

# REIBAHLEN UND SENKER HSS/E REAMERS AND COUNTERSINKS HSS/E

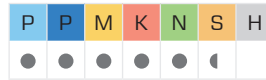
Kegelsenker  
Countersinks 181

Reibahlen  
Reamers 187





**HSSE-Kegelsenker 90°**  
HSSE countersinks 90°



Preise siehe Preisliste Seite 24 Price List page 24



| Artikelnummer<br>Article-No. | d1 z9 | d3  | l1  | d2 h9 |
|------------------------------|-------|-----|-----|-------|
| E.4601.0.0430                | 4,3   | 1,3 | 40  | 4,0   |
| E.4601.0.0500                | 5,0   | 1,5 | 40  | 4,0   |
| E.4601.0.0530                | 5,3   | 1,5 | 40  | 4,0   |
| E.4601.0.0580                | 5,8   | 1,5 | 45  | 5,0   |
| E.4601.0.0600                | 6,0   | 1,5 | 45  | 5,0   |
| E.4601.0.0630                | 6,3   | 1,5 | 45  | 5,0   |
| E.4601.0.0700                | 7,0   | 1,8 | 50  | 6,0   |
| E.4601.0.0730                | 7,3   | 1,8 | 50  | 6,0   |
| E.4601.0.0800                | 8,0   | 2,0 | 50  | 6,0   |
| E.4601.0.0830                | 8,3   | 2,0 | 50  | 6,0   |
| E.4601.0.0940                | 9,4   | 2,2 | 50  | 6,0   |
| E.4601.0.1000                | 10,0  | 2,5 | 50  | 6,0   |
| E.4601.0.1040                | 10,4  | 2,5 | 50  | 6,0   |
| E.4601.0.1150                | 11,5  | 2,8 | 56  | 8,0   |
| E.4601.0.1200                | 12,0  | 2,8 | 56  | 8,0   |
| E.4601.0.1240                | 12,4  | 2,8 | 56  | 8,0   |
| E.4601.0.1440                | 14,4  | 2,9 | 56  | 8,0   |
| E.4601.0.1500                | 15,0  | 3,2 | 60  | 10,0  |
| E.4601.0.1650                | 16,5  | 3,2 | 60  | 10,0  |
| E.4601.0.1900                | 19,0  | 3,5 | 63  | 10,0  |
| E.4601.0.2050                | 20,5  | 3,5 | 63  | 10,0  |
| E.4601.0.2500                | 25,0  | 3,8 | 67  | 10,0  |
| E.4601.0.3000                | 30,0  | 4,2 | 71  | 12,0  |
| E.4601.0.3100                | 31,0  | 4,2 | 71  | 12,0  |
| E.4601.0.3500                | 35,0  | 4,5 | 103 | 16,0  |
| E.4601.0.4000                | 40,0  | 4,5 | 118 | 16,0  |
| E.4601.0.5000                | 50,0  | 5,0 | 126 | 16,0  |





## Senker und Reibahlen HSS / HSSE

Countersinks and reamers HSS / HSSE

Individuelle Schnittdaten online im  
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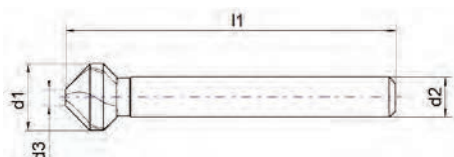


| Materialbezeichnung<br>material description                               | Vc<br>m/min | f mm/U      |             |              |               |               |               |               |
|---------------------------------------------------------------------------|-------------|-------------|-------------|--------------|---------------|---------------|---------------|---------------|
|                                                                           |             | Ø 4.30-5.30 | Ø 5.80-8.30 | Ø 9.40-14.40 | Ø 15.00-16.50 | Ø 19.00-20.50 | Ø 25.00-31.00 | Ø 35.00-50.00 |
| <b>HSS/E</b>                                                              |             |             |             |              |               |               |               |               |
| allg. Stähle General steels <500 N/mm <sup>2</sup>                        | 28,00       | 0,070       | 0,090       | 0,120        | 0,140         | 0,160         | 0,200         | 0,250         |
| allg. Stähle General steels <700 N/mm <sup>2</sup>                        | 27,00       | 0,080       | 0,080       | 0,100        | 0,120         | 0,140         | 0,180         | 0,220         |
| allg. Stähle General steels <850 N/mm <sup>2</sup>                        | 25,00       | 0,060       | 0,080       | 0,100        | 0,120         | 0,140         | 0,180         | 0,220         |
| allg. Stähle General steels <1000 N/mm <sup>2</sup>                       | 22,00       | 0,040       | 0,060       | 0,080        | 0,100         | 0,120         | 0,140         | 0,180         |
| allg. Stähle General steels <1400 N/mm <sup>2</sup>                       | 6,00        | 0,030       | 0,030       | 0,040        | 0,050         | 0,060         | 0,080         | 0,120         |
| <b>P</b>                                                                  |             |             |             |              |               |               |               |               |
| Vergütungsstähle<br>Tempering steel <850N/mm <sup>2</sup>                 | 25,00       | 0,050       | 0,060       | 0,080        | 0,100         | 0,120         | 0,140         | 0,180         |
| Vergütungsstähle<br>Tempering steel <1000N/mm <sup>2</sup>                | 8,00        | 0,030       | 0,040       | 0,050        | 0,070         | 0,080         | 0,100         | 0,120         |
| Vergütungsstähle<br>Tempering steel <1400N/mm <sup>2</sup>                | 6,00        | 0,025       | 0,030       | 0,040        | 0,050         | 0,060         | 0,080         | 0,120         |
| Vergütungsstähle<br>Tempering steel >1400N/mm <sup>2</sup>                | 6,00        | 0,025       | 0,030       | 0,040        | 0,050         | 0,060         | 0,080         | 0,120         |
| <b>M</b>                                                                  |             |             |             |              |               |               |               |               |
| Rost und säurebeständige Stähle<br>Stainless steels <700N/mm <sup>2</sup> | 7,00        | 0,040       | 0,050       | 0,060        | 0,070         | 0,080         | 0,090         | 0,120         |
| Rost und säurebeständige Stähle<br>Stainless steels >700N/mm <sup>2</sup> | 7,00        | 0,040       | 0,050       | 0,060        | 0,070         | 0,080         | 0,090         | 0,120         |
| <b>K</b>                                                                  |             |             |             |              |               |               |               |               |
| Gusseisen Cast iron <180 HB                                               | 20,00       | 0,080       | 0,100       | 0,120        | 0,160         | 0,200         | 0,250         | 0,300         |
| Temperguss Malleable cast iron                                            | 20,00       | 0,080       | 0,100       | 0,120        | 0,160         | 0,200         | 0,250         | 0,300         |
| Gusseisen mit Kugelgraphit<br>Nodular cast iron                           | 12,00       | 0,060       | 0,070       | 0,080        | 0,120         | 0,160         | 0,200         | 0,250         |
| <b>N</b>                                                                  |             |             |             |              |               |               |               |               |
| AL- und AL-Legierungen<br>AL und AL-alloys <6% Si                         | 70,00       | 0,100       | 0,120       | 0,140        | 0,180         | 0,220         | 0,260         | 0,300         |
| AL- und AL-Legierungen<br>AL und AL-alloys <12% Si                        | 33,00       | 0,080       | 0,100       | 0,120        | 0,140         | 0,180         | 0,220         | 0,260         |
| AL- und AL-Legierungen<br>AL und AL-alloys >12% Si                        | 20,00       | 0,080       | 0,100       | 0,120        | 0,140         | 0,180         | 0,220         | 0,260         |
| Kupfer, Messing, Bronze, Rotguss<br>Copper, brass, bronze, red brass      | 50,00       | 0,100       | 0,120       | 0,140        | 0,180         | 0,200         | 0,240         | 0,300         |
| Duroplaste Duroplast                                                      | 30,00       | 0,100       | 0,120       | 0,140        | 0,180         | 0,200         | 0,240         | 0,300         |
| <b>S</b>                                                                  |             |             |             |              |               |               |               |               |
| Titan Titanium                                                            | 7,00        | 0,040       | 0,050       | 0,060        | 0,070         | 0,080         | 0,090         | 0,120         |

### E.4601.1

#### HSSE-Kegelsenker 90°

HSSE countersinks 90°



Preise siehe Preisliste Seite 24 Price List page 24

| Artikelnummer<br>Article-No. | d1 z9 | d3  | l1 | d2 h9 |
|------------------------------|-------|-----|----|-------|
| E.4601.1.0430                | 4,3   | 1,3 | 40 | 4,0   |
| E.4601.1.0500                | 5,0   | 1,5 | 40 | 4,0   |
| E.4601.1.0530                | 5,3   | 1,5 | 40 | 4,0   |
| E.4601.1.0600                | 6,0   | 1,5 | 45 | 5,0   |
| E.4601.1.0630                | 6,3   | 1,5 | 45 | 5,0   |
| E.4601.1.0730                | 7,3   | 1,8 | 50 | 6,0   |
| E.4601.1.0800                | 8,0   | 2,0 | 50 | 6,0   |
| E.4601.1.0830                | 8,3   | 2,0 | 50 | 6,0   |

Fortsetzung auf nächster Seite  
Continued on next page

| Artikelnummer<br>Article-No. | d1 z9 | d3  | l1  | d2 h9 |
|------------------------------|-------|-----|-----|-------|
| E.4601.1.1000                | 10,0  | 2,5 | 50  | 6,0   |
| E.4601.1.1040                | 10,4  | 2,5 | 50  | 6,0   |
| E.4601.1.1150                | 11,5  | 2,8 | 56  | 8,0   |
| E.4601.1.1200                | 12,0  | 2,8 | 56  | 8,0   |
| E.4601.1.1240                | 12,4  | 2,8 | 56  | 8,0   |
| E.4601.1.1500                | 15,0  | 3,2 | 60  | 10,0  |
| E.4601.1.1650                | 16,5  | 3,2 | 60  | 10,0  |
| E.4601.1.1900                | 19,0  | 3,5 | 63  | 10,0  |
| E.4601.1.2050                | 20,5  | 3,5 | 63  | 10,0  |
| E.4601.1.2300                | 23,0  | 3,8 | 67  | 10,0  |
| E.4601.1.2500                | 25,0  | 3,8 | 67  | 10,0  |
| E.4601.1.3000                | 30,0  | 4,2 | 71  | 12,0  |
| E.4601.1.3100                | 31,0  | 4,2 | 71  | 12,0  |
| E.4601.1.3500                | 35,0  | 4,5 | 103 | 16,0  |
| E.4601.1.4000                | 40,0  | 4,5 | 118 | 16,0  |
| E.4601.1.5000                | 50,0  | 5,0 | 126 | 16,0  |



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| Materialbezeichnung<br>material description |                                                                           | Vc<br>m/min | f mm/U         |                |                  |                  |                  |                  |                  |
|---------------------------------------------|---------------------------------------------------------------------------|-------------|----------------|----------------|------------------|------------------|------------------|------------------|------------------|
|                                             |                                                                           |             | Ø<br>4.30-5.30 | Ø<br>6.00-8.30 | Ø<br>10.00-12.40 | Ø<br>15.00-16.50 | Ø<br>19.00-23.00 | Ø<br>25.00-31.00 | Ø<br>35.00-50.00 |
| P                                           | allg. Stähle General steels <500 N/mm <sup>2</sup>                        | 35,00       | 0,070          | 0,090          | 0,120            | 0,140            | 0,160            | 0,200            | 0,250            |
|                                             | allg. Stähle General steels <700 N/mm <sup>2</sup>                        | 33,00       | 0,060          | 0,080          | 0,100            | 0,120            | 0,140            | 0,180            | 0,220            |
|                                             | allg. Stähle General steels <850 N/mm <sup>2</sup>                        | 32,00       | 0,060          | 0,080          | 0,100            | 0,120            | 0,140            | 0,180            | 0,220            |
|                                             | allg. Stähle General steels <1000 N/mm <sup>2</sup>                       | 26,00       | 0,040          | 0,060          | 0,080            | 0,100            | 0,120            | 0,140            | 0,180            |
|                                             | allg. Stähle General steels <1400 N/mm <sup>2</sup>                       | 6,00        | 0,030          | 0,030          | 0,040            | 0,050            | 0,060            | 0,080            | 0,120            |
|                                             | Vergütungsstähle<br>Tempering steel <850N/mm <sup>2</sup>                 | 26,00       | 0,040          | 0,060          | 0,080            | 0,100            | 0,120            | 0,140            | 0,180            |
|                                             | Vergütungsstähle<br>Tempering steel <1000N/mm <sup>2</sup>                | 10,00       | 0,030          | 0,040          | 0,050            | 0,090            | 0,080            | 0,100            | 0,120            |
|                                             | Vergütungsstähle<br>Tempering steel <1400N/mm <sup>2</sup>                | 5,00        | 0,030          | 0,030          | 0,040            | 0,050            | 0,060            | 0,080            | 0,120            |
| M                                           | Vergütungsstähle<br>Tempering steel >1400N/mm <sup>2</sup>                | 5,00        | 0,030          | 0,030          | 0,040            | 0,050            | 0,060            | 0,080            | 0,120            |
|                                             | Rost und säurebeständige Stähle<br>Stainless steels <700N/mm <sup>2</sup> | 10,00       | 0,040          | 0,050          | 0,060            | 0,070            | 0,080            | 0,090            | 0,120            |
| K                                           | Rost und säurebeständige Stähle<br>Stainless steels >700N/mm <sup>2</sup> | 10,00       | 0,040          | 0,050          | 0,060            | 0,070            | 0,080            | 0,090            | 0,120            |
|                                             | Gusseisen Cast iron <180 HB                                               | 16,00       | 0,080          | 0,100          | 0,120            | 0,160            | 0,200            | 0,250            | 0,300            |
|                                             | Temperguss Malleable cast iron                                            | 16,00       | 0,080          | 0,100          | 0,120            | 0,160            | 0,200            | 0,250            | 0,300            |
| N                                           | Gusseisen mit Kugelgraphit<br>Nodular cast iron                           | 14,00       | 0,060          | 0,070          | 0,080            | 0,120            | 0,160            | 0,200            | 0,250            |
|                                             | AL- und AL-Legierungen<br>AL und AL-alloys <6% Si                         | 90,00       | 0,100          | 0,120          | 0,140            | 0,180            | 0,220            | 0,260            | 0,300            |
|                                             | AL- und AL-Legierungen<br>AL und AL-alloys <12% Si                        | 40,00       | 0,080          | 0,100          | 0,120            | 0,140            | 0,180            | 0,220            | 0,260            |
|                                             | AL- und AL-Legierungen<br>AL und AL-alloys >12% Si                        | 30,00       | 0,080          | 0,100          | 0,120            | 0,140            | 0,180            | 0,220            | 0,260            |
| S                                           | Kupfer, Messing, Bronze, Rotguss<br>Copper, brass, bronze, red brass      | 50,00       | 0,100          | 0,120          | 0,140            | 0,180            | 0,200            | 0,240            | 0,300            |
|                                             | Titan Titanium                                                            | 8,00        | 0,040          | 0,050          | 0,060            | 0,070            | 0,080            | 0,090            | 0,120            |





**E.4646.0**

**HSS-Kegelsenker 90°, extra lang**  
HSS countersinks 90°, extra long



Preise siehe Preisliste Seite 24 Price List page 24

| Artikelnummer<br>Article-No. | d1 z9 | d3  | l1  | d2 h9 |
|------------------------------|-------|-----|-----|-------|
| E.4646.0.0630                | 6,3   | 1,5 | 154 | 5,0   |
| E.4646.0.0830                | 8,3   | 2,0 | 155 | 6,0   |
| E.4646.0.1040                | 10,4  | 2,5 | 157 | 6,0   |
| E.4646.0.1240                | 12,4  | 2,8 | 158 | 8,0   |
| E.4646.0.1650                | 16,5  | 3,2 | 161 | 10,0  |
| E.4646.0.2050                | 20,5  | 3,5 | 164 | 10,0  |
| E.4646.0.2500                | 25,0  | 3,8 | 168 | 10,0  |

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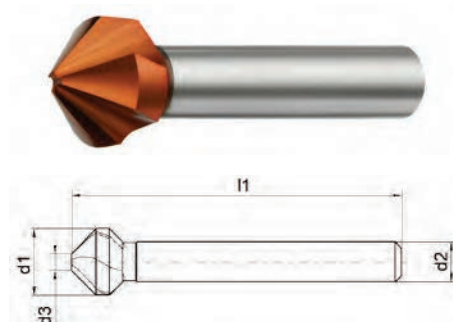


| Materialbezeichnung<br>material description                                        | Vc<br>m/min | f mm/U    |           |                  |            |                  |
|------------------------------------------------------------------------------------|-------------|-----------|-----------|------------------|------------|------------------|
|                                                                                    |             | Ø<br>6.30 | Ø<br>8.30 | Ø<br>10.40-12.40 | Ø<br>16.50 | Ø<br>20.50-25.00 |
| <b>P</b> allg. Stähle General steels <500 N/mm <sup>2</sup>                        | 25,00       | 0,090     | 0,100     | 0,120            | 0,140      | 0,160            |
| allg. Stähle General steels <700 N/mm <sup>2</sup>                                 | 25,00       | 0,080     | 0,100     | 0,120            | 0,140      | 0,140            |
| allg. Stähle General steels <850 N/mm <sup>2</sup>                                 | 20,00       | 0,080     | 0,100     | 0,120            | 0,130      | 0,140            |
| allg. Stähle General steels <1000 N/mm <sup>2</sup>                                | 15,00       | 0,060     | 0,080     | 0,100            | 0,120      | 0,120            |
| allg. Stähle General steels <1400 N/mm <sup>2</sup>                                | 6,00        | 0,030     | 0,030     | 0,040            | 0,050      | 0,060            |
| Vergütungsstähle<br>Tempering steel <850N/mm <sup>2</sup>                          | 18,00       | 0,080     | 0,100     | 0,120            | 0,130      | 0,140            |
| Vergütungsstähle<br>Tempering steel <1000N/mm <sup>2</sup>                         | 15,00       | 0,060     | 0,080     | 0,100            | 0,120      | 0,130            |
| Vergütungsstähle<br>Tempering steel <1400N/mm <sup>2</sup>                         | 5,00        | 0,030     | 0,035     | 0,040            | 0,050      | 0,060            |
| Vergütungsstähle<br>Tempering steel >1400N/mm <sup>2</sup>                         | 5,00        | 0,030     | 0,035     | 0,040            | 0,050      | 0,060            |
| <b>M</b> Rost und säurebeständige Stähle<br>Stainless steels <700N/mm <sup>2</sup> | 12,00       | 0,020     | 0,030     | 0,035            | 0,040      | 0,500            |
| Rost und säurebeständige Stähle<br>Stainless steels >700N/mm <sup>2</sup>          | 7,00        | 0,015     | 0,025     | 0,030            | 0,035      | 0,040            |
| <b>K</b> Gusseisen Cast iron <180 HB                                               | 20,00       | 0,080     | 0,100     | 0,120            | 0,130      | 0,140            |
| Temperguss Malleable cast iron                                                     | 20,00       | 0,080     | 0,100     | 0,120            | 0,130      | 0,140            |
| Gusseisen mit Kugelgraphit<br>Nodular cast iron                                    | 12,00       | 0,060     | 0,080     | 0,090            | 0,100      | 0,120            |
| <b>N</b> AL- und AL-Legierungen<br>AL and AL-alloys <6% Si                         | 60,00       | 0,120     | 0,140     | 0,180            | 0,200      | 0,230            |
| AL- und AL-Legierungen<br>AL and AL-alloys <12% Si                                 | 45,00       | 0,110     | 0,130     | 0,140            | 0,160      | 0,180            |
| AL- und AL-Legierungen<br>AL and AL-alloys >12% Si                                 | 45,00       | 0,090     | 0,110     | 0,120            | 0,150      | 0,160            |
| Kupfer, Messing, Bronze, Rotguss<br>Copper, brass, bronze, red brass               | 50,00       | 0,120     | 0,140     | 0,150            | 0,160      | 0,170            |
| Duroplaste Duroplast                                                               | 35,00       | 0,120     | 0,140     | 0,180            | 0,200      | 0,230            |

**HSSE-Kegelsenker 90° mit ungleicher Teilung**  
HSSE countersinks 90° with unequal pitch



Preise siehe Preisliste Seite 24 Price List page 24



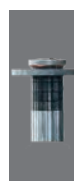
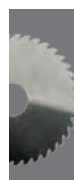
- ▶ Revolutionäre Geometrie mit einer ungleichen Teilung der Schneiden
- ▶ wesentlich höhere Vorschübe möglich
- ▶ sehr ruhiger Lauf
- ▶ sehr gutes Preis-Leistungs-Verhältnis

- ▶ revolutionary geometry with unequal pitch
- ▶ much higher feed rate possible
- ▶ very smooth running
- ▶ very good price-performance ratio

**TOPSELLER**



| Artikelnummer<br>Article-No. | d1 z9 | d3  | l1 +-1 | d2 h9 |
|------------------------------|-------|-----|--------|-------|
| E.4650.1.0430                | 4,3   | 1,3 | 40     | 4,0   |
| E.4650.1.0530                | 5,3   | 1,5 | 40     | 4,0   |
| E.4650.1.0600                | 6,0   | 1,5 | 45     | 5,0   |
| E.4650.1.0630                | 6,3   | 1,5 | 45     | 5,0   |
| E.4650.1.0800                | 8,0   | 2,0 | 50     | 6,0   |
| E.4650.1.0830                | 8,3   | 2,0 | 50     | 6,0   |
| E.4650.1.0940                | 9,4   | 2,2 | 50     | 6,0   |
| E.4650.1.1000                | 10,0  | 2,5 | 50     | 6,0   |
| E.4650.1.1040                | 10,4  | 2,5 | 50     | 6,0   |
| E.4650.1.1150                | 11,5  | 2,8 | 56     | 8,0   |
| E.4650.1.1200                | 12,0  | 2,8 | 56     | 8,0   |
| E.4650.1.1240                | 12,4  | 2,8 | 56     | 8,0   |
| E.4650.1.1500                | 15,0  | 3,2 | 60     | 10,0  |
| E.4650.1.1650                | 16,5  | 3,2 | 60     | 10,0  |
| E.4650.1.2050                | 20,5  | 3,5 | 63     | 10,0  |
| E.4650.1.2500                | 25,0  | 3,8 | 67     | 10,0  |
| E.4650.1.2800                | 28,0  | 4,0 | 71     | 12,0  |
| E.4650.1.3000                | 30,0  | 4,2 | 71     | 12,0  |
| E.4650.1.3100                | 31,0  | 4,2 | 71     | 12,0  |





## Senker und Reibahlen HSS / HSSE

Countersinks and reamers HSS / HSSE

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[www.nachreiner-schnittdaten.eu](http://www.nachreiner-schnittdaten.eu)

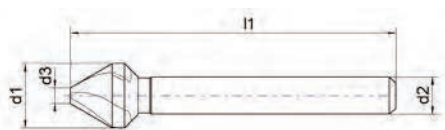


| Materialbezeichnung<br>material description                                           | Vc<br>m/min | f mm/U         |                 |                  |                  |                  |                  |
|---------------------------------------------------------------------------------------|-------------|----------------|-----------------|------------------|------------------|------------------|------------------|
|                                                                                       |             | Ø<br>4.30-6.30 | Ø<br>8.00-11.50 | Ø<br>12.00-12.40 | Ø<br>15.00-16.50 | Ø<br>20.50-25.00 | Ø<br>28.00-31.00 |
| <b>HSS/E</b><br>allg. Stähle General steels <500 N/mm <sup>2</sup>                    | 50,00       | 0,070          | 0,100           | 0,120            | 0,140            | 0,180            | 0,220            |
| allg. Stähle General steels <700 N/mm <sup>2</sup>                                    | 50,00       | 0,070          | 0,100           | 0,120            | 0,140            | 0,180            | 0,220            |
| allg. Stähle General steels <850 N/mm <sup>2</sup>                                    | 45,00       | 0,070          | 0,100           | 0,120            | 0,140            | 0,180            | 0,220            |
| allg. Stähle General steels <1000 N/mm <sup>2</sup>                                   | 35,00       | 0,070          | 0,100           | 0,120            | 0,140            | 0,180            | 0,220            |
| allg. Stähle General steels <1400 N/mm <sup>2</sup>                                   | 30,00       | 0,060          | 0,080           | 0,100            | 0,120            | 0,140            | 0,180            |
| <b>P</b><br>Vergütungsstähle<br>Tempering steel <850N/mm <sup>2</sup>                 | 45,00       | 0,070          | 0,100           | 0,120            | 0,140            | 0,180            | 0,220            |
| Vergütungsstähle<br>Tempering steel <1000N/mm <sup>2</sup>                            | 35,00       | 0,070          | 0,100           | 0,120            | 0,140            | 0,180            | 0,220            |
| Vergütungsstähle<br>Tempering steel <1400N/mm <sup>2</sup>                            | 30,00       | 0,060          | 0,080           | 0,100            | 0,120            | 0,140            | 0,180            |
| Vergütungsstähle<br>Tempering steel >1400N/mm <sup>2</sup>                            | 30,00       | 0,060          | 0,080           | 0,100            | 0,120            | 0,140            | 0,180            |
| <b>M</b><br>Rost und säurebeständige Stähle<br>Stainless steels <700N/mm <sup>2</sup> | 12,00       | 0,050          | 0,060           | 0,070            | 0,080            | 0,090            | 0,120            |
| Rost und säurebeständige Stähle<br>Stainless steels >700N/mm <sup>2</sup>             | 9,00        | 0,050          | 0,060           | 0,070            | 0,080            | 0,090            | 0,120            |
| <b>K</b><br>Gusseisen Cast iron <180 HB                                               | 25,00       | 0,100          | 0,120           | 0,140            | 0,180            | 0,200            | 0,250            |
| Temperguss Malleable cast iron                                                        | 22,00       | 0,100          | 0,120           | 0,140            | 0,180            | 0,200            | 0,250            |
| Gusseisen mit Kugelgraphit<br>Nodular cast iron                                       | 20,00       | 0,100          | 0,120           | 0,140            | 0,180            | 0,200            | 0,250            |
| <b>N</b><br>AL- und AL-Legierungen<br>AL und AL-alloys <6% Si                         | 45,00       | 0,100          | 0,120           | 0,140            | 0,180            | 0,200            | 0,250            |
| AL- und AL-Legierungen<br>AL und AL-alloys <12% Si                                    | 45,00       | 0,100          | 0,120           | 0,140            | 0,180            | 0,200            | 0,250            |
| AL- und AL-Legierungen<br>AL und AL-alloys >12% Si                                    | 40,00       | 0,070          | 0,100           | 0,120            | 0,140            | 0,180            | 0,200            |
| Kupfer, Messing, Bronze, Rotguss<br>Copper, brass, bronze, red brass                  | 45,00       | 0,100          | 0,120           | 0,140            | 0,180            | 0,200            | 0,250            |
| Kunststoff - Thermoplaste Thermoplast                                                 | 45,00       | 0,100          | 0,120           | 0,140            | 0,180            | 0,200            | 0,250            |
| Duroplaste Duroplast                                                                  | 45,00       | 0,100          | 0,120           | 0,140            | 0,180            | 0,200            | 0,250            |

### E.4602.0

#### HSSE-Kegelsenker 60°

HSSE countersinks 60°



Preise siehe Preisliste Seite 24 Price List page 24

| Artikelnummer<br>Article-No. | d1 z9 | d3  | l1 +1/-1 | d2 h9 |
|------------------------------|-------|-----|----------|-------|
| E.4602.0.0630                | 6,3   | 1,5 | 47       | 5,0   |
| E.4602.0.0830                | 8,3   | 2,0 | 52       | 6,0   |
| E.4602.0.1040                | 10,4  | 2,5 | 53       | 6,0   |
| E.4602.0.1240                | 12,4  | 2,8 | 60       | 8,0   |
| E.4602.0.1650                | 16,5  | 3,2 | 65       | 10,0  |
| E.4602.0.2050                | 20,5  | 3,5 | 69       | 10,0  |
| E.4602.0.2500                | 25,0  | 3,8 | 75       | 10,0  |
| E.4602.0.3100                | 31,0  | 4,2 | 81       | 12,0  |



Individuelle Schnittdaten online im  
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data online in the cutting data calculator:  
[www.nachreiner-schnittdaten.eu](http://www.nachreiner-schnittdaten.eu)

| Materialbezeichnung<br>material description                                        | Vc<br>m/min | f mm/U         |                  |            |                  |            |
|------------------------------------------------------------------------------------|-------------|----------------|------------------|------------|------------------|------------|
|                                                                                    |             | Ø<br>6.30-8.30 | Ø<br>10.40-12.40 | Ø<br>16.50 | Ø<br>20.50-25.00 | Ø<br>31.00 |
| <b>P</b> allg. Stähle General steels <500 N/mm <sup>2</sup>                        | 28,00       | 0,090          | 0,120            | 0,140      | 0,160            | 0,200      |
| allg. Stähle General steels <700 N/mm <sup>2</sup>                                 | 27,00       | 0,080          | 0,100            | 0,120      | 0,140            | 0,180      |
| allg. Stähle General steels <850 N/mm <sup>2</sup>                                 | 27,00       | 0,080          | 0,100            | 0,120      | 0,140            | 0,180      |
| allg. Stähle General steels <1000 N/mm <sup>2</sup>                                | 22,00       | 0,060          | 0,080            | 0,100      | 0,120            | 0,140      |
| allg. Stähle General steels <1400 N/mm <sup>2</sup>                                | 4,00        | 0,030          | 0,040            | 0,050      | 0,060            | 0,080      |
| <b>P</b> Vergütungsstähle<br>Tempering steel <850N/mm <sup>2</sup>                 | 22,00       | 0,060          | 0,080            | 0,100      | 0,120            | 0,140      |
| Vergütungsstähle<br>Tempering steel <1000N/mm <sup>2</sup>                         | 8,00        | 0,040          | 0,050            | 0,070      | 0,080            | 0,100      |
| Vergütungsstähle<br>Tempering steel <1400N/mm <sup>2</sup>                         | 4,00        | 0,030          | 0,040            | 0,050      | 0,060            | 0,080      |
| Vergütungsstähle<br>Tempering steel >1400N/mm <sup>2</sup>                         | 4,00        | 0,030          | 0,040            | 0,050      | 0,060            | 0,080      |
| <b>M</b> Rost und säurebeständige Stähle<br>Stainless steels <700N/mm <sup>2</sup> | 7,00        | 0,050          | 0,060            | 0,070      | 0,080            | 0,090      |
| Rost und säurebeständige Stähle<br>Stainless steels >700N/mm <sup>2</sup>          | 7,00        | 0,050          | 0,060            | 0,070      | 0,080            | 0,090      |
| <b>K</b> Gusseisen Cast iron <180 HB                                               | 20,00       | 0,100          | 0,120            | 0,160      | 0,200            | 0,250      |
| Temperguss Malleable cast iron                                                     | 20,00       | 0,100          | 0,120            | 0,160      | 0,200            | 0,250      |
| Gusseisen mit Kugelgraphit<br>Nodular cast iron                                    | 12,00       | 0,070          | 0,080            | 0,120      | 0,160            | 0,200      |
| <b>N</b> AL- und AL-Legierungen<br>AL and AL-alloys <6% Si                         | 70,00       | 0,120          | 0,140            | 0,180      | 0,220            | 0,260      |
| AL- und AL-Legierungen<br>AL and AL-alloys <12% Si                                 | 33,00       | 0,100          | 0,120            | 0,140      | 0,180            | 0,220      |
| AL- und AL-Legierungen<br>AL and AL-alloys >12% Si                                 | 20,00       | 0,100          | 0,120            | 0,140      | 0,180            | 0,220      |
| Kupfer, Messing, Bronze, Rotguss<br>Copper, brass, bronze, red brass               | 50,00       | 0,120          | 0,140            | 0,180      | 0,200            | 0,240      |
| Kunststoff - Thermoplaste Thermoplast                                              | 35,00       | 0,120          | 0,140            | 0,180      | 0,200            | 0,240      |
| Duroplaste Duroplast                                                               | 30,00       | 0,120          | 0,140            | 0,180      | 0,200            | 0,240      |
| <b>S</b> Titan Titanium                                                            | 7,00        | 0,050          | 0,060            | 0,070      | 0,080            | 0,090      |

**E.4617.0**

## HSSE-Maschinenreibahlen HSSE machine reamers



\*=Form B



Preise siehe Preisliste Seite 25 Price List page 25



| Artikelnummer<br>Article-No. | d1 H7 | l2 | l3 | l1 | d2 h9 | Zähne<br>flutes |
|------------------------------|-------|----|----|----|-------|-----------------|
| E.4617.0.0150                | 1,5*  | 8  | 18 | 40 | 1,5   | 3               |
| E.4617.0.0200                | 2,0*  | 11 | 24 | 49 | 2,0   | 4               |
| E.4617.0.0250                | 2,5*  | 14 | 29 | 57 | 2,5   | 4               |
| E.4617.0.0300                | 3,0   | 15 | 33 | 61 | 3,0   | 6               |
| E.4617.0.0350                | 3,5   | 18 | 42 | 70 | 3,5   | 6               |
| E.4617.0.0400                | 4,0   | 19 | 47 | 75 | 4,0   | 6               |
| E.4617.0.0450                | 4,5   | 21 | 52 | 80 | 4,5   | 6               |

Fortsetzung auf nächster Seite  
Continued on next page



Senker und Reibahlen HSS / HSSE  
Countersinks and reamers HSS / HSSE

Fortsetzung  
Continuation

| Artikelnummer<br>Article-No. | d1 H7 | l2 | l3  | l1  | d2 h9 | Zähne<br>flutes |
|------------------------------|-------|----|-----|-----|-------|-----------------|
| E.4617.0.0500                | 5,0   | 23 | 58  | 86  | 5,0   | 6               |
| E.4617.0.0550                | 5,5   | 26 | 57  | 93  | 5,6   | 6               |
| E.4617.0.0600                | 6,0   | 26 | 57  | 93  | 5,6   | 6               |
| E.4617.0.0650                | 6,5   | 28 | 65  | 101 | 6,3   | 6               |
| E.4617.0.0700                | 7,0   | 31 | 73  | 109 | 7,1   | 6               |
| E.4617.0.0800                | 8,0   | 33 | 81  | 117 | 8,0   | 6               |
| E.4617.0.0900                | 9,0   | 36 | 85  | 125 | 9,0   | 6               |
| E.4617.0.1000                | 10,0  | 38 | 93  | 133 | 10,0  | 6               |
| E.4617.0.1200                | 12,0  | 44 | 111 | 151 | 10,0  | 6               |
| E.4617.0.1300                | 13,0  | 44 | 111 | 151 | 10,0  | 8               |
| E.4617.0.1400                | 14,0  | 47 | 115 | 160 | 12,5  | 8               |
| E.4617.0.1500                | 15,0  | 50 | 117 | 162 | 12,5  | 8               |
| E.4617.0.1600                | 16,0  | 52 | 125 | 170 | 12,5  | 8               |
| E.4617.0.1700                | 17,0  | 54 | 130 | 175 | 14,0  | 8               |
| E.4617.0.1800                | 18,0  | 56 | 137 | 182 | 14,0  | 8               |
| E.4617.0.2000                | 20,0  | 60 | 147 | 195 | 16,0  | 8               |

Individuelle Schnittdaten online im  
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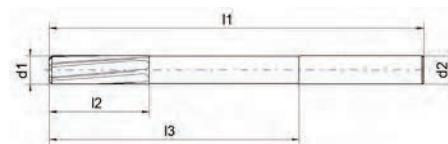


| Materialbezeichnung<br>material description                                        | Vc<br>m/min | f mm/U         |                |                |                |                |                      |                      |                      |
|------------------------------------------------------------------------------------|-------------|----------------|----------------|----------------|----------------|----------------|----------------------|----------------------|----------------------|
|                                                                                    |             | Ø<br>1.50-2.50 | Ø<br>3.00-3.50 | Ø<br>4.00-5.50 | Ø<br>6.00-7.00 | Ø<br>8.00-9.00 | Ø<br>10.00-<br>14.00 | Ø<br>15.00-<br>17.00 | Ø<br>18.00-<br>20.00 |
| <b>P</b> allg. Stähle General steels <500 N/mm <sup>2</sup>                        | 10,00       | 0,080          | 0,100          | 0,110          | 0,120          | 0,140          | 0,160                | 0,200                | 0,250                |
| allg. Stähle General steels <700 N/mm <sup>2</sup>                                 | 8,00        | 0,080          | 0,100          | 0,110          | 0,120          | 0,140          | 0,160                | 0,200                | 0,250                |
| allg. Stähle General steels <850 N/mm <sup>2</sup>                                 | 8,00        | 0,080          | 0,100          | 0,110          | 0,120          | 0,140          | 0,160                | 0,200                | 0,250                |
| allg. Stähle General steels <1000 N/mm <sup>2</sup>                                | 5,00        | 0,060          | 0,080          | 0,090          | 0,100          | 0,120          | 0,140                | 0,170                | 0,200                |
| allg. Stähle General steels <1400 N/mm <sup>2</sup>                                | 3,00        | 0,060          | 0,080          | 0,090          | 0,100          | 0,120          | 0,140                | 0,170                | 0,200                |
| Vergütungsstähle<br>Tempering steel <850N/mm <sup>2</sup>                          | 8,00        | 0,060          | 0,080          | 0,090          | 0,100          | 0,120          | 0,140                | 0,170                | 0,200                |
| Vergütungsstähle<br>Tempering steel <1000N/mm <sup>2</sup>                         | 5,00        | 0,060          | 0,080          | 0,090          | 0,100          | 0,120          | 0,140                | 0,170                | 0,200                |
| Vergütungsstähle<br>Tempering steel <1400N/mm <sup>2</sup>                         | 3,00        | 0,060          | 0,080          | 0,090          | 0,100          | 0,120          | 0,140                | 0,170                | 0,200                |
| Vergütungsstähle<br>Tempering steel >1400N/mm <sup>2</sup>                         | 2,00        | 0,060          | 0,080          | 0,090          | 0,100          | 0,120          | 0,140                | 0,170                | 0,200                |
| <b>M</b> Rost und säurebeständige Stähle<br>Stainless steels <700N/mm <sup>2</sup> | 7,00        | 0,060          | 0,080          | 0,090          | 0,100          | 0,120          | 0,140                | 0,170                | 0,200                |
| Rost und säurebeständige Stähle<br>Stainless steels >700N/mm <sup>2</sup>          | 4,00        | 0,060          | 0,080          | 0,090          | 0,100          | 0,120          | 0,140                | 0,170                | 0,200                |
| <b>K</b> Gusseisen Cast iron <180 HB                                               | 8,00        | 0,120          | 0,180          | 0,190          | 0,200          | 0,220          | 0,230                | 0,260                | 0,300                |
| Temperguss Malleable cast iron                                                     | 8,00        | 0,100          | 0,120          | 0,140          | 0,160          | 0,170          | 0,180                | 0,220                | 0,250                |
| Gusseisen mit Kugelgraphit<br>Nodular cast iron                                    | 8,00        | 0,100          | 0,120          | 0,140          | 0,160          | 0,170          | 0,180                | 0,220                | 0,250                |
| <b>N</b> AL- und AL-Legierungen<br>AL und AL-alloys <6% Si                         | 18,00       | 0,120          | 0,180          | 0,190          | 0,200          | 0,210          | 0,230                | 0,260                | 0,300                |
| AL- und AL-Legierungen<br>AL und AL-alloys <12% Si                                 | 12,00       | 0,120          | 0,180          | 0,190          | 0,200          | 0,210          | 0,230                | 0,260                | 0,300                |
| AL- und AL-Legierungen<br>AL und AL-alloys >12% Si                                 | 10,00       | 0,120          | 0,180          | 0,190          | 0,200          | 0,210          | 0,230                | 0,260                | 0,300                |
| Kupfer, Messing, Bronze, Rotguss<br>Copper, brass, bronze, red brass               | 13,00       | 0,150          | 0,200          | 0,220          | 0,250          | 0,280          | 0,320                | 0,360                | 0,400                |
| <b>S</b> Titan Titanium                                                            | 5,00        | 0,060          | 0,080          | 0,090          | 0,100          | 0,120          | 0,140                | 0,170                | 0,200                |

**HSSE-Maschinenreibahlen, extra lang**  
HSSE machine reamers, extra long



Preise siehe Preisliste Seite 25 Price List page 25

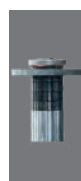


| Artikelnummer<br>Article-No. | d1 H7 | l2 | l3  | l1  | d2 h6 | Zähne<br>flutes |
|------------------------------|-------|----|-----|-----|-------|-----------------|
| E.4619.0.0200                | 2     | 11 | 45  | 65  | 2,0   | 4               |
| E.4619.0.0300                | 3     | 15 | 65  | 90  | 3,0   | 6               |
| E.4619.0.0400                | 4     | 19 | 70  | 105 | 4,0   | 6               |
| E.4619.0.0500                | 5     | 23 | 80  | 115 | 5,0   | 6               |
| E.4619.0.0600.130            | 6     | 26 | 90  | 130 | 6,0   | 6               |
| E.4619.0.0600.250            | 6     | 26 | 210 | 250 | 6,0   | 6               |
| E.4619.0.0700                | 7     | 31 | 95  | 140 | 7,0   | 6               |
| E.4619.0.0800.160            | 8     | 33 | 115 | 160 | 8,0   | 6               |
| E.4619.0.0800.250            | 8     | 33 | 205 | 250 | 8,0   | 6               |
| E.4619.0.1000.190            | 10    | 38 | 140 | 190 | 10,0  | 6               |
| E.4619.0.1000.250            | 10    | 38 | 200 | 250 | 10,0  | 6               |
| E.4619.0.1200                | 12    | 44 | 160 | 210 | 12,0  | 6               |



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| Materialbezeichnung<br>material description                          | Vc<br>m/min | f mm/U         |                |                |           |                  |
|----------------------------------------------------------------------|-------------|----------------|----------------|----------------|-----------|------------------|
|                                                                      |             | Ø<br>2.00-3.00 | Ø<br>4.00-5.00 | Ø<br>6.00-7.00 | Ø<br>8.00 | Ø<br>10.00-12.00 |
| <b>P</b> allg. Stähle General steels <500 N/mm <sup>2</sup>          | 11,00       | 0,090          | 0,110          | 0,120          | 0,140     | 0,160            |
| allg. Stähle General steels <700 N/mm <sup>2</sup>                   | 9,00        | 0,090          | 0,110          | 0,120          | 0,140     | 0,160            |
| allg. Stähle General steels <850 N/mm <sup>2</sup>                   | 8,00        | 0,090          | 0,110          | 0,120          | 0,140     | 0,160            |
| allg. Stähle General steels <1000 N/mm <sup>2</sup>                  | 5,00        | 0,070          | 0,090          | 0,100          | 0,120     | 0,140            |
| allg. Stähle General steels <1400 N/mm <sup>2</sup>                  | 4,00        | 0,070          | 0,090          | 0,100          | 0,120     | 0,140            |
| Vergütungsstähle<br>Tempering steel <850N/mm <sup>2</sup>            | 8,00        | 0,070          | 0,090          | 0,100          | 0,120     | 0,140            |
| Vergütungsstähle<br>Tempering steel <1000N/mm <sup>2</sup>           | 5,00        | 0,070          | 0,090          | 0,100          | 0,120     | 0,140            |
| Vergütungsstähle<br>Tempering steel <1400N/mm <sup>2</sup>           | 4,00        | 0,070          | 0,090          | 0,100          | 0,120     | 0,140            |
| Vergütungsstähle<br>Tempering steel >1400N/mm <sup>2</sup>           | 4,00        | 0,070          | 0,090          | 0,100          | 0,120     | 0,140            |
| <b>K</b> Gusseisen Cast iron <180 HB                                 | 10,00       | 0,150          | 0,190          | 0,200          | 0,220     | 0,230            |
| Temperguss Malleable cast iron                                       | 6,00        | 0,110          | 0,140          | 0,160          | 0,170     | 0,180            |
| <b>N</b> AL- und AL-Legierungen<br>AL und AL-alloys <6% Si           | 15,00       | 0,150          | 0,190          | 0,200          | 0,220     | 0,230            |
| AL- und AL-Legierungen<br>AL und AL-alloys <12% Si                   | 15,00       | 0,130          | 0,170          | 0,190          | 0,200     | 0,210            |
| Kupfer, Messing, Bronze, Rotguss<br>Copper, brass, bronze, red brass | 12,00       | 0,180          | 0,220          | 0,250          | 0,280     | 0,320            |
| <b>S</b> Titan Titanium                                              | 5,00        | 0,070          | 0,090          | 0,100          | 0,120     | 0,140            |





## Senker und Reibahlen HSS / HSSE

Countersinks and reamers HSS / HSSE

**E.4624.0**

### HSS-Handreibahlen

HSS hand reamers



HSS/E



VHM



HSS/E



VHM



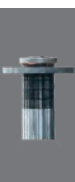
HPC/TPC



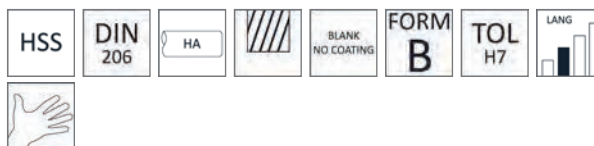
VHM



HSSE



i



Preise siehe Preisliste Seite 25 Price List page 25

| Artikelnummer<br>Article-No. | d1 H7 | l2  | l1  | d2 e9 | Zähne<br>flutes |
|------------------------------|-------|-----|-----|-------|-----------------|
| E.4624.0.0200                | 2     | 25  | 50  | 2,0   | 4               |
| E.4624.0.0300                | 3     | 32  | 62  | 3,0   | 6               |
| E.4624.0.0400                | 4     | 38  | 76  | 4,0   | 6               |
| E.4624.0.0500                | 5     | 44  | 87  | 5,0   | 6               |
| E.4624.0.0600                | 6     | 47  | 93  | 6,0   | 6               |
| E.4624.0.0700                | 7     | 54  | 107 | 7,0   | 6               |
| E.4624.0.0800                | 8     | 58  | 115 | 8,0   | 6               |
| E.4624.0.0900                | 9     | 62  | 124 | 9,0   | 6               |
| E.4624.0.1000                | 10    | 66  | 133 | 10,0  | 6               |
| E.4624.0.1200                | 12    | 76  | 152 | 12,0  | 6               |
| E.4624.0.1400                | 14    | 81  | 163 | 14,0  | 8               |
| E.4624.0.1600                | 16    | 87  | 175 | 16,0  | 8               |
| E.4624.0.1800                | 18    | 93  | 188 | 18,0  | 8               |
| E.4624.0.2000                | 20    | 100 | 201 | 20,0  | 8               |

**HSSE-NC-Maschinenreibahlen**  
HSSE NC machine reamers



Preise siehe Preisliste Seite 25 Price List page 25

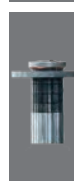
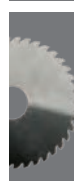


| Artikelnummer<br>Article-No. | d1 H7 | l2 | l3  | l1  | d2 h6 | Zähne<br>flutes |
|------------------------------|-------|----|-----|-----|-------|-----------------|
| E.4628.0.0300                | 3     | 15 | 33  | 61  | 3,0   | 6               |
| E.4628.0.0400                | 4     | 19 | 47  | 75  | 4,0   | 6               |
| E.4628.0.0500                | 5     | 23 | 58  | 86  | 5,0   | 6               |
| E.4628.0.0600                | 6     | 26 | 57  | 93  | 6,0   | 6               |
| E.4628.0.0800                | 8     | 33 | 81  | 117 | 8,0   | 6               |
| E.4628.0.1000                | 10    | 38 | 93  | 133 | 10,0  | 6               |
| E.4628.0.1200                | 12    | 44 | 111 | 151 | 10,0  | 6               |
| E.4628.0.1400                | 14    | 47 | 115 | 160 | 14,0  | 8               |
| E.4628.0.1600                | 16    | 52 | 125 | 170 | 14,0  | 8               |



Individuelle Schnittdaten online im  
Schnittdaten-Rechner berechnen lassen:  
Calculate individual cutting  
data online in the cutting data calculator:  
[www.nachreiner-schnittdaten.eu](http://www.nachreiner-schnittdaten.eu)

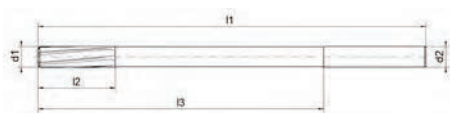
| Materialbezeichnung<br>material description                                        | Vc<br>m/min | f mm/U    |                |           |           |                  |                  |
|------------------------------------------------------------------------------------|-------------|-----------|----------------|-----------|-----------|------------------|------------------|
|                                                                                    |             | Ø<br>3.00 | Ø<br>4.00-5.00 | Ø<br>6.00 | Ø<br>8.00 | Ø<br>10.00-12.00 | Ø<br>14.00-16.00 |
| <b>P</b> allg. Stähle General steels <500 N/mm <sup>2</sup>                        | 11,00       | 0,100     | 0,110          | 0,120     | 0,140     | 0,160            | 0,200            |
| allg. Stähle General steels <700 N/mm <sup>2</sup>                                 | 9,00        | 0,100     | 0,110          | 0,120     | 0,140     | 0,160            | 0,200            |
| allg. Stähle General steels <850 N/mm <sup>2</sup>                                 | 8,00        | 0,100     | 0,110          | 0,120     | 0,140     | 0,160            | 0,200            |
| allg. Stähle General steels <1000 N/mm <sup>2</sup>                                | 5,00        | 0,080     | 0,090          | 0,100     | 0,120     | 0,140            | 0,170            |
| allg. Stähle General steels <1400 N/mm <sup>2</sup>                                | 4,00        | 0,080     | 0,090          | 0,100     | 0,120     | 0,140            | 0,170            |
| <b>P</b> Vergütungstähle<br>Tempering steel <850N/mm <sup>2</sup>                  | 8,00        | 0,080     | 0,090          | 0,100     | 0,120     | 0,140            | 0,170            |
| Vergütungstähle<br>Tempering steel <1000N/mm <sup>2</sup>                          | 5,00        | 0,080     | 0,090          | 0,100     | 0,120     | 0,140            | 0,170            |
| Vergütungstähle<br>Tempering steel <1400N/mm <sup>2</sup>                          | 4,00        | 0,080     | 0,090          | 0,100     | 0,120     | 0,140            | 0,170            |
| Vergütungstähle<br>Tempering steel >1400N/mm <sup>2</sup>                          | 4,00        | 0,080     | 0,090          | 0,100     | 0,120     | 0,140            | 0,170            |
| <b>M</b> Rost und säurebeständige Stähle<br>Stainless steels <700N/mm <sup>2</sup> | 7,00        | 0,080     | 0,090          | 0,100     | 0,120     | 0,140            | 0,170            |
| Rost und säurebeständige Stähle<br>Stainless steels >700N/mm <sup>2</sup>          | 5,00        | 0,080     | 0,090          | 0,100     | 0,120     | 0,140            | 0,170            |
| <b>K</b> Gusseisen Cast iron <180 HB                                               | 10,00       | 0,180     | 0,190          | 0,200     | 0,220     | 0,230            | 0,260            |
| Temperguss Malleable cast iron                                                     | 7,00        | 0,130     | 0,140          | 0,160     | 0,170     | 0,180            | 0,220            |
| Gusseisen mit Kugelgraphit<br>Nodular cast iron                                    | 5,00        | 0,110     | 0,120          | 0,140     | 0,150     | 0,160            | 0,200            |
| <b>N</b> AL- und AL-Legierungen<br>AL und AL-alloys <6% Si                         | 25,00       | 0,180     | 0,190          | 0,200     | 0,210     | 0,230            | 0,260            |
| AL- und AL-Legierungen<br>AL und AL-alloys <12% Si                                 | 23,00       | 0,180     | 0,190          | 0,200     | 0,210     | 0,230            | 0,260            |
| AL- und AL-Legierungen<br>AL und AL-alloys >12% Si                                 | 20,00       | 0,180     | 0,190          | 0,320     | 0,210     | 0,230            | 0,260            |
| <b>S</b> Kupfer, Messing, Bronze, Rotguss<br>Copper, brass, bronze, red brass      | 13,00       | 0,210     | 0,220          | 0,250     | 0,280     | 0,320            | 0,360            |
| Nickelbasierende Stähle Nickel based alloys                                        | 6,00        | 0,080     | 0,120          | 0,170     | 0,190     | 0,225            | 0,225            |
| Titan Titanium                                                                     | 5,00        | 0,080     | 0,090          | 0,100     | 0,120     | 0,140            | 0,170            |





**E.4616.0**

**HSSE-Maschinenreibahlen**  
HSSE machine reamers



Preise siehe Preisliste Seite 25 Price List page 25

| Artikelnummer<br>Article-No. | d1 0/+0,003 | l2   | l3   | l1 | d2 h6 | Zähne<br>flutes |
|------------------------------|-------------|------|------|----|-------|-----------------|
| E.4616.0.0097                | 0,97        | 5,5  | 15,0 | 34 | 1,0   | 3               |
| E.4616.0.0098                | 0,98        | 5,5  | 15,0 | 34 | 1,0   | 3               |
| E.4616.0.0099                | 0,99        | 5,5  | 15,0 | 34 | 1,0   | 3               |
| E.4616.0.0100                | 1,00        | 5,5  | 15,0 | 34 | 1,0   | 3               |
| E.4616.0.0101                | 1,01        | 5,5  | 15,0 | 34 | 1,0   | 3               |
| E.4616.0.0102                | 1,02        | 5,5  | 15,0 | 34 | 1,0   | 3               |
| E.4616.0.0103                | 1,03        | 5,5  | 15,0 | 34 | 1,0   | 3               |
| E.4616.0.0104                | 1,04        | 5,5  | 15,0 | 34 | 1,0   | 3               |
| E.4616.0.0105                | 1,05        | 5,5  | 15,0 | 34 | 1,0   | 3               |
| E.4616.0.0110                | 1,10        | 6,5  | 15,5 | 36 | 1,0   | 3               |
| E.4616.0.0120                | 1,20        | 8,0  | 16,5 | 38 | 2,0   | 3               |
| E.4616.0.0130                | 1,30        | 8,0  | 16,5 | 38 | 2,0   | 3               |
| E.4616.0.0140                | 1,40        | 8,0  | 18,0 | 40 | 2,0   | 3               |
| E.4616.0.0150                | 1,50        | 8,0  | 18,0 | 40 | 2,0   | 3               |
| E.4616.0.0160                | 1,60        | 9,0  | 20,0 | 43 | 2,0   | 4               |
| E.4616.0.0170                | 1,70        | 9,0  | 20,0 | 43 | 2,0   | 4               |
| E.4616.0.0180                | 1,80        | 10,0 | 22,0 | 46 | 2,0   | 4               |
| E.4616.0.0196                | 1,96        | 11,0 | 24,0 | 49 | 2,0   | 4               |
| E.4616.0.0197                | 1,97        | 11,0 | 24,0 | 49 | 2,0   | 4               |
| E.4616.0.0198                | 1,98        | 11,0 | 24,0 | 49 | 2,0   | 4               |
| E.4616.0.0199                | 1,99        | 11,0 | 24,0 | 49 | 2,0   | 4               |
| E.4616.0.0200                | 2,00        | 11,0 | 24,0 | 49 | 2,0   | 4               |
| E.4616.0.0201                | 2,01        | 11,0 | 24,0 | 49 | 2,0   | 4               |
| E.4616.0.0202                | 2,02        | 11,0 | 24,0 | 49 | 2,0   | 4               |
| E.4616.0.0203                | 2,03        | 11,0 | 24,0 | 49 | 2,0   | 4               |
| E.4616.0.0204                | 2,04        | 11,0 | 24,0 | 49 | 2,0   | 4               |
| E.4616.0.0205                | 2,05        | 11,0 | 24,0 | 49 | 2,0   | 4               |
| E.4616.0.0210                | 2,10        | 11,0 | 24,0 | 49 | 2,0   | 4               |
| E.4616.0.0220                | 2,20        | 12,0 | 25,0 | 53 | 3,0   | 4               |
| E.4616.0.0230                | 2,30        | 12,0 | 25,0 | 53 | 3,0   | 4               |
| E.4616.0.0240                | 2,40        | 14,0 | 29,0 | 57 | 3,0   | 4               |
| E.4616.0.0250                | 2,50        | 14,0 | 29,0 | 57 | 3,0   | 4               |
| E.4616.0.0260                | 2,60        | 14,0 | 29,0 | 57 | 3,0   | 4               |
| E.4616.0.0270                | 2,70        | 15,0 | 33,0 | 61 | 3,0   | 4               |
| E.4616.0.0280                | 2,80        | 15,0 | 33,0 | 61 | 3,0   | 6               |
| E.4616.0.0290                | 2,90        | 15,0 | 33,0 | 61 | 3,0   | 6               |
| E.4616.0.0296                | 2,96        | 15,0 | 33,0 | 61 | 3,0   | 6               |

Fortsetzung auf nächster Seite  
Continued on next page

| Artikelnummer<br>Article-No. | d1 0/+0,003 | l2   | l3   | l1 | d2 h6 | Zähne<br>flutes |
|------------------------------|-------------|------|------|----|-------|-----------------|
| E.4616.0.0297                | 2,97        | 15,0 | 33,0 | 61 | 3,0   | 6               |
| E.4616.0.0298                | 2,98        | 15,0 | 33,0 | 61 | 3,0   | 6               |
| E.4616.0.0299                | 2,99        | 15,0 | 33,0 | 61 | 3,0   | 6               |
| E.4616.0.0300                | 3,00        | 15,0 | 33,0 | 61 | 3,0   | 6               |
| E.4616.0.0301                | 3,01        | 16,0 | 37,0 | 65 | 4,0   | 6               |
| E.4616.0.0302                | 3,02        | 16,0 | 37,0 | 65 | 4,0   | 6               |
| E.4616.0.0303                | 3,03        | 16,0 | 37,0 | 65 | 4,0   | 6               |
| E.4616.0.0304                | 3,04        | 16,0 | 37,0 | 65 | 4,0   | 6               |
| E.4616.0.0305                | 3,05        | 16,0 | 37,0 | 65 | 4,0   | 6               |
| E.4616.0.0310                | 3,10        | 16,0 | 37,0 | 65 | 4,0   | 6               |
| E.4616.0.0320                | 3,20        | 16,0 | 37,0 | 65 | 4,0   | 6               |
| E.4616.0.0330                | 3,30        | 16,0 | 37,0 | 65 | 4,0   | 6               |
| E.4616.0.0340                | 3,40        | 18,0 | 42,0 | 70 | 4,0   | 6               |
| E.4616.0.0350                | 3,50        | 18,0 | 42,0 | 70 | 4,0   | 6               |
| E.4616.0.0360                | 3,60        | 18,0 | 42,0 | 70 | 4,0   | 6               |
| E.4616.0.0370                | 3,70        | 18,0 | 42,0 | 70 | 4,0   | 6               |
| E.4616.0.0380                | 3,80        | 19,0 | 47,0 | 75 | 4,0   | 6               |
| E.4616.0.0390                | 3,90        | 19,0 | 47,0 | 75 | 4,0   | 6               |
| E.4616.0.0396                | 3,96        | 19,0 | 47,0 | 75 | 4,0   | 6               |
| E.4616.0.0397                | 3,97        | 19,0 | 47,0 | 75 | 4,0   | 6               |
| E.4616.0.0398                | 3,98        | 19,0 | 47,0 | 75 | 4,0   | 6               |
| E.4616.0.0399                | 3,99        | 19,0 | 47,0 | 75 | 4,0   | 6               |
| E.4616.0.0400                | 4,00        | 19,0 | 47,0 | 75 | 4,0   | 6               |
| E.4616.0.0401                | 4,01        | 19,0 | 47,0 | 75 | 4,0   | 6               |
| E.4616.0.0402                | 4,02        | 19,0 | 47,0 | 75 | 4,0   | 6               |
| E.4616.0.0403                | 4,03        | 19,0 | 47,0 | 75 | 4,0   | 6               |
| E.4616.0.0404                | 4,04        | 19,0 | 47,0 | 75 | 4,0   | 6               |
| E.4616.0.0405                | 4,05        | 19,0 | 47,0 | 75 | 4,0   | 6               |
| E.4616.0.0410                | 4,10        | 19,0 | 47,0 | 75 | 4,0   | 6               |
| E.4616.0.0420                | 4,20        | 19,0 | 47,0 | 75 | 4,0   | 6               |
| E.4616.0.0430                | 4,30        | 21,0 | 52,0 | 80 | 5,0   | 6               |
| E.4616.0.0440                | 4,40        | 21,0 | 52,0 | 80 | 5,0   | 6               |
| E.4616.0.0450                | 4,50        | 21,0 | 52,0 | 80 | 5,0   | 6               |
| E.4616.0.0460                | 4,60        | 21,0 | 52,0 | 80 | 5,0   | 6               |
| E.4616.0.0470                | 4,70        | 21,0 | 52,0 | 80 | 5,0   | 6               |
| E.4616.0.0480                | 4,80        | 23,0 | 52,0 | 86 | 5,0   | 6               |
| E.4616.0.0490                | 4,90        | 23,0 | 52,0 | 86 | 5,0   | 6               |
| E.4616.0.0496                | 4,96        | 23,0 | 52,0 | 86 | 5,0   | 6               |
| E.4616.0.0497                | 4,97        | 23,0 | 52,0 | 86 | 5,0   | 6               |
| E.4616.0.0498                | 4,98        | 23,0 | 52,0 | 86 | 5,0   | 6               |
| E.4616.0.0499                | 4,99        | 23,0 | 52,0 | 86 | 5,0   | 6               |
| E.4616.0.0500                | 5,00        | 23,0 | 52,0 | 86 | 5,0   | 6               |
| E.4616.0.0501                | 5,01        | 23,0 | 52,0 | 86 | 5,0   | 6               |
| E.4616.0.0502                | 5,02        | 23,0 | 52,0 | 86 | 5,0   | 6               |
| E.4616.0.0503                | 5,03        | 23,0 | 52,0 | 86 | 5,0   | 6               |
| E.4616.0.0504                | 5,04        | 23,0 | 52,0 | 86 | 5,0   | 6               |
| E.4616.0.0505                | 5,05        | 23,0 | 52,0 | 86 | 5,0   | 6               |
| E.4616.0.0510                | 5,10        | 23,0 | 52,0 | 86 | 5,0   | 6               |

Fortsetzung auf nächster Seite  
Continued on next page





# Senker und Reibahlen HSS / HSSE

## Countersinks and reamers HSS / HSSE

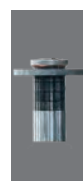
Fortsetzung  
Continuation

| Artikelnummer<br>Article-No. | d1 0/+0,003 | l2   | l3   | l1  | d2 h6 | Zähne<br>flutes |
|------------------------------|-------------|------|------|-----|-------|-----------------|
| E.4616.0.0520                | 5,20        | 23,0 | 52,0 | 86  | 5,0   | 6               |
| E.4616.0.0530                | 5,30        | 23,0 | 52,0 | 86  | 5,0   | 6               |
| E.4616.0.0540                | 5,40        | 26,0 | 57,0 | 93  | 6,0   | 6               |
| E.4616.0.0550                | 5,50        | 26,0 | 57,0 | 93  | 6,0   | 6               |
| E.4616.0.0560                | 5,60        | 26,0 | 57,0 | 93  | 6,0   | 6               |
| E.4616.0.0580                | 5,80        | 26,0 | 57,0 | 93  | 6,0   | 6               |
| E.4616.0.0590                | 5,90        | 26,0 | 57,0 | 93  | 6,0   | 6               |
| E.4616.0.0596                | 5,96        | 26,0 | 57,0 | 93  | 6,0   | 6               |
| E.4616.0.0597                | 5,97        | 26,0 | 57,0 | 93  | 6,0   | 6               |
| E.4616.0.0598                | 5,98        | 26,0 | 57,0 | 93  | 6,0   | 6               |
| E.4616.0.0599                | 5,99        | 26,0 | 57,0 | 93  | 6,0   | 6               |
| E.4616.0.0600                | 6,00        | 26,0 | 57,0 | 93  | 6,0   | 6               |
| E.4616.0.0601                | 6,01        | 28,0 | 65,0 | 101 | 6,0   | 6               |
| E.4616.0.0602                | 6,02        | 28,0 | 65,0 | 101 | 6,0   | 6               |
| E.4616.0.0603                | 6,03        | 28,0 | 65,0 | 101 | 6,0   | 6               |
| E.4616.0.0604                | 6,04        | 28,0 | 65,0 | 101 | 6,0   | 6               |
| E.4616.0.0605                | 6,05        | 28,0 | 65,0 | 101 | 6,0   | 6               |
| E.4616.0.0610                | 6,10        | 28,0 | 65,0 | 101 | 6,0   | 6               |
| E.4616.0.0620                | 6,20        | 28,0 | 65,0 | 101 | 6,0   | 6               |
| E.4616.0.0630                | 6,30        | 28,0 | 65,0 | 101 | 6,0   | 6               |
| E.4616.0.0640                | 6,40        | 28,0 | 65,0 | 101 | 6,0   | 6               |
| E.4616.0.0650                | 6,50        | 28,0 | 65,0 | 101 | 6,0   | 6               |
| E.4616.0.0660                | 6,60        | 28,0 | 65,0 | 101 | 6,0   | 6               |
| E.4616.0.0680                | 6,80        | 31,0 | 73,0 | 109 | 8,0   | 6               |
| E.4616.0.0697                | 6,97        | 31,0 | 73,0 | 109 | 8,0   | 6               |
| E.4616.0.0698                | 6,98        | 31,0 | 73,0 | 109 | 8,0   | 6               |
| E.4616.0.0699                | 6,99        | 31,0 | 73,0 | 109 | 8,0   | 6               |
| E.4616.0.0700                | 7,00        | 31,0 | 73,0 | 109 | 8,0   | 6               |
| E.4616.0.0701                | 7,01        | 31,0 | 73,0 | 109 | 8,0   | 6               |
| E.4616.0.0702                | 7,02        | 31,0 | 73,0 | 109 | 8,0   | 6               |
| E.4616.0.0703                | 7,03        | 31,0 | 73,0 | 109 | 8,0   | 6               |
| E.4616.0.0705                | 7,05        | 31,0 | 73,0 | 109 | 8,0   | 6               |
| E.4616.0.0710                | 7,10        | 31,0 | 73,0 | 109 | 8,0   | 6               |
| E.4616.0.0730                | 7,30        | 31,0 | 73,0 | 109 | 8,0   | 6               |
| E.4616.0.0740                | 7,40        | 31,0 | 73,0 | 109 | 8,0   | 6               |
| E.4616.0.0750                | 7,50        | 31,0 | 73,0 | 109 | 8,0   | 6               |
| E.4616.0.0760                | 7,60        | 33,0 | 81,0 | 117 | 8,0   | 6               |
| E.4616.0.0770                | 7,70        | 33,0 | 81,0 | 117 | 8,0   | 6               |
| E.4616.0.0780                | 7,80        | 33,0 | 81,0 | 117 | 8,0   | 6               |
| E.4616.0.0796                | 7,96        | 33,0 | 81,0 | 117 | 8,0   | 6               |
| E.4616.0.0797                | 7,97        | 33,0 | 81,0 | 117 | 8,0   | 6               |
| E.4616.0.0798                | 7,98        | 33,0 | 81,0 | 117 | 8,0   | 6               |
| E.4616.0.0799                | 7,99        | 33,0 | 81,0 | 117 | 8,0   | 6               |
| E.4616.0.0800                | 8,00        | 33,0 | 81,0 | 117 | 8,0   | 6               |
| E.4616.0.0801                | 8,01        | 33,0 | 81,0 | 117 | 8,0   | 6               |
| E.4616.0.0802                | 8,02        | 33,0 | 81,0 | 117 | 8,0   | 6               |
| E.4616.0.0803                | 8,03        | 33,0 | 81,0 | 117 | 8,0   | 6               |
| E.4616.0.0804                | 8,04        | 33,0 | 81,0 | 117 | 8,0   | 6               |

Fortsetzung auf nächster Seite  
Continued on next page

| Artikelnummer<br>Article-No. | d1 0/+0,003 | l2   | l3    | l1  | d2 h6 | Zähne<br>flutes |
|------------------------------|-------------|------|-------|-----|-------|-----------------|
| E.4616.0.0805                | 8,05        | 33,0 | 81,0  | 117 | 8,0   | 6               |
| E.4616.0.0810                | 8,10        | 33,0 | 81,0  | 117 | 8,0   | 6               |
| E.4616.0.0820                | 8,20        | 33,0 | 81,0  | 117 | 8,0   | 6               |
| E.4616.0.0830                | 8,30        | 33,0 | 81,0  | 117 | 8,0   | 6               |
| E.4616.0.0840                | 8,40        | 33,0 | 81,0  | 117 | 8,0   | 6               |
| E.4616.0.0850                | 8,50        | 33,0 | 81,0  | 117 | 8,0   | 6               |
| E.4616.0.0860                | 8,60        | 36,0 | 85,0  | 125 | 10,0  | 6               |
| E.4616.0.0870                | 8,70        | 36,0 | 85,0  | 125 | 10,0  | 6               |
| E.4616.0.0880                | 8,80        | 36,0 | 85,0  | 125 | 10,0  | 6               |
| E.4616.0.0890                | 8,90        | 36,0 | 85,0  | 125 | 10,0  | 6               |
| E.4616.0.0896                | 8,96        | 36,0 | 85,0  | 125 | 10,0  | 6               |
| E.4616.0.0897                | 8,97        | 36,0 | 85,0  | 125 | 10,0  | 6               |
| E.4616.0.0898                | 8,98        | 36,0 | 85,0  | 125 | 10,0  | 6               |
| E.4616.0.0899                | 8,99        | 36,0 | 85,0  | 125 | 10,0  | 6               |
| E.4616.0.0900                | 9,00        | 36,0 | 85,0  | 125 | 10,0  | 6               |
| E.4616.0.0901                | 9,01        | 36,0 | 85,0  | 125 | 10,0  | 6               |
| E.4616.0.0902                | 9,02        | 36,0 | 85,0  | 125 | 10,0  | 6               |
| E.4616.0.0903                | 9,03        | 36,0 | 85,0  | 125 | 10,0  | 6               |
| E.4616.0.0904                | 9,04        | 36,0 | 85,0  | 125 | 10,0  | 6               |
| E.4616.0.0905                | 9,05        | 36,0 | 85,0  | 125 | 10,0  | 6               |
| E.4616.0.0950                | 9,50        | 36,0 | 85,0  | 125 | 10,0  | 6               |
| E.4616.0.0980                | 9,80        | 38,0 | 93,0  | 133 | 10,0  | 6               |
| E.4616.0.0996                | 9,96        | 38,0 | 93,0  | 133 | 10,0  | 6               |
| E.4616.0.0997                | 9,97        | 38,0 | 93,0  | 133 | 10,0  | 6               |
| E.4616.0.0998                | 9,98        | 38,0 | 93,0  | 133 | 10,0  | 6               |
| E.4616.0.0999                | 9,99        | 38,0 | 93,0  | 133 | 10,0  | 6               |
| E.4616.0.1000                | 10,00       | 38,0 | 93,0  | 133 | 10,0  | 6               |
| E.4616.0.1001                | 10,01       | 38,0 | 93,0  | 133 | 10,0  | 6               |
| E.4616.0.1002                | 10,02       | 38,0 | 93,0  | 133 | 10,0  | 6               |
| E.4616.0.1003                | 10,03       | 38,0 | 93,0  | 133 | 10,0  | 6               |
| E.4616.0.1004                | 10,04       | 38,0 | 93,0  | 133 | 10,0  | 6               |
| E.4616.0.1005                | 10,05       | 38,0 | 93,0  | 133 | 10,0  | 6               |
| E.4616.0.1010                | 10,10       | 38,0 | 93,0  | 133 | 10,0  | 6               |
| E.4616.0.1020                | 10,20       | 38,0 | 93,0  | 133 | 10,0  | 6               |
| E.4616.0.1030                | 10,30       | 38,0 | 93,0  | 133 | 10,0  | 6               |
| E.4616.0.1050                | 10,50       | 38,0 | 93,0  | 133 | 10,0  | 6               |
| E.4616.0.1098                | 10,98       | 41,0 | 102,0 | 142 | 10,0  | 6               |
| E.4616.0.1099                | 10,99       | 41,0 | 102,0 | 142 | 10,0  | 6               |
| E.4616.0.1100                | 11,00       | 41,0 | 102,0 | 142 | 10,0  | 6               |
| E.4616.0.1101                | 11,01       | 41,0 | 102,0 | 142 | 10,0  | 6               |
| E.4616.0.1102                | 11,02       | 41,0 | 102,0 | 142 | 10,0  | 6               |
| E.4616.0.1198                | 11,98       | 44,0 | 111,0 | 151 | 10,0  | 6               |
| E.4616.0.1199                | 11,99       | 44,0 | 111,0 | 151 | 10,0  | 6               |
| E.4616.0.1200                | 12,00       | 44,0 | 111,0 | 151 | 10,0  | 6               |
| E.4616.0.1201                | 12,01       | 44,0 | 111,0 | 151 | 10,0  | 6               |
| E.4616.0.1202                | 12,02       | 44,0 | 111,0 | 151 | 10,0  | 6               |
| E.4616.0.1203                | 12,03       | 44,0 | 111,0 | 151 | 10,0  | 6               |
| E.4616.0.1204                | 12,04       | 44,0 | 111,0 | 151 | 10,0  | 6               |

Fortsetzung auf nächster Seite  
Continued on next page





# Senker und Reibahlen HSS / HSSE

Countersinks and reamers HSS / HSSE

Fortsetzung  
Continuation

| Artikelnummer<br>Article-No. | d1 0/+0,003 | l2   | l3    | l1  | d2 h6 | Zähne<br>flutes |
|------------------------------|-------------|------|-------|-----|-------|-----------------|
| E.4616.0.1205                | 12,05       | 44,0 | 111,0 | 151 | 10,0  | 6               |
| E.4616.0.1298                | 12,98       | 44,0 | 111,0 | 151 | 10,0  | 8               |
| E.4616.0.1299                | 12,99       | 44,0 | 111,0 | 151 | 10,0  | 8               |
| E.4616.0.1300                | 13,00       | 44,0 | 111,0 | 151 | 10,0  | 8               |
| E.4616.0.1301                | 13,01       | 44,0 | 111,0 | 151 | 10,0  | 8               |
| E.4616.0.1302                | 13,02       | 44,0 | 111,0 | 151 | 10,0  | 8               |

Individuelle Schnittdaten online im  
Schnittdaten-Rechner berechnen lassen:  
Calculate individual cutting  
data online in the cutting data calculator:  
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| Materialbezeichnung<br>material description |                                                                           | Vc<br>m/min | f mm/U         |                |                |                |                |                |                  |                  |
|---------------------------------------------|---------------------------------------------------------------------------|-------------|----------------|----------------|----------------|----------------|----------------|----------------|------------------|------------------|
|                                             |                                                                           |             | Ø<br>0.97-1.99 | Ø<br>2.00-2.99 | Ø<br>3.00-3.99 | Ø<br>4.00-5.99 | Ø<br>6.00-7.99 | Ø<br>8.00-9.99 | Ø<br>10.00-11.99 | Ø<br>12.00-13.02 |
| P                                           | allg. Stähle General steels <500 N/mm <sup>2</sup>                        | 11,00       | 0,080          | 0,090          | 0,100          | 0,110          | 0,120          | 0,140          | 0,160            | 0,180            |
|                                             | allg. Stähle General steels <700 N/mm <sup>2</sup>                        | 10,00       | 0,080          | 0,090          | 0,100          | 0,110          | 0,120          | 0,140          | 0,160            | 0,180            |
|                                             | allg. Stähle General steels <850 N/mm <sup>2</sup>                        | 9,00        | 0,080          | 0,090          | 0,100          | 0,110          | 0,120          | 0,140          | 0,160            | 0,180            |
|                                             | allg. Stähle General steels <1000 N/mm <sup>2</sup>                       | 6,00        | 0,060          | 0,070          | 0,080          | 0,090          | 0,100          | 0,120          | 0,140            | 0,160            |
|                                             | allg. Stähle General steels <1400 N/mm <sup>2</sup>                       | 3,00        | 0,060          | 0,070          | 0,080          | 0,090          | 0,100          | 0,120          | 0,140            | 0,160            |
|                                             | Vergütungsstähle<br>Tempering steel <850N/mm <sup>2</sup>                 | 9,00        | 0,060          | 0,070          | 0,080          | 0,090          | 0,100          | 0,120          | 0,140            | 0,160            |
|                                             | Vergütungsstähle<br>Tempering steel <1000N/mm <sup>2</sup>                | 6,00        | 0,060          | 0,070          | 0,080          | 0,090          | 0,100          | 0,120          | 0,140            | 0,160            |
|                                             | Vergütungsstähle<br>Tempering steel <1400N/mm <sup>2</sup>                | 3,00        | 0,060          | 0,070          | 0,080          | 0,090          | 0,100          | 0,120          | 0,140            | 0,160            |
|                                             | Vergütungsstähle<br>Tempering steel >1400N/mm <sup>2</sup>                | 3,00        | 0,060          | 0,070          | 0,080          | 0,090          | 0,100          | 0,120          | 0,140            | 0,160            |
|                                             | Rost und säurebeständige Stähle<br>Stainless steels <700N/mm <sup>2</sup> | 6,00        | 0,060          | 0,070          | 0,080          | 0,090          | 0,100          | 0,120          | 0,140            | 0,160            |
| M                                           | Rost und säurebeständige Stähle<br>Stainless steels >700N/mm <sup>2</sup> | 5,00        | 0,060          | 0,070          | 0,080          | 0,090          | 0,100          | 0,120          | 0,140            | 0,160            |
| K                                           | Gusseisen Cast iron <180 HB                                               | 10,00       | 0,120          | 0,150          | 0,180          | 0,190          | 0,200          | 0,220          | 0,230            | 0,250            |
|                                             | Temperguss Malleable cast iron                                            | 8,00        | 0,100          | 0,110          | 0,120          | 0,140          | 0,160          | 0,170          | 0,180            | 0,200            |
|                                             | Gusseisen mit Kugelgraphit<br>Nodular cast iron                           | 5,00        | 0,080          | 0,090          | 0,100          | 0,120          | 0,140          | 0,150          | 0,160            | 0,180            |
| N                                           | AL- und AL-Legierungen<br>AL und AL-alloys <6% Si                         | 18,00       | 0,120          | 0,160          | 0,180          | 0,190          | 0,200          | 0,210          | 0,230            | 0,250            |
|                                             | AL- und AL-Legierungen<br>AL und AL-alloys <12% Si                        | 15,00       | 0,120          | 0,160          | 0,180          | 0,190          | 0,200          | 0,210          | 0,230            | 0,250            |
|                                             | AL- und AL-Legierungen<br>AL und AL-alloys >12% Si                        | 13,00       | 0,120          | 0,160          | 0,180          | 0,190          | 0,200          | 0,210          | 0,230            | 0,250            |
|                                             | Kupfer, Messing, Bronze, Rotguss<br>Copper, brass, bronze, red brass      | 13,00       | 0,150          | 0,180          | 0,200          | 0,220          | 0,250          | 0,280          | 0,320            | 0,340            |
|                                             | Nickelbasierende Stähle Nickel based alloys                               | 6,00        | 0,060          | 0,080          | 0,110          | 0,150          | 0,150          | 0,200          | 0,200            | 0,225            |
| S                                           | Titan Titanium                                                            | 5,00        | 0,060          | 0,070          | 0,080          | 0,090          | 0,100          | 0,120          | 0,150            | 0,170            |