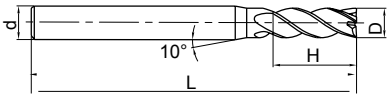
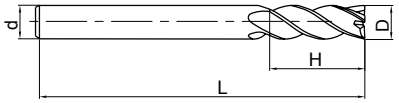
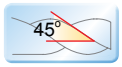
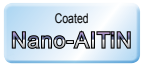
## HM-4E series for machining high hardness steel · HM-4E Serie für die Hartbearbeitung

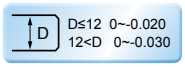
### 4-flute end mills with straight shank
### 4-Schneiden Schaftfräser mit Zylinderschaft




| Type Typ | Dimension(mm) Abmessungen | | | | Teeth Zähne Z | Geometry Ausführung | Grade Sorte KMG 555 |
|---|---|---|---|---|---|---|---|
| | D | d | H | L | | | |
| **HM-4E-D1.0S** | 1.0 | 4 | 3 | 50 | 4 | A | ● |
| **HM-4E-D1.5S** | 1.5 | 4 | 4 | 50 | 4 | A | ● |
| **HM-4E-D2.0S** | 2.0 | 4 | 6 | 50 | 4 | A | ● |
| **HM-4E-D2.5S** | 2.5 | 4 | 8 | 50 | 4 | A | ● |
| **HM-4E-D3.0S** | 3.0 | 4 | 8 | 50 | 4 | A | ● |
| **HM-4E-D4.0S** | 4.0 | 4 | 11 | 50 | 4 | B | ● |
| **HM-4E-D1.0** | 1.0 | 6 | 3 | 50 | 4 | A | ● |
| **HM-4E-D1.5** | 1.5 | 6 | 4 | 50 | 4 | A | ● |
| **HM-4E-D2.0** | 2.0 | 6 | 6 | 50 | 4 | A | ● |
| **HM-4E-D2.5** | 2.5 | 6 | 8 | 50 | 4 | A | ● |
| **HM-4E-D3.0** | 3.0 | 6 | 8 | 50 | 4 | A | ● |
| **HM-4E-D3.5** | 3.5 | 6 | 10 | 50 | 4 | A | ● |
| **HM-4E-D4.0** | 4.0 | 6 | 11 | 50 | 4 | A | ● |
| **HM-4E-D4.5** | 4.5 | 6 | 11 | 50 | 4 | A | ● |
| **HM-4E-D5.0** | 5.0 | 6 | 13 | 50 | 4 | A | ● |
| **HM-4E-D5.5** | 5.5 | 6 | 16 | 50 | 4 | A | ● |
| **HM-4E-D6.0** | 6.0 | 6 | 16 | 50 | 4 | B | ● |
| **HM-4E-D7.0** | 7.0 | 8 | 20 | 60 | 4 | A | ● |
| **HM-4E-D8.0** | 8.0 | 8 | 20 | 60 | 4 | B | ● |
| **HM-4E-D9.0** | 9.0 | 10 | 22 | 75 | 4 | A | ● |
| **HM-4E-D10.0** | 10.0 | 10 | 25 | 75 | 4 | B | ● |
| **HM-4E-D11.0** | 11.0 | 12 | 26 | 75 | 4 | A | ● |
| **HM-4E-D12.0** | 12.0 | 12 | 30 | 75 | 4 | B | ● |
| **HM-4E-D14.0** | 14.0 | 14 | 32 | 75 | 4 | B | ● |
| **HM-4E-D16.0** | 16.0 | 16 | 45 | 100 | 4 | B | ● |
| **HM-4E-D18.0** | 18.0 | 18 | 45 | 100 | 4 | B | ● |
| **HM-4E-D20.0** | 20.0 | 20 | 45 | 100 | 4 | B | ● |

### Material Overview · Material Übersicht

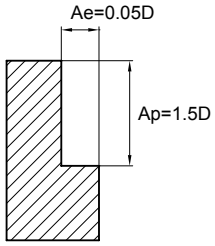
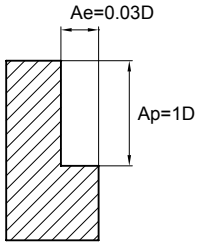
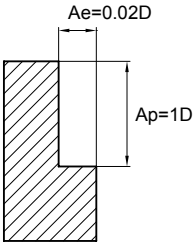
✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

| Workpiece material Werkstückstoff | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Carbon steel Kohlenstoff Stahl | Alloy steel Legierter Stahl | Quenched and tempered steel · Vergüteter Stahl | | Hardened steel · Gehärteter Stahl | | Stainless steel · Rostfreier Stahl | Cast iron, Nodular cast iron Grauguss GGG | Copper alloy Kupfer Leg | Aluminum alloy Alu Leg | Titanium alloy Titan Leg | Heat resist alloy warmfeste Leg |
| | | ~40HRC | ~50HRC | ~60HRC | ~68HRC | | | | | | |
| | | | ✔ | ✔ | ✔ | | ✔ | | | | |

● Ex Stock / ab Lager ○ On demand / auf Anfrage

## Recommended cutting data · Empfohlene Schnittdaten

### HM-4E | HM-4EL

| Workpiece material Werkstück-material | Pre-hardened steel, Hardened steel Vergüteter Stahl, Gehärteter Stahl 40~50HRC | | Hardened steel Gehärteter Stahl 50~60HRC | | Hardened steel Gehärteter Stahl 60~68HRC | |
|---|---|---|---|---|---|---|
| Diameter Ø Durchmesser (mm) | Rotating Drehzahl ($min^{-1}$) | Feed Vorschub (mm/min) | Rotating Drehzahl ($min^{-1}$) | Feed Vorschub (mm/min) | Rotating Drehzahl ($min^{-1}$) | Feed Vorschub (mm/min) |
| **1** | 40000 | 320 | 40000 | 320 | 32000 | 260 |
| **2** | 40000 | 800 | 24000 | 480 | 16000 | 320 |
| **3** | 32000 | 1020 | 16000 | 510 | 11000 | 350 |
| **4** | 24000 | 1250 | 12000 | 620 | 8000 | 420 |
| **5** | 19000 | 1360 | 9500 | 680 | 6400 | 460 |
| **6** | 16000 | 1540 | 8000 | 770 | 5300 | 510 |
| **8** | 12000 | 1540 | 6000 | 770 | 4000 | 510 |
| **10** | 9600 | 1540 | 4800 | 770 | 3200 | 510 |
| **12** | 8000 | 1600 | 4000 | 800 | 2700 | 540 |
| **14** | 6800 | 1340 | 3400 | 680 | 2300 | 460 |
| **16** | 6000 | 1200 | 3000 | 600 | 2000 | 400 |
| **18** | 5300 | 1060 | 2700 | 530 | 1800 | 360 |
| **20** | 4800 | 960 | 2400 | 480 | 1600 | 320 |
| Max. cutting depth max Schnitttiefe |  Maximum Ae=1.0mm | |  Maximum Ae=0.5mm | |  Maximum Ae=0.3mm | |

1.Please select machine and holder with high precision and rigidity.
2.Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
3.Please use air blow or MQL( minimum oil mist cooling).
4.Down milling is recommended in side milling.
5.Make overhang as short as possible if no interference.

1. Bitte präzise Maschinen und Werkzeughalter verwenden.
2. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
3. Bitte Luftkühlung oder MQL (Minimalmengen) benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Werkzeugauskragung so kurz wie möglich wählen.