÜR PROFILIERER

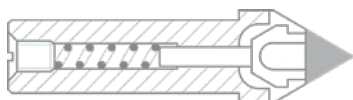
| Ref.           | D  | Art.  |
|----------------|----|-------|
| DIXI 1973.1025 | 10 | 24550 |

| Ref.             | D            | Art.  |
|------------------|--------------|-------|
| DIXI 1973.0925-1 | 9.525 (3/8") | 24549 |

| Ref.           | Morsekonus | L     | Art.  |
|----------------|------------|-------|-------|
| DIXI 1973.0125 | CM1        | 36.50 | 26549 |
| DIXI 1973.0125 | CM1        | 58.50 | 24551 |



Aufnahmen mit selbstzentrierender  
Platte für Profiliergeräte.



DIXI fertigt auf Anfrage Spezialaufnahmen  
für folgende Schleifmaschinen-Hersteller:  
Agathon, Kellenberger, Studer, Tripet,  
Tschudin (HTT), Voumard, usw...

## DIXI 1978

### SCHNEIDPLATTEN FÜR PROFILIERGERÄTE



| Ref.           | PKD   | CVD    |
|----------------|-------|--------|
| DIXI 1978.2500 | 24623 | 973739 |

| Ref.           | R     | PKD   | CVD    |
|----------------|-------|-------|--------|
| DIXI 1978.2512 | 0.125 | 24624 | 973736 |
| DIXI 1978.2520 | 0.200 | 24625 | 973732 |
| DIXI 1978.2525 | 0.250 | 24626 | 973737 |
| DIXI 1978.2550 | 0.500 | 24627 | 973738 |



**KONSTRUKTION UND EIGENSCHAFTEN**

Die mit einem Zapfen versehene DIADIX®-Schneidplatte ermöglicht eine Drehung um 360°.

Es können somit die 3 Spitzen, bzw. Radien bis zur völligen Abnützung der Platte eingesetzt werden (Form und System patentiert).

Durch den Abrichtvorgang selbst, wird die Diamantplatte ständig schneidfähig gehalten.

Das DIADIX®-Abrichtwerkzeug zersplittert die Kristalle der Schleifscheibe und es entstehen dadurch scharfe und "griffige" Schleifkörner

**VORTEILE**

Mit auf dieser Weise abgerichteten Schleifscheiben lässt sich bei verbesserter Oberflächengüte und erhöhter Masshaltigkeit an den Werkstücken, die Produktivität steigern. Durch die verbesserte Standzeit der Schleifscheibe werden die Abrichtvorgänge erheblich reduziert. Diese Vorteile zusammen leisten einen Beitrag zur Senkung Ihrer Fertigungskosten.

**ANWENDUNG**

**Schleifscheiben:** Aluminiumoxyd (Al<sub>2</sub>O<sub>3</sub>) und je nach Härte und Struktur, Siliziumkarbid (SiC).

**Härte:** bis Härte L, eventuell M - siehe Tabelle.

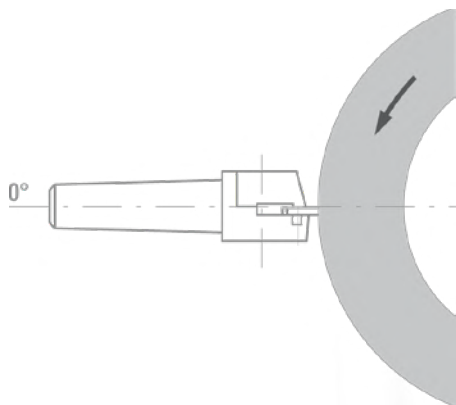
**Struktur:** von 3 bis 20 je nach Fall - siehe Tabelle.

**Körnung:** Mittelgross, im Prinzip zwischen 46 und 220.

**Schleifmaschinen:** Innen-, Rund- und Flachsleifmaschinen aller Marken

|      |      |      |      |      |
|------|------|------|------|------|
| I 1  | J 1  | K 1  | L 1  | M 1  |
| I 2  | J 2  | K 2  | L 2  | M 2  |
| I 3  | J 3  | K 3  | L 3  | M 3  |
| I 4  | J 4  | K 4  | L 4  | M 4  |
| I 5  | J 5  | K 5  | L 5  | M 5  |
| I 6  | J 6  | K 6  | L 6  | M 6  |
| I 7  | J 7  | K 7  | L 7  | M 7  |
| I 8  | J 8  | K 8  | L 8  | M 8  |
| I 9  | J 9  | K 9  | L 9  | M 9  |
| I 10 | J 10 | K 10 | L 10 | M 10 |
| ●    | ●    | ●    | ●    | ●    |
| ●    | ●    | ●    | ●    | ●    |
| ●    | ●    | ●    | ●    | ●    |

Magerdruck = Problematische Bereiche  
**Fettdruck = Sichere Bereiche**



DIADIX®-DREIPUNKT-ABRICHTWERKZEUGE

**ARBEITSBEDINGUNGEN**

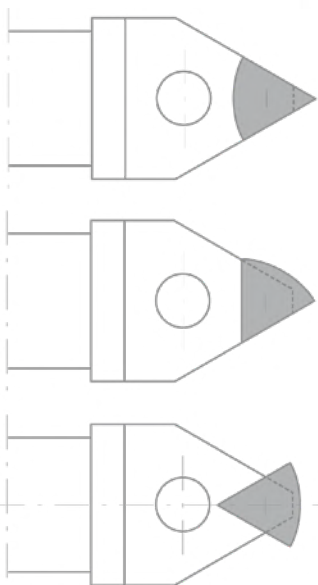
Werkzeugachse zeigt auf Schleifscheibenmitte.

**Anstellwinkel des Abrichtwerkzeuges:** 0°

**Vorschub:** je nach Breite der Schneidkante, grösser als bei Einkorn - Diamant

**Schnittiefe:** bis 0.50 mm möglich

**Kühlmittel:** unbedingt erforderlich



Positionierbeispiele der DIADIX® - Platte.

**Vorschliff.**

Bei optimaler Vorschubgeschwindigkeit wird eine sehr "griffige" Scheibe abgerichtet.

**Fertigschliff.**

Sehr gute Oberflächen werden erzielt wenn der Radius oder eine Facette im Eingriff ist.



---

## WERKZEUGE AUF ANFRAGE

**DIXI Polytool entwirft und fertigt maßgeschneiderte PKD-, CVD- und DIA-Werkzeuge, um Ihren Anforderungen gerecht zu werden - und das alles in kurzer Zeit. Vom Fräsen bis zum Drehen, von der Mattbearbeitung bis zum Superfinish ist alles möglich.**



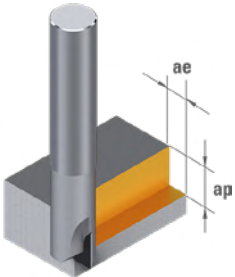
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## WERKZEUGE AUF ANFRAGE COOL+

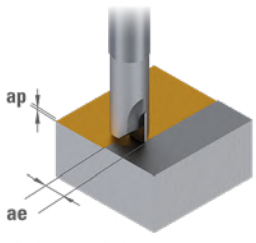


## DIXI 70600 PCD

### UMFANGSBEARBEITUNG

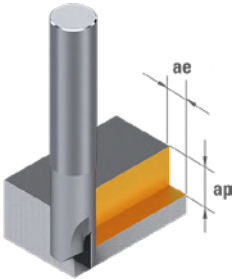
|   |  | VDI<br>3323 |   | n<br>U/min  | ae<br>(mm)  | ap<br>(mm) |
|---|--|-------------|---|-------------|-------------|------------|
| N | Alu-Knetlegierung < 12% Si                 | 21 - 22     |  | 35 - 60'000 | 0.05 - 0.20 | <0.9×L1    |
|   | Alu-Gusslegierung ≤8% Si                   | 23          |   | 30 - 60'000 | 0.05 - 0.20 | <0.9×L1    |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26          |   | 25 - 50'000 | 0.05 - 0.20 | <0.9×L1    |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27-28       |   | 20 - 45'000 | 0.05 - 0.20 | <0.9×L1    |
|   | Kunststoff                                 | 29          |   | 25 - 50'000 | 0.05 - 0.20 | <0.9×L1    |
|   | Gold, Silber                               | -           |   | 30 - 60'000 | 0.05 - 0.20 | <0.9×L1    |

### PLANFRÄSER

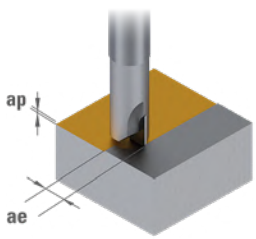
|   |  | VDI<br>3323 |  | n<br>U/min  | ae<br>(mm) | ap<br>(mm)  |
|---|--|-------------|--|-------------|------------|-------------|
| N | Alu-Knetlegierung < 12% Si                 | 21 - 22     |  | 35 - 60'000 | <1×ØD1     | 0.05 - 0.20 |
|   | Alu-Gusslegierung ≤8% Si                   | 23          |  | 30 - 60'000 | <1×ØD1     | 0.05 - 0.20 |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26          |  | 25 - 50'000 | <1×ØD1     | 0.05 - 0.20 |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27-28       |  | 20 - 45'000 | <1×ØD1     | 0.05 - 0.20 |
|   | Kunststoff                                 | 29          |  | 25 - 50'000 | <1×ØD1     | 0.05 - 0.20 |
|   | Gold, Silber                               | -           |  | 30 - 60'000 | <1×ØD1     | 0.05 - 0.20 |

## DIXI 70630 PCD

### UMFANGSBEARBEITUNG

|   |            | VDI<br>3323 |   | n<br>U/min  | ae<br>(mm)  | ap<br>(mm) |
|---|------------|-------------|---|-------------|-------------|------------|
| N | Kunststoff | 29          |  | 10 - 25'000 | 0.05 - 0.10 | <1×ØD1     |

### PLANFRÄSER

|   |            | VDI<br>3323 |   | n<br>U/min  | ae<br>(mm) | ap<br>(mm)  |
|---|------------|-------------|---|-------------|------------|-------------|
| N | Kunststoff | 29          |  | 10 - 25'000 | <1×ØD1     | 0.05 - 0.10 |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f_z \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.5 - 0.9 | $\emptyset D_1$<br>1 - 1.5 | $\emptyset D_1$<br>1.6 - 2 | $\emptyset D_1$<br>2.5 - 3 | $\emptyset D_1$<br>3 - 4 | $\emptyset D_1$<br>4.5 - 6 | $\emptyset D_1$<br>8 - 10 |
|------------------------------|----------------------------|----------------------------|----------------------------|--------------------------|----------------------------|---------------------------|
| 0.005 - 0.009                | 0.011 - 0.016              | 0.017 - 0.021              | 0.026 - 0.032              | 0.032 - 0.042            | 0.048 - 0.065              | 0.080 - 0.110             |
| 0.005 - 0.008                | 0.009 - 0.014              | 0.015 - 0.018              | 0.023 - 0.027              | 0.027 - 0.036            | 0.040 - 0.055              | 0.070 - 0.090             |
| 0.005 - 0.009                | 0.011 - 0.016              | 0.017 - 0.021              | 0.026 - 0.032              | 0.032 - 0.042            | 0.048 - 0.065              | 0.080 - 0.110             |
| 0.004 - 0.008                | 0.008 - 0.013              | 0.013 - 0.017              | 0.021 - 0.025              | 0.025 - 0.034            | 0.038 - 0.050              | 0.070 - 0.080             |
| 0.005 - 0.009                | 0.011 - 0.016              | 0.017 - 0.021              | 0.026 - 0.032              | 0.032 - 0.042            | 0.048 - 0.065              | 0.080 - 0.110             |
| 0.004 - 0.006                | 0.007 - 0.011              | 0.011 - 0.014              | 0.018 - 0.021              | 0.021 - 0.028            | 0.032 - 0.040              | 0.060 - 0.070             |

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>0.5 - 0.9 | $\emptyset D_1$<br>1 - 1.5 | $\emptyset D_1$<br>1.6 - 2 | $\emptyset D_1$<br>2.5 - 3 | $\emptyset D_1$<br>3 - 4 | $\emptyset D_1$<br>4.5 - 6 | $\emptyset D_1$<br>8 - 10 |
|------------------------------|----------------------------|----------------------------|----------------------------|--------------------------|----------------------------|---------------------------|
| 0.004 - 0.008                | 0.009 - 0.014              | 0.014 - 0.016              | 0.022 - 0.027              | 0.024 - 0.032            | 0.036 - 0.050              | 0.060 - 0.080             |
| 0.004 - 0.007                | 0.008 - 0.012              | 0.013 - 0.014              | 0.020 - 0.023              | 0.020 - 0.027            | 0.030 - 0.040              | 0.050 - 0.070             |
| 0.004 - 0.008                | 0.009 - 0.014              | 0.014 - 0.016              | 0.022 - 0.027              | 0.024 - 0.032            | 0.036 - 0.050              | 0.060 - 0.080             |
| 0.003 - 0.007                | 0.007 - 0.011              | 0.011 - 0.013              | 0.018 - 0.021              | 0.019 - 0.026            | 0.029 - 0.040              | 0.050 - 0.060             |
| 0.004 - 0.008                | 0.009 - 0.014              | 0.014 - 0.016              | 0.022 - 0.027              | 0.024 - 0.032            | 0.036 - 0.050              | 0.060 - 0.080             |
| 0.003 - 0.005                | 0.006 - 0.009              | 0.009 - 0.011              | 0.015 - 0.018              | 0.016 - 0.021            | 0.024 - 0.030              | 0.045 - 0.050             |

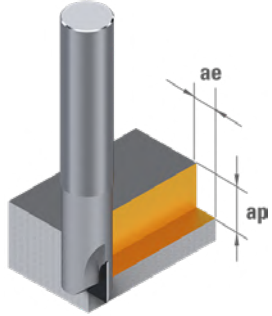
Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>3 - 6 | $\emptyset D_1$<br>8 - 12 |
|--------------------------|---------------------------|
| 0.027 - 0.045            | 0.060 - 0.090             |

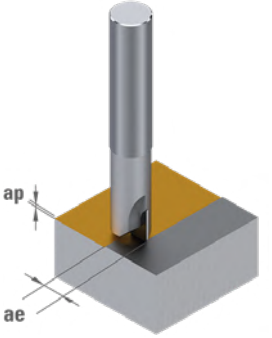
| $\emptyset D_1$<br>3 - 6 | $\emptyset D_1$<br>8 - 12 |
|--------------------------|---------------------------|
| 0.024 - 0.041            | 0.054 - 0.081             |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

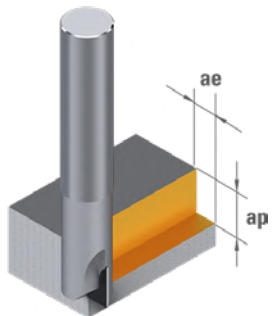
UMFANGSBEARBEITUNG

|   |  | VDI<br>3323 |  | n<br>U/min  | ae<br>(mm)  | ap<br>(mm) |
|---|--|-------------|--|-------------|-------------|------------|
| N | Alu-Knetlegierung < 12% Si                 | 21 - 22     |  | 35 - 60'000 | 0.03 - 0.08 | <2.50      |
|   | Alu-Gusslegierung $\leq$ 8% Si             | 23          |  | 35 - 60'000 | 0.03 - 0.08 | <2.50      |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26          |  | 35 - 50'000 | 0.03 - 0.08 | <2.50      |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27-28       |  | 35 - 45'000 | 0.03 - 0.08 | <2.50      |
|   | Kunststoff                                 | 29          |  | 35 - 50'000 | 0.03 - 0.08 | <2.50      |
|   | Gold, Silber                               | -           |  | 35 - 60'000 | 0.03 - 0.08 | <2.50      |

PLANFRÄSER

|   |  | VDI<br>3323 |   | n<br>U/min  | ae<br>(mm) | ap<br>(mm)  |
|---|--|-------------|---|-------------|------------|-------------|
| N | Alu-Knetlegierung < 12% Si                 | 21 - 22     |  | 35 - 60'000 | <1×ØD1     | 0.03 - 0.08 |
|   | Alu-Gusslegierung $\leq$ 8% Si             | 23          |   | 35 - 60'000 | <1×ØD1     | 0.03 - 0.08 |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26          |   | 35 - 50'000 | <1×ØD1     | 0.03 - 0.08 |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27-28       |   | 35 - 45'000 | <1×ØD1     | 0.03 - 0.08 |
|   | Kunststoff                                 | 29          |   | 35 - 50'000 | <1×ØD1     | 0.03 - 0.08 |
|   | Gold, Silber                               | -           |   | 35 - 60'000 | <1×ØD1     | 0.03 - 0.08 |

UMFANGSBEARBEITUNG

|   |  | VDI<br>3323 |  | n<br>U/min  | ae<br>(mm)  | ap<br>(mm) |
|---|--|-------------|--|-------------|-------------|------------|
| N | Alu-Knetlegierung < 12% Si                 | 21 - 22     |  | 40 - 50'000 | 0.03 - 0.05 | <0.8×L1    |
|   | Alu-Gusslegierung $\leq$ 8% Si             | 23          |  | 40 - 50'000 | 0.03 - 0.05 | <0.8×L1    |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26          |  | 30 - 50'000 | 0.03 - 0.05 | <0.8×L1    |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27-28       |  | 30 - 50'000 | 0.03 - 0.05 | <0.8×L1    |
|   | Kunststoff                                 | 29          |  | 35 - 50'000 | 0.03 - 0.05 | <0.8×L1    |
|   | Gold, Silber                               | -           |  | 40 - 50'000 | 0.03 - 0.05 | <0.8×L1    |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f_z \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>3 - 4 | $\varnothing D_1$<br>4 - 6 |  |
|----------------------------|----------------------------|--|
| 0.008 - 0.009              | 0.009 - 0.012              |  |
| 0.007 - 0.008              | 0.008 - 0.010              |  |
| 0.008 - 0.009              | 0.009 - 0.012              |  |
| 0.006 - 0.007              | 0.007 - 0.010              |  |
| 0.008 - 0.009              | 0.009 - 0.012              |  |
| 0.005 - 0.006              | 0.006 - 0.008              |  |

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>3 - 4 | $\varnothing D_1$<br>4 - 6 |  |
|----------------------------|----------------------------|--|
| 0.007 - 0.008              | 0.007 - 0.009              |  |
| 0.006 - 0.007              | 0.006 - 0.008              |  |
| 0.007 - 0.008              | 0.007 - 0.009              |  |
| 0.005 - 0.006              | 0.005 - 0.008              |  |
| 0.007 - 0.008              | 0.007 - 0.009              |  |
| 0.004 - 0.005              | 0.005 - 0.006              |  |

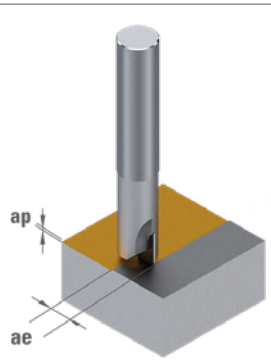
Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>0.4 - 0.9 | $\varnothing D_1$<br>1 - 2 |  |
|--------------------------------|----------------------------|--|
| 0.002 - 0.004                  | 0.004 - 0.006              |  |
| 0.002 - 0.004                  | 0.003 - 0.005              |  |
| 0.002 - 0.004                  | 0.004 - 0.006              |  |
| 0.002 - 0.003                  | 0.003 - 0.005              |  |
| 0.002 - 0.004                  | 0.004 - 0.006              |  |
| 0.001 - 0.003                  | 0.003 - 0.004              |  |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

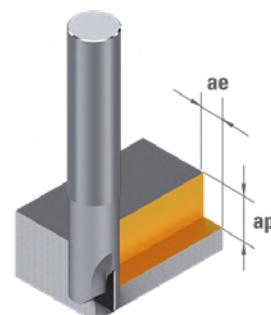
## DIXI 72310 DIA - 70330 DIA

### PLANFRÄSER

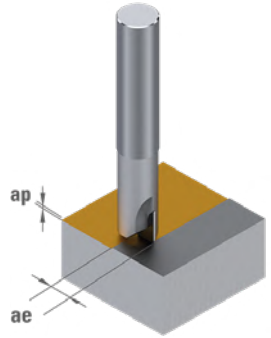
|   |  | VDI<br>3323 |  | n<br>U/min  | ae<br>(mm) | ap<br>(mm)  |
|---|--|-------------|--|-------------|------------|-------------|
| N | Alu-Knetlegierung < 12% Si                 | 21 - 22     |  | 25 - 50'000 | <1×ØD1     | 0.03 - 0.05 |
|   | Alu-Gusslegierung ≤8% Si                   | 23          |  | 20 - 50'000 | <1×ØD1     | 0.03 - 0.05 |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26          |  | 15 - 40'000 | <1×ØD1     | 0.03 - 0.05 |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27-28       |  | 10 - 35'000 | <1×ØD1     | 0.03 - 0.05 |
|   | Kunststoff                                 | 29          |  | 15 - 40'000 | <1×ØD1     | 0.03 - 0.05 |
|   | Gold, Silber                               | -           |  | 20 - 50'000 | <1×ØD1     | 0.03 - 0.05 |

## DIXI 72421 SH DIA

### UMFANGSBEARBEITUNG

|   |  | VDI<br>3323 |  | n<br>U/min  | ae<br>(mm)  | ap<br>(mm) |
|---|--|-------------|--|-------------|-------------|------------|
| N | Alu-Knetlegierung < 12% Si                 | 21 - 22     |  | 20 - 30'000 | 0.02 - 0.08 | <0.8×L1    |
|   | Alu-Gusslegierung ≤8% Si                   | 23          |  | 15 - 30'000 | 0.02 - 0.08 | <0.8×L1    |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26          |  | 10 - 20'000 | 0.02 - 0.08 | <0.8×L1    |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27-28       |  | 10 - 20'000 | 0.02 - 0.08 | <0.8×L1    |
|   | Kunststoff                                 | 29          |  | 10 - 20'000 | 0.02 - 0.08 | <0.8×L1    |
|   | Gold, Silber                               | -           |  | 15 - 30'000 | 0.02 - 0.08 | <0.8×L1    |

### PLANFRÄSER

|   |  | VDI<br>3323 |  | n<br>U/min  | ae<br>(mm)  | ap<br>(mm)  |
|---|--|-------------|--|-------------|-------------|-------------|
| N | Alu-Knetlegierung < 12% Si                 | 21 - 22     |  | 20 - 50'000 | <1×ØD1      | 0.02 - 0.08 |
|   | Alu-Gusslegierung ≤8% Si                   | 23          |  | 15 - 50'000 | <1×ØD1      | 0.02 - 0.08 |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26          |  | 10 - 40'000 | <1×ØD1      | 0.02 - 0.08 |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27-28       |  | 5 - 35'000  | <1×ØD1      | 0.02 - 0.08 |
|   | Kunststoff                                 | 29          |  | 10 - 40'000 | <1×ØD1      | 0.02 - 0.08 |
|   | Gold, Silber                               | -           | 15 - 50'000  | <1×ØD1      | 0.02 - 0.08 |             |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f_z \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>0.4 - 0.9 | $\varnothing D_1$<br>1 - 2 |
|--------------------------------|----------------------------|
| 0.002 - 0.003                  | 0.003 - 0.005              |
| 0.002 - 0.003                  | 0.003 - 0.004              |
| 0.002 - 0.003                  | 0.003 - 0.005              |
| 0.002 - 0.003                  | 0.003 - 0.004              |
| 0.002 - 0.003                  | 0.003 - 0.005              |
| 0.001 - 0.003                  | 0.003 - 0.003              |

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>6 - 8 | $\varnothing D_1$<br>10 - 12 |
|----------------------------|------------------------------|
| 0.011 - 0.024              | 0.018 - 0.036                |
| 0.009 - 0.021              | 0.016 - 0.031                |
| 0.011 - 0.024              | 0.018 - 0.036                |
| 0.009 - 0.019              | 0.014 - 0.029                |
| 0.011 - 0.024              | 0.018 - 0.036                |
| 0.007 - 0.016              | 0.012 - 0.024                |

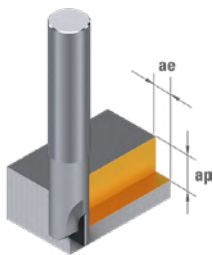
Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>6 - 8 | $\varnothing D_1$<br>10 - 12 |
|----------------------------|------------------------------|
| 0.009 - 0.020              | 0.015 - 0.031                |
| 0.008 - 0.018              | 0.014 - 0.026                |
| 0.009 - 0.020              | 0.015 - 0.031                |
| 0.008 - 0.016              | 0.012 - 0.025                |
| 0.009 - 0.020              | 0.015 - 0.031                |
| 0.062 - 0.014              | 0.010 - 0.020                |

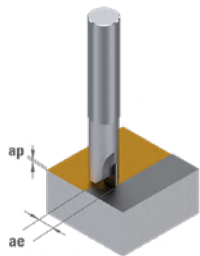
Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

## DIXI 72420 PCD - 70520 PCD

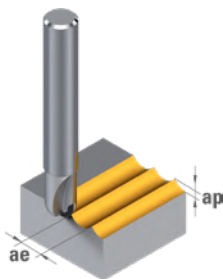
### UMFANGSBEARBEITUNG

|   |  | VDI<br>3323 |   | n<br>U/min  | ae<br>(mm)  | ap<br>(mm) |
|---|--|-------------|---|-------------|-------------|------------|
| N | Alu-Knetlegierung < 12% Si                 | 21 - 22     |  | 25 - 40'000 | 0.10 - 1.00 | <0.9×L1    |
|   | Alu-Gusslegierung ≤8% Si                   | 23          |   | 20 - 40'000 | 0.10 - 1.00 | <0.9×L1    |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26          |   | 15 - 35'000 | 0.10 - 1.00 | <0.9×L1    |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27-28       |   | 15 - 35'000 | 0.10 - 1.00 | <0.9×L1    |
|   | Kunststoff                                 | 29          |   | 15 - 30'000 | 0.10 - 1.00 | <0.9×L1    |
|   | Gold, Silber                               | -           |   | 20 - 40'000 | 0.10 - 1.00 | <0.9×L1    |

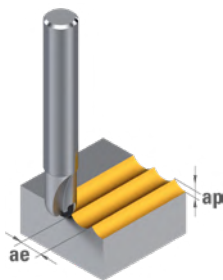
### PLANFRÄSER

|   |  | VDI<br>3323 |  | n<br>U/min  | ae<br>(mm)  | ap<br>(mm) |
|---|--|-------------|--|-------------|-------------|------------|
| N | Alu-Knetlegierung < 12% Si                 | 21 - 22     |  | 25 - 40'000 | 0.10 - 1.00 | <0.9×L1    |
|   | Alu-Gusslegierung ≤8% Si                   | 23          |  | 20 - 40'000 | 0.10 - 1.00 | <0.9×L1    |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26          |  | 15 - 35'000 | 0.10 - 1.00 | <0.9×L1    |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27-28       |  | 15 - 35'000 | 0.10 - 1.00 | <0.9×L1    |
|   | Kunststoff                                 | 29          |  | 15 - 30'000 | 0.10 - 1.00 | <0.9×L1    |
|   | Gold, Silber                               | -           |  | 20 - 40'000 | 0.10 - 1.00 | <0.9×L1    |

## DIXI 70320-SH PCD

|   |  | VDI<br>3323 |  | n<br>U/min  | ae<br>(mm) | ap<br>(mm) |
|---|--|-------------|--|-------------|------------|------------|
| N | Alu-Knetlegierung < 12% Si                 | 21 - 22     |  | 25 - 50'000 | <0.10×ØD1  | <0.10×ØD1  |
|   | Alu-Gusslegierung ≤8% Si                   | 23          |  | 20 - 50'000 | <0.10×ØD1  | <0.10×ØD1  |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26          |  | 15 - 40'000 | <0.10×ØD1  | <0.10×ØD1  |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27-28       |  | 10 - 35'000 | <0.10×ØD1  | <0.10×ØD1  |
|   | Kunststoff                                 | 29          |  | 15 - 40'000 | <0.10×ØD1  | <0.10×ØD1  |
|   | Gold, Silber                               | -           |  | 20 - 50'000 | <0.10×ØD1  | <0.10×ØD1  |

## DIXI 70320 DIA

|   |  | VDI<br>3323 |  | n<br>U/min  | ae<br>(mm)  | ap<br>(mm)  |
|---|--|-------------|--|-------------|-------------|-------------|
| N | Alu-Knetlegierung < 12% Si                 | 21 - 22     |  | 25 - 50'000 | 0.03 - 0.08 | 0.03 - 0.08 |
|   | Alu-Gusslegierung ≤8% Si                   | 23 - 25     |  | 20 - 50'000 | 0.03 - 0.08 | 0.03 - 0.08 |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26          |  | 15 - 40'000 | 0.03 - 0.08 | 0.03 - 0.08 |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27-28       |  | 10 - 35'000 | 0.03 - 0.08 | 0.03 - 0.08 |
|   | Kunststoff                                 | 29 - 30     |  | 15 - 40'000 | 0.03 - 0.08 | 0.03 - 0.08 |
|   | Gold, Silber                               | -           |  | 20 - 50'000 | 0.03 - 0.08 | 0.03 - 0.08 |



$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f_z \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>1 - 2 | $\emptyset D_1$<br>3 - 6 | $\emptyset D_1$<br>7 - 12 | $\emptyset D_1$<br>13 - 20 |
|--------------------------|--------------------------|---------------------------|----------------------------|
| 0.009 - 0.018            | 0.027 - 0.054            | 0.063 - 0.108             | 0.098 - 0.150              |
| 0.008 - 0.016            | 0.023 - 0.047            | 0.055 - 0.064             | 0.085 - 0.130              |
| 0.009 - 0.018            | 0.027 - 0.054            | 0.063 - 0.108             | 0.098 - 0.150              |
| 0.007 - 0.014            | 0.022 - 0.043            | 0.050 - 0.086             | 0.078 - 0.120              |
| 0.009 - 0.018            | 0.027 - 0.054            | 0.063 - 0.108             | 0.098 - 0.150              |
| 0.006 - 0.012            | 0.018 - 0.036            | 0.042 - 0.072             | 0.065 - 0.100              |

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>1 - 2 | $\emptyset D_1$<br>3 - 6 | $\emptyset D_1$<br>7 - 12 | $\emptyset D_1$<br>13 - 20 |
|--------------------------|--------------------------|---------------------------|----------------------------|
| 0.008 - 0.016            | 0.023 - 0.047            | 0.055 - 0.094             | 0.085 - 0.130              |
| 0.007 - 0.013            | 0.020 - 0.040            | 0.046 - 0.079             | 0.072 - 0.110              |
| 0.008 - 0.016            | 0.023 - 0.047            | 0.055 - 0.094             | 0.085 - 0.130              |
| 0.006 - 0.012            | 0.018 - 0.036            | 0.042 - 0.072             | 0.065 - 0.100              |
| 0.008 - 0.016            | 0.023 - 0.047            | 0.055 - 0.094             | 0.085 - 0.130              |
| 0.005 - 0.010            | 0.014 - 0.029            | 0.034 - 0.058             | 0.052 - 0.080              |

Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>2 - 4 | $\emptyset D_1$<br>5 - 8 | $\emptyset D_1$<br>10 - 20 |
|--------------------------|--------------------------|----------------------------|
| 0.014 - 0.027            | 0.034 - 0.054            | 0.060 - 0.120              |
| 0.012 - 0.023            | 0.029 - 0.047            | 0.052 - 0.104              |
| 0.014 - 0.027            | 0.034 - 0.054            | 0.060 - 0.120              |
| 0.011 - 0.022            | 0.027 - 0.043            | 0.048 - 0.096              |
| 0.014 - 0.027            | 0.034 - 0.054            | 0.060 - 0.120              |
| 0.009 - 0.018            | 0.023 - 0.036            | 0.040 - 0.080              |

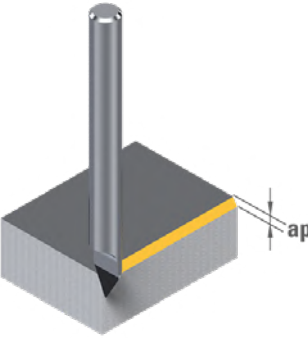
Vorschub pro Zahn  $f_z$  [mm]

| $\emptyset D_1$<br>2 - 4 | $\emptyset D_1$<br>6 - 10 |
|--------------------------|---------------------------|
| 0.005 - 0.044            | 0.012 - 0.015             |
| 0.005 - 0.009            | 0.010 - 0.013             |
| 0.005 - 0.011            | 0.012 - 0.015             |
| 0.004 - 0.009            | 0.009 - 0.012             |
| 0.005 - 0.011            | 0.012 - 0.015             |
| 0.004 - 0.007            | 0.008 - 0.010             |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

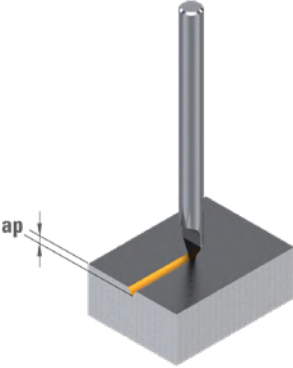
## DIXI 76230 DIA - 76231 DIA

### FASEN

|   |  | VDI<br>3323 |  | n<br>U/min  | ae<br>(mm)  | ap<br>(mm) |
|---|--|-------------|--|-------------|-------------|------------|
| N | Alu-Knetlegierung < 12% Si                 | 21 - 22     |  | 35 - 60'000 | 0.03 - 0.08 | < 0.8 × L1 |
|   | Alu-Gusslegierung ≤8% Si                   | 23          |  | 35 - 60'000 | 0.03 - 0.08 | < 0.8 × L1 |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26          |  | 35 - 60'000 | 0.03 - 0.08 | < 0.8 × L1 |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27-28       |  | 35 - 60'000 | 0.03 - 0.08 | < 0.8 × L1 |
|   | Kunststoff                                 | 29          |  | 35 - 60'000 | 0.03 - 0.08 | < 0.8 × L1 |
|   | Gold, Silber                               | -           |  | 35 - 60'000 | 0.03 - 0.08 | < 0.8 × L1 |

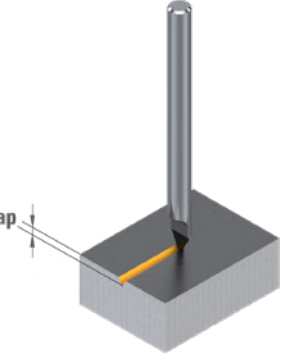
## DIXI 70170 DIA

### GRAVIEREN

|   |  | VDI<br>3323 |  | n<br>U/min  | ae<br>(mm)  |
|---|--|-------------|--|-------------|-------------|
| N | Alu-Knetlegierung < 12% Si                 | 21 - 22     |  | 30 - 60'000 | 0.03 - 0.08 |
|   | Alu-Gusslegierung ≤8% Si                   | 23          |  | 30 - 60'000 | 0.03 - 0.08 |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26          |  | 30 - 60'000 | 0.03 - 0.08 |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27-28       |  | 30 - 60'000 | 0.03 - 0.08 |
|   | Kunststoff                                 | 29          |  | 30 - 60'000 | 0.03 - 0.08 |
|   | Gold, Silber                               | -           |  | 30 - 60'000 | 0.03 - 0.08 |

## DIXI 70070 PCD - 70170 PCD

### GRAVIEREN

|   |  | VDI<br>3323 |  | n<br>U/min  | ae<br>(mm)  |
|---|--|-------------|--|-------------|-------------|
| N | Alu-Knetlegierung < 12% Si                 | 21 - 22     |  | 25 - 45'000 | 0.05 - 0.10 |
|   | Alu-Gusslegierung ≤8% Si                   | 23          |  | 20 - 45'000 | 0.05 - 0.10 |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26          |  | 15 - 35'000 | 0.05 - 0.10 |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27-28       |  | 10 - 30'000 | 0.05 - 0.10 |
|   | Kunststoff                                 | 29          |  | 15 - 35'000 | 0.05 - 0.10 |
|   | Gold, Silber                               | -           |  | 20 - 45'000 | 0.05 - 0.10 |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f_z \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>0.1 - 0.9 | $\varnothing D_1$<br>1 - 3.9 | $\varnothing D_1$<br>4 - 16 |
|--------------------------------|------------------------------|-----------------------------|
| 0.003 - 0.007                  | 0.008 - 0.012                | 0.011 - 0.019               |
| 0.003 - 0.006                  | 0.007 - 0.010                | 0.009 - 0.017               |
| 0.003 - 0.007                  | 0.008 - 0.012                | 0.011 - 0.019               |
| 0.002 - 0.005                  | 0.006 - 0.009                | 0.009 - 0.015               |
| 0.003 - 0.007                  | 0.008 - 0.012                | 0.011 - 0.019               |
| 0.002 - 0.005                  | 0.005 - 0.008                | 0.007 - 0.013               |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.

Vorschub pro Zahn  $f_z$  [mm]

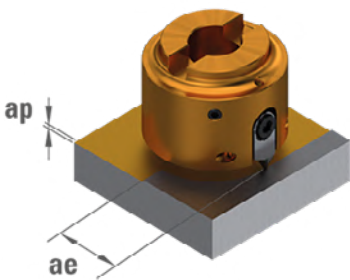
| $\varnothing D_1$<br>0.05 - 0.10 |
|----------------------------------|
| 0.004 - 0.007                    |
| 0.003 - 0.006                    |
| 0.004 - 0.007                    |
| 0.003 - 0.006                    |
| 0.004 - 0.007                    |
| 0.002 - 0.005                    |

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>0.05 - 0.10 | $\varnothing D_1$<br>0.10 - 0.20 |
|----------------------------------|----------------------------------|
| 0.003 - 0.006                    | 0.007 - 0.011                    |
| 0.003 - 0.005                    | 0.006 - 0.009                    |
| 0.003 - 0.006                    | 0.007 - 0.011                    |
| 0.002 - 0.005                    | 0.006 - 0.009                    |
| 0.003 - 0.006                    | 0.007 - 0.011                    |
| 0.002 - 0.004                    | 0.005 - 0.007                    |

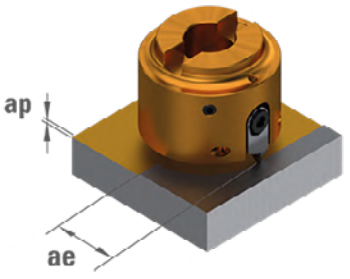
## DIXI 81000

### PLANFRÄSEN

| N |  | VDI 3323 |  | n<br>U/min | ae<br>(mm) | ap<br>(mm)  |
|---|--|----------|--|------------|------------|-------------|
|   | Alu-Knetlegierung < 12% Si                 | 21 - 22  |  | 2 - 7'000  | <1×ØD1     | 0.10 - 0.50 |
|   | Alu-Gusslegierung ≤8% Si                   | 23       |  | 2 - 7'000  | <1×ØD1     | 0.10 - 0.50 |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26       |  | 2 - 6'000  | <1×ØD1     | 0.10 - 0.50 |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27-28    |  | 2 - 5'000  | <1×ØD1     | 0.10 - 0.50 |
|   | Kunststoff                                 | 29       |  | 2 - 5'000  | <1×ØD1     | 0.10 - 0.50 |
|   | Gold, Silber                               | -        |  | 2 - 7'000  | <1×ØD1     | 0.10 - 0.50 |

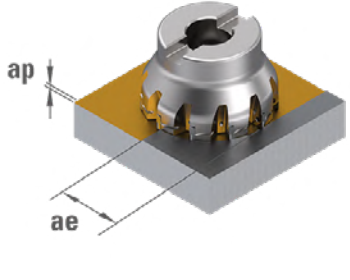
## DIXI 82000

### PLANFRÄSEN

| N |  | VDI 3323 |  | n<br>U/min | ae<br>(mm) | ap<br>(mm)  |
|---|--|----------|--|------------|------------|-------------|
|   | Alu-Knetlegierung < 12% Si                 | 21 - 22  |  | 5 - 7'000  | <1×ØD1     | 0.10 - 0.50 |
|   | Alu-Gusslegierung ≤8% Si                   | 23       |  | 5 - 7'000  | <1×ØD1     | 0.10 - 0.50 |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26       |  | 4 - 6'000  | <1×ØD1     | 0.10 - 0.50 |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27-28    |  | 4 - 5'000  | <1×ØD1     | 0.10 - 0.50 |
|   | Kunststoff                                 | 29       |  | 4 - 5'000  | <1×ØD1     | 0.10 - 0.50 |
|   | Gold, Silber                               | -        |  | 5 - 7'000  | <1×ØD1     | 0.10 - 0.50 |

## DIXI 80000

### PLANFRÄSEN

| N |  | VDI 3323 |  | n<br>U/min | ae<br>(mm) | ap<br>(mm)  |
|---|--|----------|--|------------|------------|-------------|
|   | Alu-Knetlegierung < 12% Si                 | 21 - 22  |  | 2 - 7'000  | <1×ØD1     | 0.10 - 1.00 |
|   | Alu-Gusslegierung ≤8% Si                   | 23       |  | 2 - 7'000  | <1×ØD1     | 0.10 - 1.00 |
|   | Kupferlegierung gute Zerspanbarkeit mit Pb | 26       |  | 2 - 6'000  | <1×ØD1     | 0.10 - 1.00 |
|   | Kupferlegierung schwere Zerspanbarkeit     | 27-28    |  | 2 - 5'000  | <1×ØD1     | 0.10 - 1.00 |
|   | Kunststoff                                 | 29       |  | 2 - 5'000  | <1×ØD1     | 0.10 - 1.00 |
|   | Gold, Silber                               | -        |  | 2 - 7'000  | <1×ØD1     | 0.10 - 1.00 |

$$n \text{ [U/min]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [U/min]} \times f_z \text{ [mm]} \times Z$$

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>40 - 60 | $\varnothing D_1$<br>85 - 125 |
|------------------------------|-------------------------------|
| 0.018 - 0.027                | 0.032 - 0.056                 |
| 0.016 - 0.023                | 0.028 - 0.049                 |
| 0.018 - 0.027                | 0.032 - 0.056                 |
| 0.014 - 0.022                | 0.026 - 0.045                 |
| 0.018 - 0.027                | 0.032 - 0.056                 |
| 0.012 - 0.018                | 0.021 - 0.038                 |

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>18 - 30 |
|------------------------------|
| 0.008 - 0.014                |
| 0.007 - 0.012                |
| 0.008 - 0.014                |
| 0.006 - 0.011                |
| 0.008 - 0.014                |
| 0.005 - 0.009                |

Vorschub pro Zahn  $f_z$  [mm]

| $\varnothing D_1$<br>40 - 63 | $\varnothing D_1$<br>80 - 125 |
|------------------------------|-------------------------------|
| 0.024 - 0.189                | 0.060 - 0.244                 |
| 0.021 - 0.164                | 0.052 - 0.211                 |
| 0.024 - 0.189                | 0.060 - 0.244                 |
| 0.019 - 0.151                | 0.048 - 0.195                 |
| 0.024 - 0.189                | 0.060 - 0.244                 |
| 0.016 - 0.126                | 0.040 - 0.163                 |

Werte basieren auf der Verwendung von Schneidöl. Die Schnittparameter werden durch äußere Parameter sehr stark beeinflusst, insbesondere durch die Stabilität der Werkzeugspannung sowie der Werkstückgeometrie und der Aufspannsituation.





RUNDSTÄBE GESCHLIFFEN

518

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KUGELN

520

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INFORMATIONEN

521

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VHM-LEHRDORNE

522

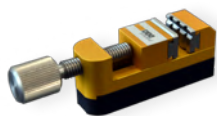
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MESSTASTER UND LEHRDORNE

524

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MINI-SCHRAUBSTOCK

525

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


VHM-RUNDSTÄBE, GESCHLIFFEN



| D <sub>h5</sub> | L   |   | VHM    | D <sub>h5</sub> | L   |   | VHM    | D <sub>h5</sub> | L    |   | VHM    | D <sub>h5</sub> | L    |   | VHM    |
|-----------------|-----|---|--------|-----------------|-----|---|--------|-----------------|------|---|--------|-----------------|------|---|--------|
| 0.30            | 30  |   | 201016 | 1.25            | 30  |   | 201067 | 2.70            | 61   |   | 200987 | 3.70            | 70   |   | 200964 |
| 0.35            | 30  |   | 200825 | 1.25            | 38  |   | 201072 | 2.70            | 102  |   | 200992 | 3.70            | 102  |   | 200879 |
| 0.40            | 30  |   | 200968 | 1.30            | 30  |   | 200916 | 2.75            | 102  |   | 201096 | 3.75            | 52   |   | 200838 |
| 0.45            | 30  |   | 200851 | 1.30            | 102 | ✓ | 200949 | 2.80            | 102  |   | 200872 | 3.80            | 55   |   | 201022 |
| 0.50            | 30  |   | 200912 | 1.40            | 102 | ✓ | 201055 | 2.85            | 102  |   | 201015 | 3.80            | 75   |   | 201040 |
| 0.50            | 38  |   | 200917 | 1.45            | 38  |   | 200982 | 2.90            | 61   |   | 200885 | 3.80            | 102  |   | 201005 |
| 0.55            | 30  |   | 200861 | 1.50            | 30  |   | 200975 | 2.90            | 102  |   | 200926 | 3.85            | 55   |   | 201044 |
| 0.55            | 38  |   | 200869 | 1.50            | 30  | ✓ | 323055 | 2.95            | 102  |   | 201097 | 3.90            | 55   |   | 201026 |
| 0.60            | 30  |   | 201064 | 1.50            | 32  |   | 981528 | 3.00            | 32   |   | 962285 | 3.90            | 75   |   | 200818 |
| 0.60            | 38  |   | 200976 | 1.50            | 40  | ✓ | 963071 | 3.00            | 38,5 |   | 960503 | 3.90            | 102  |   | 200804 |
| 0.65            | 30  |   | 200969 | 1.50            | 102 |   | 200961 | 3.00            | 46   | ✓ | 301757 | 3.95            | 55   |   | 200835 |
| 0.65            | 38  |   | 201069 | 1.55            | 102 |   | 38577  | 3.00            | 50   | ✓ | 977075 | 4.00            | 35   |   | 200938 |
| 0.70            | 30  | ✓ | 200913 | 1.60            | 102 |   | 201076 | 3.00            | 61   | ✓ | 201011 | 4.00            | 38,5 |   | 335046 |
| 0.70            | 38  | ✓ | 200918 | 1.70            | 43  |   | 200884 | 3.00            | 102  | ✓ | 200960 | 4.00            | 42   |   | 201054 |
| 0.75            | 30  | ✓ | 200970 | 1.70            | 102 |   | 201032 | 3.05            | 102  | ✓ | 200824 | 4.00            | 51   | ✓ | 332349 |
| 0.75            | 38  |   | 200865 | 1.80            | 46  |   | 201050 | 3.10            | 65   |   | 201053 | 4.00            | 55   | ✓ | 200833 |
| 0.80            | 30  | ✓ | 200862 | 1.80            | 102 |   | 200870 | 3.10            | 102  |   | 201079 | 4.00            | 62   | ✓ | 201017 |
| 0.80            | 38  | ✓ | 200977 | 1.85            | 102 |   | 46203  | 3.15            | 102  |   | 201019 | 4.00            | 75   | ✓ | 200817 |
| 0.80            | 102 |   | 200950 | 1.90            | 46  |   | 200948 | 3.175           | 30   |   | 303056 | 4.00            | 102  |   | 200857 |
| 0.85            | 30  | ✓ | 201065 | 1.90            | 102 |   | 200852 | 3.175           | 38   |   | 201010 | 4.05            | 55   | ✓ | 200889 |
| 0.85            | 38  | ✓ | 200978 | 2.00            | 25  |   | 201058 | 3.175           | 102  | ✓ | 966109 | 4.10            | 55   |   | 201024 |
| 0.90            | 30  |   | 200914 | 2.00            | 32  |   | 200988 | 3.20            | 65   | ✓ | 200854 | 4.10            | 75   |   | 201094 |
| 0.90            | 38  | ✓ | 200919 | 2.00            | 38  |   | 200986 | 3.20            | 102  |   | 200993 | 4.10            | 102  |   | 200874 |
| 0.95            | 30  | ✓ | 200971 | 2.00            | 38  | ✓ | 323064 | 3.25            | 102  |   | 200956 | 4.15            | 55   |   | 201104 |
| 0.95            | 38  | ✓ | 201070 | 2.00            | 102 |   | 201057 | 3.30            | 65   |   | 200897 | 4.20            | 55   |   | 201085 |
| 1.00            | 30  | ✓ | 201066 | 2.10            | 102 |   | 200925 | 3.30            | 102  |   | 200927 | 4.20            | 75   |   | 200830 |
| 1.00            | 30  |   | 323054 | 2.15            | 40  |   | 201013 | 3.35            | 102  |   | 200887 | 4.20            | 102  |   | 201098 |
| 1.00            | 32  | ✓ | 981529 | 2.20            | 53  |   | 200954 | 3.40            | 52   |   | 200836 | 4.25            | 55   |   | 201100 |
| 1.00            | 38  |   | 200979 | 2.20            | 102 |   | 201077 | 3.40            | 70   |   | 200924 | 4.25            | 102  |   | 973861 |
| 1.00            | 70  |   | 391314 | 2.30            | 53  |   | 200856 | 3.40            | 102  |   | 201080 | 4.30            | 58   |   | 201001 |
| 1.00            | 102 |   | 200907 | 2.30            | 102 |   | 200871 | 3.45            | 52   |   | 200941 | 4.30            | 80   |   | 201062 |
| 1.05            | 30  |   | 200972 | 2.35            | 102 |   | 47709  | 3.50            | 40   |   | 200859 | 4.30            | 102  |   | 200827 |
| 1.05            | 38  |   | 200866 | 2.40            | 57  |   | 201075 | 3.50            | 52   |   | 201025 | 4.35            | 58   |   | 200939 |
| 1.10            | 30  |   | 200915 | 2.40            | 102 |   | 200899 | 3.50            | 70   |   | 201060 | 4.40            | 58   |   | 201036 |
| 1.10            | 38  |   | 200920 | 2.45            | 102 |   | 46772  | 3.50            | 102  |   | 200873 | 4.40            | 102  |   | 201018 |
| 1.10            | 102 |   | 200902 | 2.50            | 32  |   | 201078 | 3.55            | 52   |   | 200837 | 4.45            | 58   |   | 200831 |
| 1.15            | 30  |   | 200863 | 2.50            | 43  | ✓ | 323057 | 3.60            | 52   |   | 201034 | 4.50            | 50   | ✓ | 312849 |
| 1.15            | 38  |   | 201071 | 2.50            | 102 |   | 200906 | 3.60            | 70   |   | 200908 | 4.50            | 58   |   | 200798 |
| 1.20            | 30  |   | 200973 | 2.60            | 57  |   | 200959 | 3.60            | 102  |   | 200994 | 4.50            | 80   |   | 200900 |
| 1.20            | 38  |   | 200980 | 2.60            | 102 |   | 200991 | 3.65            | 52   |   | 201103 | 4.50            | 102  |   | 200909 |
| 1.20            | 102 |   | 200947 | 2.65            | 102 |   | 38733  | 3.70            | 52   |   | 200890 |                 |      |   |        |



## VHM-RUNDSTÄBE, GESCHLIFFEN

| D <sub>h5</sub> | L    |  | VHM    | D <sub>h5</sub> | L    |  | VHM    | D <sub>h5</sub> | L   |  | VHM    |
|-----------------|------|---|--------|-----------------|------|---|--------|-----------------|-----|---|--------|
| 4.55            | 58   |   | 201027 | 6.00            | 66   | ✓   | 10665  | 10.00           | 67  |   | 335048 |
| 4.60            | 58   |   | 200877 | 6.00            | 66   | ✓   | 200832 | 10.00           | 72  | ✓   | 49215  |
| 4.60            | 80   |   | 201059 | 6.00            | 75   |   | 201082 | 10.00           | 73  |   | 332053 |
| 4.60            | 102  |   | 200828 | 6.00            | 81   |   | 975718 | 10.00           | 75  |   | 201083 |
| 4.65            | 58   |   | 200839 | 6.00            | 93   |   | 200883 | 10.00           | 90  |   | 200807 |
| 4.70            | 58   |   | 201086 | 6.00            | 102  |   | 200958 | 10.00           | 102 |   | 200945 |
| 4.70            | 102  |   | 201099 | 6.10            | 70   |   | 200898 | 10.00           | 133 |   | 200812 |
| 4.75            | 58   |   | 201020 | 6.10            | 102  |   | 200892 | 10.20           | 89  |   | 968835 |
| 4.80            | 62   |   | 200799 | 6.20            | 70   |   | 200911 | 10.20           | 133 |   | 200808 |
| 4.80            | 86   |   | 200819 | 6.20            | 102  |   | 201048 | 10.50           | 89  |   | 200810 |
| 4.80            | 102  |   | 201042 | 6.30            | 70   |   | 201051 | 10.50           | 133 |   | 201009 |
| 4.85            | 62   |   | 200840 | 6.30            | 102  |   | 200845 | 11.00           | 75  |   | 200998 |
| 4.90            | 62   |   | 200928 | 6.35            | 63   |   | 201056 | 11.00           | 102 |   | 200849 |
| 4.90            | 86   |   | 201041 | 6.35            | 76   |   | 200933 | 11.00           | 142 |   | 200813 |
| 4.90            | 102  |   | 200829 | 6.40            | 70   |   | 200967 | 11.50           | 102 |   | 201035 |
| 4.95            | 62   |   | 200891 | 6.40            | 102  |   | 201047 | 11.50           | 142 | ✓   | 201092 |
| 5.00            | 62   |   | 201002 | 6.50            | 70   |   | 200943 | 12.00           | 74  | ✓   | 333502 |
| 5.00            | 75   |   | 200996 | 6.50            | 102  |   | 200944 | 12.00           | 84  |   | 960550 |
| 5.00            | 86   |   | 200850 | 6.60            | 70   |   | 201081 | 12.00           | 102 |   | 200894 |
| 5.00            | 102  |   | 200962 | 6.60            | 102  |   | 201052 | 12.00           | 110 |   | 200905 |
| 5.10            | 62   |   | 200931 | 6.70            | 70   |   | 201063 | 12.00           | 151 |   | 201039 |
| 5.10            | 86   |   | 201012 | 6.70            | 102  |   | 201030 | 12.50           | 102 |   | 201090 |
| 5.10            | 102  |   | 200844 | 6.80            | 74   |   | 200997 | 12.50           | 151 |   | 200814 |
| 5.20            | 62   |   | 200800 | 6.80            | 109  |   | 966959 | 12.70           | 76  |   | 200999 |
| 5.20            | 86   |   | 200963 | 6.90            | 75   |   | 201061 | 13.00           | 75  |   | 201006 |
| 5.20            | 102  |   | 200952 | 6.90            | 109  |   | 200951 | 13.00           | 102 |   | 200876 |
| 5.30            | 62   |   | 201087 | 7.00            | 60   |   | 200805 | 13.00           | 151 |   | 200882 |
| 5.30            | 86   |   | 200858 | 7.00            | 75   |   | 200929 | 13.50           | 107 |   | 201028 |
| 5.30            | 102  |   | 200878 | 7.00            | 109  |   | 200895 | 14.00           | 75  | ✓   | 200930 |
| 5.40            | 66   |   | 200942 | 7.20            | 75   |   | 200881 | 14.00           | 76  | ✓   | 960552 |
| 5.40            | 93   |   | 200953 | 7.50            | 74   |   | 201031 | 14.00           | 84  |   | 960551 |
| 5.40            | 102  |   | 200955 | 7.50            | 109  |   | 200811 | 14.00           | 107 |   | 200888 |
| 5.50            | 66   |   | 200801 | 7.80            | 79   | ✓   | 200806 | 14.00           | 152 |   | 201045 |
| 5.50            | 102  |   | 200848 | 8.00            | 63,5 | ✓   | 960546 | 14.00           | 160 |   | 201093 |
| 5.60            | 66   |   | 201043 | 8.00            | 75   |   | 396289 | 15.00           | 75  |   | 200880 |
| 5.60            | 102  |   | 200932 | 8.00            | 79   | ✓   | 201007 | 15.00           | 111 | ✓   | 200935 |
| 5.70            | 66   |   | 201003 | 8.00            | 102  |   | 200893 | 16.00           | 83  | ✓   | 335049 |
| 5.70            | 102  |   | 200802 | 8.00            | 117  |   | 200934 | 16.00           | 92  |   | 49217  |
| 5.80            | 66   |   | 201004 | 8.50            | 79   |   | 200965 | 16.00           | 102 |   | 201000 |
| 5.80            | 102  |   | 201088 | 8.50            | 117  |   | 967426 | 16.00           | 120 |   | 201105 |
| 5.90            | 66   |   | 200803 | 8.80            | 84   |   | 201038 | 16.00           | 152 | ✓   | 201029 |
| 5.90            | 102  | ✓   | 201037 | 9.00            | 67   |   | 201008 | 18.00           | 93  |   | 960557 |
| 6.00            | 32   | ✓   | 994215 | 9.00            | 84   |   | 200995 | 18.00           | 125 |   | 200842 |
| 6.00            | 42   | ✓   | 962222 | 9.00            | 102  |   | 201046 | 18.00           | 152 | ✓   | 200843 |
| 6.00            | 50,5 | ✓   | 960544 | 9.00            | 125  |   | 200946 | 20.00           | 105 |   | 960558 |
| 6.00            | 55   | ✓   | 332354 | 9.50            | 84   |   | 200826 | 20.00           | 130 |   | 200816 |
| 6.00            | 57   |   | 960545 | 9.50            | 125  | ✓   | 201091 | 20.00           | 152 | ✓   | 201106 |
|                 |      |   |        |                 |      |   |        | 25.00           | 105 |   | 955903 |

VHM-KUGELN, POLIERT



| [mm]   | inches | VHM   |
|--------|--------|-------|
| 0.500  |        | 11330 |
| 0.600  |        | 12684 |
| 0.700  |        | 11331 |
| 0.7938 | 1/32"  | 13962 |
| 0.800  |        | 11332 |
| 1.000  |        | 11333 |
| 1.100  |        | 14065 |
| 1.1906 | 3/64"  | 12735 |
| 1.200  |        | 12739 |
| 1.500  |        | 11336 |
| 1.5875 | 1/16"  | 13617 |
| 1.750  |        | 11337 |
| 2.000  |        | 11338 |
| 2.3815 | 3/32"  | 13963 |
| 2.500  |        | 11339 |
| 2.750  |        | 12786 |
| 2.7781 | 7/64"  | 12788 |
| 3.000  |        | 11340 |
| 3.175  | 1/8"   | 11328 |
| 3.200  |        | 12602 |
| 3.500  |        | 11341 |
| 3.750  |        | 12825 |

| [mm]   | inches | VHM   |
|--------|--------|-------|
| 5.500  |        | 12226 |
| 3.9685 | 5/32"  | 13964 |
| 4.000  |        | 11342 |
| 4.500  |        | 11343 |
| 4.762  | 3/16"  | 13586 |
| 5.000  |        | 11344 |
| 5.500  |        | 12226 |
| 5.5565 | 7/32"  | 13965 |
| 6.000  |        | 11345 |
| 6.350  | 1/4"   | 13957 |
| 6.500  |        | 10496 |
| 7.000  |        | 11346 |
| 7.1438 | 9/32"  | 13966 |
| 7.500  |        | 11347 |
| 7.9370 | 5/16"  | 13535 |
| 8.000  |        | 11348 |
| 8.500  |        | 13956 |
| 8.7315 | 11/32" | 12920 |
| 9.000  |        | 11349 |
| 9.525  | 3/8"   | 13959 |
| 10.000 |        | 11350 |
| 11.000 |        | 11351 |

| [mm]    | inches | VHM   |
|---------|--------|-------|
| 11.112  | 7/16"  | 13536 |
| 15.000  |        | 12226 |
| 12.000  |        | 12671 |
| 12.700  | 1/2"   | 13550 |
| 14.000  |        | 12673 |
| 14.287  | 9/16"  | 12985 |
| 15.000  |        | 11352 |
| 15.081  | 19/32" | 13983 |
| 15.875  | 5/8"   | 13960 |
| 16.000  |        | 12674 |
| 16.6688 | 21/32" | 22063 |
| 17.000  |        | 12675 |
| 17.462  | 11/16" | 13961 |
| 18.000  |        | 12676 |
| 19.050  | 3/4"   | 13958 |
| 20.000  |        | 12678 |
| 21.431  | 27/32" | 28751 |
| 22.000  |        | 14179 |
| 23.000  |        | 13038 |
| 24.000  |        | 13012 |
| 25.000  |        | 13639 |
| 25.400  | 1"     | 11017 |

DIXI 6961

AL<sub>2</sub>O<sub>3</sub> - SIC KUGELN, POLIERT



| [mm]  | inches | KERAMIK |
|-------|--------|---------|
| 1.50  |        | 19035   |
| 3.00  |        | 19036   |
| 3.175 | 1/8"   | 21267   |
| 4.00  |        | 19037   |
| 4.50  |        | 15864   |
| 5.00  |        | 22280   |

| [mm]  | inches | KERAMIK |
|-------|--------|---------|
| 7.00  |        | 28995   |
| 8.00  |        | 28994   |
| 10.00 |        | 29401   |
| 11.00 |        | 59670   |
| 12.00 |        | 37932   |

RUBIN / SAPHIR KUGELN, POLIERT



| [mm]   | inches | RUBIN |
|--------|--------|-------|
| 0.50   |        | 31368 |
| 0.70   |        | 19603 |
| 0.7931 | 1/32"  | 23153 |
| 0.80   |        | 17774 |
| 1.00   |        | 13996 |
| 1.1906 | 3/64"  | 30249 |
| 1.20   |        | 29360 |
| 1.50   |        | 13997 |
| 1.585  | 1/16"  | 19626 |
| 1.75   |        | 21380 |

| [mm]  | inches | RUBIN |
|-------|--------|-------|
| 2.00  |        | 13998 |
| 2.381 | 3/32"  | 19023 |
| 3.00  |        | 14048 |
| 3.175 | 1/8"   | 16644 |
| 4.00  |        | 14063 |
| 5.00  |        | 14811 |
| 6.00  |        | 16320 |
| 6.35  | 1/4"   | 17706 |
| 7.00  |        | 17211 |
| 8.00  |        | 15716 |

| [mm]   | inches | RUBIN |
|--------|--------|-------|
| 1.00   |        | 13859 |
| 1.50   |        | 19024 |
| 1.5875 | 1/16"  | 60423 |
| 2.00   |        | 15144 |
| 2.50   |        | 19025 |
| 3.00   |        | 13282 |
| 3.175  | 1/8"   | 17052 |
| 4.00   |        | 16962 |



KUGELN

EIGENSCHAFTEN DER VERWENDETEN WERKSTOFFE

|  | Hartmetall | Rubin / Saphir                 | KERAMIK                        | silizium-Karbid |
|--|------------|--------------------------------|--------------------------------|-----------------|
| Chemische Zusammensetzung                  | 94 WC+6 Co | Al <sub>2</sub> O <sub>3</sub> | Al <sub>2</sub> O <sub>3</sub> | SiC             |
| Dichte                                     | 14.90      | 3.98                           | 3.90                           | 3.1             |
| Härte HV 50                                | 1700       | -                              | -                              | 2500            |
| Knoop-Härte                                | -          | 1800/2200                      | 2000                           | -               |
| Elastizitäts-Modul E (kN/mm <sup>2</sup> ) | 640        | 420                            | 350                            | 400             |
| Druckfestigkeit (kN/mm <sup>2</sup> )      | 5.7        | 2.1                            | 2.4                            | 4.1             |
| Zugfestigkeit (kN/mm <sup>2</sup> )        | 1.7        | 0.019                          | 0.025                          | 0.4             |
| Erweichungstemperatur (°C)                 | 600        | 1800                           | 1725                           | 1400            |
| Schmelzpunkt bzw. Dissoziationstemp.(°C)   | 2600       | 2050                           | 2050                           | 1900            |
| Wärmeausdehnung (10 <sup>-6</sup> /°C)     | 5          | 5.3-6.2                        | 6.6                            | 4.3             |
| Spezifische Wärme (j/g/°C)                 | 0.20       | 0.043                          | 0.06                           | 0.8             |
| Porosität                                  | porös      | null                           | porös                          | porös           |
| Säurebeständigkeit                         | relativ    | unbegrenzt                     | unbegrenzt                     | ausgezeichnet   |
| Laugenbeständigkeit                        | relativ    | unbegrenzt                     | unbegrenzt                     | ausgezeichnet   |

VHM-LEHRDORNE

DIXI 0420 ( $\pm 0.5\mu\text{m}$ )



| $D_1 \pm 0.0005$ | $L_1$ |
|------------------|-------|
| 0.100 - 0.199    | 1.50  |
| 0.200 - 0.299    | 2.00  |
| 0.300 - 0.499    | 3.50  |
| 0.500 - 1.499    | 5.00  |
| 1.500 - 1.950    | 6.00  |
| 1.951 - 3.499    | 8.00  |
| 3.500 - 3.999    | 10.00 |

Standard alle 0.001mm  
Erhältlich innerhalb von 72 Stunden.

DIXI 0421 ( $\pm 1.0\mu\text{m}$ )



| $D_1 \pm 0.0005$ | $L_1$ |
|------------------|-------|
| 0.10 - 0.19      | 1.50  |
| 0.20 - 0.29      | 2.00  |
| 0.30 - 0.49      | 3.50  |
| 0.50 - 1.49      | 5.00  |
| 1.50 - 1.95      | 6.00  |
| 1.96 - 3.49      | 8.00  |
| 3.50 - 3.99      | 10.00 |

Ab Lager alle 0.01mm



Lieferbare Produkte mit internem  
Messprotokoll oder von einem zugelassenen  
Laboratorium.

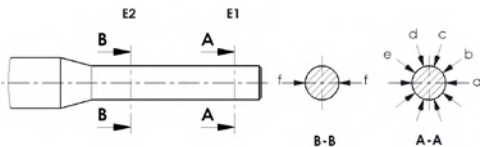
PROTCOLE DE CONTRÔLE  
DIAMÈTRE DE TAMPON LISSE



Certificat N° : ..... N/C  
Date de mesure : ..... 15.08.2016  
Client : ..... N/C  
Objet : ..... Tampon lisse  
Article : ..... 309161  
Description : ..... DIXI 0420 Ø 1.000 ± 0.5 µm L1 = 5 D = 3 L = 38 SP  
Echantillon N° : ..... ZZ99

Page 1 sur 1

| Ø nominal (mm) | Tolérance inférieure (µm) | Tolérance supérieure (µm) | Ø mesuré (mm) | Ecart (mm) | Remarque |
|----------------|---------------------------|---------------------------|---------------|------------|----------|
| 1.0000         | -0.5                      | +0.5                      | 1.0001        | +0.0001    | E1-a     |
| 1.0000         | -0.5                      | +0.5                      | 1.0002        | +0.0002    | E1-b     |
| 1.0000         | -0.5                      | +0.5                      | 0.9999        | -0.0001    | E1-c     |
| 1.0000         | -0.5                      | +0.5                      | 0.9998        | -0.0002    | E1-d     |
| 1.0000         | -0.5                      | +0.5                      | 1.0002        | +0.0002    | E1-e     |
| 1.0000         | -0.5                      | +0.5                      | 1.0001        | +0.0001    | E2-f     |



Instrument de mesure : ..... Banc de mesure horizontal (inv. N° BM040)  
Méthode de mesure : ..... Entre touches plates  
Instruction de contrôle N° : ..... N/C  
Incertitude de mesure : ..... 0.4µm  
Température : ..... 20 °C  
Traçabilité : ..... ISO 9001:2008

Résultat de la mesure : ..... Opérationnel

Le Locle, le 15.08.2016

Date / Lieu

Opérateur

DIXI Polytool S.A.  
ISO 9001:2008  
ISO 14001:2004

Av. du Technicum 37  
CH-2400 Le Locle  
dixipoly@dixi.ch

Tel: +41 (0)32 933 54 44  
Fax +41 (0)32 931 89 16  
www.dixipolytool.com



Für alle andere Zusammenstellungen,  
bitten wir Sie mit uns Kontakt aufzunehmen.

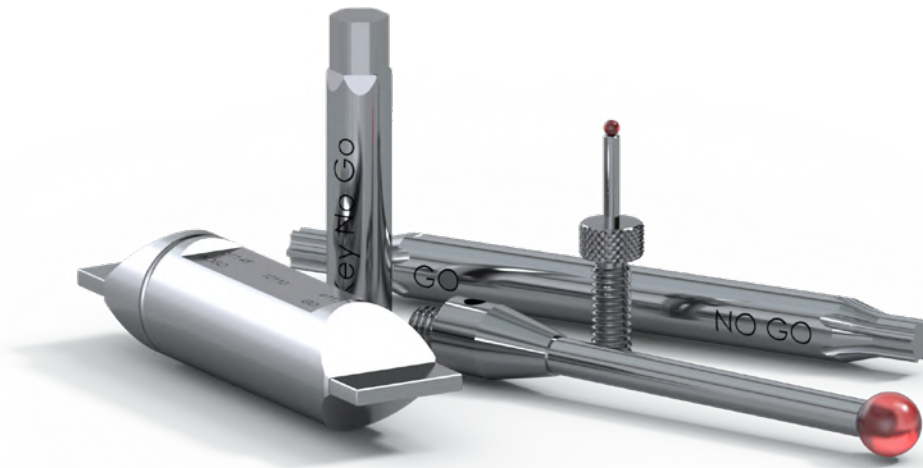
50 STÜCK SET



100 STÜCK SET







Die Messtaster werden entsprechend ihrer Messaufgabe nach folgenden Kriterien speziell hergestellt:

- Homogene Werkstoffe mit hoher Druckfestigkeit und maximaler Verschleissfestigkeit
- Hohe Formgenauigkeit
- Engste Toleranzen
- Polierte bzw. geläppte Oberflächen

Folgende Angaben benötigen wir möglichst mit Ihrer Zeichnung: Abmessungen, Toleranzen sowie Werkstoff.

---

## VHM-MESSEINSÄTZE

Die Messflächen sind poliert bzw. in hoher Plangenaugigkeit geläpft. Maximale Formtreue und Oberflächengüte können erreicht werden. PKD sowie CBN Verschleisssteile sind ebenfalls lieferbar.

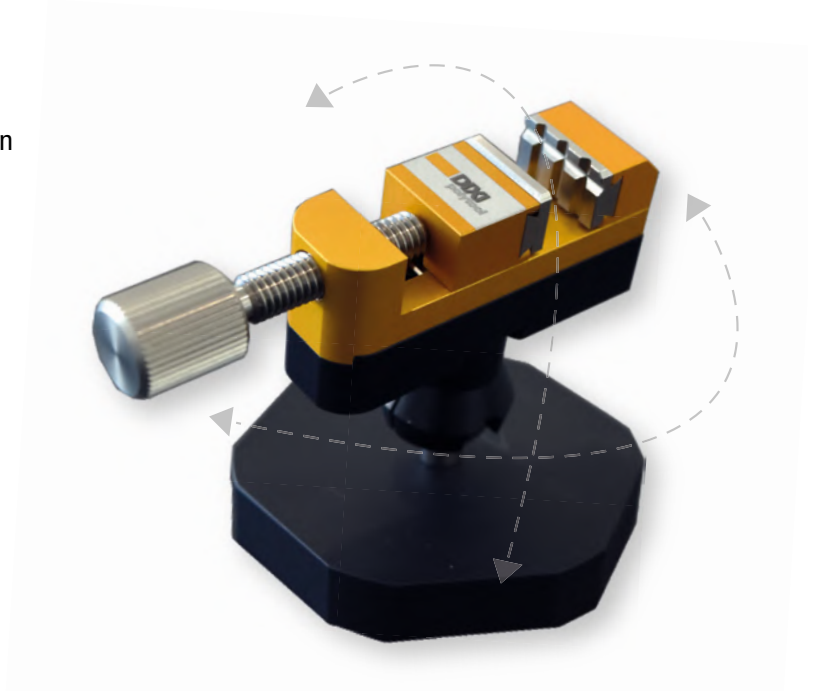
Bei der Bestellung bitte folgende Punkte angeben: Abmessungen, Toleranzen.



## MINI-PRÄZISIONSSCHRAUBSTOCK

Dieser Mini-Schraubstock vereinigt die alltäglichen Ansprüche an eine extrem hohe Qualität.

- kompakt, sehr handlich und einfach in der Handhabung
- auf allen Messvorrichtungen einsetzbar
- 360° drehbar



## ALUMINIUM-SCHRAUBSTOCK MIT INOX BACKEN

art : 369645

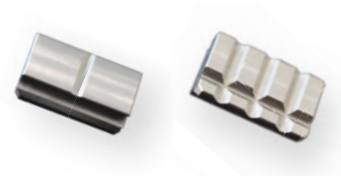
- Dimensionen 15 × 15 × 76
- Spannkraft 15.5 mm



## SET MIT JE 2 ERSATZBACKEN AUS INOX

art : 381484

- ein glatte Backe
- ein Backe mit Einkerbungen
- Dimensionen 15×3×8



## SET MIT JE 2 ERSATZBACKEN AUS DELRIN

art : 381485

- ein glatte Backe
- ein Backe mit Einkerbungen
- Dimensionen 15×3×8



## DREHBARER HALTER, STECKBAR

art : 367295

- Dimensionen 50×37 mm





M3.00x0.50 6H NO CO  
976722 - 0207787

51.00x0.30 16/18 CO

60.00x0.18 11.00 CO



|                                   |     |
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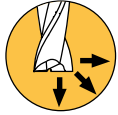
# PIKTOGRAMME



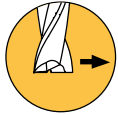
Anwendungsempfehlungen



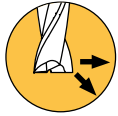
Schnittbedingungen



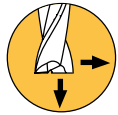
Mehrseitig möglich



Nur Umfangsbearbeitung



Umfangsbearbeitung und Rampen



Umfangsbearbeitung und Tauchen



DIN Normen



ISO Normen



DIXI Normen



Abtrennen



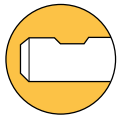
Einstecken



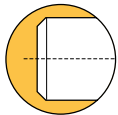
Unterschiedliche Drallwinkel



Ungleiche Teilung



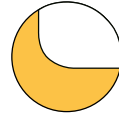
Mit Spannfläche



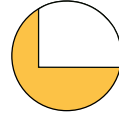
Mit Fase



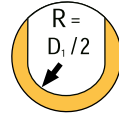
Fase



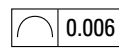
Radius



Scharfkantig



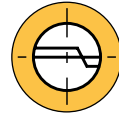
Radiustoleranz



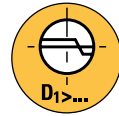
Profilformtoleranz



Ausspitzung der Kernstärke



Zentrumschnitt



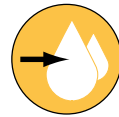
Zentrumschnitt ab  $\varnothing > \dots$



Kein Zentrumschnitt



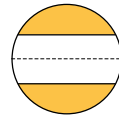
Kein Kühlung



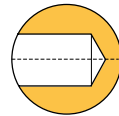
Innenkühlung



Innenkühlung



Für Durchgangsloch



Für Sackloch

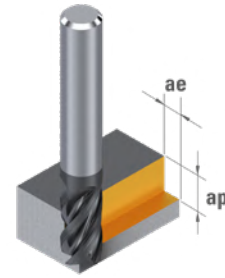
**P M H K S N** Werkstoffgruppe

**>1500 N/mm<sup>2</sup>** Werkstoffhärte

## INFORMATIONEN

### Schneidstoff

|            |   |                              |
|------------|---|------------------------------|
|            | □ | Hartmetall / VHM             |
| <b>PKD</b> | ● | Polykristalliner Diamant     |
| <b>CVD</b> | ■ | CVD polykristalliner Diamant |
| <b>DIA</b> | ◆ | Monokristalliner Diamant     |
| <b>CBN</b> | ▲ | CBN polykristalliner Diamant |



### Beschichtungen

|                |   |                      |
|----------------|---|----------------------|
| <b>TIAlN</b>   | ■ | TiAlN Beschichtung   |
| <b>DICUT</b>   | ■ | DICUT Beschichtung   |
| <b>XIDUR</b>   | ■ | XIDUR Beschichtung   |
| <b>C-TOP</b>   | ■ | C-TOP Beschichtung   |
| <b>CUTINOX</b> | ■ | CUTINOX Beschichtung |
| <b>DAC</b>     | ■ | DAC Beschichtung     |
| <b>DIXAL</b>   | ■ | DIXAL Beschichtung   |
| <b>DLC</b>     | ■ | DLC Beschichtung     |
| <b>DIAMANT</b> | ■ | DIAMANT Beschichtung |
| <b>DINAC</b>   | ■ | DINAC Beschichtung   |
| <b>DI-TOP</b>  | ■ | DI-TOP Beschichtung  |
| <b>DRYCUT</b>  | ■ | DRYCUT Beschichtung  |
| <b>POLYCUT</b> | ■ | POLYCUT Beschichtung |

|           |                                    |
|-----------|------------------------------------|
| <b>Z</b>  | Zähnezahl                          |
| <b>Vc</b> | Schnittgeschwindigkeit [m/min]     |
| <b>f</b>  | Vorschub/Umdrehung [mm/U]          |
| <b>Vf</b> | Vorschub in [mm/min]               |
| <b>n</b>  | Drehzahl [U/min]                   |
| <b>ap</b> | Schnitttiefe                       |
| <b>ae</b> | Schnittbreite                      |
| <b>Rm</b> | Zugfestigkeit [N/mm <sup>2</sup> ] |
| <b>fz</b> | Vorschub pro Zahn [mm]             |
| <b>R</b>  | Rechtsschneidend                   |
| <b>L</b>  | Linksschneidend                    |
| <b>S.</b> | Seite                              |

## KÜHLTYPEN

|  |            |   |  |               |
|--|------------|---|--|---------------|
|  | <b>-HH</b> | Spiralisierte Kühlbohrungen                   | Spiralisierte Bohrer<br>Spiralisierte Fräser | DIXI 1145-HH  |
|  | <b>-SH</b> | Gerade genutete Kühlkanäle                    | Gerade genutet Fräser                        | DIXI 72420-SH |
|  | <b>-TC</b> | Zentraler Kühlkanal                           | VHM-Reibahle                                 | POLY 4001-TC  |
|  | <b>-FC</b> | Zentraler Kühlkanal mit seitlichen Austritten | Schafffräser mit Kühlkanälen im Spanraum     | DIXI 7563-FC  |
|  | <b>-PH</b> | Umfangs-Kühlkanäle                            | Mikrofräser                                  | DIXI 1738-PH  |
|  | <b>-SC</b> | Außenliegende Kühlkanäle                      | Gerade genutet Fräser<br>VHM Reibahle        | POLY 4005-SC  |

[ $\mu\text{m}$ ]

| [mm]                       | D10          | E9           | F7          | F8          | G7         | G9        | H6       | H7       | H8       | H9        | H10       | H11       | H12       | H13       | JS7        | JS9        | K6        | K7         | M6         | M7        | N7         | N9        | P7         | P9          |
|----------------------------|--------------|--------------|-------------|-------------|------------|-----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|------------|------------|-----------|------------|------------|-----------|------------|-----------|------------|-------------|
| - 3                        | +60<br>+20   | +39<br>+14   | +16<br>+6   | +20<br>+6   | +12<br>+2  | +27<br>+2 | +6<br>0  | +10<br>0 | +14<br>0 | +25<br>0  | +40<br>0  | +60<br>0  | +100<br>0 | +140<br>0 | $\pm 5$    | $\pm 125$  | 0<br>-6   | 0<br>-10   | -2<br>-8   | -2<br>-12 | -4<br>-14  | -4<br>-29 | -6<br>-16  | -6<br>-31   |
| 3 > $\varnothing$ $\geq$ 6 | +78<br>+30   | +50<br>+20   | +22<br>+10  | +28<br>+10  | +16<br>+4  | +34<br>+4 | +8<br>0  | +12<br>0 | +18<br>0 | +30<br>0  | +48<br>0  | +75<br>0  | +120<br>0 | +180<br>0 | $\pm 6$    | $\pm 15$   | +2<br>-6  | +3<br>-9   | -1<br>-9   | 0<br>-12  | -4<br>-16  | 0<br>-30  | -8<br>-20  | -12<br>-42  |
| 6 10                       | +98<br>+40   | +61<br>+25   | +28<br>+13  | +35<br>+13  | +20<br>+5  | +41<br>+5 | +9<br>0  | +15<br>0 | +22<br>0 | +36<br>0  | +58<br>0  | +90<br>0  | +150<br>0 | +220<br>0 | $\pm 7.5$  | $\pm 18$   | +2<br>-7  | +5<br>-10  | -3<br>-12  | 0<br>-15  | -4<br>-19  | 0<br>-36  | -9<br>-24  | -15<br>-51  |
| 10 18                      | +120<br>+50  | +75<br>+32   | +34<br>+16  | +43<br>+16  | +24<br>+16 | +49<br>+6 | +11<br>0 | +18<br>0 | +27<br>0 | +43<br>0  | +70<br>0  | +110<br>0 | +180<br>0 | +270<br>0 | $\pm 9$    | $\pm 21.5$ | +2<br>-9  | +6<br>-15  | -4<br>-17  | 0<br>-21  | -7<br>-28  | 0<br>-52  | -14<br>-35 | -22<br>-74  |
| 18 30                      | +149<br>+65  | +92<br>+40   | +41<br>+20  | +53<br>+20  | +28<br>+7  | +59<br>+7 | +13<br>0 | +21<br>0 | +33<br>0 | +52<br>0  | +84<br>0  | +130<br>0 | +210<br>0 | +330<br>0 | $\pm 10.5$ | $\pm 26$   | +2<br>-11 | +6<br>-15  | -4<br>-17  | 0<br>-21  | -7<br>-28  | 0<br>-52  | -14<br>-35 | -22<br>-74  |
| 30 50                      | +180<br>+80  | +112<br>+50  | +50<br>+25  | +64<br>+25  | +34<br>+9  | +71<br>+9 | +16<br>0 | +25<br>0 | +39<br>0 | +62<br>0  | +100<br>0 | +160<br>0 | +250<br>0 | +390<br>0 | $\pm 12.5$ | $\pm 31$   | +3<br>-13 | +7<br>-18  | -4<br>-20  | 0<br>-25  | -8<br>-33  | 0<br>-62  | -17<br>-42 | -26<br>-88  |
| 50 80                      | +220<br>+100 | +134<br>+60  | +60<br>+30  | +76<br>+30  | +40<br>+10 |           | +19<br>0 | +30<br>0 | +46<br>0 | +74<br>0  | +120<br>0 | +190<br>0 | +300<br>0 | +460<br>0 | $\pm 15$   | $\pm 37$   | +4<br>-15 | +9<br>-21  | -5<br>-24  | 0<br>-30  | -9<br>-39  | 0<br>-74  | -21<br>-51 | -32<br>-106 |
| 80 120                     | +260<br>+120 | +159<br>+72  | +71<br>+36  | +90<br>+36  | +47<br>+12 |           | +22<br>0 | +35<br>0 | +54<br>0 | +87<br>0  | +140<br>0 | +220<br>0 | +350<br>0 | +540<br>0 | $\pm 17.5$ | $\pm 43.5$ | +4<br>-18 | +10<br>-15 | -6<br>-28  | 0<br>-35  | -10<br>-45 | 0<br>-87  | -24<br>-59 | -37<br>-124 |
| 120 180                    | +305<br>+145 | +185<br>+85  | +83<br>+43  | +106<br>+43 | +54<br>+14 |           | +25<br>0 | +40<br>0 | +63<br>0 | +100<br>0 | +160<br>0 | +250<br>0 | +400<br>0 | +630<br>0 | $\pm 20$   | $\pm 50$   | +4<br>-21 | +12<br>-28 | -8<br>-33  | 0<br>-40  | -12<br>-52 | 0<br>-100 | -28<br>-62 | -43<br>-143 |
| 180 250                    | +355<br>+170 | +215<br>+110 | +96<br>+50  | +122<br>+50 | +61<br>+15 |           | +29<br>0 | +46<br>0 | +72<br>0 | +115<br>0 | +185<br>0 | +290<br>0 | +460<br>0 | +720<br>0 | $\pm 23$   | $\pm 57.5$ | +5<br>-24 | +13<br>-33 | -8<br>-37  | 0<br>-46  | -14<br>-60 | 0<br>-115 | -33<br>-79 | -50<br>-165 |
| 250 315                    | +400<br>+190 | +240<br>+110 | +108<br>+56 | +137<br>+56 | +69<br>+17 |           | +32<br>0 | +52<br>0 | +81<br>0 | +130<br>0 | +210<br>0 | +320<br>0 | +520<br>0 | +810<br>0 | $\pm 26$   | $\pm 65$   | +5<br>-27 | +16<br>-36 | -9<br>-41  | 0<br>-52  | -14<br>-66 | 0<br>-130 | -36<br>-88 | -56<br>-186 |
| 315 400                    | +440<br>+210 | +265<br>+125 | +119<br>+62 | +151<br>+62 | +75<br>+18 |           | +36<br>0 | +57<br>0 | +89<br>0 | +140<br>0 | +230<br>0 | +360<br>0 | +570<br>0 | +890<br>0 | $\pm 28.5$ | $\pm 70$   | +7<br>-29 | +17<br>-40 | -10<br>-46 | 0<br>-57  | -16<br>-73 | 0<br>-140 | -41<br>-98 | -62<br>-202 |

[ $\mu\text{m}$ ]

| [mm]                       | d9           | e8           | f7          | g6         | h5       | h6       | h7       | h8       | h9        | h10       | h11       | js5        | js6        | js12      | js13      | js14      | k5        | k6        | m5         | m6         | n5         | n6         | p6         |
|----------------------------|--------------|--------------|-------------|------------|----------|----------|----------|----------|-----------|-----------|-----------|------------|------------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|------------|------------|
| - 3                        | -20<br>-45   | -14<br>-28   | -6<br>-16   | -2<br>-8   | 0<br>-4  | 0<br>-6  | 0<br>-10 | 0<br>-14 | 0<br>-25  | 0<br>-40  | 0<br>-60  | $\pm 2$    | $\pm 3$    | $\pm 50$  | $\pm 70$  | $\pm 125$ | +4<br>0   | +6<br>0   | +6<br>+2   | +8<br>+2   | +8<br>+4   | +10<br>+4  | +12<br>+6  |
| 3 > $\varnothing$ $\geq$ 6 | -30<br>-60   | -20<br>-38   | -10<br>-22  | -4<br>-12  | 0<br>-5  | 0<br>-8  | 0<br>-12 | 0<br>-18 | 0<br>-30  | 0<br>-48  | 0<br>-75  | $\pm 2.5$  | $\pm 4$    | $\pm 60$  | $\pm 90$  | $\pm 150$ | +6<br>+1  | +9<br>+1  | +9<br>+4   | +12<br>+4  | +13<br>+8  | +16<br>+8  | +20<br>+12 |
| 6 10                       | -40<br>-76   | -25<br>-47   | -13<br>-28  | -5<br>-14  | 0<br>-6  | 0<br>-9  | 0<br>-15 | 0<br>-22 | 0<br>-36  | 0<br>-58  | 0<br>-90  | $\pm 3$    | $\pm 4.5$  | $\pm 75$  | $\pm 110$ | $\pm 180$ | +7<br>+1  | +10<br>+1 | +12<br>+6  | +15<br>+6  | +16<br>+10 | +19<br>+10 | +24<br>+15 |
| 10 18                      | -50<br>-93   | -32<br>-59   | -16<br>-34  | -6<br>-17  | 0<br>-8  | 0<br>-11 | 0<br>-18 | 0<br>-27 | 0<br>-43  | 0<br>-70  | 0<br>-110 | $\pm 4$    | $\pm 5.5$  | $\pm 90$  | $\pm 135$ | $\pm 215$ | +9<br>+1  | +12<br>+1 | +15<br>+7  | +18<br>+7  | +20<br>+12 | +23<br>+15 | +35<br>+22 |
| 18 30                      | -65<br>-117  | -40<br>-73   | -20<br>-41  | -7<br>-20  | 0<br>-9  | 0<br>-13 | 0<br>-21 | 0<br>-33 | 0<br>-52  | 0<br>-84  | 0<br>-130 | $\pm 4.5$  | $\pm 6.5$  | $\pm 105$ | $\pm 165$ | $\pm 260$ | +11<br>+2 | +15<br>+2 | +17<br>+8  | +21<br>+8  | +24<br>+15 | +28<br>+17 | +35<br>+22 |
| 30 50                      | -80<br>-142  | -50<br>-89   | -25<br>-50  | -9<br>-25  | 0<br>-11 | 0<br>-16 | 0<br>-25 | 0<br>-39 | 0<br>-62  | 0<br>-100 | 0<br>-160 | $\pm 5.5$  | $\pm 8$    | $\pm 125$ | $\pm 195$ | $\pm 310$ | +13<br>+2 | +18<br>+2 | +20<br>+9  | +25<br>+9  | +28<br>+17 | +33<br>+17 | +42<br>+26 |
| 50 80                      | -100<br>-174 | -60<br>-106  | -30<br>-60  | -10<br>-29 | 0<br>-13 | 0<br>-19 | 0<br>-30 | 0<br>-46 | 0<br>-74  | 0<br>-120 | 0<br>-190 | $\pm 6.5$  | $\pm 9.5$  | $\pm 150$ | $\pm 230$ | $\pm 370$ | +15<br>+2 | +21<br>+2 | +24<br>+11 | +30<br>+11 | +33<br>+20 | +39<br>+20 | +51<br>+32 |
| 80 120                     | -120<br>-207 | -72<br>-126  | -36<br>-71  | -12<br>-34 | 0<br>-15 | 0<br>-22 | 0<br>-35 | 0<br>-54 | 0<br>-87  | 0<br>-140 | 0<br>-220 | $\pm 7.5$  | $\pm 11$   | $\pm 175$ | $\pm 270$ | $\pm 435$ | +18<br>+3 | +25<br>+3 | +28<br>+13 | +35<br>+13 | +38<br>+23 | +45<br>+23 | +59<br>+37 |
| 120 180                    | -145<br>-245 | -85<br>-148  | -43<br>-83  | -14<br>-39 | 0<br>-18 | 0<br>-25 | 0<br>-40 | 0<br>-63 | 0<br>-100 | 0<br>-160 | 0<br>-250 | $\pm 9$    | $\pm 12.5$ | $\pm 200$ | $\pm 315$ | $\pm 500$ | +21<br>+3 | +28<br>+3 | +33<br>+15 | +40<br>+15 | +45<br>+27 | +52<br>+27 | +68<br>+43 |
| 180 250                    | -170<br>-285 | -100<br>-172 | -50<br>-96  | -15<br>-44 | 0<br>-20 | 0<br>-29 | 0<br>-46 | 0<br>-72 | 0<br>-115 | 0<br>-185 | 0<br>-290 | $\pm 10$   | $\pm 14.5$ | $\pm 230$ | $\pm 360$ | $\pm 575$ | +24<br>+4 | +33<br>+4 | +37<br>+17 | +46<br>+17 | +51<br>+31 | +50<br>+31 | +79<br>+50 |
| 250 315                    | -190<br>-320 | -110<br>-191 | -56<br>-108 | -17<br>-49 | 0<br>-23 | 0<br>-32 | 0<br>-52 | 0<br>-81 | 0<br>-130 | 0<br>-210 | 0<br>-320 | $\pm 11.5$ | $\pm 16$   | $\pm 260$ | $\pm 405$ | $\pm 660$ | +27<br>+4 | +36<br>+4 | +43<br>+20 | +52<br>+20 | +57<br>+34 | +66<br>+34 | +88<br>+56 |
| 315 400                    | -210<br>-350 | -125<br>-214 | -62<br>-119 | -18<br>-54 | 0<br>-25 | 0<br>-36 | 0<br>-57 | 0<br>-89 | 0<br>-140 | 0<br>-230 | 0<br>-360 | $\pm 12.5$ | $\pm 18$   | $\pm 285$ | $\pm 445$ | $\pm 700$ | +29<br>+4 | +40<br>+4 | +46<br>+21 | +57<br>+21 | +62<br>+37 | +73<br>+37 | +98<br>+62 |

## HÄRTETABELLE

| Rm                   | Brinell | Vickers | Rockwell |       |
|----------------------|---------|---------|----------|-------|
|                      |         |         | [HRB]    | [HRC] |
| [N/mm <sup>2</sup> ] | [HB]    | [HV 30] | [HRB]    | [HRC] |
| 370                  | 109     | 115     |          |       |
| 385                  | 114     | 120     | 66.7     |       |
| 400                  | 119     | 125     |          |       |
| 415                  | 124     | 130     | 71.2     |       |
| 430                  | 128     | 135     |          |       |
| 450                  | 133     | 140     | 75.0     |       |
| 465                  | 138     | 145     |          |       |
| 480                  | 143     | 150     | 78.7     |       |
| 495                  | 147     | 155     |          |       |
| 510                  | 152     | 160     | 81.7     |       |
| 530                  | 156     | 165     |          |       |
| 545                  | 162     | 170     | 85.0     |       |
| 560                  | 166     | 175     |          |       |
| 575                  | 171     | 180     | 87.1     |       |
| 595                  | 176     | 185     |          |       |
| 610                  | 181     | 190     | 89.5     |       |
| 625                  | 185     | 195     |          |       |
| 640                  | 190     | 200     | 91.5     |       |
| 660                  | 195     | 205     | 92.5     |       |
| 675                  | 199     | 210     | 93.5     |       |
| 690                  | 204     | 215     | 94.0     |       |
| 705                  | 209     | 220     | 95.0     |       |
| 720                  | 214     | 225     | 96.0     |       |
| 740                  | 219     | 230     | 96.7     |       |
| 755                  | 223     | 235     |          |       |
| 770                  | 228     | 240     | 98.1     | 20.3  |
| 785                  | 233     | 245     |          | 21.3  |
| 800                  | 238     | 250     | 99.5     | 22.2  |
| 820                  | 242     | 255     |          | 23.1  |
| 835                  | 247     | 260     | 101      | 24.0  |
| 850                  | 252     | 265     |          | 24.8  |
| 865                  | 257     | 270     | 102      | 25.6  |
| 880                  | 261     | 275     |          | 26.4  |
| 900                  | 266     | 280     | 104      |       |
| 915                  | 271     | 285     |          |       |
| 930                  | 276     | 290     | 105      |       |

| Rm                   | Brinell | Vickers | Rockwell |       |
|----------------------|---------|---------|----------|-------|
|                      |         |         | [HRB]    | [HRC] |
| [N/mm <sup>2</sup> ] | [HB]    | [HV 30] | [HRB]    | [HRC] |
| 950                  | 280     | 295     |          | 29.2  |
| 965                  | 285     | 300     |          | 29.8  |
| 995                  | 295     | 310     |          | 31.0  |
| 1030                 | 304     | 320     |          | 32.2  |
| 1060                 | 314     | 330     |          | 33.3  |
| 1095                 | 323     | 340     |          | 34.4  |
| 1125                 | 333     | 350     |          | 35.5  |
| 1155                 | 345     | 360     |          | 36.6  |
| 1190                 | 352     | 370     |          | 37.7  |
| 1220                 | 361     | 380     |          | 38.8  |
| 1255                 | 371     | 390     |          | 39.8  |
| 1290                 | 380     | 400     |          | 40.8  |
| 1320                 | 390     | 410     |          | 41.8  |
| 1350                 | 399     | 420     |          | 42.7  |
| 1385                 | 409     | 430     |          | 43.6  |
| 1420                 | 418     | 440     |          | 44.5  |
| 1455                 | 428     | 450     |          | 45.3  |
| 1485                 | 437     | 460     |          | 46.1  |
| 1520                 | 447     | 470     |          | 46.9  |
| 1555                 | 456     | 480     |          | 47.7  |
| 1630                 | 475     | 500     |          | 49.1  |
| 1700                 | 494     | 520     |          | 50.5  |
| 1775                 | 513     | 540     |          | 51.7  |
| 1845                 | 532     | 560     |          | 53.0  |
| 1920                 | 551     | 580     |          | 54.1  |
| 1995                 | 570     | 600     |          | 55.2  |
| 2070                 | 589     | 620     |          | 56.3  |
| 2145                 | 608     | 640     |          | 57.3  |
|                      |         | 660     |          | 58.3  |
|                      |         | 680     |          | 58.3  |
|                      |         | 700     |          | 60.1  |
|                      |         | 720     |          | 61.0  |
|                      |         | 740     |          | 61.8  |
|                      |         | 760     |          | 62.5  |
|                      |         | 780     |          | 63.3  |
|                      |         | 800     |          | 64.0  |

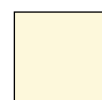
# RAUHEITSTABELLE

|            |  | Ra [ $\mu\text{m}$ ] | Rt [ $\mu\text{m}$ ] | Rz [ $\mu\text{m}$ ] |        |
|------------|--|----------------------|----------------------|----------------------|--------|
| POLIRIEREN |  | N1<br>▼▼▼▼           | 0.025                | 0.50                 | 0.40   |
|            |  | N2<br>▼▼▼▼           | 0.05                 | 0.80                 | 0.63   |
|            |  | N3<br>▼▼▼▼           | 0.10                 | 1.25                 | 1.00   |
|            |  | N4<br>▼▼▼            | 0.20                 | 2.50                 | 2.00   |
| SCHLEIFEN  |  | N5<br>▼▼▼            | 0.40                 | 5.00                 | 4.00   |
|            |  | N6<br>▼▼▼            | 0.80                 | 8.00                 | 6.30   |
| REIBEN     |  | N7<br>▼▼             | 1.60                 | 16.00                | 10.00  |
|            |  | N8<br>▼▼             | 3.20                 | 32.00                | 16.00  |
| FRÄSEN     |  | N9<br>▼▼             | 6.30                 | -                    | 40.00  |
|            |  | N10<br>▼             | 12.50                | -                    | 63.00  |
| DREHEN     |  | N11<br>▼             | 25.00                | -                    | 100.00 |
|            |  | N12<br>▼             | 50.00                | -                    | 160.00 |
| BOHREN     |  |                      |                      |                      |        |
|            |  |                      |                      |                      |        |

Bearbeitung



fein

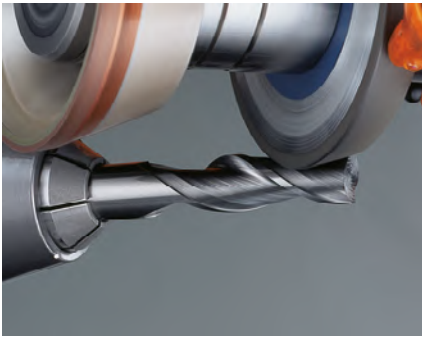


normal



grob

## NACHSCHLEIFSERVICE



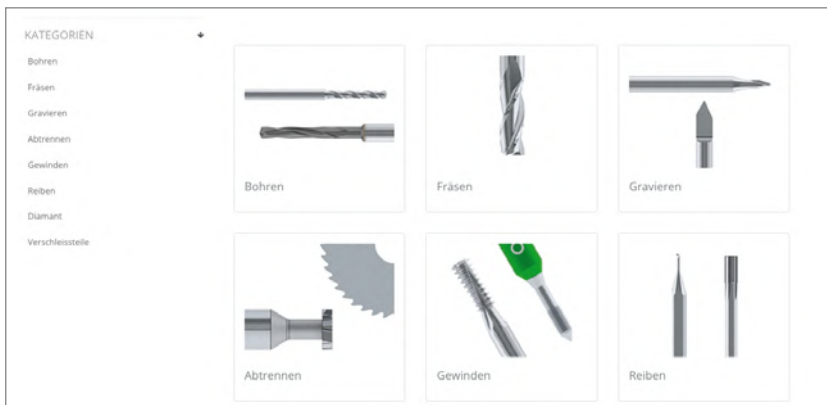
DIXI Polytool bietet seinen Kunden einen Nachschliffservice für alle Werkzeuge aus VHM und HSS, sowie PKD und Diamant bestückten Werkzeugen an. Selbstverständlich gilt dieser Service auch für Werkzeuge anderer Hersteller.

Der Nachschliff wird auf 5-Achsschleifmaschinen durchgeführt. Dadurch kann eine perfekte Schneidengeometrie garantiert werden. Die Endkontrolle der nachgeschliffenen Werkzeuge erfolgt auf modernsten Messmaschinen.

Unsere Reaktivität erlaubt dem Kunden mehr Flexibilität bei seiner Planung.

## E-SHOP

Bestellen Sie unsere Standardwerkzeuge online.



## ANFRAGE FÜR SPEZIALWERKZEUGE

Nutzen Sie unser Online-Formular.



### Ihr Werkzeug Erstellen

Werkzeugstyp:

Werkzeuggeometrie:

Anderes:

Die Felder, die mit einem Stern (\*) gekennzeichnet sind, sind Pflichtfelder. Wenn nicht anders angegeben, werden die Standardtoleranzen angenommen.

D\*

D1\*

L (oder nach DIXI Standard)

L1\*

$\alpha$  (Gesamtwinkel)\*

Z\*

Schnitttrichtung\*

Zu bearbeitender Werkstoff\*

Beschichtung

Innenkühlung

Menge (z.B. : 5/10/20)\*

# ANWENDUNGSBEREICHE BESCHICHTUNGEN

## Zu bearbeitender Werkstoff

|          | VDI<br>3323  | TiAIN                      |                       | DICUT                      |                       | XIDUR                      |                       | C-TOP                      |                         |
|----------|--|----------------------------|-----------------------|----------------------------|-----------------------|----------------------------|-----------------------|----------------------------|-------------------------|
|          |  | Härte<br>(HV0.05)<br>3'100 | Temp.<br>max<br>800°C | Härte<br>(HV0.05)<br>3'000 | Temp.<br>max<br>800°C | Härte<br>(HV0.05)<br>3'100 | Temp.<br>max<br>900°C | Härte<br>(HV0.05)<br>3'400 | Temp.<br>max<br>1'100°C |
| <b>P</b> | Unlegierter Stahl, Automaten Stahl   | 1 - 5                      | ○                     | ○                          | ○                     | ○                          | ○                     | ○                          | ⊙                       |
|          | Niedrig legierter Stahl < 800 N/ mm²   | 6 - 9                      | ○                     | ○                          | ○                     | ○                          | ○                     | ○                          | ⊙                       |
|          | Hochlegierter Stahl > 800 N/mm², ferritischer /<br>martensitischer Edelstahl | 10 - 13                    | ○                     | ○                          | ○                     | ○                          | ○                     | ○                          | ⊙                       |
| <b>M</b> | Austenitischer rostfreier Stahl < 700 N/mm²                                  | 14.1 - 14.2                | ○                     | ○                          | ⊙                     | ○                          | ○                     | ○                          | ⊙                       |
|          | Nickelfreier rostfreier Stahl / DUPLEX > 700 N/mm²                           | 14.3 - 14.4                | ○                     | ○                          | ○                     | ○                          | ○                     | ○                          | ⊙                       |
| <b>K</b> | Grauguss < 250 HB  | 15 - 16                    | ○                     | ○                          | ○                     | ○                          | ○                     | ○                          | ○                       |
|          | Duktiles Gusseisen, Temperguss > 250 HB                                      | 17 - 20                    | ○                     | ○                          | ○                     | ○                          | ○                     | ○                          | ○                       |
| <b>N</b> | Alu-Knetlegierung < 12% Si   | 21 - 22                    |                       |                            |                       |                            |                       |                            |                         |
|          | Alu-Gusslegierung > 12% Si   | 23 - 25                    |                       |                            |                       |                            |                       |                            |                         |
|          | Kupferlegierung gute Zerspanbarkeit mit Pb                                   | 26                         |                       |                            |                       |                            |                       |                            |                         |
|          | Kupferlegierung schwere Zerspanbarkeit                                       | 27 - 28                    |                       |                            |                       |                            |                       |                            |                         |
|          | Kunststoff, Holz   | 29 - 30                    |                       |                            |                       |                            |                       |                            |                         |
|          | Graphit  | -                          |                       |                            |                       |                            |                       |                            |                         |
|          | CRFP   | -                          |                       |                            |                       |                            |                       |                            |                         |
|          | Gold, Silber   | -                          |                       |                            |                       |                            |                       |                            |                         |
| Platin   | -  |                            |                       |                            |                       |                            |                       |                            |                         |
| <b>S</b> | Spezielle Nickel-Kobalt-Legierung  | 31 - 35                    |                       |                            | ○                     |                            | ⊙                     |                            | ⊙                       |
|          | Titan, Titanlegierung  | 36 - 37                    |                       |                            | ○                     |                            |                       |                            | ○                       |
| <b>H</b> | Gehärteter Stahl > 45 HRC, Hartguss  | 38 - 41                    |                       |                            |                       |                            | ⊙                     |                            | ○                       |

✘ Nicht anwendbar

○ Gut

⊙ Ausgezeichnet



Gravieren Gewindebohren Reiben

| CUTINOX                   |                         | DAC                        |                       | DIXAL                      |                       | DLC                        |                       | DRY-CUT                    |                       | DIAMANT                     |                       | DINAC                      |                       | DI-TOP                     |                       | POLY-CUT                   |                         |
|---------------------------|-------------------------|----------------------------|-----------------------|----------------------------|-----------------------|----------------------------|-----------------------|----------------------------|-----------------------|-----------------------------|-----------------------|----------------------------|-----------------------|----------------------------|-----------------------|----------------------------|-------------------------|
| Härte<br>(HV0.05)<br>3200 | Temp.<br>max<br>1'000°C | Härte<br>(HV0.05)<br>1'900 | Temp.<br>max<br>700°C | Härte<br>(HV0.05)<br>2'100 | Temp.<br>max<br>550°C | Härte<br>(HV0.05)<br>4'800 | Temp.<br>max<br>500°C | Härte<br>(HV0.05)<br>7'000 | Temp.<br>max<br>500°C | Härte<br>(HV0.05)<br>10'000 | Temp.<br>max<br>500°C | Härte<br>(HV0.05)<br>3'250 | Temp.<br>max<br>450°C | Härte<br>(HV0.05)<br>3'200 | Temp.<br>max<br>450°C | Härte<br>(HV0.05)<br>3'700 | Temp.<br>max<br>1'100°C |
| ⊙                         |                         |                            |                       |                            |                       | ✗                          |                       | ✗                          |                       | ✗                           |                       | ⊙                          |                       | ⊙                          |                       | ⊙                          |                         |
| ⊙                         |                         |                            |                       |                            |                       | ✗                          |                       | ✗                          |                       | ✗                           |                       | ⊙                          |                       | ○                          |                       | ⊙                          |                         |
| ○                         |                         |                            |                       |                            |                       | ✗                          |                       | ✗                          |                       | ✗                           |                       | ⊙                          |                       | ○                          |                       | ⊙                          |                         |
| ⊙                         |                         |                            |                       |                            |                       | ✗                          |                       | ✗                          |                       | ✗                           |                       | ⊙                          |                       | ⊙                          |                       | ⊙                          |                         |
| ⊙                         |                         |                            |                       |                            |                       | ✗                          |                       | ✗                          |                       | ✗                           |                       | ⊙                          |                       | ⊙                          |                       | ⊙                          |                         |
|                           |                         |                            |                       |                            |                       | ✗                          |                       | ✗                          |                       | ✗                           |                       | ○                          |                       |                            |                       | ○                          |                         |
|                           |                         |                            |                       |                            |                       | ✗                          |                       | ✗                          |                       | ✗                           |                       | ○                          |                       |                            |                       | ○                          |                         |
|                           |                         | ⊙                          |                       | ⊙                          |                       | ⊙                          |                       | ⊙                          |                       |                             |                       | ○                          |                       | ⊙                          |                       |                            |                         |
|                           |                         | ○                          |                       | ○                          |                       | ⊙                          |                       | ⊙                          |                       | ○                           |                       |                            |                       |                            |                       |                            |                         |
|                           |                         | ○                          |                       | ○                          |                       | ⊙                          |                       | ⊙                          |                       |                             |                       | ○                          |                       | ⊙                          |                       |                            |                         |
|                           |                         | ○                          |                       | ○                          |                       | ○                          |                       | ⊙                          |                       |                             |                       | ○                          |                       | ⊙                          |                       |                            |                         |
|                           |                         |                            |                       |                            |                       |                            |                       | ○                          |                       | ⊙                           |                       |                            |                       |                            |                       |                            |                         |
|                           |                         |                            |                       |                            |                       | ○                          |                       | ⊙                          |                       | ⊙                           |                       |                            |                       |                            |                       |                            |                         |
|                           |                         |                            |                       |                            |                       | ○                          |                       | ○                          |                       |                             |                       |                            |                       |                            |                       |                            |                         |
|                           |                         |                            |                       |                            |                       | ○                          |                       | ⊙                          |                       | ⊙                           |                       |                            |                       |                            |                       |                            |                         |
|                           |                         |                            |                       |                            |                       | ○                          |                       | ○                          |                       | ○                           |                       | ○                          |                       |                            |                       |                            |                         |
| ○                         |                         |                            |                       |                            |                       | ✗                          |                       | ✗                          |                       | ✗                           |                       | ○                          |                       |                            |                       | ⊙                          |                         |
|                           |                         |                            |                       |                            |                       | ✗                          |                       | ✗                          |                       | ✗                           |                       |                            |                       |                            |                       |                            |                         |
|                           |                         |                            |                       |                            |                       | ✗                          |                       | ✗                          |                       | ✗                           |                       |                            |                       |                            |                       | ○                          |                         |

# WERKSTOFF-GRUPPEN

|   | VDI 3323 | W.-Nr. | AISI/SAE  | DIN                            | BS  | AFNOR                                   | JIS   |
|---|----------|--------|---|--------------------------------|---|---|---|
| P | 1        | 0.0030 | A 366 (1012); 1008  | C10                            | 040 A 10; 045 M 10; 1449 10 CS  | AF 34 C 10; XC 10                       | S 10C   |
|   | 1        | 1.0028 |   | Ust 34-2 (S250G1T)             |   | A 34-2                                  | SS 330  |
|   | 1        | 1.0034 |   | RSt 34-2 (S250G2T)             | 1449 34/20 HR, HS, CR, CS   | A 34-2 NE                               |   |
|   | 1        | 1.0035 |   | St185 (Fe 310-0); St 33        | Fe 310-0; 1449 15 HR, HS  | A 33                                    |   |
|   | 1        | 1.0036 | A 570; Gr. 33,36  | S235JRG1 (Fe 360 B) Ust 37-2   | Fe 360 B; 4360-40 B   |   |   |
|   | 1        | 1.0037 |   | S235JR (Fe 360 B) St 37-2      | Fe 360 B; 4360-40 B   | E 24-2                                  | STKM 12A;C  |
|   | 1        | 1.0038 | 1115  | GS-CK16                        | 030A04  |   | SS 330  |
|   | 1        | 1.0044 | A 570 Gr. 40  | S275JR (Fe 430 B) St44-2       | Fe 430 B FN; 1449 43/25 HR, HS<br>4360-43 B   | E 28-2                                  | SM 400 A;B;C  |
|   | 1        | 1.0045 |   | S355JR                         | 4360-50 B   | E 36-2                                  |   |
|   | 1        | 1.0050 | A 570 Gr.50; A 572 Gr.50                                      | E295 (Fe 490-2); St 50-2       | Fe 490-2 FN; 4360-50 B  | A 50-2                                  | SS 490  |
|   | 1        | 1.0060 | A 572 Gr. 65  | E335 (Fe 590-2); St 60-2       | Fe 60-2; 4360-55 E; 55 C  | A 60-2                                  | SM 570  |
|   | 1        | 1.0070 |   | E360 (Fe 690-2); St 70-2       | Fe 690-2 FN   | E 28-2                                  |   |
|   | 1        | 1.0112 |   | P235S                          | 1501-164-360B LT20  | E 36-2                                  |   |
|   | 1        | 1.0114 |   | S235JU;St 37-3 U               | 4360-40C  | A 50-2                                  |   |
|   | 1        | 1.0116 | A 284 Gr.D; A 573 Gr.58; A 570 Gr 36;C<br>A 611 Gr. C         | S235J2G3 (Fe 360 D 1); St 37-3 | Fe 360 D1 FF 1449 37/23 CR<br>4360-40 D   | A 60-2                                  |   |
|   | 1        | 1.0130 |   | P265S                          | 1501-164-400B LT 20   | A 42 AP                                 |   |
|   | 1        | 1.0143 |   | S275J0; St 44-3 U              | 4360-43C  | E 28-3                                  |   |
|   | 1        | 1.0144 | A 573 Gr. 70; A 611 Gr.D                                      | S275J2G3 (Fe 430 D 1); St 44-3 | Fe 430 D1 FF; 4360-43 C; 43 D   | E 28-3; E 28-4                          | SM 400 A;B;C  |
|   | 1        | 1.0149 |   | S275JOH; RoSt 44-2             | 4360-43C  |   |   |
|   | 1        | 1.0226 |   | DX51D; St 02 Z                 |   |   |   |
|   | 1        | 1.0301 | M 1010  | C10                            | 040 A 10; 045 M 10; 1449 10 CS  | AF 34 C 10; XC 10                       | S 10C   |
|   | 1        | 1.033  | A 621 (1008)  | DC 01; St 2; St 12             | 1449 4 CR; 1449 3 CS  | TE                                      | SPHD  |
|   | 1        | 1.0333 | A 619 (1008)  | Ust.3 (DC03G1); Ust 13         | 1449 2 CR;3 CR  | E                                       | SPCD  |
|   | 1        | 1.0334 | A 621 (1008)  | UStW 23 (DD12G1)               |   | SC                                      | SPHE  |
|   | 1        | 1.0335 | A 622 (1008)  | DD13; StW 24                   | 1449 1 HR   | 3C                                      | SPHE  |
|   | 1        | 1.0338 | A 620 (1008)  | DC04; St4; St 14               | 1449 1 CR;2 CR  | ES                                      | SPCE  |
|   | 1        | 1.0345 | A 516 Gr. 65; 55; A 515 Gr. 65;55 A 414<br>Gr. C; A 442 Gr.55 | P235GH HI                      | 1501 Gr. 141-360<br>1501 Gr. 161-360; 151-360<br>1501 Gr. 161-400; 154-360<br>1501 Gr. 164-360; 161-360 | A 37 CP;AP                              | SGV 410, SGV<br>450, SGV 48, SPV<br>450;SPV 480         |
|   | 1        | 1.0402 | (M) 1020; M 1023  | C22                            | 055 M 15, 070 M 20 2C/2D<br>1499 22 HS, CS  | AF 42 C 20;<br>XC 25;1 C 22             | S20C  |
|   | 1        | 1.0402 | 1020  | C22                            | 050A20 2C/2D  | CC20                                    | S22C  |
|   | 1        | 1.0402 | 1020;1023   | C22                            | 055 M 15, 070 M 20 2C   | AF 42 C 20; XC 25;1 C 22                | S 20 C;S 22 C   |
|   | 1        | 1.0425 |   | P265GH H II                    | 1501 Gr. 161-400;151-400<br>1501 Gr. 164-360; 161-400<br>1501 Gr. 164-400;154-400                       | A 42 CP; AP                             | SPV 315; SPV 355<br>SG 295; SGV 410<br>SGV 450; SGV 480 |
|   | 1        | 1.0443 | A27 65-35   | GS-45                          | A1  | E 23-45 M                               |   |
|   | 1        | 1.0539 |   | S355NH;StE 355                 |   | TSE 355-4                               |   |
|   | 1        | 1.0545 |   | S355N; StE 355                 | 4360-50E  | E 355 R                                 |   |
|   | 1        | 1.0546 |   | S355NL;TStE 355                | 4360-50EE   | E 355 FP                                |   |
|   | 1        | 1.0547 |   | S355JOH                        | 4360-50C  | TSE 355-3                               |   |
|   | 1        | 1.0549 |   | S355 NLH;TStE 355              |   |   |   |
|   | 1        | 1.0533 |   | S355JO;St 52-3U                | 4360-50C  | E 36-3                                  |   |
|   | 1        | 1.0562 | A 633 Gr.C; A 588   | P355N; StE 355                 | 1501 Gr.225-490A LT 20  | FeE 355 KG N<br>E 355 R/FP;<br>A 510 AP | SM 490 A;B;C;<br>YA;YB                                  |
|   | 1        | 1.0565 |   | P355NH; WStE 355               | 1501-225-490B LT 20   | A 510 AP                                | S20C  |
|   | 1        | 1.0566 | A 366 (1012); 1008  | P355NL1; TStE 355              | 1501-225-490A LT 50   | A 510 FP                                |   |
|   | 1        | 1.0570 | 1213  | S355J2G3 St 52-3               | Fe 510 D1 FF ;1449 50/35 HR>HS<br>; 4360-50 D   | E 36-3; E 36-4                          | SM 490 A;B;C; YA;YB                                     |
|   | 1        | 1.0715 | 1213  | 9 SMn 28 (1SMn30)              | 230 M 07  | S 250                                   | SUM 22  |
|   | 1        | 1.0715 | 12 L 13   | 9 SMn 28                       | 230 M 07  | S 250                                   | SUM 22  |
|   | 1        | 1.0718 | 1108; 1109  | 9 SMnPb 28 (11SMnPb30)         | Fe 360 B; 4360-40 B   | S 250 Pb                                | SUM 22 L ;SUM 23 L,<br>SUM 24 L                         |

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| VDI 3323 | W.-Nr. | AISI/SAE                     | DIN                    | BS   | AFNOR                         | JIS                         |
|----------|--------|------------------------------|------------------------|--|-------------------------------|-----------------------------|
| 1        | 1.0721 | 11 L 08                      | 10 S 20                | (210 M 15)                                       | 10 S 20; 10 F 2               |                             |
| 1        | 1.0722 | 11 L 08                      | 10 SPb 20              |  | 10 Pb F 2                     |                             |
| 1        | 1.0736 | 1215                         | 10 SPb 20              |  | 10 Pb F 2                     | SUM25                       |
| 1        | 1.0737 | 12 L 14                      | 9 SMn 36 11SMn37)      |  |                               |                             |
| 1        | 1.0972 | A 570 Gr.50; A 572 Gr.50     | 9 SMnPb 36 (11SMnPb37) | 1501-40F30                                       | E 315 D                       |                             |
| 1        | 1.0976 | A 572 Gr. 65                 | S315MC; QStE 300 TM    | 1501-43F35                                       | E 355 D                       |                             |
| 1        | 1.0982 |                              | S355MC; QStE 360 TM    | 1501-50F45                                       |                               |                             |
| 1        | 1.0984 |                              | S460MC; QStE 460 TM    |  | E 490 D                       |                             |
| 1        | 1.0986 |                              | S500MC; QStE 500 TM    | 1501 - 60F55                                     | E 560 D                       |                             |
| 1        | 1.1121 | 1010                         | CK 10 (C10E)           | 040 A 10   | XC 10                         | S 9 CK; S 10 C              |
| 1        | 1.1121 |                              | St 37-1                | 4360 40 A  |                               |                             |
| 1        | 1.1141 | 1015                         | CK 15 (C15E)           | 040 A 15; 080 M 15                               | XC 12 XC15; XC 18             | S 15; S 15 CK               |
| 1        | 1.1151 | 1020 ; 1023                  | C22E CK 22             |  | 2 C 22 XC18; XC 25            | S 20 C, S 20 CK; S 22 C     |
| 1        | 1.2080 | D 3                          | X 210 Cr 12            | BD 3   | Z 200 C 12                    |                             |
| 1        |        | A36                          | St 44-2                | 4360 43 A  | NFA 35-501 E 28               |                             |
| 1        |        | A 621 (1008)                 | StE 320-3Z             | 1 501 160  |                               |                             |
| 1        | 1.8900 | A572-60                      | StE 380                | 4360 55 E  |                               | S 25C                       |
| 1        | 1.0406 | (M) 1025                     | C 25                   | 070 M 26   | 1 C 25                        |                             |
| 1        | 1.0416 | A 622 (1008)                 | GS-38                  |  | 20-400 M                      |                             |
| 1        | 1.0473 | A 537 Cl.1 A 414 Gr. G A 612 | P355GH                 | 19 Mn 6  | A 52 CP                       | SGV 410; SGV 450<br>SGV 480 |
| 1        | 1.0501 | 1035                         | C 35                   | 080 A 32, 080 A 35; 080 M 36,<br>1449 40 CS      | 1 C 35<br>AF 55 C 35<br>XC 38 | S35C                        |
| 2        | 1.0503 | 1045                         | CF 45 (C45G)           | 060 A 47; 080 M 46                               | XC 42 H 1 TS                  | S 45 C                      |
| 2        | 1.0511 | 1040                         | C 40                   | 080 M 40   | 1 C 40; AF 60 C 40            | S 40 C                      |
| 2        | 1.0540 |                              | C 50                   |  |                               |                             |
| 2        | 1.0551 | A27 70-36                    | GS-52                  | A2   | 280-480 M                     |                             |
| 2        | 1.0553 | A148 80-40                   | GS-60                  | A3   | 320-560 M                     |                             |
| 2        | 1.0577 | A738                         | S355J2G4 (Fe 510 D 2)  | Fe 510 D2 FF 1501 Gr.224-460<br>1501 Gr. 224-490 | A 52 FP                       |                             |
| 2        | 1.0726 | 1140                         | 35 S 20                | 212 M 36   | 35MF 6                        |                             |
| 2        | 1.0727 | 1146                         | 45 S 20 (46S20)        |  | 45 MF 4                       |                             |
| 2        | 1.1157 | 1035; 1041                   | 40Mn4                  | 150 M 36   | 35 M 5; 40 M 5                | S 09CK; S 25 C              |
| 2        | 1.1158 | 1025                         | C25E; CK 25            | (070 M 25)                                       | 2 C 25; XC 25                 |                             |
| 2        | 1.1166 | 1536                         | 34Mn5                  | 4360-50C   |                               |                             |
| 2        | 1.1170 | 1330                         | 28Mn6                  | (150 M 28), (150 M 18)                           | 20 M 5, 28 Mn 6               | SCMn 1                      |
| 2        | 1.1170 | 1330                         | 28Mn6                  | 150 M 5  | 20 M 5                        |                             |
| 2        | 1.1170 | 1330                         | 28Mn6                  |  | 20 M 5                        | SCMn 1                      |
| 2        | 1.1178 |                              | C30E; CK 30            | 080M30   | XC 32                         |                             |
| 2        | 1.1170 | 1330                         | 28Mn6                  | (150 M 28), (150 M 18)                           | 20 M 5, 28 Mn 6               | SCMn 1                      |
| 2        | 1.1170 | 1330                         | 28Mn6                  | 150 M 5  | 20 M 5                        |                             |
| 2        | 1.1170 | 1330                         | 28Mn6                  |  | 20 M 5                        | SCMn 1                      |
| 2        | 1.1178 |                              | C30E; CK 30            | 080M30   | XC 32                         |                             |
| 2        | 1.1180 | 1035                         | C35R; Cm 35            | 080 A 35   | 3 C 35; XC 32                 |                             |
| 2        | 1.1181 | 1035; 1038                   | C35E CK 35             | 080 A 35; (080 M 36)                             | 2 C 35, XC 32; XC 38 H 1      | S 35 C                      |
| 2        | 1.1181 | 1035                         | C35E; CK 35            | 080 A 35; (080 M 36)                             |                               | S 35 C                      |
| 2        | 1.1191 | 1042                         | GS- Ck 45              | 080 A 46   | XC 45                         |                             |
| 2        | 1.1206 | 1049; 1050                   | C50E CK 50             | 080 M 50   | 2 C 50; XC 48 H 1; XC 50 H 1  |                             |
| 2        | 1.1213 | 1050; 1055                   | Cf 53 (C53G)           | 070 M 55   | XC 48 H TS                    | S 50 C                      |
| 2        | 1.5423 | 4520                         | 22Mo4                  | 1503-245-420                                     |                               | SB 450 M                    |

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|   | VDI 3323 | W.-Nr.  | AISI/SAE                                | DIN                     | BS                                 | AFNOR                               | JIS                                 |
|---|----------|---------|---|-------------------------|------------------------------------|-------------------------------------|-------------------------------------|
| P | 2        | 1.0481  | A 516 Gr.70; A 515 Gr. 70 A 414 Gr.F; G | P295GH 17 Mn 4          | 1501 Gr. 224                       | A 48 Cp;AP                          | SG 365, SGV 410; SGV 450<br>SGV 480 |
|   | 2        | 1.0503  | 1043                                    | C35                     | 060 A 47; 080 M 46; 1449 50 HS, CS | 1 C 45; AF 65 C 45                  | S 45 C                              |
|   | 2        | 1.0614  | 1074                                    | C 76 D; D 75-2          |                                    | XC 75                               |                                     |
|   | 2        | 1.0616  | 1086                                    | C 86 D; D 85-2          |                                    | XC 80                               | SMn 433 H; SCMn 2                   |
|   | 2        | 1.0618  | 1095                                    | C 92 D; D 95-2          |                                    | XC 90                               | SMn 438 (H); SCMn 3                 |
|   | 2        | 1.1165  | 1036; 1330                              | 30Mn5                   | 120 M 36; (150 M 28)               | 35 M 5                              | S 40 C                              |
|   | 2        | 1.1167  | 1335                                    | 30Mn5                   | 150 M 36                           | 40 M 5                              | S 45 C; S 48 C                      |
|   | 3        | 1.1186  | 1040                                    | C40E CK 40              | 060 A 40, 080 A 40; 080 M 40       | 2 C 40; XC 42 H 1                   | S 50 C                              |
|   | 3        | 1.1191  | 1045                                    | C45E CK 45              | 080 M 46; 060 A 47                 | 2 C 45; XC 42 H 1; XC 45; XC 48 H 1 |                                     |
|   | 3        | 1.1201  | 1049                                    | C45R; Cm 45             | 080 M 46                           | 3 C 45; XC 42 H 1; XC 48 H 1        | SM 400 A;B;C                        |
|   | 3        | 1.7242  |   | 18 CrMo 4               |                                    |                                     |                                     |
|   | 3        | 1.7337  | A 387 Gr. 12 Cl                         | 16 CrMo 4 4             |                                    |                                     |                                     |
|   | 3        | 1.7362  |   | 12 CrMo 19 5            |                                    | Z 10 CD 5.05                        |                                     |
|   | 3        |         | A572-60                                 | 17 MnV 6                | 3606-625                           | NFA 35-501 E 36                     |                                     |
|   | 3        | 1.0535  | 1055                                    | C55                     | 436055 E                           | 1 C 55; AF 70 C 55                  | S 55 C                              |
|   | 3        | 1.0601  | 1060                                    | C60                     | 070 M 55                           | 1 C 60; AF 70 C 55                  | S 58 C                              |
|   | 3        | 1.0603  | 1070                                    | C67                     | 060 A 62; 1449 HS,CS               | XC 65                               |                                     |
|   | 3        | 1.0605  | 1074; 1075                              | C75                     | 080 A 67; 1449 70HS                |                                     |                                     |
|   | 3        | 1.1203  | 1055                                    | C55E CK 55              | 1449 80 HS                         | 2 C 5; XC 55 H 1                    | S 55 C                              |
|   | 3        | 1.1209  | 1055                                    | C55R Cm 55              | 060 A 57; 070 M 55                 | 3 C 55; XC 55 H 1                   |                                     |
|   | 3        | 1.1221  | 1060; 1064                              | C60E CK 60              | 070 M 55                           | 2 C 60; XC 60 H 1                   | S 58 C                              |
|   | 3        | 1.1231  | 1070                                    | CK 67 (C67E)            | 060 A 62                           | XC 68                               |                                     |
|   | 3        | 1.1248  | 1074; 1075; 1078                        | CK 75 (C75E)            | 060 A 67                           | XC 75                               |                                     |
|   | 4        | 1.1269  | 1086                                    | CK 85 (C85E)            |                                    | XC 90                               |                                     |
|   | 4        | 1.1274  | 1095                                    | Ck 101 (C101E); C 125 W |                                    | XC 100                              | SUP 4                               |
|   | 4        | 1.1663  | W 112                                   | C 125 W                 |                                    | Y2 120                              |                                     |
|   | 4        | 1.0070  |   | Si70-2                  |                                    |                                     |                                     |
|   | 4        | 1.7238  |   | 49 CrMo 4               |                                    |                                     |                                     |
|   | 4        | 1.7701  |   | 51 CrMoV 4              |                                    |                                     |                                     |
|   | 4        | 1.0116  | A573-81 65                              | St 37-3                 | 4360 40 B                          |                                     |                                     |
|   | 4        | 1.0345  | A515 65                                 | H1                      | 1 501 161                          |                                     |                                     |
|   | 4        | 1.0841  | 5120                                    | St 52-3                 | 150 M 19                           |                                     |                                     |
|   | 4        | 1.0904  | 9255                                    | 55 Si 7                 | 250A53                             |                                     |                                     |
|   | 4        | 1.0904  | 9254                                    | 55 Si 7                 | 250 A 53                           |                                     |                                     |
|   | 5        | 1.0961  | 9262                                    | 60SiCr7                 | 1 501 161                          | 60 SC 6                             |                                     |
|   | 5        | 1.2067  | L3                                      | 100Cr6                  | BL3                                | 100 C6                              |                                     |
|   | 5        | 1.2108  | L1                                      | 90 CrSi 5               |                                    |                                     |                                     |
|   | 6        | 1.2210  | L2                                      | 115CrV3                 |                                    | 100 C 3                             |                                     |
|   | 6        | 1.2241  |   | 51CrV4                  |                                    |                                     |                                     |
|   | 6        | 1.2311  |   | 40 CrMnMo 7             |                                    |                                     |                                     |
|   | 6        | 1.2330  | 4135                                    | 35 CrMo 4               | 708 A 37                           | 34 CD 4                             | SCM435TK                            |
|   | 6        | 1.2419  |   | 105WC6                  | BO1                                | 105 WC 13                           |                                     |
|   | 6        | 1.2510  | 1                                       | 100 MnCrW 4             | BS1                                | 8 M0 8                              | SKS 31                              |
|   | 6        | 1.2542  | S1                                      | 45 WCv7                 |                                    |                                     |                                     |
|   | 6        | 1.2550  | S1                                      | 60WCv7                  |                                    | 55 WC 20                            |                                     |
| 6 | 1.2713   | L6      | 55NiCrMoV6                              |                         | 55 NCDV 7                          | SKT 4                               |                                     |
| 6 | 1.2721   | L6      | 50NiCr13                                |                         | 55 NCV 6                           |                                     |                                     |
| 6 | 1.2842   | O2      | 90MnCrV8                                | BO2                     | 90 MV8                             |                                     |                                     |
| 6 | 1.3501   | E 50100 | 100 Cr 2                                |                         | 55 WC 20                           |                                     |                                     |
| 6 | 1.3505   | 52100   | 100Cr6                                  | 2 S 135; 535 A 99       | 100 C 6                            | SUJ2                                |                                     |



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|   | VDI<br>3323 | W.-Nr.   | AISI/SAE         | DIN                          | BS                                   | AFNOR               | JIS          |
|---|-------------|----------|------------------|------------------------------|--------------------------------------|---------------------|--------------|
| P | 6           | 1.5024   |                  | 46Si7                        |                                      | 45 S 7; 46 Si 7     |              |
|   | 6           | 1.5025   | 9255             | 51Si7                        |                                      | 51 S 7; 51 Si 7     |              |
|   | 6           | 1.5026   | 9255             | 55Si7                        | 251 a 58                             | 55 S 7              |              |
|   | 6           | 1.5027   | 9260             | 60Si7                        | 251 A 60; 251 H 60                   | 60 S 7              |              |
|   | 6           | 1.5028   | 9260 H           | 65Si7                        |                                      | 60 S 7              | 50 P 7 SUP 6 |
|   | 6           | 1.5120   |                  | 38 MnSi 4                    |                                      |                     |              |
|   | 6           | 1.5415   | A 204 Gr.A; 4017 | 16Mo3; 15 Mo 3               | 1503-243 B                           | 15 D 3              |              |
|   | 6           | 1.5419   | 4419             | 20Mo4                        | 1503-243-430                         |                     | SCPH 11      |
|   | 6           | 1.5622   | A 350-LF 5       | 14Ni6                        |                                      | 16 N 6              |              |
|   | 6           | 1.5732   | 3415             | 1 NiCr10                     |                                      | 14 NC 11            |              |
|   | 6           | 1.5752   | 3310; 3314       | 14NiCr14                     | 655M13                               | 12 NC 15            |              |
|   | 6           | 1.6587   |                  | 17CrNiMo6                    | 820A16                               | 18 NCD 6            |              |
|   | 6           | 1.6657   |                  | 14NiCrMo134                  |                                      |                     |              |
|   | 6           | 1.7015   | 5515             | 15 Cr 3                      | 523 M 15                             | 12 C 3              | SCr415(H)    |
|   | 6           | 1.7033   | 5132             | 34Cr4                        | 530A32                               | 32 C 4              | SCr430(H)    |
|   | 6           | 1.7035   | 5140             | 41C r4                       | 530M40                               | 42 C 4              | SCr440(H)    |
|   | 6           | 1.7045   | 5140             | 42Cr41                       | 530 A 40                             | 42 C 4 TS           | SCr440       |
|   | 6           | 1.7131   | 5115             | 16MnCr5                      | 527 M 17                             | 16 MC 5             |              |
|   | 6           | 1.7139   |                  | 16MnCr5                      |                                      |                     |              |
|   | 6           | 1.7176   | 5515             | 55Cr3                        | 527 A 60                             | 55 C 3              | SUP9(A)      |
|   | 6           | 1.7220   | 4135; 4137       | 34CrMo4                      | 708 Aa 37                            | 35 CD 4             |              |
|   | 6           | 1.7223   | 4142             | 41CrMo4                      |                                      |                     | SNB 22-1     |
|   | 6           | 1.7225   | 4140             | 42CrMo4                      | 708 M 0                              | 42 CD 4             |              |
|   | 6           | 1.7176   | 5515             | 55Cr3                        | 527 A 60                             | 55 C 3              | SUP9(A)      |
|   | 6           | 1.7220   | 4135; 4137       | 34CrMo4                      | 708 Aa 37                            | 35 CD 4             |              |
|   | 6           | 1.7223   | 4142             | 41CrMo4                      |                                      |                     | SNB 22-1     |
|   | 6           | 1.7225   | 4140             | 42CrMo4                      | 708 M 0                              | 42 CD 4             |              |
|   | 6           | 1.7228   |                  | 55NiCrMoV6G                  | 823M30                               |                     |              |
|   | 6           | 1.7262   |                  | 15CrMo5                      | 28Mn6                                | 12 CD 4             |              |
|   | 6           | 1.7321   |                  | 20 mOcR 4                    | C30E; CK 30                          |                     |              |
|   | 6           | 1.7335   | ASTM A182 F-12   | 13CrMo4 4                    | 1501-620Gr27                         |                     |              |
|   | 6           | 1.7335   | A 182-F11;12     | 13 CrMo 4 4                  | 1 501 620 Gr. 27                     | 15 CD 4.5           | SCM415(H)    |
|   | 6           | 1.7380   | ASTM A 182 F.22  | 10CrMo9 10                   | 1501-622gR31; 45                     |                     |              |
|   | 6           | 1.7380   | A182 F-22        | 10 CrMo 9 10                 | 1501-622                             | 12 CD 9.10          |              |
|   | 6           | 1.7715   |                  | 14MoV6 3                     | 1503-660-440                         |                     |              |
|   | 6           | 1.8509   | A355A            | 41CrAlMo 7                   | 905 M 39                             | 40 CAD 6.12         |              |
|   | 7           | 1.0038   | A570.36          | S235JRG2 (Fe 360 B) RSt 37-2 | Fe 360 B FU 1449 27/23 CR; 4360-40 B | E 24-2NE            |              |
|   | 7           | 1.5710   | 3135             | 36NiCr6                      | 640A35                               | 35 NC 6             |              |
|   | 7           | 1.5755   |                  | 31 NiCr 14                   | 653 M 31                             | 18 NC 13            |              |
|   | 7           | 1.6523   | 8620             | 2 NiCrMo2                    | 805M20                               | 20 NCD 2            |              |
|   | 7           | 1.6546   | 8740             | 40 NiCrMo 22                 | 311-Tyre 7                           |                     |              |
|   | 7           | 1.7218   | 4130             | 25CrMo4                      | CDS 110                              | 25 CD 4             |              |
|   | 7           | 1.7733   |                  | 24 CrMoV 5 5                 |                                      | 20 CDV 6            |              |
|   | 7           | 1.7755   |                  | GS-45 CrMOV 10 4             |                                      |                     |              |
|   | 7           | 1.8070   |                  | 21 CrMoV 5 11                |                                      |                     |              |
| 8 | 1.2332      | 4142     | 47 CrMo 4        | 708 M 40                     | 42 CD 4                              | SCM (440)           |              |
| 8 | 1.3401      | A128 (A) | G-X120 Mn 12     |                              | Z 120 M 12                           | SCMnH 1, SCMn; H 11 |              |
| 8 | 1.5736      | 3435     | 36 NiCr 10       |                              | 30 NC 11                             |                     |              |



# WERKSTOFF-GRUPPEN

|    | VDI 3323 | W.-Nr. | AISI/SAE               | DIN                 | BS                   | AFNOR                | JIS              |
|----|----------|--------|------------------------|---------------------|----------------------|----------------------|------------------|
| P  | 8        | 1.6511 | 9840                   | 36CrNiMo4           | 816M40               | 40 NCD 3             | SUP 10           |
|    | 8        | 1.6582 | 4340                   | 35CrNiM 6           | 817 M 40             | 35 NCD 6             | SNCM 447         |
|    | 8        | 1.7361 |                        | 32 CeMo12           | 722 M 24             | 30 CD 12             |                  |
|    | 8        | 1.8159 | 6150                   | 50 CrV 4            | 735 A 50             | 50 CV 4              |                  |
|    | 8        | 1.8161 |                        | 58 CrV 4            |                      |                      |                  |
|    | 8        | 1.8515 |                        | 32 CrMo 12          | 722 M 24             | 30 CD 12             |                  |
|    | 8        | 1.8523 |                        | 39CrMoV13 9         | 897M39               |                      |                  |
|    | 9        | 1.4882 |                        | X 50 CrMnNiNbN 21 9 |                      | Z 50 CMNNb 21.09     |                  |
|    | 9        | 1.5710 | 3135                   | 36NiCr6             | 640A35               | 35 NC 6              | SNC236           |
|    | 9        | 1.5864 |                        | 35 niCr 18          |                      |                      |                  |
|    | 9        |        |                        | 31 NiCrMo 13 4      | 830 M 31             |                      |                  |
|    | 10       | 1.0144 | A573-81                | ST 44-3             | 4360 43 C            | E 28-3               | SM 400A;B;C      |
|    | 10       | 1.0347 | A 619                  | DC03; RSt;RRSt 13   | 1449 3 CR; 1449 2 CR | E                    |                  |
|    | 10       | 1.0401 | M 1015; M 1016; M 1017 | C15                 | 080 M 15             | AF 37 C12; XC 18     | S 15 C           |
|    | 10       | 1.0570 |                        | ST 52-3             | 4360 50 B            | E 36-3               | SM490A;B;C;YA;YB |
|    | 10       | 1.0718 | 12L13                  | 9 SMnPb 28          |                      | S 250 Pb             | SUM 22L          |
|    | 10       | 1.0723 |                        | 15 S 22; 15 S 20    | 210 A 15; 210 M 15   |                      | SUM 32           |
|    | 10       | 1.2083 |                        |                     |                      |                      |                  |
|    | 10       | 1.2343 | H 11                   | X 38 CrMoV 5 1      | BH 11                | Z 38 CDV 5           |                  |
|    | 10       | 1.2344 | H 13                   | X 40 CrMoV 5 1      | BH 13                | Z 40 CDV 5           | SKD61            |
|    | 10       | 1.2363 | A 2                    | X100 CrMoV 5 1      | BA 2                 | Z 100 CDV 5          | SKD12            |
|    | 10       | 1.2379 | D 2                    | X 155 CrVMo 12 1    | BD2                  | Z 160 CDV 12         |                  |
|    | 10       | 1.2379 | HNV3                   | X210Cr12G           | BD2                  | Z 160 CDV 12         |                  |
|    | 10       | 1.2436 | D 4 (D 6)              | X 210 CrW 12        | BD6                  | Z 200 CD 12          |                  |
|    | 10       | 1.2581 | H 21                   | X 30 WCrV 9 3       | BH 21                | Z 30 WCV 9           | SKD5             |
|    | 10       | 1.2601 |                        | X 165 CrMoV 12      |                      |                      |                  |
|    | 10       | 1.2606 | H 12                   | X 37 CrMoW 5 1      | BH 12                | Z 35 CWDV 5          |                  |
|    | 10       | 1.3343 | D3                     | S 6-5-2             | BM2                  | Z 200 C12            | SUH3             |
|    | 10       | 1.2436 | D 4 (D 6)              | X 210 CrW 12        | BD6                  | Z 200 CD 12          |                  |
|    | 10       | 1.2581 | H 21                   | X 30 WCrV 9 3       | BH 21                | Z 30 WCV 9           | SKD5             |
|    | 10       | 1.2601 |                        | X 165 CrMoV 12      |                      |                      |                  |
|    | 10       | 1.2606 | H 12                   | X 37 CrMoW 5 1      | BH 12                | Z 35 CWDV 5          |                  |
|    | 10       | 1.3343 | D3                     | S 6-5-2             | BM2                  | Z 200 C12            | SUH3             |
|    | 10       | 1.4563 | N08028                 |                     |                      | Z 1 NCDU 31-27-03    |                  |
|    | 10       | 1.5662 | ASTM A353              | X8Ni9               | 1501-509;510         |                      | SL9N60(53)       |
|    | 10       | 1.5662 | ASM A353               | X8Ni9               | 502-650              | 9 Ni                 |                  |
|    | 10       | 1.5680 | 2517                   | 12Ni19              | 12Ni19               | Z 18 N 5             |                  |
|    | 11       | 1.3202 |                        | S 12-1-4-5          | BT 15                |                      | SKS 31           |
|    | 11       | 1.3207 |                        | S 10-4-3-10         | BT 42                | Z 130 WKCDV          |                  |
|    | 11       | 1.3243 | T15                    | S 6-5-2-5           |                      | KCV 06-05-05-04-02   | SKH55            |
|    | 11       | 1.3246 |                        | S 7-4-2-5           |                      | Z 110 WKCDV 07-05-04 |                  |
|    | 11       | 1.3247 |                        | S 2-10-1-8          | BM 42                | Z 110 DKCWW 09-08-04 |                  |
|    | 11       | 1.3249 | M 42                   | S 2-9-2-8           | BM 34                |                      |                  |
|    | 11       | 1.3255 | T 4                    | S 18-1-2-5          | BT 4                 | Z80 WKCV 18-05-04-0  |                  |
|    | 11       | 1.3343 | M 2                    | S6-5-2              | BM2                  | Z 85 WDCV            | SKH 51           |
|    | 11       | 1.3348 | M 7                    | S2-9-2              |                      | Z 100 DCWW 09-04-02  |                  |
|    | 11       | 1.3355 | T 1                    | S 18-0-1            | BT 1                 | Z 80 WCV 18-4-01     |                  |
|    | 11       | 1.4548 | 630                    |                     |                      | Z 7 CNU 17-04        |                  |
|    | 11       | 1.4718 | HNV 3                  | X45CrSi 9 3         | 401S45               | Z 45 CS 9            | SUH1             |
|    | 11       | 1.4935 | 422                    | X20 CrMoWW 12 1     |                      |                      |                  |
|    | 12       | 1.4000 | 403                    | X6Cr13              | 403 S 17             | Z 6 C 13             | SUS403           |
|    | 12       | 1.4001 |                        | X6Cr14              |                      |                      |                  |
|    | 12       | 1.4001 | (410S)                 | X7 Cr 13            | (403 S 7)            | Z 8 C 13             | SCPH 11          |
|    | 12       | 1.4002 | 405                    | X6CrA12             | 405S17               | Z 8 CA 12            |                  |
|    | 12       | 1.4002 | 405                    | X6 CrAl 13          | 405 S 17             | Z6 CA 13             |                  |
| 12 | 1.4005   | 416    | X12CrS 13              | 416 S 21            | Z 11 CF 13           | SUS403               |                  |

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|          | VDI 3323 | W.-Nr. | AISI/SAE          | DIN                     | BS  | AFNOR            | JIS                 |
|----------|----------|--------|-------------------|-------------------------|---|------------------|---------------------|
|          | 12       | 1.4006 | 410; CA-15        | (G-)X10 Cr 13           | 410S21  | Z 10 C 13        | SUS403              |
|          | 12       | 1.4016 | 430               | X8Cr17                  | Z8C17   | 430 S15          |                     |
|          | 12       | 1.4016 |                   | X6 Cr 17                | 430 S 15  | Z 8 C 17         | SUS 430             |
|          | 12       | 1.4027 |                   | G-X20Cr14               | 420 C 29  | Z 20 C 13M       |                     |
|          | 12       | 1.4027 | 5140              | G-X 20 Cr 14            | 420 C 29  | Z20 C 13M        |                     |
|          | 12       | 1.4028 | 420               | X30 Cr 13               | 420 S 45  | Z 30 C 13        |                     |
|          | 12       | 1.4086 |                   | G-X120Cr29              | 452C11  |                  |                     |
|          | 12       | 1.4104 | 430 F             | X12CrMoS17              | 420 S 37  | Z 10 CF 17       | SUS430F             |
|          | 12       | 1.4112 | 440B              | X90 CrMoV 18            |   |                  |                     |
|          | 12       | 1.4113 | 434               | X6CrMo 17               | 434 S 17  | Z 8 CD 17.01     | SUS434              |
|          | 12       | 1.4340 |                   | G-X40CrNi27 4           |   |                  |                     |
|          | 12       | 1.4417 | S31500            | X2CrNiMoSi19 5          |   |                  |                     |
|          | 12       | 1.4418 |                   | X2 CrNoMoSi 18 5 3      |   | Z 6 CND 16-04-01 |                     |
|          | 12       | 1.4510 | XM 8; 430 Ti; 439 | X4 CrNiMo16 5           |   | Z 4 CT 17        | SUS 430 LK          |
|          | 12       | 1.4511 | XM 8; 430 Ti; 439 | X 6 CrNb 17(X 6 CrNb 17 |   | Z 4 CNb 17       | SUS 430 LK          |
|          | 12       | 1.4512 | 409               | X 6 CrTi 12 (X2CrTi12)  | LW 19; 409 S 19                                 | Z 3 CT 12        | SUH 409             |
|          | 12       | 1.4418 |                   | X2 CrNoMoSi 18 5 3      |   | Z 6 CND 16-04-01 |                     |
|          | 12       | 1.4510 | XM 8; 430 Ti; 439 | X4 CrNiMo16 5           |   | Z 4 CT 17        | SUS 430 LK          |
|          | 12       | 1.4511 | XM 8; 430 Ti; 439 | X 6 CrNb 17(X 6 CrNb 17 |   | Z 4 CNb 17       | SUS 430 LK          |
|          | 12       | 1.4512 | 409               | X 6 CrTi 12 (X2CrTi12)  | LW 19; 409 S 19                                 | Z 3 CT 12        | SUH 409             |
|          | 12       | 1.4720 |                   | X20CrMo13               |   |                  |                     |
|          | 12       | 1.4724 | 405               | X10CrA113               | 403S17  | Z 10 C 13        |                     |
|          | 12       | 1.4742 | 430               | X10CrA118               | 439S15  | Z 10 CAS 18      | SUS430              |
|          | 12       | 1.4747 | HNV6              | X80CrNiSi20             | 443S65  | Z 80 CSN 20.02   | SUH4                |
|          | 12       | 1.4749 | 446               | X18 CrN 28              |   |                  |                     |
|          | 12       | 1.4762 | 446               | X10CrA124               |   | Z 10 CAS 24      | SUH446              |
|          | 12       | 1.4871 | EV 8              | X 53 CrMnNiN 21 9       | 349 S 54  | Z 52 CMN 21.09   | SUH35,SUH36         |
|          | 12       |        | 302               | X12 CrNi 18 9           | 302 S 31  | Z 10 CN 18-09    |                     |
|          | 12       |        | 429               | X10 CrNi 15             |   |                  |                     |
|          | 12       | 1.4521 | 443; 444          | X2CrMoTi18-2            | 317 S 16  |                  | SUS 444             |
|          | 13       | 1.4021 | 420               | X20Cr13                 | 420S37  | Z 20 C 13        |                     |
|          | 13       | 1.4031 | 420               | X40 Cr 13               |   | Z 40 C 14        |                     |
|          | 13       | 1.4034 |                   | X46Cr13                 | 420 S 45  | Z 40 C 14        | SUS420J2            |
|          | 13       | 1.4057 | 431               | X20CrNi172              | 431 S 29  | Z 15 CN 16.02    | SUS431              |
|          | 13       | 1.4125 |                   | X 105 CrMo 17           |   | Z 100 CD 17      |                     |
|          | 13       | 1.4313 | 8620              | 2 NiCrMo2               | 805M20  | 20 NCD 2         |                     |
|          | 13       | 1.4544 |                   |                         | S. 524; S. 526                                  |                  |                     |
|          | 13       | 1.4546 | 348               | X5CrNiNb 18-10          | 347 S 31; 2 S. 130; 2 S. 143/144/145; S.525/527 |                  |                     |
|          | 13       | 1.4922 |                   | X20CrMoV12-1            |   |                  |                     |
|          | 13       | 1.4923 |                   | X22 CrMoV12 1           |   |                  |                     |
| <b>M</b> | 14.1     | 1.4305 | 303               | X10 CrNiS 18 9          | 303 S 21  | Z 8 CNF 18-09    |                     |
|          | 14.1     | 1.4306 | 304L              | X2CrNi18 9              | 304S12  | Z 2 CN 18 10     | SCM (440)           |
|          | 14.1     | 1.4305 | 303               | X10 CrNiS 18 9          | 303 S 21  | Z 8 CNF 18-09    |                     |
|          | 14.1     | 1.4306 | 304L              | X2CrNi18 9              | 304S12  | Z 2 CN 18 10     | SCM (440)           |
|          | 14.2     | 1.4301 | 304               | X 5 CrNi 18 9           | 304 S 15  | Z 5 CN 18.09     | SCMnH 1, SCMn; H 11 |
|          | 14.2     | 1.4306 | 304L              | X2 CrNi 18 10           | 304 S 11  | Z 3 CN 19-11     |                     |
|          | 14.2     | 1.4308 | CF-8              | X6 CrNi 18 9            | 304 C 15  | Z 6 CN 18-10 M   | SUP 10              |
|          | 14.2     | 1.4310 | 301               | X12CrN i17 7            | 301 S 21  | Z 12 CN 17.07    | SNCM 447            |
|          | 14.2     | 1.4311 | 304 LN            | X2 CrNiN 18 10          | 304 S 62  | Z 2 CN18.10      |                     |
|          | 14.2     | 1.4312 |                   | G-X10CrNi18 8           | 302C25  | Z 10 CN 18.9M    |                     |
|          | 14.2     | 1.4312 | 305               | X8 CrNi 18 12           | 305 S 19  |                  |                     |

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|   | VDI 3323 | W.-Nr.         | AISI/SAE    | DIN  | BS  | AFNOR  | JIS              |
|---|----------|----------------|-------------|--|---|--|------------------|
| M | 14.2     | 1.4332         |             | X2 CrNi 18-8   |   | Z 6CN18.09   |                  |
|   | 14.2     | 1.4350         | 304         | X5CrNi18 9   | 304S15  | Z 8 CMN 18- 08-05  |                  |
|   | 14.2     | 1.4371         | 202         | X3 CrMnNiN 188 8 7   | 284 S 16  | Z3 CND 17 -11-01;Z 6 CND 17-11; Z 6 CND 17-11-02; Z 7 CND 17-11-02; Z 7 CND 17-12-02                   |                  |
|   | 14.2     | 1.4401         | 316         | X 5 CrNiMo 17 12 2; (X4 CrNiMo 17 -12-2)                     | 316 S 13; 316 S 17; 316 S 19; 316 S 31; 316 S 33                                  | Z 2 CND 17-12; Z 2 CND 18-13; Z 3 CND 17-11-02; Z 3 CND 17-12-02 FF; Z 3 CND 18-12-03; Z 3 CND 19.10 M | SNC236           |
|   | 14.2     | 1.4404         | 316L        | X2 CrNiMo 17 13 2; (X2 CrNiMo 17-12-2)<br>GX 2 CrNiMoN 18-10 | 316 S 11, 316 S 13; 316 S 14, 316 S 31;<br>316 S 42, S.537;316;C 12, T.75, S. 161 | Z 2 CND 17-12 AZ   |                  |
|   | 14.2     | 1.4406         | 316LN       | X2 CrNiMoN 17 12 2; (X2CrNiMoN 18-10)                        | 316 S 61; 316 S 63  |  |                  |
|   | 14.2     | 1.4408         | CF-8M       | GX 5 CrNiMoN 7 12 2; G-X 6 CrNiMo 18 10                      | 316 C 16 (LT 196);ANC 4 B*  |  | SM 400A;B;C      |
|   | 14.2     | 1.4429         | 316 Ln      | X2 CrNiMo 17 -13-3   | 316 S 62  | Z 2 CND 17-13 Az   |                  |
|   | 14.2     | 1.4435         | 316L        | X2 CrNiMo18 14 3   | 316 S 11;316 S 13; 316 S 14;316 S 31; LW 22;<br>LWCF 22                           | Z 3 CND 17-12-03; Z 3 CND 18-14-03   | S 15 C           |
|   | 14.2     | 1.4436         | 316         | X 5 CrNiMo 17 13 3; (X4CRNIMO 17-13-3)                       | 316 S 19; 316 S 31; 316 S 33; LW 23; LWCF 23                                      | Z 6 CND 18-12-03; Z 7 CND 18-12-03   | SM490A;B;C;YA;YB |
|   | 14.2     | 1.4438         | 317L        | X2 CrNiMo 18 16 4; (X2CrNiMo 18-15-4)                        | 317 S 12  | Z 2 CND 19-15-04; Z 3 CND 19-15-04   | SUM 22L          |
|   | 14.2     | 1.4439         | (s31726)    | X 2 CrNiMo 18 13   |   | Z 3 CND 18-14-06 AZ  | SUM 32           |
|   | 14.2     | 1.4440         |             | X5 CrNiMo 17 13 3  |   |  |                  |
|   | 14.2     | 1.4449         | 317         | X 4 CrNiMo 27 5 2 (X3CrNiMo27-5-2)                           | 317 S 16  | (Z 3 CND 25-07 Az); Z 5 CND 27-05 Az   |                  |
|   | 14.2     | 1.4449; 1.4460 | 329         | G-X7NiCrMoCuNb25 20  |   | Z 3 NCDU 25.20M  | SKD61            |
|   | 14.2     | 1.4500         |             | X1NiCrMoCuN25-20-5   |   | Z 2 NCDU 25-20   | SKD12            |
|   | 14.2     | 1.4539         |             | X1NiCrMoCuN25-20-5   |   | Z 1 NCDU 25-02 M   |                  |
|   | 14.2     | 1.4539         | 904L        | (G-)X1 NiCrMoCu 25 20 5                                      |   | Z 6 CNT 18-10  |                  |
|   | 14.2     | 1.4541         | CN-7M       | X1 CrNiMoN 20 18 7   | 321 S 31; 321 S 51 (1010;1105); LW 24; LWCF 24                                    | Z 200 CD 12  |                  |
|   | 14.2     | 1.4547         | 321         | X6 CrNiMoTi 17 12 2  |   |  | SKD5             |
|   | 14.2     | 1.4571         | S31254      | G-X 5 CrNiMoNb   | 320 S 31  | Z 6 CNDT 17-12002  |                  |
|   | 14.2     | 1.4581         |             | X 10CrNiMoNb 18 12   | 318 C 17  | Z 4 CNDNb 18.12 M  |                  |
|   | 14.2     | 1.4583         | 318         | G-X7CrNiMoCuNb18 18  | 303 S 21  | Z 15 CNS 20.12   | SUH3             |
|   | 14.2     | 1.4585         |             | X5 CrNiNb 18 10  |   |  |                  |
|   | 14.2     | 1.4891         | Ss30415     | X 30 WCrV 9 3  |   | Z 20 CNS 25.04   | SKD5             |
|   | 14.2     | 1.4893         | S30815      | X8 CrNiNb 11   |   |  |                  |
|   | 14.2     | 1.4948         | 304H        | X6 CrNi 18 11  | 304 S 51  | Z 5 CN 18-09   |                  |
|   | 14.3     | 1.4362         | S32304      | X2 CrNiN 23 4  |   | Z 2 CN 23-04 AZ  | SUH3             |
|   | 14.3     | 1.4410         |             | G-X10CrNiMo18 9  |   | Z 5 CNaD 20.12M  |                  |
|   | 14.3     | 1.4460         | 329         | X8CrNiMo27 5   |   |  | SL9N60(53)       |
|   | 14.3     | 1.4462         |             | X2CrNiMoN22 5 3  | 318 S 13  | Z 3 CND 22-05 Az; (Z 2 CND 24 -08 Az)<br>(Z 3 CND 25-06-03 Az)   |                  |
|   | 14.3     | 1.4823         | 310         | G-X40CrNiSi27 4  |   | Z 30 CN 26-05  |                  |
|   | 14.4     | 1.4542         | 630         | X 5 CrNiCuNb 17 4; (X5CrNiCuNb 16-4)                         |   | Z 7 CNU 15-05; Z 7 CNU 17-04   | SKS 31           |
|   | 14.4     | 1.4542         | 17-4PH      |  |   | Z 7 CNU 17-04  |                  |
|   | 14.4     | 1.4550         | 347         | X6 CrNiNb 18 10  | 347 S 17  | Z 6 CNNb 18.10   | SKH55            |
|   | 14.4     |                | 17-7PH      |  | 316 S 111   |  |                  |
|   | 14.4     | 1.4821         |             | X20CrNiSi25 4  |   | Z 20 CNS 25.04   |                  |
|   | 14.4     | 1.4828         | 309         | X15CrNiSi20 12   | 309 S 24  | Z 15 CNS 20.12   | SCS17            |
|   | 14.4     | 1.4833         | 309S        | X6 CrNi 22 13  | 309 S 13  | Z 15 CN 24-13  |                  |
|   | 14.4     | 1.4845         | 310 S       | X12 CrNi 25 21   | 310 S 24  | Z 12 CN 25-20  | SUH310           |
|   | 14.4     | 1.4878         | 321         | X6 CrNiTi 18 9   | 32 1 S 20   | Z 6 CNT 18-12 (B)  | SUS321           |
|   | 14.4     | 1.4980         | 660         | X6 NiCrTiMoVB25-15-2   |   | E-Z6 NCT 25  |                  |
| K | 15       | 0.6010         | A48-20B     | GG 10  |   | Ft 10 D  |                  |
|   | 15       | 0.6015         | NO 25 B     | GG 15  | Grade 150   | Ft 15 D  | FC150            |
|   | 15       | 0.6015         | CLASS25     | GG 15  | Grade 150   | Ft 15D   |                  |
|   | 15       | 0.6015         | A48 25 B    | GG 15  | Grade 150   | Ft 15 D  |                  |
|   | 15       | 0.6020         | A48-30B     | GG 20  | Grade 220   | Ft 20 D  |                  |
|   | 15       | 0.6020         | NO 30 B     | GG 20  | Grade 220   | Ft 20 D  | FC200            |
|   | 15       | 0.6660         | A436 Type 2 | GGL-NiCr202  | L-NiCuCr202   | L-NC 202   |                  |
|   | 15       | 0.7040         | 60-40-18    | GGG 40   | SNG 420/12  | FCS 400-12   | FCD400           |



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| VDI 3323 | W.-Nr. | AISI/SAE   | DIN          | BS            | AFNOR        | JIS          |         |
|----------|--------|------------|--------------|---------------|--------------|--------------|---------|
| K        | 15     | 0.6660     | A436 Type 2  | GGL-NiCr202   | L-NiCuCr202  | L-NC 202     |         |
|          | 15     | 0.7040     | 60-40-18     | GGG 40        | SNG 420/12   | FCS 400-12   | FCD400  |
|          | 15     |            | No 20 B      | GG 10         |              | Ft 10 D      | FC100   |
|          | 16     | 0.6020     | CLASS30      | GG 20         | Grade 220    | Ft 20D       |         |
|          | 16     | 0.6030     | CLASS45      | GG 30         | Grade 300    | Ft 30D       | FC300   |
|          | 16     | 0.6030     | A48-45 B     |               | Grade 350    | Ft 30D       |         |
|          | 16     | 0.6035     | A48-50       | GG 35         | Grade 350    | Ft 35 D      | FC350   |
|          | 16     | 0.6040     | A48-60 B     | GG 40         | Grade 400    | Ft 40 D      |         |
|          | 16     | 0.7070     | 100/70/03    | GGG 70        | SNG700/2     | FGS 700-2    | FCD700  |
|          | 17     | 0.7033     |              | GGG35.3       |              |              |         |
|          | 17     |            | 434          | GGG-35.3      | 350/22 L 40  | FGS 370/17   |         |
|          | 17     | 0.7040     | 60-40-18     | GGG-40        | SNG 420/12   | FGS 400-12   |         |
|          | 17     | 0.7043     | 60/40/18     | GGG-40.3      | 370/7        | FGS 370/17   |         |
|          | 17     | 0.7050     | 80-55-06     | GGG50         | SNG500/7     | FGS 500/7    |         |
|          | 17     |            | 65-45-12     | GGG-50        | SNG 500/7    | FGS 500-7    | FCD 500 |
|          | 17     | 0.7652     |              | GGG-NiMn 13 7 | S-NiMn 137   | S-Mn 137     |         |
|          | 17     | 0.7660     | A43D2        | GGG-NiCr 20 2 | Grade S6     | S-NC 202     |         |
|          | 17     |            |              |               | SNG 370/17   | FGS 370-17   |         |
|          | 18     | 0.6025     | A48-40 B     | GG25          | Grade260     | Ft 25 D      |         |
|          | 18     | 0.7060     |              | GGG60         | SNG600/3     | FGS600-3     | FC250   |
|          | 18     |            | 80/55/06     | GGG-60        | 600/3        | FGS 600/3    |         |
|          | 18     |            | A48 40 B     |               |              |              | FCD600  |
|          | 19     | 0.8055     |              | GTW55         |              |              |         |
|          | 19     | 0.8135     | 32510        | GTS-35-10     | B 340/12     | MN35-10      |         |
|          | 19     |            | A47-32510    | GTS-35-10     | B 340/2      | MN 35-10     |         |
|          | 19     | 0.8145     | A220-40010   | GTS-45-06     | P 440/7      | MN 450-6     |         |
|          | 19     |            |              | GTS-35        | B 340/12     |              |         |
|          | 19     |            |              |               | 8 290/6      | MN 32-8      |         |
|          | 19     |            | 32510        | GTS-35        | B340/12      | MN 35-10     |         |
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|          | 20     | 0.8040     |              | GTW-40        | W410/4       | MB40-10      | FCMW330 |
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|          | 20     | 0.8165     | 70003        | GTS-65-02     | P 570/3      | MN 650-3     |         |
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| 20       |        | A220-90001 | GTS-70-02    |               | MN 700-2     | FCMP590      |         |
| 20       | 0.8170 |            | GTS-70-02    | IP 70-2       |              | FCMP690      |         |
| 20       | 1.1133 | 1022; 1518 | 20Mn5        | 120 M 19      | 20 M 5       |              |         |
| 20       | 1.1183 | 1035       | Cf 35 (C35G) | 080 A 35      | XC 38 H 1 TS |              |         |
| 20       |        | 40 010     | GTS-45       | P440/7        |              | SMnC 420     |         |
| 20       |        | 70003      | GTS-65       | P 570/3       | MP 60-3      | S 35 C       |         |
| N        | 21     | 3.0205     | Al99         |               |              |              |         |
|          | 21     | 3.0255     | 1000         | Al99.5        | L31/34/36    | A59050C      | FCMP540 |
|          | 21     | 3.3315     |              | AlMg1         |              |              |         |
|          | 22     | 3.1325     |              | AlCuMg 1      |              |              |         |
|          | 22     | 3.1655     |              | AlCuSiPb      |              |              |         |
|          | 22     | 3.2315     |              | AlMgSi1       |              |              |         |
|          | 21     | 3.4345     | 7050         | AlZnMgCu0,5   | L 86         | AZ 4 GU/9051 |         |
| 23       | 3.2381 |            | G-AlSi 10 Mg |               |              |              |         |



# WERKSTOFF-GRUPPEN

|    | VDI 3323 | W.-Nr.     | AISI/SAE          | DIN                   | BS         | AFNOR          | JIS              |
|----|----------|------------|-------------------|-----------------------|------------|----------------|------------------|
| N  | 23       | 3.2382     |                   | GD-AISI10Mg           |            |                |                  |
|    | 23       | 3.2581     |                   | G-AISI12              |            |                |                  |
|    | 23       | 3.3561     |                   | G-AIMg 5              |            |                |                  |
|    | 23       | 3.5101     | ZE 41             | G-MgZn4sE1Zr1         | MAG 5      |                |                  |
|    | 23       | 3.5103     | EZ 33             | MgSE3Zn27r1           | MAG 6      | G-TR3Z2        |                  |
|    | 23       | 3.5812     | AZ 81             | G-MgAl8Zn1            | NMAG 1     |                |                  |
|    | 23       | 3.5912     | AZ 91             | G-MgAl9Zn1            | MAG 7      |                |                  |
|    | 24       | 2.1871     |                   | G-AICu 4 TiMg         |            |                |                  |
|    | 24       | 3.1754     |                   | G-AICu5Ni1,5          |            |                |                  |
|    | 24       | 3.2163     |                   | G-AISI9Cu3            |            |                |                  |
|    | 24       | 3.2371     | 4218 B            | G-AISI 7 Mg           |            |                |                  |
|    | 24       | 3.2373     | SC64D             | G-AISI9MGWA           |            | A-S7G          | C4BS             |
|    | 24       | 3.2373     |                   | G-AISI 9 Mg           |            |                |                  |
|    | 24       | 3.5106     | QE 22             | G-MgAg3SE2Zr1         | mag 12     |                |                  |
|    | 24       |            | GD-AISI12         | G-ALMG5               | LM5        |                | A-SU12           |
|    | 23-24    | 3.2383     | A360.2            | G-AISI0Mg(Cu)         | LM9        |                |                  |
|    | 23-24    |            | A356-72           |                       | 2789;1973  |                | NFA32-201        |
|    | 23-24    |            | 356,1             |                       | LM25       |                | A5052            |
|    | 23-24    |            | A413.2            | G-AISI12              | LM6        |                |                  |
|    | 23-24    |            | A413.1            | G-AISI 12 (Cu)        | LM20       |                | ADC12            |
|    | 23-24    |            | A413.0            | GD-AISI12             |            |                | A6061            |
|    | 23-24    |            | A380.1            | GD-AISI8Cu3           | LM24       |                | A7075            |
|    | 26       | 2.1090     | C93200            | G-CuSn 7 5 pb         |            |                | U-E 7 Z 5 pb 4   |
|    | 26       | 2.1096     | C83600            | G-CuSn5ZnPb           | LG 2       |                |                  |
|    | 26       | 2.1098     | C83600            | G-CuSn 2 Znpb         |            |                |                  |
|    | 26       | 2.1182     | C23000            | G-CuPb15Sn            | LB1        |                | U-pb 15 E 8      |
|    | 26       | 2.1182     | C93800            | G-CuPb15Sn            |            |                | Uu-PB 15e 8      |
|    | 27       | 2.0240     |                   | CuZn 15               |            |                |                  |
|    | 27       | 2.0321     | C27200            | CuZn 37               | cz 108     |                | CuZn 36, CuZn 37 |
|    | 27       | 2.0590     |                   | G-CuZn40Fe            |            |                |                  |
|    | 27       | 2.0592     | C 86500           | G-CuZn 35 Al 1        | U-Z 36 N 3 |                | HTB 1            |
|    | 27       | 2.0596     | C 86200           | G-CuZn 34 Al 2        | HTB 1      |                | U-Z 36 N 3       |
|    | 27       | 2.1293     | C 18200           | CuCrZr                | CC 102     |                | U-Cr 0.8 Zr      |
| 28 | 2.0060   |            | E-Cu57            |                       |            |                |                  |
| 28 | 2.0375   |            | CuZn36Pb3         |                       |            |                |                  |
| 28 | 2.0596   | C 94100    | G-CuZn 34 Al 2    | HTB 1                 |            | U-Z 36 N 3     |                  |
| 28 | 2.0966   | C 63000    | CuAl 10 Ni 5 Fe 4 | Ca 104                |            | U-A 10 N       |                  |
| 28 | 2.0975   | B-148-52   | G-CuAl 10 Ni      |                       |            |                |                  |
| 28 | 2.1050   | C 90700    | G-CuSn 10         | CT1                   |            |                |                  |
| 28 | 2.1052   | C 90800    | G-CuSn 12         | pb 2                  |            |                |                  |
| 28 | 2.1292   | C 81500    | G-CuCrF 35        | CC1-FF                |            |                |                  |
| 28 | 2.4764   |            |                   |                       |            |                |                  |
| S  | 31       | 1.4558     | N 08800           | X 2 NiCrAlTi 32 20    | NA 15      |                |                  |
|    | 31       | 1.4562     | N 08031           | X 1 NiCrMoCu 32 28 7  |            |                |                  |
|    | 31       | 1.4563     | N 08028           | X 1 NiCrMoCuN 32 27 4 |            |                |                  |
|    | 31       | 1.4564     | N 08330           | X 12 NiCrSi 36 16     | NA 17      | Z 12 NCS 35.16 |                  |
|    | 31       | 1.4564     | 330               | X12 NiCrSi 36 16      | NA 17      | Z 12 NCS 37.18 | SUH330           |
|    | 31       | 1.4865     |                   | G-X40NiCrSi38 18      | 330 C 40   |                | SCH15            |
|    | 31       | 1.4958     |                   | X 5 NiCrAlTi          |            |                |                  |
|    | 31       | 2.4668     | AMS 5544          | NiCr19NbMo            |            |                | NC 20 K14        |
|    | 32       | 1.4977     |                   | X 40 CoCrNi 20 20     |            |                | Z 42 CNKDOWNb    |
|    | 33       | 2.4360     | Monel 400         | NiCu30Fe              | NA 13      |                | NU 30            |
|    | 33       | 2.4603     | 5390A             |                       |            |                | NC 22 FeD        |
|    | 33       | 2.4610     | Hastelloy C-4     | NiMo16Cr16Ti          |            |                |                  |
| 33 | 2.4630   | Nimonic 75 | NiCr20Ti          | HR 5,203-4            |            | NC 20 T        |                  |

# WERKSTOFF-GRUPPEN

|    | VDI 3323 | W.-Nr. | AISI/SAE           | DIN                   | BS              | AFNOR          | JIS   |      |
|----|----------|--------|--------------------|-----------------------|-----------------|----------------|-------|------|
| S  | 33       | 2.4642 | Inconel 690        | NiCr29Fe              |                 | NC 30 Fe       |       |      |
|    | 33       | 2.4856 | Inconel 625        | NiCr22Mo9Nb           | NA 21           | NC 22 FeDNb    |       |      |
|    | 33       | 2.4858 | Incoloy 825        | NiCr21Mo              | NA 16           | NC 21 Fe DU    |       |      |
|    | 34       | 2.4375 | Monel k-500        | NiCu30 Al             | NA 18           | NU 30 AT       |       |      |
|    | 34       | 2.4375 | 4676               | NiCu30Al              | 3072-76         |                |       |      |
|    | 34       | 2.4631 |                    | NiCr20TiAl            | Hr40;601        | NC20TA         |       |      |
|    | 34       | 2.4668 | Inconel 718        | NiCr19FeNbMo          |                 | NC 19 Fe Nb    |       |      |
|    | 34       | 2.4694 | Inconel            | NiCr16Fe7TiAl         |                 | NC 19 Fe Nb    |       |      |
|    | 34       | 2.4955 |                    | NiFe25Cr20NbTi        |                 |                |       |      |
|    | 34       | 2.4668 | 5383               | NiCr19Fe19NbMo        | HR8             | NC 19 FeNB     |       |      |
|    | 34       | 2.4670 | 5391               | S-NiCr13A16MoNb       | 3146-3          | NC 12 AD       |       |      |
|    | 34       | 2.4662 | 5660               | NiFe35Cr14MoTi        |                 | Z 8 NCDT 42    |       |      |
|    | 34       | 2.4964 | 5537C              | CoCr20W15Ni           |                 | KC20WN         |       |      |
|    | 34       |        | AMS 5772           | CoCr22W14Ni           |                 | KC22WN         |       |      |
|    | 35       | 2.4669 | Inconel X-750      | NiCr15Fe7TiAl         |                 | NC 15 TNb A    |       |      |
|    | 35       | 2.4685 | Hastelloy B        | G-NiMo28              |                 |                |       |      |
|    | 35       | 2.4810 | Hastelloy C        | G-NiMo30              |                 |                |       |      |
|    | 35       | 2.4973 | AMS 5399           | NiCr19Co11MoTi        |                 | NC 19 KDT      |       |      |
|    | 35       | 3.7115 |                    | TiAl5Sn2              |                 |                |       |      |
|    | 36       | 3.7025 | R 50250            | Ti 1                  | 2 TA 1          |                |       |      |
|    | 36       | 3.7225 | R 52250            | Ti 1 pd               | TP 1            |                |       |      |
|    | 36       | 2.4674 | AMS 5397           | NiCo15Cr10MoAlTi      |                 |                |       |      |
|    | 37       | 3.7124 |                    | TiCu2                 | 2 TA 21-24      |                |       |      |
|    | 37       | 3.7145 | R 54620            | TiAl6Sn2Zr4Mo2Si      |                 |                |       |      |
|    | 37       | 3.7165 |                    | TiAl6V4               | TA 10-13;TA 28  | T-A 6 V        |       |      |
|    | 37       | 3.7185 |                    | TiAl4Mo4Sn2           | TA 45-51; TA 57 |                |       |      |
|    | 37       | 3.7195 |                    | TiAl 3 V 2.5          |                 |                |       |      |
|    | 37       |        |                    | TiAl4Mo4Sn4Si0.5      |                 |                |       |      |
|    | 37       |        | AMS R54520         | TiAl5Sn2.5            | TA14/17         | T-A5E          |       |      |
|    | 37       |        | AMS R56400         | TiAl6V4               | TA10-13/TA28    | T-A6V          |       |      |
|    | 37       |        | AMS R56401         | TiAl6V4ELI            | TA11            |                |       |      |
|    | H        | 38     | 1.1545             | W 1                   | C105W1          | BW 1A          | Y1105 | SK3  |
|    |          | 38     | 1.1545             | W210                  | C105W1          | BW2            | Y120  | SUP4 |
| 38 |          | 1.2762 |                    | 75 CrMoNiW 6 7        |                 |                |       |      |
| 38 |          | 1.4125 | 440C               | X105 CrMo 17          |                 | Z 100 CD 17    |       |      |
| 38 |          | 1.6746 |                    | 32 nlcRmO 14 5        | 832 M 31        | 35 NCD 14      |       |      |
| 40 |          | 0.9620 | Ni- Hard 2         | G-X 260 NiCr 4 2      | Grade 2 A       |                |       |      |
| 40 |          | 0.9625 | Ni- Hard 1         | G-X 330 Ni Cr 4 2     | Grade 2 B       |                |       |      |
| 40 |          | 0.9630 | Ni- Hard 4         | G-X 300 CrNiSi 9 5 2  |                 |                |       |      |
| 40 |          | 0.9640 |                    | G-X 300 CrMoNi 15 2 1 |                 |                |       |      |
| 40 |          | 0.9650 | A 532 III A 25% Cr | G-X 260 Cr 27         | Grade 3 D       |                |       |      |
| 40 |          | 0.9655 | A 532 III A 25% Cr | G-X 300 CrNiMo 27 1   | Grade 3 E       |                |       |      |
| 40 |          | 1.2419 |                    | 105 WCr 6             | 105WC 13        |                |       |      |
| 40 |          | 1.4841 | 310                | X15 CrNiSi 25 20      | 314 S31         | Z 15 CNS 25-20 |       |      |
| 41 |          | 0.9635 |                    | G-X 300 CrMo 15 3     |                 |                |       |      |
| 41 |          | 0.9645 |                    | G-X 260 CrMoNi 20 2 1 |                 |                |       |      |
| 41 |          | 0.9655 |                    | G-X 300 CrNiMo 27 1   |                 |                |       |      |

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