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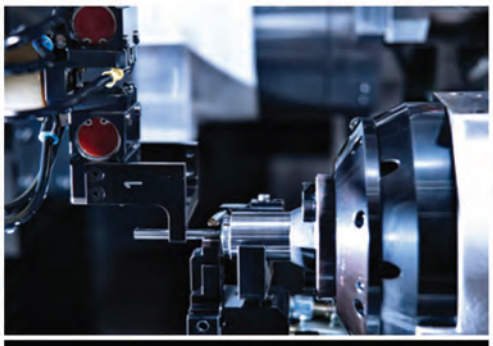
HPMT Industries Sdn Bhd, the leading producer of cutting tools in South-East Asia, with over 40 years of experience in tool design and manufacturing.

With the latest production machinery and in house R&D facilities, HPMT is progressively developing new tools to serve the ever demanding industrial market.

We are committed to design high-quality products manufactured with state-of the art technology to deliver high performance in every application. We work together with customers from various industries as their machining tools partner to identify the right tools for their applications or design customized tools to suit every customer's manufacturing environment : mould & die, automotive, electronics, oil & gas, aerospace, medical and more.




WALTER
HELITRONIC BASIC

# Index by Series

| Tipo / Type / Typ / Type | EDP | | N° Z | Helix Angle | Coating | Recess |
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| **Endmills for General Engineering** | | | | | | |
| EZ Line ≤ 35 HRC | C76 | DP/DH Endmills, 4 Flutes |  | a°≠ b° | G6110 | |
| SE 30 ≤ 35 HRC | 816 | Endmills, 2 Flutes |  | 40° | B0819 | |
| | 818 | Endmills, 3 Flutes |  | 40° | B0819 | |
| | 836 | Multi-Purpose Endmills with 90° Point Angle, 2 Flutes |  | 40° | B0819 | |
| | 398 | Round Corner Milling Cutters, 4 Flutes |  | - | B0819 | |
| **Universal Endmills for General Engineering** | | | | | | |
| Optimum ≤ 45 HRC | 918DH | DP/DH Endmills, 4 Flutes **NEW** |  | 40° | G6110 | |
| | 981DH | DP/DH with Recess Endmills, 4 Flutes **NEW** |  | 40° | G6110 | • |
| | 986DH | DP/DH with Recess, Weldon Endmills, 4 Flutes **NEW** |  | 40° | G6110 | • |
| | K47DH | DP/DH R-Like Endmills, 4 Flutes **NEW** |  | 40° | G6110 | |
| | K52DH | DP/DH R-Like with Recess Endmills, 4 Flutes **NEW** |  | 40° | G6110 | • |
| | K53DH | DP/DH R-Like with Recess, Weldon Endmills, 4 Flutes **NEW** |  | 40° | G6110 | • |
| | 919 | DP Torus Endmills, 4 Flutes |  | 40° | G6110 | |
| | 991 | DP Torus with Recess Endmills, 4 Flutes |  | 40° | G6110 | • |
| | K86 | Short DP/DH Endmills, 3 Flutes **NEW** |  | a°≠ b° | G6110 | |
| **Endmills for Mould & Die** | | | | | | |
| SE 45 36 - 50 HRC | A26 | Torus Endmills, 4 Flutes |  | 40° | B0909 | |
| | A1B | Torus Short Flutes Long Reach with Recess Endmills - Long, 4 Flutes |  | 40° | B0909 | • |
| | A03 | Miniature Endmills with Long Neck, 2 Flutes |  | 40° | B0909 | |
| | A79 | Miniature Torus Endmills with Long Neck, 2 Flutes |  | 40° | B0909 | |
| BN 45 36 -50 HRC | A57 | Ballnose Cutters, 2 Flutes |  | 30° | B0909 | |
| | A59 | Long Ballnose Cutters, 2 Flutes |  | 30° | B0909 | |
| | A61 | Extra-Long Ballnose Cutters, 2 Flutes |  | 30° | B0909 | |
| | A76 | Miniature Ballnose Cutters with Long Neck, 2 Flutes |  | 30° | B0909 | |
| SE 45X ≤ 52 HRC | A06 | DP Endmills, 4 Flutes |  | 40° | B0909 | |
| SE 60X 40 - 60 HRC | G78 | Fin-Mill Torus Endmills, 4 - 6 Flutes |  | 25° | B0909 | |
| | G86 | Sweep-Mill Torus Endmills, 4 - 6 Flutes |  | 3° | B0909 | • |
| | A4G | Fin-mill Torus Endmills with Long Neck, 4 Flutes |  | 25° | B0909 | |
| BN 60X 40 - 60 HRC | A4Q | Ballnose Cutters, 2 Flutes |  | 30° | B0909 | |
| | A4S | Miniature Ballnose Cutters with long neck, 2 Flutes |  | 30° | B0909 | |
| SE 60 53 - 68 HRC | A52 | Long Reach Torus Endmills, Short Flutes - Long with Recess, 4 Flutes |  | 40° | B0909 | • |

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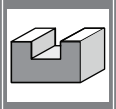
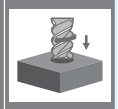
|  |  |  |  | Carbon steel | Alloy steel | Prehardened steel, 35 ▫ HRC < 45 | Stainless steel, high machinability | Stainless steel, low machinability | Grey cast iron | Ductile cast iron | Aluminum wrought alloy, Si < 9% | Aluminum cast alloy, Si ▫ 9% | Copper alloy | Titanium alloy | Nickel alloy | Cobalt alloy | Hardened steel, 45 ▫ HRC < 52 | Hardened steel, ▫ 52 HRC | Thermoplastics | Graphite | | | Page / Seite / Pagina |
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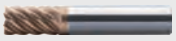
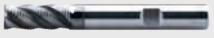
# Index by Series

| Tipo / Type / Typ / Type | EDP | | N° Z | Helix Angle | Coating | Recess |
|---|---|---|---|---|---|---|
| **Endmills for Mould & Die** | | | | | | |
| DM 70<br>50 - 70 HRC | K73 | DH Multiflute with Recess Endmills, 6 - 7 Flutes |  | 42°/43°/44° | B0909 | • |
| | K76 | Torus DH Multiflute with Recess Endmills, 6 - 7 Flutes |  | 42°/43°/44° | B0909 | • |
| | K77 | Torus DH Multiflute Endmills, 6 - 7 Flutes |  | 42°/43°/44° | B0909 | |
| **Endmills for Exotic Material, Stainless Steel & Super Alloys** | | | | | | |
| NiTiCo 30<br>< 35 HRC | J89 | DH 2xD Endmills, 5 Flutes |  | 35°/36°/37° | G6110 | |
| | J90 | DH 4xD with Weldon Endmills, 5 Flutes |  | 35°/36°/37° | G6110 | |
| | J92 | DH 2xD Long Endmills, 5 Flutes |  | 35°/36°/37° | G6110 | |
| | J93 | DH 4xD Long Endmills with Weldon, 5 Flutes |  | 35°/36°/37° | G6110 | |
| | K50 | DH 2xD, with Chip Breaker, Recess and Weldon Endmills, 5 Flutes |  | 35°/36°/37° | G6110 | • |
| | K51 | DH 4xD Long Endmills, with Chip Breaker, Recess and Weldon, 5 Flutes |  | 35°/36°/37° | G6110 | • |
| | K65 | DH 2xD Endmills, with Internal Oil Hole, Chip Breaker, Recess and Weldon, 5 Flutes |  | 35°/36°/37° | G6110 | • |
| | K67 | DH 4xD Long Endmills, with Internal Oil Hole, Chip Breaker, Recess and Weldon, 5 Flutes |  | 35°/36°/37° | G6110 | • |
| | 949 | DP/DH Endmills, 4 Flutes |  | 35°/38° | G6110 | |
| | C49 | DP/DH with Weldon Endmills, 4 Flutes |  | 35°/38° | G6110 | |
| | K78 | DP/DH with Recess and Weldon Endmills, 4 Flutes |  | 35°/38° | G6110 | • |
| | C46 | DP Torus Endmills, 4 Flutes |  | 40° | G6110 | |
| | C47 | DP Roughing Endmills, 4 Flutes |  | 40° | G6110 | |
| | C64 | DP Roughing Endmills with Weldon, 4 Flutes |  | 40° | G6110 | |
| NiTiCo 45<br>36 - 52 HRC | K93 | DP/DH Endmills with Recess, 4 Flutes **NEW** |  | a°≠ b° | B0909 | • |
| | K95 | DP/DH Endmills with Recess and Weldon, 4 Flutes **NEW** |  | a°≠ b° | B0909 | • |
| | K97 | DP/DH Torus Endmills with Recess, 4 Flutes **NEW** |  | a°≠ b° | B0909 | • |
| | K99 | DP/DH Torus Endmills with Recess and Weldon, 4 Flutes **NEW** |  | a°≠ b° | B0909 | • |
| | G47 | DP Roughing Endmills with Recess and Weldon, 4 Flutes |  | 40° | G6110 | • |

# Index by Series

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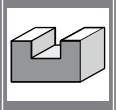
|  |  |  |  | Carbon steel | Alloy steel | Prehardened steel, 35 ▫ HRC < 45 | Stainless steel, high machinability | Stainless steel, low machinability | Grey cast iron | Ductile cast iron | Aluminum wrought alloy, Si < 9% | Aluminum cast alloy, Si ▫ 9% | Copper alloy | Titanium alloy | Nickel alloy | Cobalt alloy | Hardened steel, 45 ▫ HRC < 52 | Hardened steel, ▫ 52 HRC | Thermoplastics | Graphite | Page / Seite / Pagina | |
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# Index by Series

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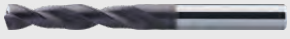
| Tipo / Type / Typ / Type | EDP | | N° Z | Helix Angle | Coating | Recess |
|---|---|---|---|---|---|---|
| **Endmills for Non-Ferrous Materials** | | | | | | |
| Alu Line | 303 | Endmills, 3 Flutes |  | 50° | UC | |
| | K30 | DP Endmills, 3 Flutes |  | 40° | UC | |
| | K60 | DP/DH/DF Endmills with Recess, 4 Flutes |  | 38°/41° | UC | • |
| | K61 | DP/DH/DF Endmills, with Recess and Chip Breakers, 4 Flutes |  | 38°/41° | UC | • |
| | K62 | DP/DH/DF Torus Endmills with Recess, 4 Flutes |  | 38°/41° | UC | • |
| | K63 | DP/DH/DF Torus Endmills with Chip Breaker and Recess, 4 Flutes |  | 38°/41° | UC | • |
| | G74 | Ballnose Cutters, 2 Flutes |  | 30° | UC | |
| | G75 | Ballnose Cutters with Recess, 2 Flutes |  | 30° | UC | • |
| | G76 | Miniature Ballnose Cutters with Long Neck, 2 Flutes |  | 30° | UC | |
| **Drills (ø1-ø16) for EZ Line** | | | | | | |
| EZ DRILL ≤35 HRC | W16 | DIN 6537K - 3 x Ø, Point Angle 140°, 2 Flutes |  | 30° | T8090 | |
| **Drill (ø3-ø20) for General Engineering** | | | | | | |
| DR-S | W08 | DIN 6537K - 3 x Ø, Point Angle 140°, 2 Flutes |  | 30° | T8090 | |
| | W09 | DIN 6537L - 5 x Ø, Point Angle 140°, 2 Flutes |  | 30° | T8090 | |
| | W10 | DIN 6537K - 3 x Ø, Point Angle 140°, 2 Flutes |  | 30° | T8090 | |
| | W11 | DIN 6537L - 5 x Ø, Point Angle 140°, 2 Flutes |  | 30° | T8090 | |
| | W12 | DIN 6537L - 8 x Ø, Point Angle 140°, 2 Flutes |  | 30° | T8090 | |
| **Micro Drills (ø1 - ø3) up to 30 X D** | | | | | | |
| DR MINI | H03 | Point Angle 135°- 5 x Ø, 8x Ø, 12 x Ø, 15x Ø, 20x Ø, 25x Ø, 30x Ø, 2 Flutes |  | 30° | T8090 | |
| **Extra Long-Drill (ø3, 1 - ø10) up to 30 X D** | | | | | | |
| DR-LX | W05 | Point Angle 135°- 12 x Ø, 15x Ø, 20x Ø, 25x Ø, 30x Ø, 2 Flutes |  | 30° | T8090 | |

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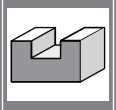
|  |  |  |  | Carbon steel | Alloy steel | Prehardened steel, 35 ▫ HRC < 45 | Stainless steel, high machinability | Stainless steel, low machinability | Grey cast iron | Ductile cast iron | Aluminum wrought alloy, Si < 9% | Aluminum cast alloy, Si ▫ 9% | Copper alloy | Titanium alloy | Nickel alloy | Cobalt alloy | Hardened steel, 45 ▫ HRC < 52 | Hardened steel, ▫ 52 HRC | Thermoplastics | Graphite | Page / Seite / Pagina | |
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# Description of The Icons

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| | | |
|---|---|---|
|  Micro Grain Carbide<br>90% WC 6% CO<br>91.5 HRA<br>0.7 micron Grain Size<br>ISO Grade K10/K30 |  Micro Grain Carbide<br>90% WC 10% CO<br>92.0±0.5 HRA<br>0.8 micron Grain Size<br>ISO Grade K10/K30 |  Micro Grain Carbide<br>93.5% WC 6% CO<br>93.5 HRA<br>0.6 micron Grain Size<br>ISO Grade K05/K10 |
|  Sub-micrograna<br>86.5% WC 12% CO<br>93.0±0.5 HRA<br>Grano: 0.5 micron<br>Qualità ISO: K10 / K40 |  Sub-micrograna<br>91% WC 9% CO<br>93.9 HRA<br>Grano: 0.2 micron<br>Qualità ISO: K10 / K30 | |

## 2 Corner Form

| | | |
|---|---|---|
|  Sharp corner Edge |  Corner Edge Radius<br>Tolerance Of The Radius |  Full Radius<br>Tolerance Of The Radius |
|  Chamfer | | |

## 3 Cutting Geometry

| | | |
|---|---|---|
|  Display Helix Angle<br>Of Flute |  No Vibration |  No Vibration |

## 4 Shank design

| | |
|---|---|
|  HA = Plain shank<br>HB = Weldon Shank | |

## 5 DR

| | | |
|---|---|---|
|  Without Oil Hole |  Internal Oil Hole |  Drilling Depth |

## 6 Tolerance

| Ø mm | Tol. µm | | | | | | |
|---|---|---|---|---|---|---|---|
| | HPMT | h5 | h6 | h7 | h9 | m7 | H7 |
| ≤ 3.0 | 0 / -20 | 0 / -4 | 0 / -6 | 0 / -6 | 0 / -25 | 6 | +10 / 0 |
| 3.0~6.0 | 0 / -25 | 0 / -5 | 0 / -8 | 0 / -12 | 0 / -30 | 4 | +12 / 0 |
| 6.0~10.0 | 0 / -30 | 0 / -6 | 0 / -9 | 0 / -15 | 0 / -36 | 3.5 | +15 / 0 |
| 10.0~18.0 | | 0 / -8 | 0 / -11 | 0 / -18 | 0 / -43 | 3.57 | +18 / 0 |
| 18.0~30.0 | | 0 / -9 | 0 / -13 | 0 / -21 | 0 / -52 | 3.63 | +21 / 0 |

## 7 Recess

| Ø (mm) | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Recess Ø (mm) | 2.8 | 3.7 | 4.6 | 5.5 | 7.4 | 9.2 | 11 | 13 | 15 | 17 | 19 |

# Description of The Icons

| 8 | Coatings | | | | | | |
|---|---|---|---|---|---|---|---|
| Type of Coating | Coating Material | Hardness | Oxidation Resistance Temperature | Coefficient of Friction | Standard Thickness | Application Area | Coating Colour |
| UC Uncoated | Uncoated | -/- | -/- | -/- | -/- | -/- | -/- |
| HPT B0819 AlTiN | AlTiN (Monolayer) | (HV 0.05) 3,300 | ≥ 900°C ≤ 1,000°C | 0.3 | 3 µm | Suitable for medium and high speed, wet and drymachining and good for machining steel with hardness up to HRC 52. |  Blue-Black |
| HSC B0909 TiSiN | TiSi Based (Multilayer) | (HV 0.05) 3,600 | ≤ 1,200°C | 0.3 | 2.5 - 3.5 µm | Suitable for high speed (dry) and hard machining for difficult materials above HRC 52. Suitable for high speed machining with hardened steels above HRC 60. |  Copper |
| HSC B0909+ TiSiN | AlTiSiN Based (Multilayer) | 3,800 | >1,100 °C | 0.5 | 2.5 - 3.5µm | Suitable for high speed (dry) and hard machining for difficult material above HRC 50. Suitable for high speed machining with hardened steels above HRC60. Vc & Vf = +30% |  Copper to Brown |
| HPT G6110 AlCrN | AlCrN (Monostrato) | (HV 0.05) 3,200 | ≤ 1,100°C | 0.35 | 2.5 - 3.5 µm | Suitable for low to medium speed, wet and dry machining and good for machining steel with hardness and high temperature alloy up to HRC 52. |  Blue-Grey |
| HSC DCT01 Diamond | Diamond (Monolayer) | (GPA) 40 -90 | ≤ 600°C | 0.15 - 0.2 | 1.2 µm | Suitable for machining graphite and composite reinforced plastic fiber glass (CRP) (e.g. graphite electrodes, crucibles, boats). |  Dark Grey |
| HPT H2600 Alu | Alu | 2,600 | 600°C | 0.35 | 1 - 3 µm | Suitable for aluminium. |  Barley |
| HSC D0120 TiSi | TiSi Based (Multilayer) | (HV 0.05) 3,600 | ≤ 1,200°C | 0.3 | 2 - 3 µm | Suitable for high performance drilling in difficult machinning material. |  Copper |
| HPT T8090 TiALN | TiALN (Multilayer) | (HV 0.05) 3,300 | ≤ '900°C | 0.3-0.35 | 3 µm | Suitable for low and medium cutting speed under wet machining. |  Blue-Black |

***HSC = High Speed Cutting**
***HPT = High Performance Tools**

# Description of The Icons

| | Descripción de los iconos | Beschreibung der Symbole | Descriptions des symboles |
|---|---|---|---|
| **1** | **Material de la herramienta (Carburo de tungsteno)** | **Werkstoffe ( Vollhartmetall )** | **Matières de coupe ( carbures monobloc )** |
|  | Carburo micrograno<br>90% WC 6% CO<br>91.5 HRA<br>0.7 micras Tamaño de las partículas<br>ISO Grado K10/K30 | Feinkorn<br>90% WC 6% CO<br>91.5±0.5 HRA<br>Kerngröße: 0.7 µm<br>ISO Qualität: K10/K30 | Micrograin<br>90% WC 6% CO<br>91.5±0.5 HRA<br>Grain: 0.7 micron<br>Qualité ISO: K10 / K30 |
|  | Carburo micrograno<br>90% WC 10% CO<br>92.0±0.5 HRA<br>0.8 micras Tamaño de las partículas<br>ISO Grado K10/K30 | Feinkorn<br>90% WC 10% CO<br>92.0±0.5 HRA<br>Kerngröße: 0.8 µm<br>ISO Qualität: K10/K30 | Micrograin<br>90% WC 10% CO<br>92.0±0.5 HRA<br>Grain: 0.8 micron<br>Qualité ISO: K10 / K30 |
|  | Carburo micrograno<br>93.5% WC 6% CO<br>93.5 HRA<br>0.6 micras Tamaño de las partículas<br>ISO Grado K05/K10 | Feinkorn<br>93.5% WC 6% CO<br>93.5 HRA<br>Kerngröße: 0.6 µm<br>ISO Qualität: K05/K10 | Micrograin<br>93.5% WC 6% CO<br>93.5 HRA<br>Grain: 0.6 micron<br>Qualité ISO: K05 / K10 |
|  | Carburo micrograno<br>86.5% WC 12% CO<br>93.0±0.5 HRA<br>0.5 micras Tamaño de las partículas<br>ISO Grado K10/K40 | Feinkorn<br>86.5% WC 12% CO<br>93.0±0.5 HRA<br>Kerngröße: 0.5 µm<br>ISO Qualität: K10/K40 | Submicrograin<br>86.5% WC 12% CO<br>93.0±0.5 HRA<br>Grain: 0.5 micron<br>Qualité ISO: K10 / K40 |
|  | Carburo micrograno<br>91% WC 9% CO<br>93.9 HRA<br>0.2 micras Tamaño de las partículas<br>ISO Grado K05/K10 | Feinkorn<br>91% WC 9% CO<br>93.9 HRA<br>Kerngröße: 0.2 µm<br>ISO Qualität: K05/K10 | Submicrograin<br>91% WC 9% CO<br>93.9 HRA<br>Grain: 0.2 micron<br>Qualité ISO: K05 / K10 |
| **2** | **Geometría de corte** | **Eckenformen** | **Formes des angles** |
|  | Borde afilado | Scharfe Schneidecken | Angles vifs |
|  | Radio del borde de la esquina<br>Tolerancia del radio | Eckenradius - Torusfräser<br>Radius - Toleranz | Angles à rayon - toriques<br>tolérance des rayons |
|  | Radio completo<br>Tolerancia del radio | Radius - Fräser<br>Radius - Toleranz | Bout hémisphérique<br>tolérance des rayons |
|  | Chaflán | Chamfer | Chamfer |
| **3** | **Geometría de corte** | **Schneidengeometrien** | **Géometries de coupe** |
|  | Indicación del ángulo<br>de la hélice de la flauta | Größe des Drallwinkels | Indique la valeur de<br>l'angle d'hélice |
|  | Sin vibraciones | Keine Vibrationen | Pas de vibrations |
|  | Sin vibraciones | Keine Vibrationen | Pas de vibrations |

# Description of The Icons

| | Descripción de los iconos | Beschreibung der Symbole | Descriptions des symboles |
|---|---|---|---|
| **8** | **Revestimientos** | **Oberflächen-Beschichtungen** | **Revêtements des surfaces** |
| UC Uncoated | Sin recubrimiento | Unbeschichtet | sans revêtement |
| HPT B0819 AlTiN | Material de revestimiento : AITIN (Monocapa)<br>Dureza : (HV 0.05) 3,300<br>Resistencia a la oxidación Temperatura : ≥ 900˚C ≤ 1,000˚C<br>Coeficiente de fricción : 0.3<br>Espesor estándar : 3 µm | Schichtmaterial: AlTiN (einschichtig)<br>Mikrohärte (HV 0,05): 3,300<br>Max. Anwendungstemperatur: ≥ 900˚C ≤ 1000˚C<br>Reibungskoeffizient 0.3<br>Schichtdicke : 3 µm | Revêtement = AlTiN (Monocouche)<br>Dureté (HV 0,05): 3,300<br>Température max. d'utilisation: ≥ 900˚C ≤ 1000˚C<br>Coefficient de friction: 0,25<br>Épaisseur du revêtement: 3 microns |
| HSC B0909 TiSiN | Material de revestimiento : Basado en TiSi (multicapa)<br>Dureza : (HV 0.05) 3,600<br>Resistencia a la oxidación Temperatura : ≤ 1,200˚C<br>Coeficiente de fricción : 0.3<br>Espesor estándar : 2.5 - 3.5 µm | Schichtmaterial:TiSi basierend (mehrlagig)<br>Mikrohärte (HV 0,05): 3,600<br>Max. Anwendungstemperatur: ≥ 1200˚C<br>Reibungskoeffizient 0.3<br>Schichtdicke : 2.5 ~ 3.5 µm | Revêtement = à base de TiSi (multi couches)<br>Dureté (HV 0,05): 3,600<br>Température max. d'utilisation: ≥ 1200˚C<br>Coefficient de friction: 0,3<br>Épaisseur du revêtement: 2.5 ~ 3.5 microns |
| HSC B0909+ TiSiN | Material de revestimiento : Basado en TiSi (multicapa)<br>Dureza : 3,800<br>Resistencia a la oxidación Temperatura : >1,100 ˚C<br>Coeficiente de fricción : 0.3<br>Espesor estándar : 2.5 - 3.5 µm | Schichtmaterial:AlTiSiN basierend (mehrlagig)<br>Mikrohärte (HV 0,05): 3,800<br>Max. Anwendungstemperatur: '>1,100 ˚C<br>Reibungskoeffizient 0.5<br>Schichtdicke :'2.5 - 3.5µm | Revêtement = à base de AlTiSiN (multi couches)<br>Dureté (HV 0,05): 3,800<br>Température max. d'utilisation: '>1,100 ˚C<br>Coefficient de friction: 0,5<br>Épaisseur du revêtement: 2.5 ~ 3.5 microns |
| HPT G6110 AlCrN | Material de revestimiento : AITIN (Monocapa)<br>Dureza : (HV 0.05) 3,200<br>Resistencia a la oxidación Temperatura : ≤ 1,100˚C<br>Coeficiente de fricción : 0.35<br>Espesor estándar : 2.5 - 3.5 µm | Schichtmaterial:AlCrN (einschichtig)<br>Mikrohärte (HV 0,05): 3,200<br>Max. Anwendungstemperatur: ≤ 1100˚C<br>Reibungskoeffizient 0.35<br>Schichtdicke : 2.5 ~ 3.5 µm | Revêtement = AlCrN (monocouche)<br>Dureté (HV 0,05): 3,200<br>Température max. d'utilisation: ≤ 1100˚C<br>Coefficient de friction: 0,35<br>Épaisseur du revêtement: 2.5 ~ 3.5 microns |
| HSC DCT01 Diamond | Material de revestimiento : Diamante (monocapa)<br>Dureza : (GPA) 40 -90<br>Resistencia a la oxidación Temperatura : ≤ 600˚C<br>Coeficiente de fricción : 0.15 - 0.2<br>Espesor estándar : 1.2 µm | Schichtmaterial: Diamanten (einschichtig)<br>Härte (GPA): 40 - 90<br>Max. Anwendungstemperatur: 600˚C<br>Reibungskoeffizient 0.15 - 0.20<br>Schichtdicke : 4 - 6 µm | Revêtement = diamanté (monocouche)<br>Dureté (GPA) : 40 - 90<br>Température max. d'utilisation: (˚C) ≤ 600<br>Coefficient de friction = 0,15 - 0,20<br>Épaisseur: 4 ~ 6 microns |
| HPT H2600 Alu | Material del revestimiento: Alu<br>Dureza : 2,600<br>Resistencia a la oxidación Temperatura : 600˚C<br>Coeficiente de fricción : 0.35<br>Espesor estándar : 1 - 3 µm | Schichtmaterial: Alu<br>Härte (GPA): 2,600<br>Max. Anwendungstemperatur: 600˚C<br>Reibungskoeffizient 0.35<br>Schichtdicke : 1 - 3 µm | Revêtement = Alu<br>Dureté (GPA): 2,600<br>Température max. d'utilisation: 600˚C<br>Coefficient de friction: 0,35<br>Épaisseur du revêtement: 1-3 microns |
| HSC D0120 TiSi | Material de revestimiento : Basado en TiSi (multicapa)<br>Dureza : (HV 0.05) 3,600<br>Resistencia a la oxidación Temperatura : ≤ 1,200˚C<br>Coeficiente de fricción : 0.3<br>Espesor estándar : 2 - 3 µm | Schichtmaterial: TiSi basierend (mehrlagig)<br>Mikrohärte (HV 0,05): 3,600<br>Max. Anwendungstemperatur: 1200˚C<br>Reibungskoeffizient 0.3<br>Schichtdicke : 2~3 µm | Revêtement = à base de TiSi (multi couches)<br>Dureté (HV 0,05): 3,600<br>Température max. d'utilisation: ≥ 1200˚C<br>Coefficient de friction: 0,3<br>Épaisseur du revêtement: 2 ~ 3 microns |
| HPT T8090 TiALN | Material de revestimiento : Diamante (monocapa)<br>Dureza : (HV 0.05) 3,300<br>Resistencia a la oxidación Temperatura : ≤ '900˚C<br>Coeficiente de fricción : 0.3-0.35<br>Espesor estándar : 3 µm | Schichtmaterial: AlTiN (einschichtig)<br>Mikrohärte (HV 0,05): 3,300<br>Max. Anwendungstemperatur: ≥ 900˚C<br>Reibungskoeffizient 0.3-0.35<br>Schichtdicke : 3 µm | Revêtement = AlTiN (Monocouche)<br>Dureté (HV 0,05): 3,300<br>Température max. d'utilisation: ≥ 900˚C<br>Coefficient de friction: 0.3-0.35<br>Épaisseur du revêtement: 3 microns |
| *HSC | Corte de alta velocidad | für Hochgeschwindigtsfräsen geeignet | pour UGV |
| *HPT | Instrumentos de alto rendimiento | Hochleistungswerkzeug | outil à haute performance |

# Material Group

| | English | Spanish | Deutsch | Français |
|---|---|---|---|---|
| | **Material Groups** | **Grupo de Materiales** | **Materialgruppen** | **Groupes matiére** |
| **N01** | Aluminium wrought alloy, Si < 9% | **Aleaciones de aluminio, Si < 9%** | Aluminiumlegierungen, Si < 9% | Alliages d'aluminium, Si < 9% |
| **N02** | Aluminium cast alloy, Si ≥ 9% | **Aleaciones de aluminio, Si ≥ 9%** | Aluminiumguss, Si ≥ 9% | Avec, Si ≥ 9% |
| **N03** | Copper alloy | **Aleaciones de cobre** | Kupferlegierungen | Cuivres non alliés |
| **K01** | Grey cast iron | **Fundición gris** | Grauguss | Gris Fontes |
| **K02** | Ductile cast iron | **Fundición esferoidal** | Gusseisen | Ductile Fontes |
| **P01** | Carbon steel | **Aceros al carbono** | Kohlenstoffstähle | Carbone Aciers |
| **P02** | Alloy steel | **Aceros al carbono de aleación media** | Stahllegierungen | Alliages Aciers |
| **P03** | Prehardened steel, 35 ≤ HRC < 45 | **Aceros al carbono de alta aleación** | Vorgehärtete Stähle, 35 ≤ HRC ≤ 45 | Préchauffé Aciers, 35 ≤ HRC ≤ 45 |
| **M01** | Stainless steel, high machinability | **Aceros inoxidables, Alta maquinabilidad** | Rostfreie Stähle <35 HRC | Aciers inoxydables, Usinabilité élevée |
| **M02** | Stainless steel, low machinability | **Aceros inoxidables, Baja maquinabilidad** | Rostfreie Stähle ≥35 HRC | Aciers inoxydables, Faible usinabilité |
| **S01** | Titanium alloy | **Aleaciones de titanio** | Titanlegierungen | Allliages de titane jusquà |
| **S02** | Nickel alloy | **Aleaciones de Ni** | Nickellegierungen | Alliages de Ni |
| **S03** | Cobalt alloy | **Aleaciones a co** | Kobaltlegierungen | Alliages de Co |
| **H01** | Hardened steel, 45 ≤ HRC < 52 | **Aceros templados, 45 ≤ HRC < 52** | Gehärtete Stähle, 45 ≤ HRC < 52 | Aciers trempés, 45 ≤ HRC < 52 |
| **H02** | Hardened steel, ≥ 52HRC | **Aceros templados, ≥ 52 HRC** | Gehärtete Stähle, ≥ 52 HRC | Aciers trempés, ≥ 52 HRC |
| **O01** | Thermoplastics | **Termoplásticos** | Thermoplaste | Thermoplastiques |
| **O02** | Graphite | **Grafito** | Grafit | Graphite |

# Material Appendix HPMT

| Material | HPMT | Description | Properties | W. Nr. | DIN | UNI | AFNOR | AISI/SAE/ASTM | JIS | Common Name |
|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum wrought alloy, Si < 9% | N01 | Aluminium alloys | Si < 9% | 3.0255 | Al99.5 | | A-5/1050A | | (A1050) | |
| | | | | 3.0515 | AlMn1 | | | | | |
| | | | | 3.0517 | AlMn1Cu | | A-M1/3003 | | A3003 | |
| | | | | 3.1255 | AlCuSiMn | | A-U4SG/2014 | | | |
| | | | | 3.1655 | AlCuBiPb | | A-U5PbBi/2011 | | A2011 | |
| | | | | 3.2161 | G-AlSi8Cu3 | | | A380 | | |
| | | | | 3.2341 | G-AlSi5Mg | 3599 | A-S7G | B26 | AC 4C | |
| | | | | 3.3206 | AlMgSi0.5 | | A-GS/6060 | | | |
| | | | | 3.3210 | AlMgSi0.7 | | A-GSUC/6061 | | (A6063) | |
| | | | | 3.3315 | AlMg1 | | A-G0.6 | | | |
| | | | | 3.4335 | AlZn4.5Mg1 | | A-Z5G/7020 | | | |
| | | | | 3.4365 | AlZnMgCu1.5 | | A-Z5GU/7075 | | A7075 | |
| | | | | 3.5103 | G-MgSe3Zn2Zr1 | | ZRE1 | AMS 4442 | | |
| | | | | 3.5612 | G-MgAl6Zn | | G-A6-Z1 | AZ61A | | |
| | | | | 3.5812 | G-MgAl8Zn | | (G-A7-Z1) | AZ80A | | |
| Aluminum cast alloy, Si ≥ 9% | N02 | Aluminium alloys | 9% < Si < 16% | 3.2315 | AlMgSi1 | | A-SGM0.7/6082 | | | |
| | | | | 3.2381 | G-AlSi10Mg | | A-S10G | B85 | | |
| | | | | 3.2382 | GD-AlSi12 | | | A413.2 | | |
| | | Aluminium alloys | Si > 16% | | | | | B390.0 | ADC14 | |
| Copper alloy | N03 | Copper alloys | | 2.0940.01 | CuAl10Fe | | CuAl10Fe | CA952 | | |
| | | | | 2.0975.01 | CuAl10Ni | | CuAl10Ni5Fe5 | CA955 | | |
| | | | | 2.0872 | CuNi10Fe1Mn | | CuNi10Fe1Mn | | | |
| | | | | | CuNi10Zn45 | | | | | |
| | | | | 2.0790 | CuNi18Zn19Pb | | CuNi18Zn19Pb1 | | | |
| | | | | 2.1176 | CuPb10Sn | | CuSn10Pb10 | CA937 | | |
| | | | | 2.1050.01 | CuSn10 | | CuSn10 | | | |
| | | | | 2.1087 | CuSn10Zn | | | | | |
| | | | | 2.1020 | CuSn6 | | CuSn6 | | C5191 | |
| | | | | 2.0240 | CuZn15 | | CuZn15 | | C2300 | |
| | | | | 2.0470 | CuZn28Sn1 | | CuZn29Sn1 | | | |
| | | | | 2.0321 | CuZn37 | | CuZn37 | | | |
| | | | | 2.0530 | CuZn38Sn1 | | | | | |
| | | | | 2.0401 | CuZn39Pb3 | | CuZn39Pb3 | | | |
| | | | | 2.0402 | CuZn40Pb2 | | CuZn39Pb2 | | | |
| | | | | 2.0410 | CuZn44Pb2 | | | | | |
| Grey cast iron | K01 | Grey cast irons (GCI) | | 0.6150 | GG-15 | G15 | Ft 15 D | A48 25 B | FC 150 | |
| | | | | 0.6200 | GG-20 | G20 | Ft 20 D | A48 30 B | FC 200 | |
| | | | | | GG-220 HB | | | G 3500 | | |
| | | | | 0.6250 | GG-25 | G25 | Ft 25 D | A48 35 B | FC 250 | |
| | | | | 0.6300 | GG-30 | G30 | Ft 30 D | A48 45 B | FC 300 | |
| | | | | 0.6350 | GG-35 | G35 | Ft 35 D | A48 50 B | FC 350 | |
| Ductile cast iron | K02 | Ductile Cast Iron | | 0.7033 | GGG-35.3 | | FGS 370-17 | | FCD 350-22L | |
| | | | | 0.7040 | GGG-40 | GS 400-12 | FGS 400-12 | 60-40-18 | FCD 400-18L | |
| | | | | 0.7043 | GGG-40.3 | GSO 42/17 | FGS-370-17 | 60-40-18 | | |
| | | | | 0.7050 | GGG-50 | GS 500-7 | FGS 500-7 | A536 80-55-6 | FCD 500-7 | |
| | | | | 0.7060 | GGG-60 | GS 600-3 | FGS 600-3 | A476 80-60-03 | FCD 600-3 | |
| | | | | 0.7070 | GGG-70 | GS 700-2 | FGS 700-2 | A536 100-70-03 | FCD 700-2 | |
| Carbon steel | P01 | Free-cutting steels | 360 < Rm < 880 | 1.0715 | 9 SMn 28 | CF 9 SMn 28 | S 250 | 1213 | SUM 22 | |
| | | | | 1.0718 | 9 SMnPb 28 | CF 9 SMnPb 28 | S 250 Pb | 12 L 13 | SUM 22 L | |
| | | | | 1.0721 | 10 S 20 | CF 10 S 20 | 10 F 1 | 1108 | | |
| | | | | 1.0722 | 10 SPb 20 | CF 10 SPb 20 | 10 PbF 2 | 11 L 08 | | |
| | | | | 1.0723 | 15 S 20 | | | | SUM 32 | |
| | | | | 1.0726 | 35 S 20 | | 35 MF 4 | 1140 | | |
| | | | | 1.0727 | 46 S 20 | | 45 MF 4 | 1146 | | |
| | | | | 1.0736 | 9 SMn 36 | CF 9 SMn 36 | S 300 | 1215 | | |
| | | | | 1.0737 | 9 SMnPb 36 | CF 9 SMnPb 36 | S 300 Pb | 12 L 14 | | |
| | | "Low alloy ferritic steels, C < 0.25%wt Low alloy weldable general structural steels" | 320 < Rm < 600 | 1.0037 | St 37-2 | Fe 360 B | E 24-2 | | STKM 12 C | |
| | | | | 1.0116 | St 37-3 | Fe 360 D FF | E 24-3, E 24-4 | A 573 Gr. 58 | | |
| | | | | 1.0144 | St 44-3 N | Fe 430 D FF | E 28-3, E 28-4 | A 573 Gr. 70 | SM 41 C | |
| | | | | 1.0301 | C 10 | C 10 | AF 34 C 10, XC 10 | 1010 | S 10 C | |
| | | | | 1.0401 | C 15 | C 15, C 16 | AF3 7 C 12, XC 18 | 1015 | | |
| | | | | 1.0402 | C 22 | C 20, C 21 | C 20 | 1023 | | |
| | | | | 1.0570 | St 52-3 | Fe 510 B | E 36-3, E 36-4 | | SM 50 YA | |
| | | | | 1.1141 | Ck 15 | C 15, C 16 | XC 15, XC 18 | 1015 | S 15 C, S 15 CK | |
| | | | | 1.1158 | Ck 25 | C 25 | XC 25 | 1025 | S 25 C | |
| | | "Ferritic & ferritic/ pearlitic steels, C < 0.25%wt Weldable general structural steels Case hardening steels" | 430 < Rm < 610 | 1.2162 | 21 MnCr 5 | | 20 NC 5 | | SCR 420 H | |
| | | | | 1.5415 | 15 Mo 3 | 16 Mo 3 | 15 D 3 | A 204 Gr. A | | |
| | | | | 1.5423 | 16 Mo 5 | 16 Mo 5 | | 4520 | SB 450 M | |
| | | | | 1.5752 | 14 NiCr 14 | | 12 NC 15 | 3310, 9314 | SNC 815 (H) | |
| | | | | 1.5919 | 15 CrNi 6 | 16 CrNi4 | 16 NC 6 | 4320 | | |
| | | | | 1.6587 | 18 CrNiMo 7 6 | 18 NiCrMo 7 | 18 NCD 6 | | | |
| | | | | 1.7131 | 16 MnCr 5 | 16 MnCr 5 | 16 MC 5 | 5115 | SCR 415 | |
| | | | | 1.7139 | 16 MnCrS 5 | | | | | |
| | | | | 1.7147 | 20 MnCr 5 | 20 MnCr 5 | 20 MC 5 | 5120 | SMnC 420 (H) | |
| | | | | 1.7149 | 20 MnCrS 5 | | 20 MnCrS 5 | 5120 H | SMnC 21 H | |
| | | | | 1.7335 | 13 CrMo 4 4 | 14 CrMo 4 5 | 15 CD 3.5 | A 182-F11, F12 | | |
| | | | | 1.7337 | 16 CrMo 4 4 | 14 CrMo 4 5 | 15 CD 4.5 | A 387 Gr. 12 Cl. 2 | | |
| | | | | 1.7380 | 10 CrMo 9 10 | 12 CrMo 9 10 | 10 CD 9.10 | A 182-F22 | | |

# Material Appendix HPMT

| Material | HPMT | Description | Properties | W. Nr. | DIN | UNI | AFNOR | AISI/SAE/ASTM | JIS | Common Name |
|---|---|---|---|---|---|---|---|---|---|---|
| Alloy steel | P02 | "Low alloy general structural steels, 0.25% < C < 0.67%wt Low alloy Quench & Temper steels" | 520 < Rm < 1200 | 1.0501 | C 35 | C 35 | AF 55 C 35 | 1035 | | |
| | | | | 1.0503 | C 45 | C 45 | AF 65 C 45 | 1045 | S 45 C | |
| | | | | 1.0511 | C 40 | C 40 | AF 60 C 40 | 1040 | S 40 C | |
| | | | | 1.0535 | St 70-2 | Fe 690 | A 70-2 | 1055 | | |
| | | | | 1.0601 | C 60 | C 60 | CC 55 | 1060 | | |
| | | | | 1.1157 | 40 Mn 4 | | 35 M 5 | 1039 | | |
| | | | | 1.1165 | 30 Mn 5 | | | 1330 | SMn 1 H, SCMn 2 | |
| | | | | 1.1167 | 36 Mn 5 | | 40 M 5 | 1335 | SMn 438 (H), SCMn 3 | |
| | | | | 1.1181 | Ck 35 | C 35 | XC 38 H1 | 1035 | S 35 C | |
| | | | | 1.1191 | Ck 45 | C 45 | XC 42 | 1045 | S 45 C | |
| | | | | 1.1221 | Ck 60 | C 60 | XC 60 | 1064 | S 58 C | |
| | | | | 1.1740 | C 60 W | | Y3 55 | 1060 | SK 7 | |
| | | "Structural steels, 0.25% < C < 0.67%wt Quench & Temper steels" | 550 < Rm < 1200 | 1.0904 | 55 Si 7 | 55 Si 8 | 55 S 7 | 9255 | | |
| | | | | 1.1201 | 42 CrMo 4 | 42 CrMo 4 | 42 CD 4 | 4142, 4140 | SCM 440 (H) | |
| | | | | 1.2330 | 35 CrMo 4 | 35 CrMo 4 | 34 CD 4 | 4135 | | |
| | | | | 1.2542 | 45 WCrV 7 | 45 WCrV 8 KU | | S1 | | |
| | | | | 1.2714 | 56 NiCrMoV 7 | 56 NiCrMoV7-KU | | L6 | SKT 4 | |
| | | | | 1.5121 | 46 MnSi 4 | | | 5045 | | |
| | | | | 1.5710 | 36 NiCr 6 | | 35 NC 6 | 3135 | SNC 236 | |
| | | | | 1.5736 | 36 NiCr 10 | 35 NiCr 9 | 35 NC 11 | 3435 | SNC 631 (H) | |
| | | | | 1.6511 | 36 CrNiMo 4 | 38 NiCrMo 4 (KB) | 40 NCD 3 | 9840 | | |
| | | | | 1.6582 | 36 CrNiMo 6 | 35 NiCrMo 6 (KW) | 35 NCD 6 | 4340 | SNCM 447 | |
| | | | | 1.7033 | 34 Cr 4 | 34 Cr 4 (KB) | 32 C 4 | 5132 | SCr 430 (H) | |
| | | | | 1.7035 | 41 Cr 4 | 41 Cr 4 | 42 C 4 | 5140 | SCr 440 (H) | |
| | | | | 1.7218 | 25 CrMo 4 | 25 CrMo 4 (KB) | 25 CD 4 S | 4130 | SCM 425 | |
| | | | | 1.7361 | 32 CrMo 12 | 32 CrMo 12 | 30 CD 12 | | | |
| | | | | 1.8159 | 50 CrV 4 | 51 CrV 4 | 50 CV 4 | 6150 | SUP 10 | |
| | | | | 1.8509 | 41 CrAlMo 7 | 41 CrAlMo 7 | 40 CAD 6.12 | A 355 Cl. A | SACM 645 | |
| Prehardened steel | P03 | "Low alloy through hardening steels, C > 0.67%wt Low alloy spriing and bearing steels" | 35 ≤ HRC < 45 | 1.1231 | Ck 67 | C 70 | XC 68 | 1070 | | |
| | | | | 1.1274 | Ck 101 | | | 1095 | SUP 4 | |
| | | | | 1.1545 | C 105 W1 | C 100 KU | Y1 105 | W1 | | |
| | | | | 1.1645 | C 105 W2 | C 100 KU | Y1 105 | | SK 3 | |
| | | | | 1.1663 | C 125 W | C 120 KU | Y2 120 | W1 | SK 2 | |
| | | "Through hardening steels, C > 0.67%wt Spring and bearing steels" | 35 ≤ HRC < 45 | 1.2210 | 115 CrV 3 | 107 CrV 3 KU | 100 C 3 | L2 | | |
| | | | | 1.2311 | 40 CrMnMo 7 | 40 CrMnMo 7 KU | 40 CMD 8 S | P20 | | |
| | | | | 1.2510 | 100 MnCrW 4 | 95 MnWCr 5 KU | 90 MWCV 5 | O1 | SKS 3 | |
| | | | | 1.2842 | 90 MnCrV 8 | 90 MnVCr 8 KU | 90 MV 8 | O2 | | |
| | | | | 1.3505 | 100 Cr 6 | 100 Cr 6 | 100 C 6 | 52100 | SUJ 2 | |
| | | "Tool steels High speed steels (HSS)" | 35 ≤ HRC < 45 | 1.2080 | X 210 Cr 12 | X 210 Cr 13 KU | Z 200 C 12 | D3 | SKD 1 | |
| | | | | 1.3243 | X 38 CrMoV 5 1 | X 37 CrMoV 5 1 KU | Z 38 CDV 5 | H11 | SKD 6 | |
| | | | | 1.2344 | X 40 CrMoV 5 1 | X 40 CrMo 5 1 1 KU | Z 40 CDV 5 | H13 | SKD 61 | |
| | | | | 1.2363 | X 100 CrMoV 5 1 | X 100 CrMoV 5 1 KU | Z 100 CDV 5 | A2 | SKD 12 | |
| | | | | 1.2365 | X 32 CrMoV 3 3 | 30 CrMoV 12 27 KU | 32 DCV 28 | H10 | SKD 7 | |
| | | | | 1.2436 | X 210 CrW 12 | X 215 CrW 12 1 KU | | D6 | SKD 2 | |
| | | | | 1.2601 | X 165 CrMoV 12 | X 165 CrMoW 12 KU | | | | |
| | | | | 1.2713 | 55 NiCrMoV 6 | | 55 NCDV 7 | L6 | SKT 4 | |
| | | | | 1.3243 | S 6-5-2-5 | HS 6-5-2-5 | Z 85 WDKCV 06-05-05-04-02 | M35 | SKH 55 | |
| | | | | 1.3247 | S 2-10-1-8 | HS 2-10-1-8 | Z 110 DKCWV 09-08-04 | M42 | SKH 51 | |
| | | | | 1.3255 | S 18-1-2-5 | HS 18-1-2-5 | Z 80 WKCV 18-05-04-01 | T4 | SKH 3 | |
| | | | | 1.3343 | S 6-5-2 | HS 6-5-2 | Z 85 WDCV 06-05-04-02 | M2 | SKH 9, SKH 5 | |
| | | | | 1.3348 | S 2-9-2 | HS 2-9-2 | Z 100 DCWV 09-04-02-02 | M7 | SKH 58 | |
| | | | | 1.3355 | S 18-0-1 | HS 18-0-1 | Z 80 WCV 18-04-01 | T1 | SKH 2 | |

# Material Appendix HPMT

| Material | HPMT | Description | Properties | W. Nr. | DIN | UNI | AFNOR | AISI/SAE/ASTM | JIS | Common Name |
|---|---|---|---|---|---|---|---|---|---|---|
| Stainless steel, high machinability | M01 | Free-cutting austenitic stainless steel | | 1.4305 | X 10 CrNiS 18 9 | X 10 CrNi 18 09 | Z 10 CNF 18.09 | 303 | SUS 303 | |
| | | Low alloy austenitic stainless steels | | 1.4300 | X 12 CrNi 18 8 | | Z 12 CN 18 | 302 | SUS 302 | |
| | | | | 1.4301 | X 6 CrNi 18 10 | X 5 CrNi 18 11 | Z 6 CN 18.09 | 304 | SUS 304 | |
| | | | | 1.4306 | X 2 CrNi 19 11 | X 3 Cr Ni 18 11 | Z 2 CN 18.10 | 304 L | SUS 304 L | |
| | | | | 1.4310 | X 12 CrNi 17 7 | X 12 CrNi 17.07 | Z 12 CN 17.07 | 301 | SUS 301 | |
| | | | | 1.4401 | X 5 CrNiMo 17 12 2 | X 5 CrNiMo 17 12 | Z 3 CND 17.11.1 | 316 | s | |
| | | | | 1.4550 | X 6 CrNiNb 18 10 | X 6 CrNiNb 18 11 | Z 6 CNNb 18.10 | 347 | SUS 347 | |
| | | Medium alloy austenitic stainless steels | | 1.4311 | X 2 CrNiN 19 11 | X 2 CrNiN 18 11 | Z 2 CN 18.10 Az | 304 LN | SUS 304 LN | |
| | | | | 1.4335 | X 12 CrNi 25 21 | X 6 CrNi 26 20 | Z 12 CN 25.20 | 310 S | SUH 310, SUS 310 S | |
| | | | | 1.4429 | X 2 CrNiMoN 17 13 3 | X 2 CrNiMoN 17 13 3 | Z 2 CND 17.13 Az | 316 LN | SUS 316 LN | |
| | | | | 1.4435 | X 2 CrNiMo 18 14 3 | X 2 CrNiMo 17 13 2 | Z 2 CND 17.13 | 316L | SCS 16, SUS 316L | |
| | | | | 1.4466 | X 5 CrNi 18 15 | X 5 CrNi 18 15 | | 317 | SUS 317 | |
| | | | | 1.4893 | X 9 CrNiSiNCe 21 11 2 | | | | | 252 MA |
| Stainless steel, low machinability | M02 | Ferritic & martensitic stainless steels | | 1.4000 | X 6 Cr 13 | X 6 Cr 13 | Z 6 C 12 | 403 | SUS 403 | |
| | | | | 1.4006 | X 10 Cr 13 | X 12 Cr 13 | Z 10 C 13 | 410, CA-15 | SUS 410 | |
| | | | | 1.4016 | X 6 Cr 17 | X 8 Cr 17 | Z 8 C 17 | 430 | SUS 430 | |
| | | | | 1.4021 | X 20 Cr 13 | X 20 Cr 13 | Z 20 C 13 | 420 | SUS 420 J 1 | |
| | | | | 1.4031 | X 40 Cr 13 | X 40 Cr 14 | Z 40 C 14 | 420 | SUS 420 | |
| | | | | 1.4109 | X 65 CrMo 14 | | Z 70 D 14 | 440 A | SUS 440 A | |
| | | | | 1.4112 | X 90 CrMoV 18 | X CrTi 12 | Z 2 CND 18 05 | 440 B | SUS 440 B | |
| | | | | 1.4125 | X 105 CrMo 17 | X 105 CrMo 17 | Z 100 CD 17 | 440 C | SUS 440 C | |
| | | | | 1.4313 | X 5 CrNi 13 4 | X 6 CrNi 13 04 | Z 5 CN 13.4 | | SCS 5 | |
| | | | | 1.4749 | X 18 CrN 28 | | Z 18 C 25 | 446 | | |
| | | High alloy austenitic and duplex stainless steels | | 1.4417 | X 2 CrNiMoSi 19 5 | | Z 2 CND 18.05.03 | | | 3RE60 |
| | | | | 1.4460 | X 4 CrNiMo 27 5 2 | X 3 CrNiMo 27 5 2 | Z 3 CND 25.7 Az | 329 | SUS 329 J 1 | |
| | | | | 1.4462 | X 2 CrNiMoN 22 5 | X 2 CrNiMoN 22 5 | Z 2 CND 22.05 Az | 329 LN | | SAF 2205 |
| | | | | 1.4539 | X 2 NiCrMoCu 25 20 5 | | Z 2 NCDU 25 20 | 904L | | |
| | | Difficult high alloy austenitic and duplex stainless steels | | 1.4410 | X 2 CrNiMoN 25 7 4 | X 2 CrNiMoN 25 7 4 | Z 3 CND 25.07 Az | F 53 | | SAF 2507 |
| | | | | 1.4529 | X 1 CrNiMoN 20 18 7 | X 1 CrNiMoN 20 18 7 | Z 1 CNDU 20.18.05 Az | | | 254 SMO |
| | | | | 1.4534 | X 3 CrNiMoAl 13 8 2 | | | XM-13 | | PH13-8Mo |
| | | | | 1.4540 | X 4 CrNiCuNb 16 4 | | Z 4 CNUNb 16.4 M | XM-12 | | 15-5-PH |
| | | | | 1.4568 | X 7 CrNiAl 17 7 | X 7 CrNiAl 17 7 | Z 9 CAN 17.7 | AMS 5528 | SUS 631 | 17-7-PH |
| | | | | 1.4652 | X 2 CrNiMoN 25 22 7 | | | | | 654 SMO |
| | | | | 1.4876 | X 10 NiCrAlTi 32 20 | | Z 10 NC 32.21 | | NCF 800 | Alloy 800 |
| | | | | 1.4943 | X 4 NiCrTi 25 15 | | Z 6 NCTDV 25.15 | 660 | SUH 660 | A286 |
| Titanium alloy | S01 | Titanium, low alloyed, (α) | | 3.7024 | | | | | | Ti |
| | | Titanium, medium alloyed (α+β) | | | | | | AMS 4919 | | Ti 6-2-4-2 |
| | | | | | | | | AMS 4943 | | Ti 3Al-2.5V (grade 9) |
| | | | | 3.7164 | | | | AMS 4920, Grade 5 | | Ti 6Al-4V |
| | | Titanium, high alloyed | | | TiV10Fe2Al3 | | | AMS 4986 | | Ti 10V-2Fe-3Al |
| Nickel alloy | S02 | Nickel based superalloys | | 2.4810 | | | | | | Hastelloy C |
| | | | | 2.4819 | | | | | | Hastelloy C-276 |
| | | | | | | | | | | IN 100 |
| | | | | 2.4668 | | | | | | Inconel 718 |
| | | | | 2.4669 | | | | | | Inconel X-750 |
| | | | | 2.4631 | | | | | | Nimonic 80A |
| | | | | | | | | | | René 41 |
| | | | | | | | | | | Udimet 500 |
| | | | | 2.4654 | | | | | | Waspalloy |
| Cobalt alloy | S03 | Cobalt based superalloys | | | | | | | | Haynes 25 |
| | | | | | | | | | | Stellite 21 |
| | | | | | | | | | | Stellite 31 |

# Material Appendix HPMT

| Material | HPMT | Description | Properties | W. Nr. | DIN | UNI | AFNOR | AISI/SAE/ASTM | JIS | Common Name |
|---|---|---|---|---|---|---|---|---|---|---|
| Hardened steel | H01 & H02 | Case hardened steels | 58 < HRC < 62 | 1.7131 | 16 MnCr 5 | 16 MnCr 5 | 16 MC 5 | 5115 | SCR 415 | |
| | | Quenched & Tempered steels | 38 < HRC < 56 | 1.1201 | 42 CrMo 4 | 42 CrMo 4 | 42 CD 4 | 4142, 4140 | SCM 440 (H) | |
| | | | | 1.1231 | Ck 67 | C 70 | XC 68 | 1070 | | |
| | | | | 1.1248 | Ck 75 | C 75 | XC 75 | 1078, 1080 | | |
| | | | | 1.1274 | Ck 101 | | | 1095 | SUP 4 | |
| | | | | 1.1545 | C 105 W1 | C 100 KU | Y1 105 | W 1 | | |
| | | | | 1.2550 | 60 WCrV 7 | 55 WCrV 8 KU | 55 WC 20 | S1 | | |
| | | | | 1.7176 | 55 Cr 3 | 55 Cr 3 | 55 C 3 | 5155 | SUP 9 (A) | |
| | | Quenched & Tempered steels Bearing Steels | 56 < HRC < 64 | 1.2210 | 115 CrV 3 | 107 CrV 3 KU | 100 C 3 | L2 | | |
| | | | | 1.2311 | 40 CrMnMo 7 | 40 CrMnMo 7 KU | 40 CMD 8 S | P20 | | |
| | | | | 1.2510 | 100 MnCrW 4 | 95 MnWCr 5 KU | 90 MWCV 5 | O1 | SKS 3 | |
| | | | | 1.2842 | 90 MnCrV 8 | 90 MnVCr 8 KU | 90 MV 8 | O2 | | |
| | | | | 1.3505 | 100 Cr 6 | 100 Cr 6 | 100 C 6 | 52100 | SUJ 2 | |
| | | "Tool steels High Speed Steels" | 38 < HRC < 64 | 1.2344 | X 40 CrMoV 5 1 | X 40 Crmo 5 1 1 KU | Z 40 CDV 5 | H13 | SKD 61 | |
| | | | | 1.2363 | X 100 CrMoV 5 1 | X 100 CrMoV 5 1 KU | Z 100 CDV 5 | A2 | SKD 12 | |
| | | | | 1.2379 | X 155 CrVMo 12 1 | X 155 CrVMo 12 1 KU | Z 160 CDV 12 | D2 | SKD 11 | |
| | | | | 1.2436 | X 210 CrW 12 | X 215 CrW 12 1 KU | | | SKD 2 | |
| | | | | 1.2601 | X 165 CrMoV 12 | X 165 CrMoW 12 KU | 55 NCDV 7 | L6 | SKT 4 | |
| | | | | 1.2713 | 55 CNiCrMoV6 | | | | | |
| | | | | 1.3243 | S 6-5-2-5 | HS 6-5-2-5 | Z 85 WDKCV 06-05-05-04-02 | M35 | SKH 55 | |
| | | | | 1.3247 | S 2-10-1-8 | HS 2-9-1-8 | Z 110 DKCWV 09-08-04 | M42 | SKH 51 | |
| | | | | 1.3343 | S 6-5-2 | HS 6-5-2 | Z 85 WDCV 06-05-04-0 | M2 | SKH 9, SKH 51 | |
| | | | | 1.3355 | S 18-0-1 | HS 18-0-1 | Z 80 WCV 18-04-01 | T1 | SKH 2 | |
| | | | | 1.4021 | X 20 Cr 13 | X 20 Cr 13 | Z 20 C 13 | 420 | SUS 420 J 1 | |
| | | Martensitic stainless steels | 38 < HRC < 50 | 1.4109 | X 65 CrMo 14 | | Z 70 D 14 | 440 A | SUS 440 A | |
| | | | | 1.4112 | X 90 CrMoV 18 | X CrTi 12 | Z 2 CND 18 05 | 440 B | SUS 440 B | |
| | | | | 1.4125 | X 105 CrMo 17 | X 105 CrMo 17 | Z 100 CD 17 | 440 C | SUS 440 C | |
| | | | | 1.4534 | X 3 CrNiMoAl 13 8 2 | | | XM-13 | | PH13-8Mo |
| | | Precipitation hardened stainless steels | 33 < HRC < 50 | 1.4542 | X 5 CrNiCuNb 17 4 | | Z 6 CNU 17.4 | 630 | SCS 24, SUS 630 | 17-4-PH |
| | | | | 1.4568 | X 7 CrNiAl 17 7 | X 7 CrNiAl 17 7 | Z 9 CAN 17.4 | AMS 5528 | SUS 631 | 17-7-PH |
| | | | | 1.4943 | X 4 NiCrTi 25 15 | | Z 6 NCTDV 25.15 | 660 | SUH 660 | A286 |
| | | | | 1.3401 | X 120 Mn 12 | | Z 120 M 12 | A128 Grade A | SC MnH 1 | |
| | | Manganese steels | 23 < HRC < 64 | G-X330 NiCr 4 2 | FB Ni4 Cr2 BC | | Grade 2 A | A532 IB(NiCr-LC) | | Ni-Hard 2 |
| | | White Cast Irons | 50 < HRC < 64 | G-X260 NiCr4 | FB Ni4 Cr2 HC | | Grade 2 B | A532 IA (NiCr-HC) | | Ni-Hard 1 |
| | | | | G-X300 CrNiSi 9 5 2 | FB Cr9 Ni5 | | Grade 2 C, D, E | A532 ID (Ni-HiCr) | | Ni-Hard 4 |
| Thermoplastics | O1 | | | | | | | | | |
| Graphite | O2 | | | | | | | | | |

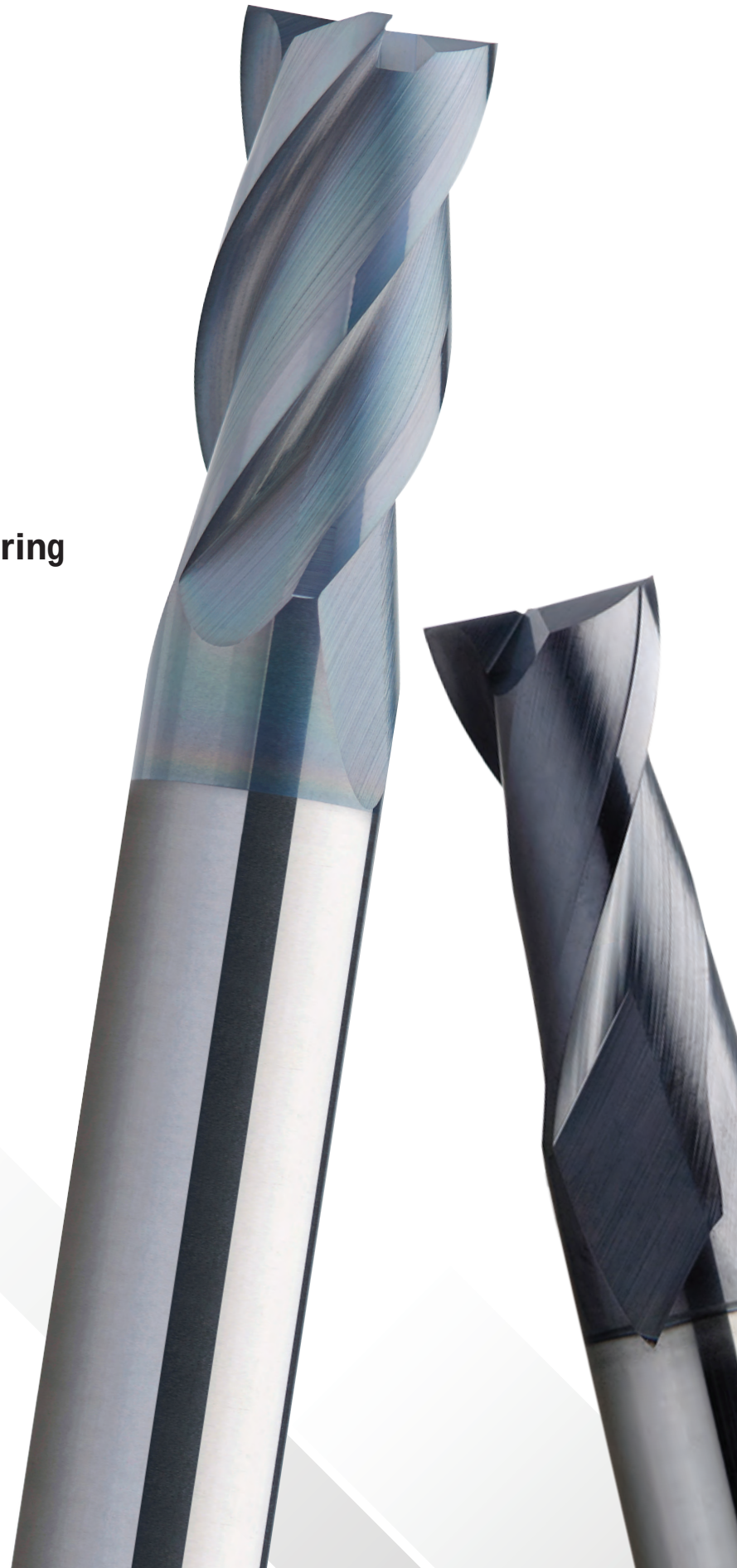
# Hardness Conversion Chart

| Tensile Strength Rm in N/mm2 | Brinell Hardness HB | Rockwell Hardness HRC | Vickers Hardness HV | PSI |
|---|---|---|---|---|
| 150 | 50 | | 50 | 22 |
| 200 | 60 | | 60 | 29 |
| 250 | 80 | | 80 | 37 |
| 300 | 90 | | 95 | 43 |
| 350 | 100 | | 110 | 50 |
| 400 | 120 | | 125 | 58 |
| 450 | 130 | | 140 | 66 |
| 500 | 150 | | 155 | 73 |
| 550 | 165 | | 170 | 79 |
| 600 | 175 | | 185 | 85 |
| 650 | 190 | | 200 | 92 |
| 700 | 200 | | 220 | 98 |
| 750 | 215 | | 235 | 105 |
| 800 | 230 | 22 | 250 | 112 |
| 850 | 250 | 25 | 265 | 120 |
| 900 | 270 | 27 | 280 | 128 |
| 950 | 280 | 29 | 295 | 135 |
| 1000 | 300 | 31 | 310 | 143 |
| 1050 | 310 | 33 | 325 | 150 |
| 1100 | 320 | 34 | 340 | 158 |
| 1150 | 340 | 36 | 360 | 164 |
| 1200 | 350 | 38 | 375 | 170 |
| 1250 | 370 | 40 | 390 | 177 |
| 1300 | 380 | 41 | 405 | 185 |
| 1350 | 400 | 43 | 420 | 192 |
| 1400 | 410 | 44 | 435 | 200 |
| 1450 | 430 | 45 | 450 | 207 |
| 1500 | 440 | 46 | 465 | 214 |
| 1550 | 450 | 48 | 480 | 221 |
| 1600 | 470 | 49 | 495 | 228 |
| | | 51 | 530 | 247 |
| | | 53 | 560 | 265 |
| | | 55 | 595 | 283 |
| | | 57 | 635 | 57 |
| | | 59 | 680 | 59 |
| | | 61 | 720 | 61 |
| | | 63 | 770 | 63 |
| | | 64 | 800 | 64 |
| | | 65 | 830 | 65 |
| | | 66 | 870 | 66 |
| | | 67 | 900 | 67 |
| | | 68 | 940 | 68 |
| | | 69 | 980 | 69 |

HPMT

# ENDMILLS

## Endmills for General Engineering



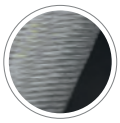
FEATURES & BENEFITS

# EZ LINE

## 1. Gash Land Design

-Reinforce edge protection of the cutting tool corner.
-Higher mechanical strength to withstand greater cutting force.
-Longer machining time consistency and greater tool durability.

## 2. Eccentric Grinding



Optimum eccentric grinding in order to avoid rubbing, while maintaining maximum cutting tool strength.

## 3. Differential Pitch (DP)


Reduces chatter to provide excellent surface finishing.

## 4. Differential Helix (DH)


**Reduces the cutting force:**

- Allows high speed machining, increasing productivity.
- Improves surface finishing.

## 5. Suitable for Material Groups

P M K N

## CARACTERÍSTICAS TÉCNICAS

1. Diseño de la ranura
   Mayor protección de la hélice del filo de corte
   Mayor resistencia mecánica a la fuerza de corte
   Mayor regularidad de los tiempos de mecanizado

2. Holgura del filo de corte
   Rectificado orbital para una menor fricción con la máxima resistencia del filo de corte

3. Paso diferenciado (DP)
   Reduce las vibraciones y proporciona un acabado superficial

4. Hélice diferencial (DH)
   Reduce la fuerza de corte
   Permite el mecanizado a alta velocidad, aumentando productividad
   Mejora el acabado superficial

5. Adecuada para materiales P, M, K, N

## MERKMALE UND VORTEILE

1. Stirnschliff Design
   Verstärkung des Kantenschutzes der Schneidekanten
   Höhere mechanische Festigkeit, um größeren Schneidkräften auszuhalten
   Konstante Bearbeitungszeit und höhere Werkzeugstandzeit

2. Exzentrischer Schliff
   Optimaler exzentrischer Schliff zur Reduzierung der Reibung unter Beibehaltung der maximalen Schneidenstabilität

3. Ungleiche Teilung (DP)
   Ungleiche Anordnung der Spannuten, um Eigenresonanz ufzulösen und Vibrationen zu reduzieren

4. Ungleiche Drallsteigung (DH)
   Minimierung von Vibrationen und Resonanzen während der Bearbeitung
   Erhöht die Werkzeugstandzeit und Produktivität
   Halten Sie die Oberfläche fest, um sich selbst zu zentrieren

5. Geeignet für Materialgruppen P, M, K, N

## CARACTÉRISTIQUES ET AVANTAGES

1. Conception de fraise pour l'usinage general
   Renforcer la protection des bords du coin de l'outil de coupe
   Résistance mécanique plus élevée pour résister à une force de coupe plus importante
   Une durée d'usinage plus longue et une plus grande durabilité de l'outil

2. Meulage excentrique
   Meulage optimal diminuant le coeficient de friction tout en maintenant une bonne acuité de l'arête de coupe

3. Conception à pas différentiel (DP)
   Réduire les vibrations pour obtenir une excellente finition de surface

4. Conception à hélice variable (DH)
   Réduit la force de coupe
   Permet l'usinage à grande vitesse, augmentant la productivité
   Améliore la finition de surface

5. Adapté pour les matériaux P, M, K, N

# C76

≤ 35 HRC

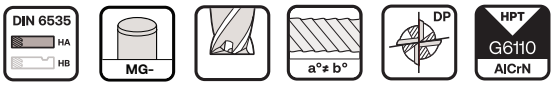
HPMT

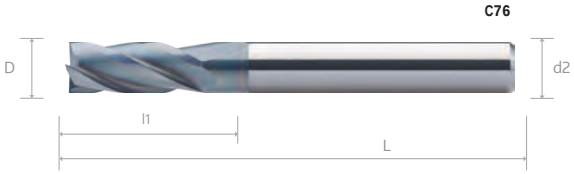
## EZ DP/DH Endmills, 4 Flutes

Fresas EZ DP/DH, 4 hélices

EZ DP/DH Fräser, 4 Zähne

EZ DP/DH à pas décalés, 4 dents





| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|
| C76 0100 040 03 | 1 | 3 | | 40 | 3 | • |
| C76 0150 040 03 | 1.5 | 4.5 | | 40 | 3 | • |
| C76 0200 040 03 | 2 | 6.5 | | 40 | 3 | • |
| C76 0250 040 03 | 2.5 | | | 40 | 3 | • |
| C76 0300 | 3 | 9 | | 40 | 3 | • |
| C76 0400 | 4 | 12 | | 50 | 4 | • |
| C76 0500 | 5 | 15 | | 50 | 5 | • |
| C76 0600 060 | 6 | 16 | | 60 | 6 | • |
| C76 0800 | 8 | 20 | | 64 | 8 | • |
| C76 1000 | 10 | 22 | | 75 | 10 | • |
| C76 1200 | 12 | 25 | | 75 | 12 | • |
| C76 1400 | 14 | 32 | | 90 | 14 | • |
| C76 1600 | 16 | | | 90 | 16 | • |
| C76 1800 | 18 | 38 | | 100 | 18 | • |
| C76 2000 | 20 | | | 100 | 20 | • |
| C76 2500 | 25 | 40 | | 100 | 25 | • |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

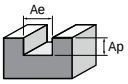
| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ○ | ● | ● | | ● | ○ | | | | | | | |

# Recommended Cutting Data

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

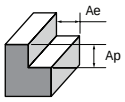
P M K N

## EZ DP/DH Endmills, 4 Flutes - C76




| Slotting | N | | | | | | K | | P | | | | M | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper alloy | | Grey Cast Iron | | Carbon steel | | Alloy steel | | Stainless steel | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | | - | | 520 < Rm < 1200 | | High Machinability | |
| Cutting depth, ap | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 × D | | 0.80 × D | |
| Cutting Width, ae | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 × D | | 1.00 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.005 | | 0.004 | | 0.003 | | 0.002 | | 0.002 | | 0.002 | | 0.001 |
| 2 | | 0.008 | | 0.008 | | 0.008 | | 0.006 | | 0.006 | | 0.004 | | 0.003 |
| 3 | | 0.013 | | 0.013 | | 0.013 | | 0.011 | | 0.011 | | 0.006 | | 0.006 |
| 4 | | 0.018 | | 0.018 | | 0.017 | | 0.015 | | 0.015 | | 0.009 | | 0.009 |
| 5 | | 0.023 | | 0.023 | | 0.023 | | 0.021 | | 0.020 | | 0.013 | | 0.012 |
| 6 | | 0.029 | | 0.028 | | 0.028 | | 0.027 | | 0.026 | | 0.017 | | 0.016 |
| 8 | | 0.042 | | 0.040 | | 0.041 | | 0.041 | | 0.038 | | 0.027 | | 0.026 |
| 10 | 220 | 0.056 | 200 | 0.053 | 165 | 0.055 | 110 | 0.056 | 135 | 0.053 | 120 | 0.038 | 100 | 0.037 |
| 12 | | 0.072 | | 0.066 | | 0.070 | | 0.075 | | 0.069 | | 0.051 | | 0.048 |
| 14 | | 0.081 | | 0.076 | | 0.079 | | 0.084 | | 0.077 | | 0.055 | | 0.053 |
| 16 | | 0.090 | | 0.084 | | 0.087 | | 0.091 | | 0.084 | | 0.059 | | 0.057 |
| 18 | | 0.097 | | 0.092 | | 0.093 | | 0.095 | | 0.090 | | 0.061 | | 0.060 |
| 20 | | 0.104 | | 0.099 | | 0.098 | | 0.099 | | 0.093 | | 0.063 | | 0.062 |
| 22 | | 0.109 | | 0.106 | | 0.103 | | 0.101 | | 0.096 | | 0.064 | | 0.062 |
| 25 | | 0.116 | | 0.113 | | 0.108 | | 0.102 | | 0.097 | | 0.063 | | 0.062 |

## EZ DP/DH Endmills, 4 Flutes - C76




| Side Milling | N | | | | | | K | | P | | | | M | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper alloy | | Grey Cast Iron | | Carbon steel | | Alloy steel | | Stainless steel | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | | - | | 520 < Rm < 1200 | | High Machinability | |
| Cutting depth, ap | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 × D | | 1.00 × D | |
| Cutting Width, ae | 0.30 x D | | 0.30 x D | | 0.30 x D | | 0.25 x D | | 0.25 x D | | 0.20 × D | | 0.18 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.005 | | 0.004 | | 0.003 | | 0.004 | | 0.003 | | 0.003 | | 0.003 |
| 2 | | 0.010 | | 0.009 | | 0.007 | | 0.008 | | 0.007 | | 0.007 | | 0.007 |
| 3 | | 0.016 | | 0.014 | | 0.012 | | 0.013 | | 0.012 | | 0.011 | | 0.012 |
| 4 | | 0.021 | | 0.019 | | 0.017 | | 0.017 | | 0.016 | | 0.015 | | 0.016 |
| 5 | | 0.027 | | 0.025 | | 0.022 | | 0.023 | | 0.021 | | 0.020 | | 0.021 |
| 6 | | 0.033 | | 0.031 | | 0.028 | | 0.028 | | 0.027 | | 0.025 | | 0.026 |
| 8 | | 0.046 | | 0.044 | | 0.042 | | 0.040 | | 0.039 | | 0.036 | | 0.038 |
| 10 | 275 | 0.060 | 240 | 0.058 | 200 | 0.057 | 140 | 0.053 | 165 | 0.053 | 130 | 0.047 | 110 | 0.051 |
| 12 | | 0.075 | | 0.074 | | 0.074 | | 0.066 | | 0.069 | | 0.060 | | 0.065 |
| 14 | | 0.086 | | 0.084 | | 0.083 | | 0.076 | | 0.078 | | 0.068 | | 0.073 |
| 16 | | 0.096 | | 0.093 | | 0.091 | | 0.085 | | 0.085 | | 0.076 | | 0.080 |
| 18 | | 0.106 | | 0.101 | | 0.097 | | 0.092 | | 0.090 | | 0.083 | | 0.086 |
| 20 | | 0.115 | | 0.108 | | 0.103 | | 0.099 | | 0.095 | | 0.088 | | 0.093 |
| 22 | | 0.123 | | 0.114 | | 0.108 | | 0.105 | | 0.099 | | 0.093 | | 0.097 |
| 25 | | 0.134 | | 0.122 | | 0.110 | | 0.113 | | 0.103 | | 0.099 | | 0.104 |

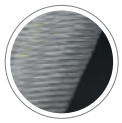
FEATURES & BENEFITS

# SE 30

## 1. Gash Land Design

-Reinforce edge protection of the cutting tool corner.
-Higher mechanical strength to withstand greater cutting force.
-Longer machining time consistency and greater tool durability.

## 2. Eccentric Grinding



Optimum eccentric grinding in order to avoid rubbing, while maintaining maximum cutting tool strength.

## 3. Cutting Edge Preparation

-Reduces material adherence on the cutting edge to overcome stable machining.
-Improves wear resistance and reduces excessive friction to prolong tool life.

## 4. Superior Coating to Reduce Friction

-Increases hardness and higher abrasive wear resistance.
-Higher thermal resistance.
-Smoother chips evacuation.

## 5. Suitable for Material Groups

P K N

## CARACTERÍSTICAS TÉCNICAS

1. Diseño de la ranura
   Mayor protección de la hélice del filo de corte
   Mayor resistencia mecánica a la fuerza de corte
   Mayor regularidad de los tiempos de mecanizado

2. Holgura del filo de corte
   Rectificado orbital para conseguir menor rozamiento con la máxima resistencia del filo de corte

3. Preparación del ángulo del filo de corte
   Reduce la adherencia de material en el filo de corte para superar el mecanizado
   Mejora la resistencia al desgaste y reduce fricción excesiva para prolongar la vida útil de la herramienta

4. Recubrimiento de AlTiN
   Aumenta la dureza y la resistencia al desgaste
   Mayor resistencia térmica
   Evacuación de virutas mejorada

5. Adecuado para material P, K, N

## MERKMALE UND VORTEILE

1. Stirnschliff Design
   Verbessert die Leistung deutlich und bietet Schutz gegen Ausbrüche

2. Exzentrischer Schliff
   Optimaler exzentrischer Schliff zur Reduzierung der Reibung unter Beibehaltung der maximalen Schneidenstabilität

3. Schneidkantenbehandlung
   VVerbessert die Werkzeuglebensdauer
   Verbessert die Verschleißfestigkeit und reduziert übermäßige Reibung

4. Ausgezeichnete Beschichtung zur Verringerung der Reibung
   Erhöht die Härte und und bietet bessere Verschleißfestigkeit
   Höhere Temperaturbeständigkeit
   Glatte Oberfläche für besseren Spänefluß

5. Geeignet für Materialgruppen P, K, N

## CARACTÉRISTIQUES ET AVANTAGES

1. Conception de fraise pour l'usinage general
   Améliore considérablement la solidité et apporte une excellente résistance à l'ébarbage

2. Meulage excentrique
   Meulage optimal diminuant le coeficient de friction tout en maintenant une bonne acuité de l'arête de coupe

3. Préparation des arêtes de coupes
   Réduit l'adhérence du matériau sur le tranchant pour surmonter l'usinage stable
   Améliore la résistance à l'usure et réduit le frottement excessif pour prolonger la durée de vie de l'outil

4. Revêtement supérieur pour réduire la friction
   Augmente la dureté et la résistance à l'abrasion
   Résistance thermique supérieure
   Évacuation des copeaux plus fluide

5. Adapté pour les matériaux P, K, N

# 816

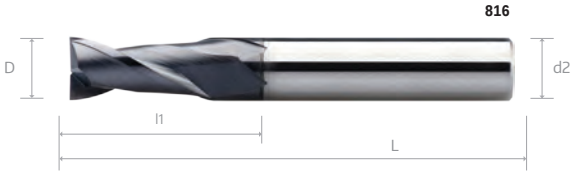
≤ 35 HRC HPMT

## SE 30 Endmills, 2 Flutes

SE 30 Fresas de mango, 2 canales

SE 30 Schaftfräser, 2 Schneiden

SE 30 Fraises en bout, 2 cannelures



| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|
| 816 0100 040 04 | 1 | 3 | | 40 | 4 | • |
| 816 0150 040 04 | 1.5 | 4.5 | | 40 | 4 | • |
| 816 0200 040 04 | 2 | 6.5 | | 40 | 4 | • |
| 816 0250 040 04 | 2.5 | | | 40 | 4 | • |
| 816 0300 050 06 | 3 | 9 | | 50 | 6 | • |
| 816 0350 050 04 | 3.5 | 12 | | 50 | 4 | • |
| 816 0400 050 06 | 4 | | | 50 | 6 | • |
| 816 0450 050 05 | 4.5 | 15 | | 50 | 5 | • |
| 816 0500 050 06 | 5 | | | 50 | 6 | • |
| 816 0550 050 06 | 5.5 | | | 50 | 6 | • |
| 816 0600 060 | 6 | 20 | | 60 | 6 | • |
| 816 0800 | 8 | | | 64 | 8 | • |
| 816 0900 070 10 | 9 | 22 | | 70 | 10 | • |
| 816 1000 075 | 10 | | | 75 | 10 | • |
| 816 1200 | 12 | 25 | | 75 | 12 | • |
| 816 1400 | 14 | 32 | | 90 | 14 | • |
| 816 1600 | 16 | | | 90 | 16 | • |
| 816 1800 | 18 | 38 | | 100 | 18 | • |
| 816 2000 | 20 | | | 100 | 20 | • |
| 816 2200 | 22 | 40 | | 100 | 22 | • |
| 816 2500 | 25 | | | 100 | 25 | • |

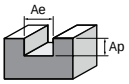
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| • | • | • | • | | • | | | | | | | | | | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

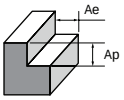
P K N

## SE 30 Endmills, 2 Flutes - 816




| Slotting | N | | | | | | K | | P | |
|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper alloy | | Grey Cast Iron | | Carbon steel | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | | - | |
| Cutting depth, ap | 0.55 x D | | 0.55 x D | | 0.55 x D | | 0.50 x D | | 0.50 x D | |
| Cutting Width, ae | 1.00 x D | | 1.00 x D | | 0.24 × D | | 1.00 x D | | 1.00 x D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.009 | | 0.009 | | 0.008 | | 0.009 | | 0.006 |
| 2 | | 0.018 | | 0.017 | | 0.016 | | 0.019 | | 0.015 |
| 3 | | 0.024 | | 0.023 | | 0.022 | | 0.025 | | 0.024 |
| 4 | | 0.032 | | 0.031 | | 0.029 | | 0.034 | | 0.032 |
| 5 | | 0.040 | | 0.038 | | 0.036 | | 0.042 | | 0.040 |
| 6 | | 0.050 | | 0.048 | | 0.045 | | 0.053 | | 0.049 |
| 8 | | 0.067 | | 0.064 | | 0.061 | | 0.071 | | 0.067 |
| 10 | 230 | 0.085 | 210 | 0.081 | 180 | 0.077 | 80 | 0.090 | 115 | 0.083 |
| 12 | | 0.101 | | 0.096 | | 0.091 | | 0.106 | | 0.098 |
| 14 | | 0.118 | | 0.112 | | 0.106 | | 0.123 | | 0.115 |
| 16 | | 0.128 | | 0.121 | | 0.115 | | 0.134 | | 0.129 |
| 18 | | 0.144 | | 0.137 | | 0.130 | | 0.151 | | 0.145 |
| 20 | | 0.145 | | 0.138 | | 0.131 | | 0.152 | | 0.155 |
| 22 | | 0.149 | | 0.141 | | 0.134 | | 0.156 | | 0.168 |
| 25 | | 0.162 | | 0.154 | | 0.146 | | 0.170 | | 0.189 |

## SE 30 Endmills, 2 Flutes - 816




| Side Milling | N | | | | | | K | | P | |
|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper alloy | | Grey Cast Iron | | Carbon steel | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | | - | |
| Cutting depth, ap | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | |
| Cutting Width, ae | 0.30 x D | | 0.30 x D | | 0.30 x D | | 0.25 x D | | 0.25 x D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.011 | | 0.010 | | 0.010 | | 0.011 | | 0.006 |
| 2 | | 0.022 | | 0.021 | | 0.020 | | 0.023 | | 0.012 |
| 3 | | 0.029 | | 0.028 | | 0.026 | | 0.030 | | 0.021 |
| 4 | | 0.039 | | 0.037 | | 0.035 | | 0.041 | | 0.028 |
| 5 | | 0.048 | | 0.046 | | 0.044 | | 0.051 | | 0.034 |
| 6 | | 0.060 | | 0.057 | | 0.055 | | 0.064 | | 0.044 |
| 8 | | 0.081 | | 0.077 | | 0.073 | | 0.085 | | 0.059 |
| 10 | 280 | 0.102 | 250 | 0.097 | 210 | 0.092 | 120 | 0.108 | 140 | 0.075 |
| 12 | | 0.121 | | 0.115 | | 0.109 | | 0.127 | | 0.094 |
| 14 | | 0.141 | | 0.134 | | 0.127 | | 0.148 | | 0.107 |
| 16 | | 0.153 | | 0.146 | | 0.138 | | 0.161 | | 0.123 |
| 18 | | 0.172 | | 0.164 | | 0.156 | | 0.181 | | 0.133 |
| 20 | | 0.174 | | 0.165 | | 0.157 | | 0.182 | | 0.143 |
| 22 | | 0.178 | | 0.169 | | 0.161 | | 0.187 | | 0.152 |
| 25 | | 0.195 | | 0.185 | | 0.176 | | 0.204 | | 0.162 |

# 818

≤ 35 HRC

HPMT

## SE 30 Endmills, 3 Flutes

SE 30 Fresas de mango, 3 canales

SE 30 Schaftfräser, 3 Schneiden

SE 30 Fraises en bout, 3 cannelures




| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|
| 818 0100 040 04 | 1 | 3 | | 40 | 4 | • |
| 818 0200 040 04 | 2 | 6.5 | | 40 | 4 | • |
| 818 0250 040 03 | 2.5 | | | 40 | 3 | • |
| 818 0250 040 04 | | | | 40 | 4 | • |
| 818 0300 050 06 | 3 | 9 | | 50 | 6 | • |
| 818 0400 | 4 | 12 | | 50 | 4 | • |
| 818 0400 050 06 | | | | 50 | 6 | • |
| 818 0500 050 06 | 5 | 15 | | 50 | 6 | • |
| 818 0600 060 | 6 | 20 | | 60 | 6 | • |
| 818 0800 | 8 | | | 64 | 8 | • |
| 818 1000 075 | 10 | 22 | | 75 | 10 | • |
| 818 1100 075 12 | 11 | 25 | | 75 | 12 | • |
| 818 1200 | 12 | | | 75 | 12 | • |
| 818 1400 | 14 | 32 | | 90 | 14 | • |
| 818 1600 | 16 | | | 90 | 16 | • |
| 818 1800 | 18 | 38 | | 100 | 18 | • |
| 818 2000 | 20 | | | 100 | 20 | • |
| 818 2200 | 22 | 40 | | 100 | 22 | • |
| 818 2500 | 25 | | | 100 | 25 | • |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

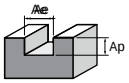
| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| • | • | • | • | | • | | | | | | | | | | | |

# Recommended Cutting Data

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

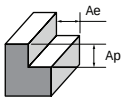
P K N

## SE 30 Endmills, 3 Flutes - 818




| Slotting | N | | | | | | K | | P | |
|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper alloy | | Grey Cast Iron | | Carbon steel | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | | - | |
| Cutting depth, ap | 0.55 x D | | 0.55 x D | | 0.55 x D | | 0.50 x D | | 0.50 x D | |
| Cutting Width, ae | 1.00 x D | | 1.00 x D | | 0.24 × D | | 1.00 x D | | 1.00 x D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.009 | | 0.009 | | 0.008 | | 0.008 | | 0.005 |
| 2 | | 0.018 | | 0.017 | | 0.015 | | 0.016 | | 0.011 |
| 3 | | 0.024 | | 0.023 | | 0.022 | | 0.025 | | 0.018 |
| 4 | | 0.032 | | 0.030 | | 0.029 | | 0.034 | | 0.024 |
| 5 | | 0.040 | | 0.038 | | 0.036 | | 0.042 | | 0.030 |
| 6 | | 0.050 | | 0.048 | | 0.045 | | 0.053 | | 0.037 |
| 8 | | 0.067 | | 0.064 | | 0.061 | | 0.071 | | 0.050 |
| 10 | 230 | 0.085 | 210 | 0.081 | 180 | 0.077 | 80 | 0.089 | 115 | 0.063 |
| 12 | | 0.101 | | 0.096 | | 0.091 | | 0.106 | | 0.074 |
| 14 | | 0.117 | | 0.111 | | 0.106 | | 0.123 | | 0.087 |
| 16 | | 0.127 | | 0.121 | | 0.115 | | 0.134 | | 0.097 |
| 18 | | 0.143 | | 0.136 | | 0.129 | | 0.150 | | 0.110 |
| 20 | | 0.145 | | 0.138 | | 0.131 | | 0.152 | | 0.118 |
| 22 | | 0.159 | | 0.151 | | 0.144 | | 0.167 | | 0.128 |
| 25 | | 0.163 | | 0.155 | | 0.147 | | 0.171 | | 0.143 |

## SE 30 Endmills, 3 Flutes - 818




| Side Milling | N | | | | | | K | | P | |
|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper alloy | | Grey Cast Iron | | Carbon steel | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | | - | |
| Cutting depth, ap | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | |
| Cutting Width, ae | 0.30 x D | | 0.30 x D | | 0.30 x D | | 0.25 x D | | 0.25 x D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.011 | | 0.010 | | 0.010 | | 0.011 | | 0.005 |
| 2 | | 0.022 | | 0.021 | | 0.020 | | 0.023 | | 0.010 |
| 3 | | 0.029 | | 0.027 | | 0.026 | | 0.030 | | 0.016 |
| 4 | | 0.038 | | 0.037 | | 0.035 | | 0.040 | | 0.021 |
| 5 | | 0.048 | | 0.046 | | 0.043 | | 0.050 | | 0.027 |
| 6 | | 0.060 | | 0.057 | | 0.054 | | 0.063 | | 0.034 |
| 8 | | 0.081 | | 0.077 | | 0.073 | | 0.085 | | 0.047 |
| 10 | 280 | 0.102 | 250 | 0.097 | 210 | 0.092 | 120 | 0.107 | 140 | 0.059 |
| 12 | | 0.121 | | 0.115 | | 0.109 | | 0.127 | | 0.074 |
| 14 | | 0.141 | | 0.134 | | 0.127 | | 0.148 | | 0.084 |
| 16 | | 0.153 | | 0.145 | | 0.138 | | 0.160 | | 0.096 |
| 18 | | 0.172 | | 0.163 | | 0.155 | | 0.181 | | 0.103 |
| 20 | | 0.174 | | 0.165 | | 0.157 | | 0.182 | | 0.112 |
| 22 | | 0.191 | | 0.181 | | 0.172 | | 0.201 | | 0.117 |
| 25 | | 0.195 | | 0.185 | | 0.176 | | 0.205 | | 0.127 |

# 836

≤ 35 HRC

HPMT

## SE 30 Multi-Purpose Endmills with 90° Point Angle, 2 Flutes

SE 30 Fresas de mango multiusos con ángulo de punta de 90°, 2 filos

SE 30 Mehrzweck-Schaftfräser mit 90° Spitzenwinkel, 2 Schneiden

Fraises multifonctions SE 30 avec angle de pointe de 90°, 2 goujures

DIN 6535 HA HB | MG | λ= 40° | HPT B0819 AlTiN



| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|
| 836 0300 040 | 3 | 9 | | 40 | 3 | • |
| 836 0400 050 | 4 | 12 | | 50 | 4 | • |
| 836 0500 050 | 5 | 15 | | 50 | 5 | • |
| 836 0600 050 | 6 | 16 | | 50 | 6 | • |
| 836 0800 064 | 8 | 20 | | 64 | 8 | • |
| 836 1000 070 | 10 | 22 | | 70 | 10 | • |
| 836 1200 075 | 12 | 25 | | 75 | 12 | • |
| 836 1600 090 | 16 | 32 | | 90 | 16 | • |
| 836 2000 100 | 20 | 38 | | 100 | 20 | • |

| Condizione | | | | |
|---|---|---|---|---|
| Scanalatura V | Ranura V | V-Nut | Rainure-V |
| Svasatura | Svasare | Senken | Chamfreiner |
| Interpolazione | Interpolazione | Zirkularfräsen | Interpolation |
| Foratura | Forare | Bohren | Percer |
| Centrare / Posizionare | Centrare / Posizionare | Zentrieren / Positionieren | Centrer / Positionner |
| Asportazione Laterale e Svasare | Asportazione Laterale e Svasare | Kantenbearbeitung und Senken | Usinage Latéral et Chamfreiner |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| • | • | • | • | | • | | | | | | | | | | | |

# 398

≤ 35 HRC HPMT

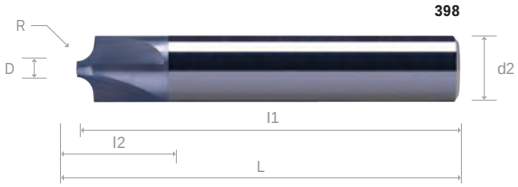
## Round Corner Milling Cutters, 4 Flutes

Fresas de esquinas redondeadas, 4 canales

Eckfräser rund, 4 Schneiden

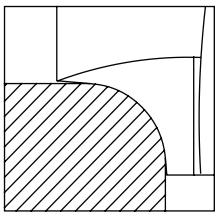
Fraises à coins ronds, 4 goujures

DIN 6535 HA HB | MG | HPT B0819 AlTiN





| Order Number | D ± 0.1 (mm) | R ± 0.02 (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| 398 0025 010 | 1 | 0.25 | 49.48 | 7 | 50 | 3 | • |
| 398 0030 010 | | 0.3 | 49.46 | 7 | 50 | 3 | • |
| 398 0040 010 | | 0.4 | 49.36 | 7 | 50 | 3 | • |
| 398 0050 015 | 1.5 | 0.5 | 49.24 | 10 | 50 | 4 | • |
| 398 0060 015 | | 0.6 | 49.14 | 10 | 50 | 4 | • |
| 398 0070 015 | | 0.7 | 49.05 | 10 | 50 | 4 | • |
| 398 0080 015 | | 0.8 | 48.96 | 10 | 50 | 4 | • |
| 398 0090 015 | | 0.9 | 48.87 | 10 | 50 | 4 | • |
| 398 0100 015 | | 1 | 48.78 | 10 | 50 | 4 | • |
| 398 0125 020 | 2 | 1.25 | 48.49 | 12 | 50 | 6 | • |
| 398 0150 020 | | 1.5 | 48.26 | 12 | 50 | 6 | • |
| 398 0150 035 | | 1.75 | 48.03 | 12 | 50 | 6 | • |
| 398 0175 020 | 2.5 | 2 | 47.74 | 14 | 50 | 8 | • |
| 398 0200 025 | | 2.25 | 47.51 | 14 | 50 | 8 | • |
| 398 0200 030 | | 2.5 | 47.28 | 14 | 50 | 8 | • |
| 398 0225 025 | 3.5 | 1.5 | 68.27 | 16 | 70 | 10 | • |
| 398 0250 025 | 3 | 2 | 67.84 | 16 | 70 | 10 | • |
| 398 0250 035 | 3.5 | 2.5 | 72.36 | 18 | 75 | 12 | • |
| 398 0300 030 | 3 | 3 | 71.92 | 18 | 75 | 12 | • |
| 398 0350 045 | 4.5 | 3.5 | 86.4 | 20 | 90 | 16 | • |
| 398 0400 040 | 4 | 4 | 85.96 | 20 | 90 | 16 | • |
| 398 0450 035 | 3.5 | 4.5 | 85.52 | 20 | 90 | 16 | • |
| 398 0500 030 | 3 | 5 | 85.09 | 20 | 90 | 16 | • |
| 398 0550 045 | 4.5 | 5.5 | 94.56 | 22 | 100 | 20 | • |
| 398 0600 040 | 4 | 6 | 94.13 | 22 | 100 | 20 | • |



These cutters are designed for CNC machines. They allow to machine even very thin materials. Easy to regrind.

Estas fresas redondas de 1/4 están diseñadas para su uso en centros CNC. Permiten mecanizar piezas finas. Fácil reafilado.

Diese Profilfräser sind für den Einsatz auf CNC Maschinen. und für die Bearbeitung dünner Werkstücke geeignet und leicht. nachschle

Ces fraises 1/4 de cercle sont conçues pour l'emploi sur des centres CNC. et permettent d'usiner des matériaux très minces. Faciles à réaffûter.

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| • | • | • | • | | • | | | | | | | | | | | |

# Recommended Cutting Data

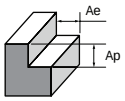
Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P K N

## SE 30 Multi-Purpose Endmills with 90° Point Angle, 2 Flutes - 836

| Chamfering | N | | | | | | K | | P | |
|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper alloy | | Grey Cast Iron | | Carbon steel | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | | - | |
| Cutting depth, ap | | | | | | | | | | |
| Cutting Width, ae | | | | | | | | | | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 3 | 230 | 0.026 | 200 | 0.023 | 160 | 0.020 | 110 | 0.020 | 130 | 0.021 |
| 4 | | 0.037 | | 0.033 | | 0.028 | | 0.028 | | 0.029 |
| 5 | | 0.047 | | 0.043 | | 0.037 | | 0.036 | | 0.037 |
| 6 | | 0.059 | | 0.054 | | 0.047 | | 0.045 | | 0.046 |
| 8 | | 0.081 | | 0.075 | | 0.065 | | 0.063 | | 0.063 |
| 10 | | 0.105 | | 0.097 | | 0.085 | | 0.081 | | 0.081 |
| 12 | | 0.131 | | 0.123 | | 0.107 | | 0.103 | | 0.101 |
| 16 | | 0.164 | | 0.151 | | 0.157 | | 0.128 | | 0.127 |
| 20 | | 0.191 | | 0.173 | | 0.180 | | 0.149 | | 0.150 |

## Round Corner Milling Cutters, 4 flutes - 398




| Side Milling | N | | | | | | K | | P | |
|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper alloy | | Grey Cast Iron | | Carbon steel | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | | - | |
| Cutting depth, ap | 0.24xD | | 0.24xD | | 0.24xD | | 0.24xD | | 0.24xD | |
| Cutting Width, ae | 0.02xD | | 0.02xD | | 0.02xD | | 0.02xD | | 0.02xD | |
| R | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | 315 | 0.008 | 205 | 0.006 | 135 | 0.005 | 175 | 0.003 | 240 | 0.003 |
| 2 | | 0.008 | | 0.010 | | 0.011 | | 0.006 | | 0.005 |
| 3 | | 0.012 | | 0.015 | | 0.017 | | 0.009 | | 0.008 |
| 4 | | 0.017 | | 0.021 | | 0.024 | | 0.013 | | 0.011 |
| 5 | | 0.022 | | 0.027 | | 0.032 | | 0.018 | | 0.015 |
| 6 | | 0.027 | | 0.033 | | 0.040 | | 0.022 | | 0.018 |

HPMT

# ENDMILLS

## Universal Endmills for General Engineering

FEATURES & BENEFITS

# Optimum

## 1. Differential Pitch (DP)


Reduces chatter to provide excellent surface finishing.

## 2. Superior Coating

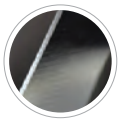
Enhances Heat Resistance to prolong tool life.

## 3. Differential Helix (DH)

**Reduces the cutting force:**

- Allows high speed machining, increasing productivity.
- Improves surface finishing.

## 4. Ideal Cutting Edge



Provides edge protection to prolong tool life.

## 5. Suitable for Material Groups

P M K N S

## CARATTERISTICHE TECNICHE

1. Paso diferenciado (DP)
   Reduce las vibraciones y proporciona un acabado superficial

2. Recubrimiento superior
   Mejora la resistencia al calor para prolongar la vida útil de la herramienta

3. Hélice diferencial (DH)
   Reduce la fuerza de corte
   Permite el mecanizado a alta velocidad, aumentando productividad
   Mejora el acabado superficial

4. Bruñido del filo de corte
   Mayor protección del filo para prolongar la vida de la fresa

5. Adecuado para material P, M, K, N, S

## MERKMALE UND VORTEILE

1. Ungleiche Teilung (DP)
   Ungleiche Anordnung der Spannuten, um Eigenresonanz aufzulösen und Vibrationen zu reduzieren

2. Ausgezeichnete Beschichtung zur Verringerung der Reibung
   Erhöht die Härte und und bietet bessere Verschleißfestigkeit

3. Ungleiche Drallsteigung (DH)
   Minimierung von Vibrationen und Resonanzen während der Bearbeitung
   Erhöht die Werkzeugstandzeit und Produktivität
   Halten Sie die Oberfläche fest, um sich selbst zu zentrieren

4. Perfekte Schneide
   Bietet Schneidkantenschutz,um die Lebensdauer des Werkzeugs zu verlängern

5. Geeignet für Materialgruppen P, M, K, N, S

## CARACTÉRISTIQUES ET AVANTAGES

1. Conception à pas différentiel (DP)
   Réduire les vibrations pour obtenir une excellente finition de surface

2. Revêtement supérieur
   Réduit l'usure de l'outil pour parvenir à un usinage économique

3. Conception à hélice variable (DH)
   Réduit la force de coupe
   Permet l'usinage à grande vitesse, augmentant la productivité
   Améliore la finition de surface

4. Arête tranchante idéale
   Protège les arêtes pour prolonger la durée de vie de l'outil

5. Adapté aux matériaux P, M, K, N, S

# 918DH / 981DH / 986DH NEW ≤ 45 HRC HPMT

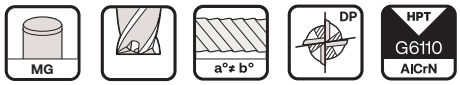
## Optimum DP/DH / with Recess/ Weldon Endmills, 4 Flutes

Optimum DP/DH / Con rebaje/ Fresas Weldon, 4 hélices

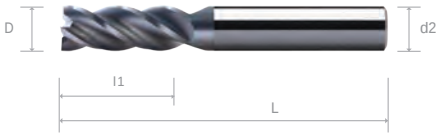
Optimum DP/DH Fräser, 4 Zähne

Optimum DP/DH à pas décalés, 4 dents

Now With Differential Pitch and Differential Helix

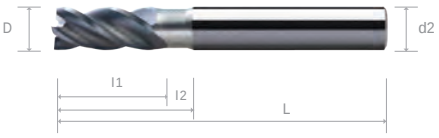



918DH





981DH




| Order Number HA | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|
| 918DH 0100 050 04 | 1 | 3 | | 50 | 4 | • |
| 918DH 0150 050 04 | 1.5 | 4.5 | | 50 | 4 | • |
| 918DH 0200 050 04 | 2 | 6.5 | | 50 | 4 | • |
| 918DH 0250 050 04 | 2.5 | | | 50 | 4 | • |
| 918DH 0300 050 04 | 3 | 9 | | 50 | 4 | • |
| 918DH 0300 050 06 | | | | 50 | 6 | • |
| 918DH 0400 057 06 | 4 | 12 | | 57 | 6 | • |
| 918DH 0500 057 06 | 5 | 15 | | 57 | 6 | • |
| 918DH 0600 060 | 6 | 20 | | 60 | 6 | • |
| 918DH 0800 22 | 8 | 22 | | 64 | 8 | • |
| 918DH 1000 072 27 | 10 | 27 | | 72 | 10 | • |
| 918DH 1200 083 | 12 | 32 | | 83 | 12 | • |
| 918DH 1400 083 | 14 | | | 83 | 14 | • |
| 918DH 1600 092 | 16 | | | 92 | 16 | • |
| 918DH 1800 092 32 | 18 | | | 92 | 18 | • |
| 918DH 2000 | 20 | 38 | | 100 | 20 | • |

* - DIN 6535

| Order Number HA | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|
| 981DH 0300 050 04 | 3 | 9 | 14 | 50 | 4 | • |
| 981DH 0300 050 06 | | | 14 | 50 | 6 | • |
| 981DH 0400 057 06 * | 4 | 12 | 20 | 57 | 6 | • |
| 981DH 0500 057 06 * | 5 | 15 | 20 | 57 | 6 | • |
| 981DH 0600 060 * | 6 | 20 | 24 | 60 | 6 | • |
| 981DH 0800 22 * | 8 | 22 | 28 | 64 | 8 | • |
| 981DH 1000 072 | 10 | | 32 | 72 | 10 | • |
| 981DH 1200 083 26 * | 12 | 26 | 37 | 83 | 12 | • |
| 981DH 1400 083 26 | 14 | | 37 | 83 | 14 | • |
| 981DH 1600 092 * | 16 | 32 | 42 | 92 | 16 | • |
| 981DH 1800 092 32 * | 18 | | 42 | 92 | 18 | • |
| 981DH 2000 * | 20 | 38 | 50 | 100 | 20 | • |

986DH


| Order Number HB | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|
| 986DH 0300 050 06 | 3 | 9 | 14 | 50 | 6 | • |
| 986DH 0400 057 06 | 4 | 12 | 20 | 57 | 6 | • |
| 986DH 0500 057 06 | 5 | 15 | 20 | 57 | 6 | • |
| 986DH 0600 060 | 6 | 20 | 24 | 60 | 6 | • |
| 986DH 0800 22 | 8 | 22 | 28 | 64 | 8 | • |
| 986DH 1000 072 | 10 | | 32 | 72 | 10 | • |
| 986DH 1200 083 26 | 12 | 26 | 37 | 83 | 12 | • |
| 986DH 1400 083 26 | 14 | | 37 | 83 | 14 | • |
| 986DH 1600 092 | 16 | 32 | 42 | 92 | 16 | • |
| 986DH 1800 092 32 | 18 | | 42 | 92 | 18 | • |
| 986DH 2000 100 | 20 | 38 | 50 | 100 | 20 | • |

| Ø mm | Tol. µm |
|---|---|
| 3.0 ~ 6.0 | -0 / -20 |
| 6.0 ~ 30.0 | -0 / -25 |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ○ | | | | |

# K47DH / K52DH / K53DH NEW ≤ 45 HRC HPMT

## Optimum DP/DH R-Like Endmills, 4 Flutes

Fresas de mango Optimum DP/DH R-Like con rebaje / Weldon, 4 hélices

Optimum DP/DH R-Like Fräser, 4 Zähne

Fraises Optimum DP/DH R-Like à pas décalés, 4 dents

MG | R-Like | a°≠ b° | DP | HPT G6110 AlCrN

K47DH


Z4

K52DH


| Order Number HA | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R-Like | Availability |
|---|---|---|---|---|---|---|---|
| K47DH 0300 050 06 | 3 | 9 | | 50 | 6 | 0.1 | • |
| K47DH 0400 057 06 | 4 | 12 | | 57 | 6 | 0.1 | • |
| K47DH 0500 057 06 | 5 | 15 | | 57 | 6 | 0.1 | • |
| K47DH 0600 060 | 6 | 20 | | 60 | 6 | 0.1 | • |
| K47DH 0800 22 | 8 | 22 | | 64 | 8 | 0.2 | • |
| K47DH 1000 072 27 | 10 | 27 | | 72 | 10 | 0.2 | • |
| K47DH 1200 083 | 12 | 32 | | 83 | 12 | 0.2 | • |
| K47DH 1400 083 | 14 | | | 83 | 14 | 0.2 | • |
| K47DH 1600 092 | 16 | | | 92 | 16 | 0.2 | • |
| K47DH 1800 092 32 | 18 | | | 92 | 18 | 0.2 | • |
| K47DH 2000 | 20 | 38 | | 100 | 20 | 0.2 | • |

| Order Number HA | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R-Like | Availability |
|---|---|---|---|---|---|---|---|
| K52DH 0300 050 06 | 3 | 9 | 14 | 50 | 6 | 0.1 | • |
| K52DH 0400 057 06 | 4 | 12 | 20 | 57 | 6 | 0.1 | • |
| K52DH 0500 057 06 | 5 | 15 | 20 | 57 | 6 | 0.1 | • |
| K52DH 0600 060 | 6 | 20 | 24 | 60 | 6 | 0.1 | • |
| K52DH 0800 22 | 8 | 22 | 28 | 64 | 8 | 0.2 | • |
| K52DH 1000 072 | 10 | | 32 | 72 | 10 | 0.2 | • |
| K52DH 1200 083 26 | 12 | 26 | 37 | 83 | 12 | 0.2 | • |
| K52DH 1400 083 26 | 14 | | 37 | 83 | 14 | 0.2 | • |
| K52DH 1600 092 | 16 | 32 | 42 | 92 | 16 | 0.2 | • |
| K52DH 1800 092 32 | 18 | | 42 | 92 | 18 | 0.2 | • |
| K52DH 2000 | 20 | 38 | 50 | 100 | 20 | 0.2 | • |

K53DH


| Order Number HB | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R-Like | Availability |
|---|---|---|---|---|---|---|---|
| K53DH 0300 050 06 | 3 | 9 | 14 | 50 | 6 | 0.1 | • |
| K53DH 0400 057 06 | 4 | 12 | 20 | 57 | 6 | 0.1 | • |
| K53DH 0500 057 06 | 5 | 15 | 20 | 57 | 6 | 0.1 | • |
| K53DH 0600 060 | 6 | 20 | 24 | 60 | 6 | 0.1 | • |
| K53DH 0800 22 | 8 | 22 | 28 | 64 | 8 | 0.2 | • |
| K53DH 1000 072 | 10 | | 32 | 72 | 10 | 0.2 | • |
| K53DH 1200 083 26 | 12 | 26 | 37 | 83 | 12 | 0.2 | • |
| K53DH 1400 083 26 | 14 | | 37 | 83 | 14 | 0.2 | • |
| K53DH 1600 092 | 16 | 32 | 42 | 92 | 16 | 0.2 | • |
| K53DH 1800 092 32 | 18 | | 42 | 92 | 18 | 0.2 | • |
| K53DH 2000 100 | 20 | 38 | 50 | 100 | 20 | 0.2 | • |

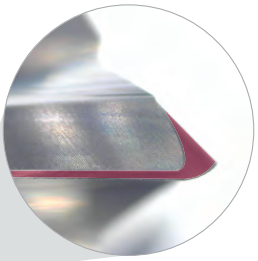
R - Like is an enhanced edge protection.

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

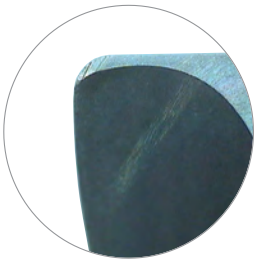
| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ○ | | | | |

FEATURES & BENEFITS

# Optimum Torus



Smooth joint at radius



S-Gash

## 1. Differential Pitch (DP)

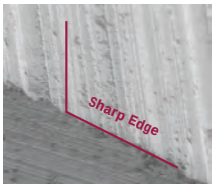

Reduces chatter to provide excellent surface finishing.

## 2. S-Gash (Unique Radius Design)

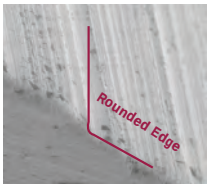
Smooth joining area at the radius to deliver tighter accuracy.

## 3. Cutting Edge Preparation

-Reduces material adherence on the cutting edge to overcome stable machining.
-Improves wear resistance and reduces excessive friction to prolong tool life.




Before




After

## 4. Suitable for Material Groups

P M K N S

## CARATTERISTICHE TECNICHE

1. Paso diferenciado (DP)
   Reduce las vibraciones y proporciona un acabado superficial
2. Nuevo diseño del radio de las esquinas
   Mejora la vida útil de la herramienta en la zona del radio
3. Preparación del ángulo del filo de corte
   Reduce la adherencia de material en el filo de corte para superar el mecanizado
   Mejora la resistencia al desgaste y reduce fricción excesiva para prolongar la vida útil de la herramienta
4. Adecuado para material P, M, K, N, S

## MERKMALE UND VORTEILE

1. Ungleiche Teilung (DP)
   Ungleiche Anordnung der Spannuten, um Eigenresonanz ufzulösen und Vibrationen zu reduzieren
2. Verbessertes Eckradius-Design
   Verbessern Sie die Haltbarkeit im Radiusbereich
3. Schneidkantenbehandlung
   VVerbessert die Werkzeuglebensdauer
   Verbessert die Verschleißfestigkeit und reduziert übermäßige Reibung
4. Geeignet für Materialgruppen P, M, K, N, S

## CARACTÉRISTIQUES ET AVANTAGES

1. Conception à pas différentiel (DP)
   Réduire les vibrations pour obtenir une excellente finition de surface
2. Conception améliorée du rayon d'angle
   Améliorer la durabilité sur la zone du rayon
3. Préparation des arêtes de coupes
   Réduit l'adhérence du matériau sur le tranchant pour surmonter l'usinage stable
   Améliore la résistance à l'usure et réduit le frottement excessif pour prolonger la durée de vie de l'outil
4. Adapté aux matériaux P, M, K, N, S

# 919 / 991

≤ 45 HRC

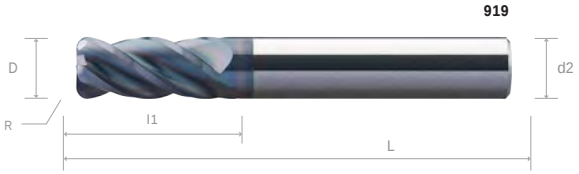
HPMT

## Optimum DP Torus Endmills, 4 Flutes

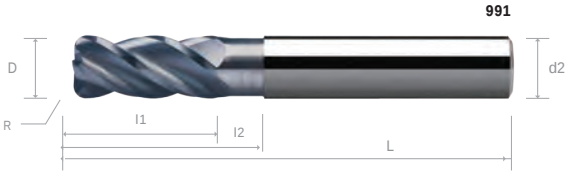
Fresas de mango Optimum DP Torus/ con rebaje, 4 canales

Optimum DP Torusfräser , 4 Zähne

Optimum DP toriques à pas décalés, 4 dents






| Order Number HA | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R | Availability |
|---|---|---|---|---|---|---|---|
| 919 0300 057 0600 030 | 3 | 9 | | 57 | 6 | 0.3 | • |
| 919 0300 057 0600 050 | | | | 57 | 6 | 0.5 | • |
| 919 0400 057 0600 030 | 4 | 12 | | 57 | 6 | 0.3 | • |
| 919 0400 057 0600 050 | | | | 57 | 6 | 0.5 | • |
| 919 0500 057 0600 030 | 5 | 15 | | 57 | 6 | 0.3 | • |
| 919 0500 057 0600 050 | | | | 57 | 6 | 0.5 | • |
| 919 0600 057 0600 030 | 6 | 16 | | 57 | 6 | 0.3 | • |
| 919 0600 057 0600 050 | | | | 57 | 6 | 0.5 | • |
| 919 0800 064 0800 030 | 8 | 20 | | 64 | 8 | 0.3 | • |
| 919 0800 064 0800 050 | | | | 64 | 8 | 0.5 | • |
| 919 1000 070 1000 050 | 10 | 22 | | 70 | 10 | 0.5 | • |
| 919 1000 070 1000 100 | | | | 70 | 10 | 1 | • |
| 919 1200 083 1200 050 | 12 | 25 | | 83 | 12 | 0.5 | • |
| 919 1200 083 1200 100 | | | | 83 | 12 | 1 | • |
| 919 1200 083 1200 200 | | | | 83 | 12 | 2 | • |
| 919 1600 090 1600 050 | 16 | 32 | | 90 | 16 | 0.5 | • |
| 919 1600 090 1600 100 | | | | 90 | 16 | 1 | • |
| 919 1600 090 1600 200 | | | | 90 | 16 | 2 | • |
| 919 2000 100 2000 050 | 20 | 38 | | 100 | 20 | 0.5 | • |
| 919 2000 100 2000 100 | | | | 100 | 20 | 1 | • |
| 919 2000 100 2000 200 | | | | 100 | 20 | 2 | • |
| 919 2000 100 2000 300 | | | | 100 | 20 | 3 | • |

| Order Number HA | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R | Availability |
|---|---|---|---|---|---|---|---|
| 991 0300 057 0600 030 | 3 | 9 | 15 | 57 | 6 | 0.3 | • |
| 991 0300 057 0600 050 | | | 15 | 57 | 6 | 0.5 | • |
| 991 0400 057 0600 030 | 4 | 12 | 20 | 57 | 6 | 0.3 | • |
| 991 0400 057 0600 050 | | | 20 | 57 | 6 | 0.5 | • |
| 991 0500 057 0600 030 | 5 | 15 | 22 | 57 | 6 | 0.3 | • |
| 991 0500 057 0600 050 | | | 22 | 57 | 6 | 0.5 | • |
| 991 0600 057 0600 030 | 6 | 16 | 22 | 57 | 6 | 0.3 | • |
| 991 0600 057 0600 050 | | | 22 | 57 | 6 | 0.5 | • |
| 991 0800 064 0800 030 | 8 | 20 | 26 | 64 | 8 | 0.3 | • |
| 991 0800 064 0800 050 | | | 26 | 64 | 8 | 0.5 | • |
| 991 1000 070 1000 050 | 10 | 22 | 30 | 70 | 10 | 0.5 | • |
| 991 1000 070 1000 100 | | | 30 | 70 | 10 | 1 | • |
| 991 1200 083 1200 050 | 12 | 25 | 35 | 83 | 12 | 0.5 | • |
| 991 1200 083 1200 100 | | | 35 | 83 | 12 | 1 | • |
| 991 1200 083 1200 200 | | | 35 | 83 | 12 | 2 | • |
| 991 1600 090 1600 050 | 16 | 32 | 42 | 90 | 16 | 0.5 | • |
| 991 1600 090 1600 100 | | | 42 | 90 | 16 | 1 | • |
| 991 1600 090 1600 200 | | | 42 | 90 | 16 | 2 | • |
| 991 2000 100 2000 050 | 20 | 38 | 50 | 100 | 20 | 0.5 | • |
| 991 2000 100 2000 100 | | | 50 | 100 | 20 | 1 | • |
| 991 2000 100 2000 200 | | | 50 | 100 | 20 | 2 | • |
| 991 2000 100 2000 300 | | | 50 | 100 | 20 | 3 | • |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ○ | | | | |

# K86

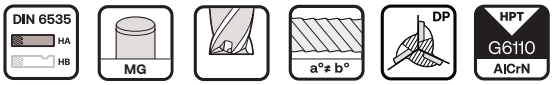
NEW ≤ 45 HRC HPMT

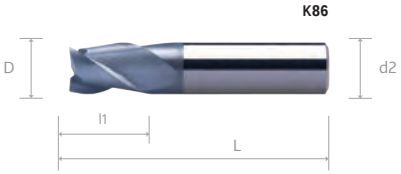
## Optimum Short DP/DH Endmills, 3 Flutes

Fresas de mango Optimum DP/DH cortas, 3 canales

Optimum Short DP/DH Schaftfräser, 3 Schneiden

Fraises courtes Optimum DP/DH, 3 goujures





| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|
| K86 0100 038 03 | 1 | 2 | | 38 | 3 | • |
| K86 0150 038 03 | 1.5 | | | 38 | 3 | • |
| K86 0200 038 06 | 2 | 4 | | 38 | 6 | • |
| K86 0250 038 06 | 2.5 | 5 | | 38 | 6 | • |
| K86 0300 038 06 | 3 | | | 38 | 6 | • |
| K86 0350 038 06 | 3.5 | 6 | | 38 | 6 | • |
| K86 0400 038 06 | 4 | 7 | | 38 | 6 | • |
| K86 0450 038 06 | 4.5 | 8 | | 38 | 6 | • |
| K86 0500 038 06 | 5 | | | 38 | 6 | • |
| K86 0550 038 06 | 5.5 | | | 38 | 6 | • |
| K86 0575 038 06 | 5.75 | | | 38 | 6 | • |
| K86 0600 038 06 | 6 | | | 38 | 6 | • |
| K86 0700 042 08 | 7 | 10 | | 42 | 8 | • |
| K86 0800 042 08 | 8 | 11 | | 42 | 8 | • |
| K86 0900 048 10 | 9 | | | 48 | 10 | • |
| K86 1000 050 10 | 10 | 13 | | 50 | 10 | • |
| K86 1200 055 12 | 12 | 15 | | 55 | 12 | • |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

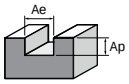
| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| • | • | • | • | • | • | • | • | • | • | • | • | | | | | |

# Recommended Cutting Data

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P M K N S

## Optimum Short DP/DH Endmills, 3 Flutes - K86




| Slotting | N | | | | | | K | | | | P | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper Alloy | | Grey Cast Iron | | Ductile Cast Iron | | Carbon steel | | Alloy steel | | Prehardened Steel | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | | - | | - | | 520 < Rm < 1200 | | - | |
| Cutting depth, ap | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | |
| Cutting Width, ae | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.005 | | 0.005 | | 0.003 | | 0.002 | | 0.001 | | 0.002 | | 0.001 | | 0.001 |
| 2 | | 0.008 | | 0.008 | | 0.008 | | 0.006 | | 0.002 | | 0.006 | | 0.004 | | 0.002 |
| 3 | | 0.014 | | 0.013 | | 0.013 | | 0.011 | | 0.003 | | 0.011 | | 0.007 | | 0.004 |
| 4 | | 0.019 | | 0.019 | | 0.018 | | 0.017 | | 0.007 | | 0.016 | | 0.010 | | 0.007 |
| 5 | 220 | 0.025 | 200 | 0.024 | 165 | 0.024 | 110 | 0.023 | 209 | 0.009 | 135 | 0.022 | 120 | 0.014 | 95 | 0.010 |
| 6 | | 0.031 | | 0.030 | | 0.030 | | 0.029 | | 0.011 | | 0.028 | | 0.018 | | 0.013 |
| 8 | | 0.045 | | 0.042 | | 0.043 | | 0.043 | | 0.016 | | 0.041 | | 0.028 | | 0.019 |
| 10 | | 0.060 | | 0.056 | | 0.058 | | 0.061 | | 0.021 | | 0.056 | | 0.040 | | 0.025 |
| 12 | | 0.077 | | 0.070 | | 0.074 | | 0.081 | | 0.026 | | 0.074 | | 0.054 | | 0.030 |

## Optimum Short DP/DH Endmills, 3 Flutes - K86

| Slotting | M | | | | S | | | |
|---|---|---|---|---|---|---|---|---|
| Working Material | Stainless Steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | |
| Properties | High Machinability | | Low Machinability | | - | | - | |
| Cutting depth, ap | 0.80 × D | | 0.80 × D | | 1.00 x D | | 1.00 × D | |
| Cutting Width, ae | 1.00 × D | | 1.00 × D | | 1.00 x D | | 1.00 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.001 | | 0.001 | | 0.001 | | 0.001 |
| 2 | | 0.003 | | 0.004 | | 0.002 | | 0.002 |
| 3 | | 0.006 | | 0.007 | | 0.004 | | 0.004 |
| 4 | | 0.009 | | 0.010 | | 0.007 | | 0.007 |
| 5 | 100 | 0.013 | 44 | 0.014 | 66 | 0.010 | 110 | 0.010 |
| 6 | | 0.017 | | 0.017 | | 0.013 | | 0.013 |
| 8 | | 0.026 | | 0.024 | | 0.019 | | 0.019 |
| 10 | | 0.038 | | 0.030 | | 0.025 | | 0.025 |
| 12 | | 0.052 | | 0.036 | | 0.030 | | 0.030 |

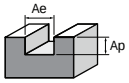
# Recommended Cutting Data

HPMT

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

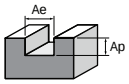
P M K N S P K

## Optimum DP/DH / DP Torus / R-Like - 918DH, 981DH, 986DH, 919, 991, K47DH, K52DH, K53DH




| Slotting | N | | | | | | K | | | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper Alloy | | Grey Cast Iron | | Ductile Cast Iron | | Titanium Alloy | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | | - | | - | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 0.80 × D | | 0.40 × D | |
| Cutting Width, ae | 1.00 × D | | 1.00 × D | | | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.005 | | 0.004 | | 0.004 | | 0.003 | | 0.003 | | 0.004 |
| 2 | | 0.007 | | 0.006 | | 0.006 | | 0.006 | | 0.006 | | 0.009 |
| 3 | | 0.011 | | 0.010 | | 0.010 | | 0.009 | | 0.009 | | 0.014 |
| 4 | | 0.016 | | 0.015 | | 0.015 | | 0.012 | | 0.013 | | 0.019 |
| 5 | | 0.021 | | 0.020 | | 0.020 | | 0.016 | | 0.017 | | 0.024 |
| 6 | | 0.026 | | 0.026 | | 0.026 | | 0.019 | | 0.021 | | 0.030 |
| 8 | 330 | 0.037 | 300 | 0.036 | 280 | 0.038 | 170 | 0.026 | 110 | 0.028 | 60 | 0.040 |
| 10 | | 0.048 | | 0.047 | | 0.050 | | 0.033 | | 0.035 | | 0.051 |
| 12 | | 0.060 | | 0.061 | | 0.062 | | 0.041 | | 0.043 | | 0.063 |
| 14 | | 0.068 | | 0.070 | | 0.071 | | 0.047 | | 0.049 | | 0.072 |
| 16 | | 0.075 | | 0.078 | | 0.080 | | 0.054 | | 0.055 | | 0.080 |
| 18 | | 0.083 | | 0.080 | | 0.088 | | 0.060 | | 0.061 | | 0.088 |
| 20 | | 0.090 | | 0.086 | | 0.096 | | 0.066 | | 0.067 | | 0.096 |

## Optimum DP/DH / DP Torus / R-Like - 918DH, 981DH, 986DH, 919, 991, K47DH, K52DH, K53DH

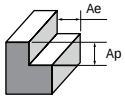



| Slotting | P | | | | | | M | | | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Carbon Steel | | Alloy Steel | | Prehardened Steel | | Stainless Steel | | Stainless Steel | | Nickel Alloy | |
| Properties | - | | 520 < Rm < 1200 | | 35 ≤ HRC < 45 | | High Machinability | | Low Machinability | | - | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 0.80 × D | | 0.80 × D | | 0.40 × D | | 0.30 × D | |
| Cutting Width, ae | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.003 | | 0.003 | | 0.003 | | 0.003 | | 0.003 | | 0.004 |
| 2 | | 0.006 | | 0.006 | | 0.006 | | 0.006 | | 0.007 | | 0.009 |
| 3 | | 0.009 | | 0.009 | | 0.009 | | 0.010 | | 0.011 | | 0.014 |
| 4 | | 0.012 | | 0.012 | | 0.012 | | 0.014 | | 0.016 | | 0.019 |
| 5 | | 0.016 | | 0.016 | | 0.016 | | 0.018 | | 0.020 | | 0.024 |
| 6 | | 0.019 | | 0.019 | | 0.019 | | 0.022 | | 0.025 | | 0.030 |
| 8 | 200 | 0.026 | 160 | 0.026 | 150 | 0.026 | 120 | 0.030 | 80 | 0.034 | 30 | 0.040 |
| 10 | | 0.033 | | 0.034 | | 0.033 | | 0.038 | | 0.044 | | 0.051 |
| 12 | | 0.041 | | 0.041 | | 0.041 | | 0.047 | | 0.054 | | 0.063 |
| 14 | | 0.047 | | 0.047 | | 0.047 | | 0.054 | | 0.062 | | 0.072 |
| 16 | | 0.054 | | 0.053 | | 0.054 | | 0.061 | | 0.069 | | 0.080 |
| 18 | | 0.060 | | 0.058 | | 0.060 | | 0.067 | | 0.076 | | 0.088 |
| 20 | | 0.066 | | 0.064 | | 0.066 | | 0.073 | | 0.082 | | 0.096 |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

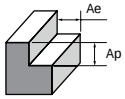
P M K N S P K

## Optimum DP/DH / DP Torus / R-Like - 918DH, 981DH, 986DH, 919, 991, K47DH, K52DH, K53DH




| Side Milling | N | | | | | | K | | | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper Alloy | | Grey Cast Iron | | Ductile Cast Iron | | Titanium Alloy | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | | - | | - | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| Cutting Width, ae | 0.30 × D | | 0.30 × D | | 0.30 × D | | 0.25 × D | | 0.18 × D | | 0.15 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.006 | | 0.005 | | 0.004 | | 0.007 | | 0.004 | | 0.005 |
| 2 | | 0.009 | | 0.008 | | 0.009 | | 0.010 | | 0.009 | | 0.011 |
| 3 | | 0.014 | | 0.014 | | 0.014 | | 0.016 | | 0.014 | | 0.018 |
| 4 | | 0.020 | | 0.019 | | 0.021 | | 0.022 | | 0.019 | | 0.024 |
| 5 | | 0.027 | | 0.026 | | 0.027 | | 0.029 | | 0.025 | | 0.031 |
| 6 | | 0.034 | | 0.034 | | 0.035 | | 0.036 | | 0.030 | | 0.039 |
| 8 | 400 | 0.046 | 380 | 0.046 | 360 | 0.050 | 250 | 0.049 | 140 | 0.041 | 70 | 0.053 |
| 10 | | 0.060 | | 0.059 | | 0.062 | | 0.063 | | 0.052 | | 0.066 |
| 12 | | 0.076 | | 0.074 | | 0.076 | | 0.075 | | 0.069 | | 0.080 |
| 14 | | 0.087 | | 0.085 | | 0.086 | | 0.085 | | 0.075 | | 0.090 |
| 16 | | 0.097 | | 0.095 | | 0.091 | | 0.095 | | 0.082 | | 0.101 |
| 18 | | 0.106 | | 0.102 | | 0.099 | | 0.103 | | 0.089 | | 0.111 |
| 20 | | 0.115 | | 0.110 | | 0.106 | | 0.112 | | 0.094 | | 0.122 |

## Optimum DP/DH / DP Torus / R-Like - 918DH, 981DH, 986DH, 919, 991, K47DH, K52DH, K53DH




| Side Milling | P | | | | | | M | | | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Carbon Steel | | Alloy Steel | | Prehardened Steel | | Stainless Steel | | Stainless Steel | | Nickel Alloy | |
| Properties | - | | 520 < Rm < 1200 | | 35 ≤ HRC < 45 | | High Machinability | | Low Machinability | | - | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| Cutting Width, ae | 0.25 × D | | 0.20 × D | | 0.18 × D | | 0.18 × D | | 0.15 × D | | 0.10 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.005 | | 0.006 | | 0.005 | | 0.004 | | 0.005 | | 0.004 |
| 2 | | 0.009 | | 0.009 | | 0.009 | | 0.009 | | 0.011 | | 0.008 |
| 3 | | 0.017 | | 0.014 | | 0.014 | | 0.014 | | 0.017 | | 0.013 |
| 4 | | 0.023 | | 0.020 | | 0.019 | | 0.020 | | 0.024 | | 0.018 |
| 5 | | 0.030 | | 0.025 | | 0.024 | | 0.025 | | 0.030 | | 0.025 |
| 6 | | 0.036 | | 0.031 | | 0.031 | | 0.031 | | 0.037 | | 0.033 |
| 8 | 280 | 0.049 | 230 | 0.043 | 190 | 0.042 | 160 | 0.043 | 100 | 0.049 | 40 | 0.046 |
| 10 | | 0.062 | | 0.056 | | 0.056 | | 0.056 | | 0.062 | | 0.061 |
| 12 | | 0.075 | | 0.070 | | 0.070 | | 0.070 | | 0.076 | | 0.075 |
| 14 | | 0.086 | | 0.079 | | 0.080 | | 0.078 | | 0.085 | | 0.081 |
| 16 | | 0.094 | | 0.087 | | 0.090 | | 0.086 | | 0.093 | | 0.089 |
| 18 | | 0.103 | | 0.092 | | 0.098 | | 0.092 | | 0.102 | | 0.094 |
| 20 | | 0.113 | | 0.098 | | 0.104 | | 0.099 | | 0.107 | | 0.102 |

# Recommended Cutting Data

HPMT

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition


P M K N S

P K

## Optimum DP/DH / DP Torus / R-Like - 918DH, 981DH, 986DH, 919, 991, K47DH, K52DH, K53DH

| **Ramp/Helical** | N | | | | | | K | | | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper Alloy | | Grey Cast Iron | | Ductile Cast Iron | | Titanium Alloy | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | | - | | - | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| **Ramping Angle** | 10° | | 10° | | 8° | | 5° | | 3° | | 2° | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.004 | | 0.003 | | 0.003 | | 0.002 | | 0.002 | | 0.003 |
| 2 | | 0.005 | | 0.005 | | 0.005 | | 0.005 | | 0.005 | | 0.007 |
| 3 | | 0.010 | | 0.008 | | 0.008 | | 0.007 | | 0.007 | | 0.011 |
| 4 | | 0.013 | | 0.012 | | 0.012 | | 0.010 | | 0.010 | | 0.015 |
| 5 | | 0.017 | | 0.016 | | 0.016 | | 0.013 | | 0.014 | | 0.019 |
| 6 | | 0.021 | | 0.021 | | 0.021 | | 0.015 | | 0.017 | | 0.024 |
| 8 | 250 | 0.030 | 220 | 0.029 | 210 | 0.030 | 130 | 0.021 | 80 | 0.022 | 45 | 0.032 |
| 10 | | 0.038 | | 0.038 | | 0.040 | | 0.026 | | 0.028 | | 0.041 |
| 12 | | 0.048 | | 0.049 | | 0.050 | | 0.033 | | 0.034 | | 0.050 |
| 14 | | 0.054 | | 0.056 | | 0.057 | | 0.038 | | 0.039 | | 0.058 |
| 16 | | 0.060 | | 0.062 | | 0.064 | | 0.043 | | 0.044 | | 0.064 |
| 18 | | 0.066 | | 0.064 | | 0.070 | | 0.048 | | 0.049 | | 0.070 |
| 20 | | 0.072 | | 0.069 | | 0.077 | | 0.053 | | 0.054 | | 0.077 |

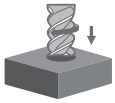
## Optimum DP/DH / DP Torus / R-Like - 918DH, 981DH, 986DH, 919, 991, K47DH, K52DH, K53DH

| **Ramp/Helical** | P | | | | | | M | | | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Carbon Steel | | Alloy Steel | | Prehardened Steel | | Stainless Steel | | Stainless Steel | | Nickel Alloy | |
| Properties | - | | 520 < Rm < 1200 | | 35 ≤ HRC < 45 | | High Machinability | | Low Machinability | | - | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| **Ramping Angle** | 5° | | 5° | | 3° | | 3° | | 2° | | 1° | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.002 | | 0.002 | | 0.002 | | 0.002 | | 0.002 | | 0.003 |
| 2 | | 0.005 | | 0.005 | | 0.005 | | 0.005 | | 0.006 | | 0.007 |
| 3 | | 0.007 | | 0.007 | | 0.007 | | 0.008 | | 0.009 | | 0.011 |
| 4 | | 0.010 | | 0.010 | | 0.010 | | 0.011 | | 0.013 | | 0.015 |
| 5 | | 0.013 | | 0.013 | | 0.013 | | 0.014 | | 0.016 | | 0.019 |
| 6 | | 0.015 | | 0.015 | | 0.015 | | 0.018 | | 0.020 | | 0.024 |
| 8 | 150 | 0.021 | 120 | 0.021 | 110 | 0.021 | 90 | 0.024 | 60 | 0.027 | 20 | 0.032 |
| 10 | | 0.026 | | 0.027 | | 0.026 | | 0.030 | | 0.035 | | 0.041 |
| 12 | | 0.033 | | 0.033 | | 0.033 | | 0.038 | | 0.043 | | 0.050 |
| 14 | | 0.038 | | 0.038 | | 0.038 | | 0.043 | | 0.050 | | 0.058 |
| 16 | | 0.043 | | 0.042 | | 0.043 | | 0.049 | | 0.055 | | 0.064 |
| 18 | | 0.048 | | 0.046 | | 0.048 | | 0.054 | | 0.061 | | 0.070 |
| 20 | | 0.053 | | 0.051 | | 0.053 | | 0.058 | | 0.066 | | 0.077 |

# Recommended Cutting Data

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition


## Optimum DP/DH / DP Torus / R-Like - 918DH, 981DH, 986DH, 919, 991, K47DH, K52DH, K53DH



| Plunging | N | | | | | | K | | P | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper Alloy | | Grey Cast Iron | | Carbon Steel | | Alloy Steel | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | | - | | 520 < Rm < 1200 | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| Cutting Width, ae | - | | - | | - | | - | | - | | - | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.009 | | 0.009 | | 0.008 | | 0.007 | | 0.007 | | 0.008 |
| 2 | | 0.018 | | 0.018 | | 0.017 | | 0.018 | | 0.018 | | 0.016 |
| 3 | | 0.028 | | 0.028 | | 0.027 | | 0.028 | | 0.028 | | 0.024 |
| 4 | | 0.038 | | 0.037 | | 0.036 | | 0.038 | | 0.038 | | 0.033 |
| 5 | | 0.048 | | 0.047 | | 0.046 | | 0.048 | | 0.048 | | 0.042 |
| 6 | | 0.058 | | 0.057 | | 0.056 | | 0.059 | | 0.059 | | 0.052 |
| 8 | 150 | 0.078 | 140 | 0.077 | 130 | 0.075 | 120 | 0.080 | 120 | 0.080 | 110 | 0.070 |
| 10 | | 0.099 | | 0.098 | | 0.097 | | 0.101 | | 0.101 | | 0.090 |
| 12 | | 0.121 | | 0.121 | | 0.120 | | 0.126 | | 0.126 | | 0.113 |
| 14 | | 0.140 | | 0.139 | | 0.138 | | 0.144 | | 0.144 | | 0.129 |
| 16 | | 0.158 | | 0.157 | | 0.156 | | 0.162 | | 0.162 | | 0.144 |
| 18 | | 0.176 | | 0.174 | | 0.173 | | 0.179 | | 0.179 | | 0.158 |
| 20 | | 0.193 | | 0.191 | | 0.189 | | 0.196 | | 0.196 | | 0.170 |

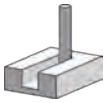
## Optimum DP/DH / DP Torus / R-Like - 918DH, 981DH, 986DH, 919, 991

| Trochoidal Milling | P | | | | | | M | | | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Carbon Steel | | Alloy Steel | | Prehardened Steel | | Stainless Steel | | Stainless Steel | | Titanium Alloy | |
| Properties | - | | 520 < Rm < 1200 | | 35 ≤ HRC < 45 | | High Machinability | | Low Machinability | | - | |
| Maximum Slot Width | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | |
| Cutting depth, ap | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | |
| Cutting Width, ae | 0.10 × D | | 0.10 × D | | 0.08 × D | | 0.10 × D | | 0.08 × D | | 0.10 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.017 | | 0.013 | | 0.012 | | 0.010 | | 0.008 | | 0.006 |
| 2 | | 0.018 | | 0.015 | | 0.016 | | 0.017 | | 0.017 | | 0.014 |
| 3 | | 0.026 | | 0.024 | | 0.025 | | 0.027 | | 0.027 | | 0.024 |
| 4 | | 0.035 | | 0.033 | | 0.035 | | 0.037 | | 0.038 | | 0.034 |
| 5 | | 0.044 | | 0.043 | | 0.045 | | 0.048 | | 0.050 | | 0.045 |
| 6 | | 0.054 | | 0.053 | | 0.055 | | 0.060 | | 0.063 | | 0.057 |
| 8 | 350 | 0.075 | 290 | 0.073 | 250 | 0.078 | 200 | 0.084 | 120 | 0.091 | 100 | 0.084 |
| 10 | | 0.098 | | 0.096 | | 0.102 | | 0.112 | | 0.122 | | 0.116 |
| 12 | | 0.121 | | 0.120 | | 0.128 | | 0.142 | | 0.157 | | 0.151 |
| 14 | | 0.138 | | 0.136 | | 0.144 | | 0.158 | | 0.174 | | 0.165 |
| 16 | | 0.153 | | 0.149 | | 0.158 | | 0.173 | | 0.188 | | 0.176 |
| 18 | | 0.167 | | 0.162 | | 0.171 | | 0.186 | | 0.200 | | 0.184 |
| 20 | | 0.180 | | 0.174 | | 0.182 | | 0.197 | | 0.209 | | 0.189 |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P M K N S P K

## Optimum DP/DH / DP Torus / R-Like - 918DH, 981DH, 986DH, 919, 991



| Trochoidal Milling | N | | | | | | K | | | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper Alloy | | Grey Cast Iron | | Ductile Cast Iron | | Nickel Alloy | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | | - | | - | |
| Maximum Slot Width | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | |
| Cutting depth, ap | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | |
| Cutting Width, ae | 0.12 × D | | 0.12 × D | | 0.12 × D | | 0.10 × D | | 0.10 × D | | 0.08 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.020 | | 0.019 | | 0.018 | | 0.015 | | 0.010 | | 0.003 |
| 2 | | 0.021 | | 0.020 | | 0.019 | | 0.016 | | 0.018 | | 0.008 |
| 3 | | 0.024 | | 0.024 | | 0.025 | | 0.025 | | 0.029 | | 0.013 |
| 4 | | 0.032 | | 0.032 | | 0.034 | | 0.034 | | 0.040 | | 0.020 |
| 5 | | 0.041 | | 0.041 | | 0.043 | | 0.043 | | 0.052 | | 0.027 |
| 6 | | 0.050 | | 0.050 | | 0.053 | | 0.053 | | 0.065 | | 0.036 |
| 8 | 450 | 0.070 | 420 | 0.070 | 380 | 0.074 | 320 | 0.073 | 170 | 0.092 | 45 | 0.054 |
| 10 | | 0.091 | | 0.092 | | 0.096 | | 0.095 | | 0.122 | | 0.079 |
| 12 | | 0.113 | | 0.114 | | 0.119 | | 0.118 | | 0.155 | | 0.105 |
| 14 | | 0.128 | | 0.130 | | 0.135 | | 0.133 | | 0.174 | | 0.110 |
| 16 | | 0.142 | | 0.144 | | 0.149 | | 0.147 | | 0.189 | | 0.111 |
| 18 | | 0.155 | | 0.156 | | 0.162 | | 0.160 | | 0.202 | | 0.109 |
| 20 | | 0.168 | | 0.168 | | 0.174 | | 0.172 | | 0.212 | | 0.104 |

HPMT

# ENDMILLS

## Endmills for Mould & Die

# A26

36 - 50 HRC

HPMT

## SE 45R Torus Endmills, 4 Flutes

SE 45R Fresas Torus, 4 hélices

SE 45R Torusfräser, 4 Zähne

SE 45R toriques, 4 dents



| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R | Availability |
|---|---|---|---|---|---|---|---|
| A26 0100 050 0400 020 | 1 | 3 | | 50 | 4 | 0.2 | • |
| A26 0200 050 0400 020 | 2 | 6.5 | | 50 | 4 | 0.2 | • |
| A26 0200 050 0400 030 | | | | 50 | 4 | 0.3 | • |
| A26 0300 050 0600 020 | 3 | 9 | | 50 | 6 | 0.2 | • |
| A26 0300 050 0600 030 | | | | 50 | 6 | 0.3 | • |
| A26 0300 050 0600 050 | | | | 50 | 6 | 0.5 | • |
| A26 0300 060 0600 020 | | | | 60 | 6 | 0.2 | • |
| A26 0300 060 0600 030 | | | | 60 | 6 | 0.3 | • |
| A26 0300 060 0600 050 | | | | 60 | 6 | 0.5 | • |
| A26 0400 050 0600 020 | 4 | 12 | | 50 | 6 | 0.2 | • |
| A26 0400 050 0600 030 | | | | 50 | 6 | 0.3 | • |
| A26 0400 050 0600 050 | | | | 50 | 6 | 0.5 | • |
| A26 0400 050 0600 100 | | | | 50 | 6 | 1 | • |
| A26 0400 060 0600 020 | | | | 60 | 6 | 0.2 | • |
| A26 0400 060 0600 030 | | | | 60 | 6 | 0.3 | • |
| A26 0400 060 0600 050 | | | | 60 | 6 | 0.5 | • |
| A26 0400 060 0600 100 | | | | 60 | 6 | 1 | • |
| A26 0500 050 0500 020 | 5 | 15 | | 50 | 5 | 0.2 | • |
| A26 0500 050 0600 020 | | | | 50 | 6 | 0.2 | • |
| A26 0500 050 0600 030 | | | | 50 | 6 | 0.3 | • |
| A26 0500 050 0600 050 | | | | 50 | 6 | 0.5 | • |
| A26 0500 050 0600 100 | | | | 50 | 6 | 1 | • |
| A26 0500 060 0600 020 | | | | 60 | 6 | 0.2 | • |
| A26 0500 060 0600 030 | | | | 60 | 6 | 0.3 | • |
| A26 0500 060 0600 050 | | | | 60 | 6 | 0.5 | • |
| A26 0500 060 0600 100 | | | | 60 | 6 | 1 | • |
| A26 0600 050 0600 020 | 6 | 16 | | 50 | 6 | 0.2 | • |
| A26 0600 050 0600 030 | | | | 50 | 6 | 0.3 | • |
| A26 0600 050 0600 050 | | | | 50 | 6 | 0.5 | • |
| A26 0600 050 0600 100 | | | | 50 | 6 | 1 | • |
| A26 0600 060 0600 020 | | 20 | | 60 | 6 | 0.2 | • |
| A26 0600 060 0600 030 | | | | 60 | 6 | 0.3 | • |
| A26 0600 060 0600 050 | | | | 60 | 6 | 0.5 | • |
| A26 0600 060 0600 100 | | | | 60 | 6 | 1 | • |
| A26 0800 064 0800 020 | 8 | | | 64 | 8 | 0.2 | • |
| A26 0800 064 0800 030 | | | | 64 | 8 | 0.3 | • |
| A26 0800 064 0800 050 | | | | 64 | 8 | 0.5 | • |
| A26 0800 064 0800 100 | | | | 64 | 8 | 1 | • |
| A26 0800 064 0800 150 | | | | 64 | 8 | 1.5 | • |
| A26 0800 064 0800 200 | | | | 64 | 8 | 2 | • |
| A26 1000 070 1000 020 | 10 | 22 | | 70 | 10 | 0.2 | • |
| A26 1000 070 1000 030 | | | | 70 | 10 | 0.3 | • |
| A26 1000 070 1000 050 | | | | 70 | 10 | 0.5 | • |
| A26 1000 070 1000 100 | | | | 70 | 10 | 1 | • |
| A26 1000 070 1000 150 | | | | 70 | 10 | 1.5 | • |
| A26 1000 070 1000 200 | | | | 70 | 10 | 2 | • |
| A26 1000 075 1000 020 | | | | 75 | 10 | 0.2 | • |
| A26 1000 075 1000 030 | | | | 75 | 10 | 0.3 | • |
| A26 1000 075 1000 050 | | | | 75 | 10 | 0.5 | • |
| A26 1000 075 1000 100 | | | | 75 | 10 | 1 | • |
| A26 1000 075 1000 150 | | | | 75 | 10 | 1.5 | • |
| A26 1000 075 1000 200 | | | | 75 | 10 | 2 | • |

| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R | Availability |
|---|---|---|---|---|---|---|---|
| A26 1200 075 1200 020 | 12 | 25 | | 75 | 12 | 0.2 | • |
| A26 1200 075 1200 030 | | | | 75 | 12 | 0.3 | • |
| A26 1200 075 1200 050 | | | | 75 | 12 | 0.5 | • |
| A26 1200 075 1200 100 | | | | 75 | 12 | 1 | • |
| A26 1200 075 1200 150 | | | | 75 | 12 | 1.5 | • |
| A26 1200 075 1200 200 | | | | 75 | 12 | 2 | • |
| A26 1200 075 1200 300 | | | | 75 | 12 | 3 | • |
| A26 1400 090 1400 030 | 14 | 32 | | 90 | 14 | 0.3 | • |
| A26 1400 090 1400 050 | | | | 90 | 14 | 0.5 | • |
| A26 1400 090 1400 100 | | | | 90 | 14 | 1 | • |
| A26 1400 090 1400 150 | | | | 90 | 14 | 1.5 | • |
| A26 1400 090 1400 200 | | | | 90 | 14 | 2 | • |
| A26 1400 090 1400 300 | | | | 90 | 14 | 3 | • |
| A26 1600 090 1600 030 | 16 | | | 90 | 16 | 0.3 | • |
| A26 1600 090 1600 050 | | | | 90 | 16 | 0.5 | • |
| A26 1600 090 1600 100 | | | | 90 | 16 | 1 | • |
| A26 1600 090 1600 150 | | | | 90 | 16 | 1.5 | • |
| A26 1600 090 1600 200 | | | | 90 | 16 | 2 | • |
| A26 1600 090 1600 300 | | | | 90 | 16 | 3 | • |
| A26 1800 100 1800 030 | 18 | 38 | | 100 | 18 | 0.3 | • |
| A26 1800 100 1800 050 | | | | 100 | 18 | 0.5 | • |
| A26 1800 100 1800 100 | | | | 100 | 18 | 1 | • |
| A26 1800 100 1800 150 | | | | 100 | 18 | 1.5 | • |
| A26 1800 100 1800 200 | | | | 100 | 18 | 2 | • |
| A26 1800 100 1800 300 | | | | 100 | 18 | 3 | • |
| A26 2000 100 2000 030 | 20 | | | 100 | 20 | 0.3 | • |
| A26 2000 100 2000 050 | | | | 100 | 20 | 0.5 | • |
| A26 2000 100 2000 100 | | | | 100 | 20 | 1 | • |
| A26 2000 100 2000 150 | | | | 100 | 20 | 1.5 | • |
| A26 2000 100 2000 200 | | | | 100 | 20 | 2 | • |
| A26 2000 100 2000 300 | | | | 100 | 20 | 3 | • |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

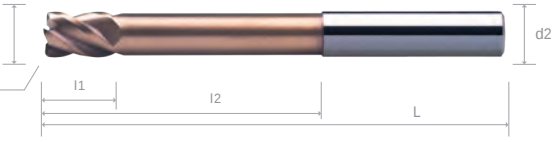
| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ● | ○ | ● | ● | ● | ● | ● | | ● | | ● | | | |

# SE 45R Torus Short Flutes Long Reach with Recess Endmills - Long, 4 Flutes

SE 45R Torus Fresas de mango de mango corto y largo alcance con rebaje - Larga, 4 hélices

SE 45R LONG REACH Torusfräser, lang, kurze Nuten, 4 Zähne

SE 45 LONG REACH toriques longues, dents courtes, 4 dents





| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R | Availability |
|---|---|---|---|---|---|---|---|
| A1B 0200 075 0600 030 | 2 | 4 | 30 | 75 | 6 | 0.3 | • |
| A1B 0300 075 0600 020 | 3 | 5 | 30 | 75 | 6 | 0.2 | • |
| A1B 0300 075 0600 030 | | | 30 | 75 | 6 | 0.3 | • |
| A1B 0300 075 0600 050 | | | 30 | 75 | 6 | 0.5 | • |
| A1B 0400 075 0600 020 | 4 | 8 | 32 | 75 | 6 | 0.2 | • |
| A1B 0400 075 0600 030 | | | 32 | 75 | 6 | 0.3 | • |
| A1B 0400 075 0600 050 | | | 32 | 75 | 6 | 0.5 | • |
| A1B 0500 075 0600 020 | 5 | 9 | 32 | 75 | 6 | 0.2 | • |
| A1B 0500 075 0600 030 | | | 32 | 75 | 6 | 0.3 | • |
| A1B 0500 075 0600 050 | | | 32 | 75 | 6 | 0.5 | • |
| A1B 0600 075 0600 020 | 6 | 10 | 40 | 75 | 6 | 0.2 | • |
| A1B 0600 075 0600 030 | | | 40 | 75 | 6 | 0.3 | • |
| A1B 0600 075 0600 050 | | | 40 | 75 | 6 | 0.5 | • |
| A1B 0600 075 0600 100 | | | 40 | 75 | 6 | 1 | • |
| A1B 0800 075 0800 020 | 8 | 12 | 40 | 75 | 8 | 0.2 | • |
| A1B 0800 075 0800 030 | | | 40 | 75 | 8 | 0.3 | • |
| A1B 0800 075 0800 050 | | | 40 | 75 | 8 | 0.5 | • |
| A1B 0800 075 0800 100 | | | 40 | 75 | 8 | 1 | • |
| A1B 1000 075 1000 020 | 10 | 14 | 40 | 75 | 10 | 0.2 | • |
| A1B 1000 075 1000 030 | | | 40 | 75 | 10 | 0.3 | • |
| A1B 1000 075 1000 050 | | | 40 | 75 | 10 | 0.5 | • |
| A1B 1000 075 1000 100 | | | 40 | 75 | 10 | 1 | • |
| A1B 1000 075 1000 200 | | | 40 | 75 | 10 | 2 | • |
| A1B 1000 100 1000 020 * | | | 60 | 100 | 10 | 0.2 | • |
| A1B 1000 100 1000 030 * | | | 60 | 100 | 10 | 0.3 | • |
| A1B 1000 100 1000 050 * | | | 60 | 100 | 10 | 0.5 | • |
| A1B 1000 100 1000 100 * | | | 60 | 100 | 10 | 1 | • |
| A1B 1000 100 1000 200 * | | | 60 | 100 | 10 | 2 | • |
| A1B 1200 100 1200 020 | 12 | 16 | 60 | 100 | 12 | 0.2 | • |
| A1B 1200 100 1200 030 | | | 60 | 100 | 12 | 0.3 | • |
| A1B 1200 100 1200 050 | | | 60 | 100 | 12 | 0.5 | • |
| A1B 1200 100 1200 100 | | | 60 | 100 | 12 | 1 | • |
| A1B 1200 100 1200 200 | | | 60 | 100 | 12 | 2 | • |
| A1B 1600 125 1600 030 | 16 | 22 | 85 | 125 | 16 | 0.3 | • |
| A1B 1600 125 1600 050 | | | 85 | 125 | 16 | 0.5 | • |
| A1B 1600 125 1600 100 | | | 85 | 125 | 16 | 1 | • |
| A1B 1600 125 1600 200 | | | 85 | 125 | 16 | 2 | • |
| A1B 1600 125 1600 300 | | | 85 | 125 | 16 | 3 | • |

* - DIN 6535

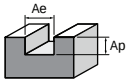
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ● | ○ | ● | ● | ● | ● | ● | | ● | | ● | | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

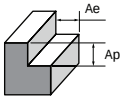
P M K S H P

## SE 45 Torus Endmills, 4 Flutes - A26 - A1B




| Slotting | P | | | | | | M | | | | K | | S | | H | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Carbon Steel | | Alloy Steel | | Prehardened Steel | | Stainless Steel | | Stainless Steel | | Ductile Cast Iron | | Titanium Alloy | | Hardened Steel | |
| Properties | - | | 520 < Rm < 1200 | | 35 ≤ HRC < 45 | | High Machinability | | Low Machinability | | - | | - | | 45 ≤ HRC < 52 | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 0.80 × D | | 0.85 × D | | 0.45 × D | | 0.80 × D | | 0.30 × D | | 0.30 × D | |
| Cutting Width, ae | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.003 | | 0.002 | | 0.003 | | 0.002 | | 0.002 | | 0.003 | | 0.004 | | 0.002 |
| 2 | | 0.006 | | 0.004 | | 0.006 | | 0.003 | | 0.004 | | 0.006 | | 0.008 | | 0.004 |
| 3 | | 0.009 | | 0.006 | | 0.009 | | 0.005 | | 0.006 | | 0.009 | | 0.012 | | 0.006 |
| 4 | | 0.012 | | 0.010 | | 0.012 | | 0.009 | | 0.010 | | 0.012 | | 0.018 | | 0.008 |
| 5 | | 0.015 | | 0.012 | | 0.015 | | 0.011 | | 0.012 | | 0.015 | | 0.024 | | 0.010 |
| 6 | | 0.018 | | 0.016 | | 0.018 | | 0.014 | | 0.016 | | 0.018 | | 0.028 | | 0.013 |
| 8 | | 0.024 | | 0.020 | | 0.024 | | 0.018 | | 0.020 | | 0.024 | | 0.037 | | 0.019 |
| 10 | 130 | 0.030 | 110 | 0.025 | 100 | 0.030 | 80 | 0.021 | 50 | 0.024 | 80 | 0.030 | 25 | 0.045 | 50 | 0.025 |
| 12 | | 0.036 | | 0.030 | | 0.036 | | 0.026 | | 0.030 | | 0.036 | | 0.055 | | 0.030 |
| 14 | | 0.042 | | 0.035 | | 0.042 | | 0.030 | | 0.035 | | 0.042 | | 0.066 | | 0.035 |
| 16 | | 0.048 | | 0.039 | | 0.048 | | 0.035 | | 0.040 | | 0.048 | | 0.072 | | 0.038 |
| 18 | | 0.054 | | 0.044 | | 0.054 | | 0.040 | | 0.045 | | 0.054 | | 0.082 | | 0.040 |
| 20 | | 0.060 | | 0.048 | | 0.060 | | 0.044 | | 0.049 | | 0.060 | | 0.091 | | 0.045 |
| 22 | | 0.066 | | 0.055 | | 0.066 | | 0.046 | | 0.055 | | 0.066 | | 0.100 | | 0.050 |
| 25 | | 0.075 | | 0.060 | | 0.075 | | 0.051 | | 0.060 | | 0.075 | | 0.120 | | 0.055 |

## SE 45 Torus Endmills, 4 Flutes - A26 - A1B




| Side Milling | P | | | | | | M | | | | K | | S | | H | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Carbon Steel | | Alloy Steel | | Prehardened Steel | | Stainless Steel | | Stainless Steel | | Ductile Cast Iron | | Titanium Alloy | | Hardened Steel | |
| Properties | - | | 520 < Rm < 1200 | | 35 ≤ HRC < 45 | | High Machinability | | Low Machinability | | - | | - | | 45 ≤ HRC < 52 | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| Cutting Width, ae | 0.25 × D | | 0.20 × D | | 0.18 × D | | 0.21 × D | | 0.18 × D | | 0.18 × D | | 0.10 × D | | 0.15 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.004 | | 0.005 | | 0.004 | | 0.004 | | 0.005 | | 0.004 | | 0.004 | | 0.003 |
| 2 | | 0.009 | | 0.009 | | 0.009 | | 0.011 | | 0.013 | | 0.008 | | 0.008 | | 0.006 |
| 3 | | 0.017 | | 0.014 | | 0.014 | | 0.016 | | 0.020 | | 0.012 | | 0.012 | | 0.009 |
| 4 | | 0.024 | | 0.021 | | 0.020 | | 0.023 | | 0.028 | | 0.017 | | 0.018 | | 0.012 |
| 5 | | 0.035 | | 0.029 | | 0.028 | | 0.032 | | 0.038 | | 0.022 | | 0.024 | | 0.015 |
| 6 | | 0.039 | | 0.034 | | 0.034 | | 0.039 | | 0.046 | | 0.026 | | 0.028 | | 0.018 |
| 8 | | 0.054 | | 0.047 | | 0.046 | | 0.053 | | 0.060 | | 0.034 | | 0.037 | | 0.024 |
| 10 | 160 | 0.064 | 130 | 0.058 | 110 | 0.058 | 90 | 0.069 | 55 | 0.076 | 90 | 0.042 | 35 | 0.045 | 90 | 0.030 |
| 12 | | 0.074 | | 0.069 | | 0.069 | | 0.083 | | 0.090 | | 0.051 | | 0.055 | | 0.036 |
| 14 | | 0.084 | | 0.077 | | 0.078 | | 0.090 | | 0.098 | | 0.060 | | 0.066 | | 0.042 |
| 16 | | 0.092 | | 0.085 | | 0.088 | | 0.100 | | 0.108 | | 0.068 | | 0.072 | | 0.048 |
| 18 | | 0.104 | | 0.093 | | 0.099 | | 0.108 | | 0.120 | | 0.076 | | 0.082 | | 0.054 |
| 20 | | 0.114 | | 0.099 | | 0.105 | | 0.122 | | 0.132 | | 0.084 | | 0.091 | | 0.060 |
| 22 | | 0.120 | | 0.109 | | 0.115 | | 0.130 | | 0.140 | | 0.088 | | 0.100 | | 0.066 |
| 25 | | 0.133 | | 0.118 | | 0.124 | | 0.144 | | 0.152 | | 0.100 | | 0.120 | | 0.075 |

# A03

36 - 50 HRC

HPMT

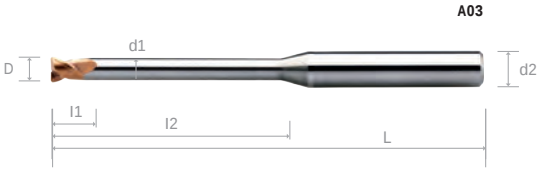
## SE 45 Miniature Endmills with Long Neck, 2 Flutes

SE 45 Fresas miniatura de mango con cuello largo, 2 hélices

SE 45 Kleinstfräser mit langem Hals, 2 Zähne

Micro-fraises SE 45 avec cou long, 2 dents

DIN 6535 HA HB | UF+ | λ= 40° | HSC B0909 TiSiN





| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d1 (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| A03 0020 050 0400 | 0.2 | 0.3 | - | 50 | - | 4 | • |
| A03 0020 050 0400 005 | | | 0.5 | 50 | 0.17 | 4 | • |
| A03 0020 050 0400 010 | | | 1 | 50 | 0.17 | 4 | • |
| A03 0020 050 0400 015 | | | 1.5 | 50 | 0.17 | 4 | • |
| A03 0030 050 0400 | 0.3 | 0.4 | - | 50 | - | 4 | • |
| A03 0030 050 0400 010 | | | 1 | 50 | 0.27 | 4 | • |
| A03 0030 050 0400 020 | | | 2 | 50 | 0.27 | 4 | • |
| A03 0030 050 0400 030 | | | 3 | 50 | 0.27 | 4 | • |
| A03 0040 050 0400 | 0.4 | 0.6 | - | 50 | - | 4 | • |
| A03 0040 050 0400 020 | | | 2 | 50 | 0.37 | 4 | • |
| A03 0040 050 0400 030 | | | 3 | 50 | 0.37 | 4 | • |
| A03 0040 050 0400 040 | | | 4 | 50 | 0.37 | 4 | • |
| A03 0040 050 0400 050 | | | 5 | 50 | 0.37 | 4 | • |
| A03 0050 050 0400 | 0.5 | 0.7 | - | 50 | - | 4 | • |
| A03 0050 050 0400 020 | | | 2 | 50 | 0.45 | 4 | • |
| A03 0050 050 0400 040 | | | 4 | 50 | 0.45 | 4 | • |
| A03 0050 050 0400 060 | | | 6 | 50 | 0.45 | 4 | • |
| A03 0050 050 0400 080 | | | 8 | 50 | 0.45 | 4 | • |
| A03 0060 050 0400 | 0.6 | 0.9 | - | 50 | - | 4 | • |
| A03 0060 050 0400 020 | | | 2 | 50 | 0.55 | 4 | • |
| A03 0060 050 0400 040 | | | 4 | 50 | 0.55 | 4 | • |
| A03 0060 050 0400 060 | | | 6 | 50 | 0.55 | 4 | • |
| A03 0060 050 0400 080 | | | 8 | 50 | 0.55 | 4 | • |
| A03 0060 050 0400 100 | | | 10 | 50 | 0.55 | 4 | • |
| A03 0070 050 0400 | 0.7 | 1 | - | 50 | - | 4 | • |
| A03 0070 050 0400 020 | | | 2 | 50 | 0.65 | 4 | • |
| A03 0070 050 0400 040 | | | 4 | 50 | 0.65 | 4 | • |
| A03 0070 050 0400 060 | | | 6 | 50 | 0.65 | 4 | • |
| A03 0070 050 0400 080 | | | 8 | 50 | 0.65 | 4 | • |
| A03 0070 050 0400 100 | | | 10 | 50 | 0.65 | 4 | • |
| A03 0080 050 0400 | 0.8 | 1.2 | - | 50 | - | 4 | • |
| A03 0080 050 0400 040 | | | 4 | 50 | 0.75 | 4 | • |
| A03 0080 050 0400 060 | | | 6 | 50 | 0.75 | 4 | • |
| A03 0080 050 0400 080 | | | 8 | 50 | 0.75 | 4 | • |
| A03 0080 050 0400 100 | | | 10 | 50 | 0.75 | 4 | • |
| A03 0080 050 0400 120 | | | 12 | 50 | 0.75 | 4 | • |
| A03 0090 050 0400 | 0.9 | 1.4 | - | 50 | - | 4 | • |
| A03 0090 050 0400 060 | | | 6 | 50 | 0.85 | 4 | • |
| A03 0090 050 0400 080 | | | 8 | 50 | 0.85 | 4 | • |
| A03 0090 050 0400 100 | | | 10 | 50 | 0.85 | 4 | • |
| A03 0090 050 0400 150 | | | 15 | 50 | 0.85 | 4 | • |
| A03 0100 050 0400 | 1 | 1.5 | - | 50 | - | 4 | • |
| A03 0100 050 0400 060 | | | 6 | 50 | 0.9 | 4 | • |
| A03 0100 050 0400 080 | | | 8 | 50 | 0.9 | 4 | • |
| A03 0100 050 0400 100 | | | 10 | 50 | 0.9 | 4 | • |
| A03 0100 050 0400 120 | | | 12 | 50 | 0.9 | 4 | • |
| A03 0100 050 0400 140 | | | 14 | 50 | 0.9 | 4 | • |
| A03 0100 050 0400 160 | | | 16 | 50 | 0.9 | 4 | • |

| CODICE | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d1 (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| A03 0120 050 0400 | 1.2 | 1.8 | - | 50 | - | 4 | • |
| A03 0120 050 0400 060 | | | 6 | 50 | 1.1 | 4 | • |
| A03 0120 050 0400 080 | | | 8 | 50 | 1.1 | 4 | • |
| A03 0120 050 0400 100 | | | 10 | 50 | 1.1 | 4 | • |
| A03 0120 050 0400 120 | | | 12 | 50 | 1.1 | 4 | • |
| A03 0140 050 0400 | 1.4 | 2.1 | - | 50 | - | 4 | • |
| A03 0140 050 0400 060 | | | 6 | 50 | 1.3 | 4 | • |
| A03 0140 050 0400 080 | | | 8 | 50 | 1.3 | 4 | • |
| A03 0140 050 0400 100 | | | 10 | 50 | 1.3 | 4 | • |
| A03 0140 050 0400 120 | | | 12 | 50 | 1.3 | 4 | • |
| A03 0140 050 0400 140 | | | 14 | 50 | 1.3 | 4 | • |
| A03 0140 050 0400 160 | | | 16 | 50 | 1.3 | 4 | • |
| A03 0150 050 0400 | 1.5 | 2.3 | - | 50 | - | 4 | • |
| A03 0150 050 0400 060 | | | 6 | 50 | 1.4 | 4 | • |
| A03 0150 050 0400 080 | | | 8 | 50 | 1.4 | 4 | • |
| A03 0150 050 0400 100 | | | 10 | 50 | 1.4 | 4 | • |
| A03 0150 050 0400 120 | | | 12 | 50 | 1.4 | 4 | • |
| A03 0150 050 0400 140 | | | 14 | 50 | 1.4 | 4 | • |
| A03 0150 050 0400 160 | | | 16 | 50 | 1.4 | 4 | • |
| A03 0150 060 0400 | | | - | 60 | - | 4 | • |
| A03 0150 060 0400 180 | | | 18 | 60 | 1.4 | 4 | • |
| A03 0150 060 0400 200 | | | 20 | 60 | 1.4 | 4 | • |
| A03 0160 050 0400 | 1.6 | 2.4 | - | 50 | - | 4 | • |
| A03 0160 050 0400 060 | | | 6 | 50 | 1.5 | 4 | • |
| A03 0160 050 0400 080 | | | 8 | 50 | 1.5 | 4 | • |
| A03 0160 050 0400 100 | | | 10 | 50 | 1.5 | 4 | • |
| A03 0160 050 0400 120 | | | 12 | 50 | 1.5 | 4 | • |
| A03 0160 050 0400 140 | | | 14 | 50 | 1.5 | 4 | • |
| A03 0160 050 0400 160 | | | 16 | 50 | 1.5 | 4 | • |
| A03 0160 060 0400 | | | - | 60 | - | 4 | • |
| A03 0160 060 0400 180 | | | 18 | 60 | 1.5 | 4 | • |
| A03 0160 060 0400 200 | | | 20 | 60 | 1.5 | 4 | • |
| A03 0180 050 0400 | 1.8 | 2.7 | - | 50 | - | 4 | • |
| A03 0180 050 0400 060 | | | 6 | 50 | 1.7 | 4 | • |
| A03 0180 050 0400 080 | | | 8 | 50 | 1.7 | 4 | • |
| A03 0180 050 0400 100 | | | 10 | 50 | 1.7 | 4 | • |
| A03 0180 050 0400 120 | | | 12 | 50 | 1.7 | 4 | • |
| A03 0180 050 0400 140 | | | 14 | 50 | 1.7 | 4 | • |
| A03 0180 050 0400 160 | | | 16 | 50 | 1.7 | 4 | • |
| A03 0180 060 0400 | | | - | 60 | - | 4 | • |
| A03 0180 060 0400 180 | | | 18 | 60 | 1.7 | 4 | • |
| A03 0180 060 0400 200 | | | 20 | 60 | 1.7 | 4 | • |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ● | ○ | ● | | ○ | ● | ● | | ● | | ● | | | |

# A79

36 - 50 HRC

HPMT

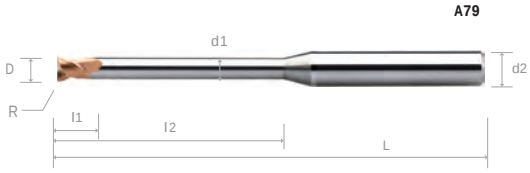
## SE 45R Miniature Torus Endmills with Long Neck, 2 Flutes

SE 45R Fresas Miniatura Torus De Cuello Largo, 2 Filos

SE 45X Torus-Kleinstfräser mit langem Hals, 2 Zähne

Micro-fraises SE 45X toriques avec cou long, 2 dents

DIN 6535 HA HB | UF+ | R±0.010 | λ= 40° | HSC B0909 TiSiN





| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d1 (mm) | R | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|---|
| A79 0020 050 0400 005 R005 | 0.2 | 0.3 | 0.5 | 50 | 0.17 | 0.05 | 4 | • |
| A79 0020 050 0400 010 R005 | | | 1 | 50 | 0.17 | 0.05 | 4 | ○ |
| A79 0020 050 0400 015 R005 | | | 1.5 | 50 | 0.17 | 0.05 | 4 | ○ |
| A79 0020 050 0400 020 R005 | | | 2 | 50 | 0.17 | 0.05 | 4 | ○ |
| A79 0030 050 0400 010 R005 | 0.3 | 0.4 | 1 | 50 | 0.27 | 0.05 | 4 | ○ |
| A79 0030 050 0400 015 R005 | | | 1.5 | 50 | 0.27 | 0.05 | 4 | ○ |
| A79 0030 050 0400 020 R005 | | | 2 | 50 | 0.27 | 0.05 | 4 | ○ |
| A79 0030 050 0400 025 R005 | | | 2.5 | 50 | 0.27 | 0.05 | 4 | ○ |
| A79 0030 050 0400 030 R005 | | | 3 | 50 | 0.27 | 0.05 | 4 | ○ |
| A79 0030 050 0400 010 R010 | | | 1 | 50 | 0.27 | 0.1 | 4 | • |
| A79 0030 050 0400 015 R010 | | | 1.5 | 50 | 0.27 | 0.1 | 4 | • |
| A79 0030 050 0400 020 R010 | | | 2 | 50 | 0.27 | 0.1 | 4 | • |
| A79 0030 050 0400 025 R010 | | | 2.5 | 50 | 0.27 | 0.1 | 4 | • |
| A79 0030 050 0400 030 R010 | | | 3 | 50 | 0.27 | 0.1 | 4 | ○ |
| A79 0040 050 0400 010 R005 | 0.4 | 0.6 | 1 | 50 | 0.37 | 0.05 | 4 | ○ |
| A79 0040 050 0400 015 R005 | | | 1.5 | 50 | 0.37 | 0.05 | 4 | ○ |
| A79 0040 050 0400 020 R005 | | | 2 | 50 | 0.37 | 0.05 | 4 | ○ |
| A79 0040 050 0400 025 R005 | | | 2.5 | 50 | 0.37 | 0.05 | 4 | ○ |
| A79 0040 050 0400 030 R005 | | | 3 | 50 | 0.37 | 0.05 | 4 | ○ |
| A79 0040 050 0400 035 R005 | | | 3.5 | 50 | 0.37 | 0.05 | 4 | ○ |
| A79 0040 050 0400 040 R005 | | | 4 | 50 | 0.37 | 0.05 | 4 | ○ |
| A79 0040 050 0400 010 R010 | | | 1 | 50 | 0.37 | 0.1 | 4 | • |
| A79 0040 050 0400 015 R010 | | | 1.5 | 50 | 0.37 | 0.1 | 4 | • |
| A79 0040 050 0400 020 R010 | | | 2 | 50 | 0.37 | 0.1 | 4 | • |
| A79 0040 050 0400 025 R010 | | | 2.5 | 50 | 0.37 | 0.1 | 4 | • |
| A79 0040 050 0400 030 R010 | | | 3 | 50 | 0.37 | 0.1 | 4 | • |
| A79 0040 050 0400 035 R010 | | | 3.5 | 50 | 0.37 | 0.1 | 4 | • |
| A79 0040 050 0400 040 R010 | | | 4 | 50 | 0.37 | 0.1 | 4 | ○ |
| A79 0050 050 0400 020 R005 | 0.5 | 0.7 | 2 | 50 | 0.45 | 0.05 | 4 | ○ |
| A79 0050 050 0400 040 R005 | | | 4 | 50 | 0.45 | 0.05 | 4 | ○ |
| A79 0050 050 0400 060 R005 | | | 6 | 50 | 0.45 | 0.05 | 4 | ○ |
| A79 0050 050 0400 080 R005 | | | 8 | 50 | 0.45 | 0.05 | 4 | ○ |
| A79 0050 050 0400 020 R010 | | | 2 | 50 | 0.45 | 0.1 | 4 | • |
| A79 0050 050 0400 040 R010 | | | 4 | 50 | 0.45 | 0.1 | 4 | • |
| A79 0050 050 0400 060 R010 | | | 6 | 50 | 0.45 | 0.1 | 4 | • |
| A79 0050 050 0400 080 R010 | | | 8 | 50 | 0.45 | 0.1 | 4 | ○ |
| A79 0060 050 0400 020 R010 | 0.6 | 0.9 | 2 | 50 | 0.45 | 0.1 | 4 | ○ |
| A79 0060 050 0400 040 R010 | | | 4 | 50 | 0.45 | 0.1 | 4 | • |
| A79 0060 050 0400 060 R010 | | | 6 | 50 | 0.45 | 0.1 | 4 | • |
| A79 0060 050 0400 080 R010 | | | 8 | 50 | 0.45 | 0.1 | 4 | ○ |
| A79 0060 050 0400 100 R010 | | | 10 | 50 | 0.45 | 0.1 | 4 | ○ |
| A79 0070 050 0400 020 R010 | 0.7 | 1 | 2 | 50 | 0.65 | 0.1 | 4 | ○ |
| A79 0070 050 0400 040 R010 | | | 4 | 50 | 0.65 | 0.1 | 4 | ○ |
| A79 0070 050 0400 060 R010 | | | 6 | 50 | 0.65 | 0.1 | 4 | ○ |
| A79 0070 050 0400 080 R010 | | | 8 | 50 | 0.65 | 0.1 | 4 | ○ |
| A79 0070 050 0400 100 R010 | | | 10 | 50 | 0.65 | 0.1 | 4 | ○ |
| A79 0080 050 0400 040 R005 | 0.8 | 1.2 | 4 | 50 | 0.75 | 0.05 | 4 | ○ |
| A79 0080 050 0400 060 R005 | | | 6 | 50 | 0.75 | 0.05 | 4 | ○ |
| A79 0080 050 0400 080 R005 | | | 8 | 50 | 0.75 | 0.05 | 4 | ○ |
| A79 0080 050 0400 100 R005 | | | 10 | 50 | 0.75 | 0.05 | 4 | ○ |
| A79 0080 050 0400 120 R005 | | | 12 | 50 | 0.75 | 0.05 | 4 | ○ |
| A79 0080 050 0400 040 R010 | | | 4 | 50 | 0.75 | 0.1 | 4 | • |
| A79 0080 050 0400 060 R010 | | | 6 | 50 | 0.75 | 0.1 | 4 | • |
| A79 0080 050 0400 080 R010 | | | 8 | 50 | 0.75 | 0.1 | 4 | • |
| A79 0080 050 0400 100 R010 | | | 10 | 50 | 0.75 | 0.1 | 4 | • |
| A79 0080 050 0400 120 R010 | | | 12 | 50 | 0.75 | 0.1 | 4 | • |

| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d1 (mm) | R | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|---|
| A79 0090 050 0400 060 R010 | 0.9 | 1.4 | 6 | 50 | 0.85 | 0.1 | 4 | ○ |
| A79 0090 050 0400 080 R010 | | | 8 | 50 | 0.85 | 0.1 | 4 | ○ |
| A79 0090 050 0400 100 R010 | | | 10 | 50 | 0.85 | 0.1 | 4 | ○ |
| A79 0090 050 0400 150 R010 | | | 15 | 50 | 0.85 | 0.1 | 4 | ○ |
| A79 0100 050 0400 040 R010 | 1 | 1.5 | 4 | 50 | 0.9 | 0.1 | 4 | ○ |
| A79 0100 050 0400 060 R010 | | | 6 | 50 | 0.9 | 0.1 | 4 | ○ |
| A79 0100 050 0400 080 R010 | | | 8 | 50 | 0.9 | 0.1 | 4 | • |
| A79 0100 050 0400 100 R010 | | | 10 | 50 | 0.9 | 0.1 | 4 | ○ |
| A79 0100 050 0400 120 R010 | | | 12 | 50 | 0.9 | 0.1 | 4 | ○ |
| A79 0100 050 0400 140 R010 | | | 14 | 50 | 0.9 | 0.1 | 4 | ○ |
| A79 0100 050 0400 160 R010 | | | 16 | 50 | 0.9 | 0.1 | 4 | • |
| A79 0100 060 0400 200 R010 | | | 20 | 60 | 0.9 | 0.1 | 4 | ○ |
| A79 0100 050 0400 040 R020 | | | 4 | 50 | 0.9 | 0.2 | 4 | • |
| A79 0100 050 0400 060 R020 | | | 6 | 50 | 0.9 | 0.2 | 4 | • |
| A79 0100 050 0400 080 R020 | | | 8 | 50 | 0.9 | 0.2 | 4 | • |
| A79 0100 050 0400 100 R020 | | | 10 | 50 | 0.9 | 0.2 | 4 | • |
| A79 0100 050 0400 120 R020 | | | 12 | 50 | 0.9 | 0.2 | 4 | • |
| A79 0100 050 0400 140 R020 | | | 14 | 50 | 0.9 | 0.2 | 4 | ○ |
| A79 0100 050 0400 160 R020 | | | 16 | 50 | 0.9 | 0.2 | 4 | ○ |
| A79 0100 060 0400 200 R020 | | | 20 | 60 | 0.9 | 0.2 | 4 | ○ |
| A79 0100 050 0400 060 R030 | | | 6 | 50 | 0.9 | 0.3 | 4 | • |
| A79 0100 050 0400 100 R030 | | | 10 | 50 | 0.9 | 0.3 | 4 | • |
| A79 0100 050 0400 160 R030 | | | 16 | 50 | 0.9 | 0.3 | 4 | • |
| A79 0100 060 0400 200 R030 | | | 20 | 60 | 0.9 | 0.3 | 4 | ○ |
| A79 0120 050 0400 060 R010 | 1.2 | 1.8 | 6 | 50 | 1.1 | 0.1 | 4 | • |
| A79 0120 050 0400 080 R010 | | | 8 | 50 | 1.1 | 0.1 | 4 | ○ |
| A79 0120 050 0400 100 R010 | | | 10 | 50 | 1.1 | 0.1 | 4 | ○ |
| A79 0120 050 0400 120 R010 | | | 12 | 50 | 1.1 | 0.1 | 4 | ○ |
| A79 0140 050 0400 060 R010 | 1.4 | 2.1 | 6 | 50 | 1.3 | 0.1 | 4 | ○ |
| A79 0140 050 0400 080 R010 | | | 8 | 50 | 1.3 | 0.1 | 4 | ○ |
| A79 0140 050 0400 100 R010 | | | 10 | 50 | 1.3 | 0.1 | 4 | ○ |
| A79 0140 050 0400 120 R010 | | | 12 | 50 | 1.3 | 0.1 | 4 | ○ |
| A79 0140 050 0400 140 R010 | | | 14 | 50 | 1.3 | 0.1 | 4 | ○ |
| A79 0140 050 0400 160 R010 | | | 16 | 50 | 1.3 | 0.1 | 4 | ○ |
| A79 0150 050 0400 060 R010 | 1.5 | 2.3 | 6 | 50 | 1.4 | 0.1 | 4 | ○ |
| A79 0150 050 0400 080 R010 | | | 8 | 50 | 1.4 | 0.1 | 4 | • |
| A79 0150 050 0400 120 R010 | | | 12 | 50 | 1.4 | 0.1 | 4 | • |
| A79 0150 050 0400 160 R010 | | | 16 | 50 | 1.4 | 0.1 | 4 | ○ |
| A79 0150 060 0400 200 R010 | | | 20 | 60 | 1.4 | 0.1 | 4 | ○ |
| A79 0150 050 0400 060 R020 | | | 6 | 50 | 1.4 | 0.2 | 4 | • |
| A79 0150 050 0400 080 R020 | | | 8 | 50 | 1.4 | 0.2 | 4 | • |
| A79 0150 050 0400 100 R020 | | | 10 | 50 | 1.4 | 0.2 | 4 | • |
| A79 0150 050 0400 120 R020 | | | 12 | 50 | 1.4 | 0.2 | 4 | • |
| A79 0150 050 0400 140 R020 | | | 14 | 50 | 1.4 | 0.2 | 4 | • |
| A79 0150 050 0400 160 R020 | | | 16 | 50 | 1.4 | 0.2 | 4 | ○ |
| A79 0150 060 0400 180 R020 | | | 18 | 60 | 1.4 | 0.2 | 4 | ○ |
| A79 0150 060 0400 200 R020 | | | 20 | 60 | 1.4 | 0.2 | 4 | ○ |
| A79 0150 050 0400 080 R030 | | | 8 | 50 | 1.4 | 0.3 | 4 | • |
| A79 0150 050 0400 160 R030 | | | 16 | 50 | 1.4 | 0.3 | 4 | • |
| A79 0150 060 0400 200 R030 | | | 20 | 60 | 1.4 | 0.3 | 4 | ○ |
| A79 0160 050 0400 060 R010 | 1.6 | 2.4 | 6 | 50 | 1.5 | 0.1 | 4 | ○ |
| A79 0160 050 0400 080 R010 | | | 8 | 50 | 1.5 | 0.1 | 4 | ○ |
| A79 0160 050 0400 100 R010 | | | 10 | 50 | 1.5 | 0.1 | 4 | ○ |
| A79 0160 050 0400 120 R010 | | | 12 | 50 | 1.5 | 0.1 | 4 | ○ |
| A79 0160 050 0400 140 R010 | | | 14 | 50 | 1.5 | 0.1 | 4 | ○ |
| A79 0160 050 0400 160 R010 | | | 16 | 50 | 1.5 | 0.1 | 4 | ○ |

cont'd ▸

"o" Product on request (Minimum order quantity 2 pcs.) | Make to order | auf Anfrage | Faire sur commande

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | • | ○ | • | | ○ | • | • | | • | | • | | | |

# A79

36 - 50 HRC

HPMT

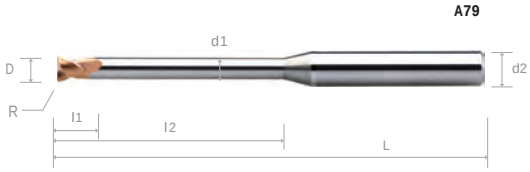
## SE 45R Miniature Torus Endmills with Long Neck, 2 Flutes

SE 45R Fresas Miniatura Torus De Cuello Largo, 2 Filos

SE 45X Torus-Kleinstfräser mit langem Hals, 2 Zähne

Micro-fraises SE 45X toriques avec cou long, 2 dents

DIN 6535 HA HB | UF+ | R±0.010 | λ= 40° | HSC B0909 TiSiN





| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d1 (mm) | R | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|---|
| A79 0160 060 0400 180 R010 | 1.6 | 2.4 | 18 | 60 | 1.5 | 0.1 | 4 | ○ |
| A79 0160 060 0400 200 R010 | | | 20 | 60 | 1.5 | 0.1 | 4 | ○ |
| A79 0180 050 0400 060 R020 | 1.8 | 2.7 | 6 | 50 | 1.7 | 0.2 | 4 | ○ |
| A79 0180 050 0400 080 R020 | | | 8 | 50 | 1.7 | 0.2 | 4 | ○ |
| A79 0180 050 0400 100 R020 | | | 10 | 50 | 1.7 | 0.2 | 4 | ○ |
| A79 0180 050 0400 120 R020 | | | 12 | 50 | 1.7 | 0.2 | 4 | • |
| A79 0180 050 0400 140 R020 | | | 14 | 50 | 1.7 | 0.2 | 4 | ○ |
| A79 0180 050 0400 160 R020 | | | 16 | 50 | 1.7 | 0.2 | 4 | • |
| A79 0180 060 0400 180 R020 | | | 18 | 60 | 1.7 | 0.2 | 4 | ○ |
| A79 0180 060 0400 200 R020 | | | 20 | 60 | 1.7 | 0.2 | 4 | ○ |
| A79 0200 050 0400 060 R020 | 2 | 3 | 6 | 50 | 1.9 | 0.2 | 4 | ○ |
| A79 0200 050 0400 080 R020 | | | 8 | 50 | 1.9 | 0.2 | 4 | ○ |
| A79 0200 050 0400 100 R020 | | | 10 | 50 | 1.9 | 0.2 | 4 | • |
| A79 0200 050 0400 120 R020 | | | 12 | 50 | 1.9 | 0.2 | 4 | • |
| A79 0200 050 0400 140 R020 | | | 14 | 50 | 1.9 | 0.2 | 4 | ○ |
| A79 0200 050 0400 160 R020 | | | 16 | 50 | 1.9 | 0.2 | 4 | • |
| A79 0200 060 0400 180 R020 | | | 18 | 60 | 1.9 | 0.2 | 4 | ○ |
| A79 0200 060 0400 200 R020 | | | 20 | 60 | 1.9 | 0.2 | 4 | ○ |
| A79 0200 075 0400 250 R020 | | | 25 | 75 | 1.9 | 0.2 | 4 | ○ |
| A79 0200 075 0400 300 R020 | | | 30 | 75 | 1.9 | 0.2 | 4 | ○ |
| A79 0200 050 0400 080 R030 | | | 8 | 50 | 1.9 | 0.3 | 4 | • |
| A79 0200 050 0400 160 R030 | | | 16 | 50 | 1.9 | 0.3 | 4 | • |
| A79 0200 060 0400 200 R030 | | | 20 | 60 | 1.9 | 0.3 | 4 | ○ |
| A79 0200 050 0400 060 R050 | | | 6 | 50 | 1.9 | 0.5 | 4 | • |
| A79 0200 050 0400 080 R050 | | | 8 | 50 | 1.9 | 0.5 | 4 | • |
| A79 0200 050 0400 120 R050 | | | 12 | 50 | 1.9 | 0.5 | 4 | • |
| A79 0200 050 0400 160 R050 | | | 16 | 50 | 1.9 | 0.5 | 4 | • |
| A79 0200 060 0400 200 R050 | | | 20 | 60 | 1.9 | 0.5 | 4 | • |
| A79 0200 075 0400 250 R050 | | | 25 | 75 | 1.9 | 0.5 | 4 | • |
| A79 0200 075 0400 300 R050 | | | 30 | 75 | 1.9 | 0.5 | 4 | • |
| A79 0250 050 0400 080 R030 | 2.5 | 3.7 | 8 | 50 | 2.4 | 0.3 | 4 | ○ |
| A79 0250 050 0400 100 R030 | | | 10 | 50 | 2.4 | 0.3 | 4 | ○ |
| A79 0250 050 0400 120 R030 | | | 12 | 50 | 2.4 | 0.3 | 4 | ○ |
| A79 0250 050 0400 140 R030 | | | 14 | 50 | 2.4 | 0.3 | 4 | ○ |
| A79 0250 050 0400 160 R030 | | | 16 | 50 | 2.4 | 0.3 | 4 | ○ |
| A79 0250 060 0400 180 R030 | | | 18 | 60 | 2.4 | 0.3 | 4 | ○ |
| A79 0250 060 0400 200 R030 | | | 20 | 60 | 2.4 | 0.3 | 4 | ○ |
| A79 0250 060 0400 250 R030 | | | 25 | 60 | 2.4 | 0.3 | 4 | ○ |
| A79 0250 075 0400 300 R030 | | | 30 | 75 | 2.4 | 0.3 | 4 | ○ |
| A79 0250 050 0400 080 R050 | | | 8 | 50 | 2.4 | 0.5 | 4 | • |
| A79 0250 050 0400 120 R050 | | | 12 | 50 | 2.4 | 0.5 | 4 | • |
| A79 0250 050 0400 160 R050 | | | 16 | 50 | 2.4 | 0.5 | 4 | • |
| A79 0250 060 0400 200 R050 | | | 20 | 60 | 2.4 | 0.5 | 4 | • |
| A79 0250 060 0400 250 R050 | | | 25 | 60 | 2.4 | 0.5 | 4 | • |
| A79 0250 075 0400 300 R050 | | | 30 | 75 | 2.4 | 0.5 | 4 | ○ |

| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d1 (mm) | R | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|---|
| A79 0300 050 0600 080 R020 | 3 | 4.5 | 8 | 50 | 2.8 | 0.2 | 6 | ○ |
| A79 0300 050 0600 100 R020 | | | 10 | 50 | 2.8 | 0.2 | 6 | ○ |
| A79 0300 050 0600 120 R020 | | | 12 | 50 | 2.8 | 0.2 | 6 | ○ |
| A79 0300 050 0600 140 R020 | | | 14 | 50 | 2.8 | 0.2 | 6 | ○ |
| A79 0300 060 0600 160 R020 | | | 16 | 60 | 2.8 | 0.2 | 6 | • |
| A79 0300 060 0600 180 R020 | | | 18 | 60 | 2.8 | 0.2 | 6 | ○ |
| A79 0300 060 0600 200 R020 | | | 20 | 60 | 2.8 | 0.2 | 6 | • |
| A79 0300 075 0600 250 R020 | | | 25 | 75 | 2.8 | 0.2 | 6 | ○ |
| A79 0300 050 0600 080 R030 | | | 8 | 50 | 2.8 | 0.3 | 6 | • |
| A79 0300 050 0600 100 R030 | | | 10 | 50 | 2.8 | 0.3 | 6 | • |
| A79 0300 050 0600 120 R030 | | | 12 | 50 | 2.8 | 0.3 | 6 | • |
| A79 0300 050 0600 140 R030 | | | 14 | 50 | 2.8 | 0.3 | 6 | • |
| A79 0300 060 0600 160 R030 | | | 16 | 60 | 2.8 | 0.3 | 6 | ○ |
| A79 0300 060 0600 180 R030 | | | 18 | 60 | 2.8 | 0.3 | 6 | ○ |
| A79 0300 060 0600 200 R030 | | | 20 | 60 | 2.8 | 0.3 | 6 | ○ |
| A79 0300 075 0600 250 R030 | | | 25 | 75 | 2.8 | 0.3 | 6 | ○ |
| A79 0300 050 0600 080 R050 | | | 8 | 50 | 2.8 | 0.5 | 6 | • |
| A79 0300 050 0600 100 R050 | | | 10 | 50 | 2.8 | 0.5 | 6 | • |
| A79 0300 050 0600 120 R050 | | | 12 | 50 | 2.8 | 0.5 | 6 | • |
| A79 0300 050 0600 140 R050 | | | 14 | 50 | 2.8 | 0.5 | 6 | • |
| A79 0300 060 0600 160 R050 | | | 16 | 60 | 2.8 | 0.5 | 6 | • |
| A79 0300 060 0600 180 R050 | | | 18 | 60 | 2.8 | 0.5 | 6 | • |
| A79 0300 060 0600 200 R050 | | | 20 | 60 | 2.8 | 0.5 | 6 | • |
| A79 0300 075 0600 250 R050 | | | 25 | 75 | 2.8 | 0.5 | 6 | • |
| A79 0400 060 0600 100 R030 | 4 | | 10 | 60 | 3.7 | 0.3 | 6 | ○ |
| A79 0400 060 0600 150 R030 | | | 15 | 60 | 3.7 | 0.3 | 6 | • |
| A79 0400 060 0600 200 R030 | | | 20 | 60 | 3.7 | 0.3 | 6 | ○ |
| A79 0400 075 0600 250 R030 | | | 25 | 75 | 3.7 | 0.3 | 6 | ○ |
| A79 0400 075 0600 300 R030 | | | 30 | 75 | 3.7 | 0.3 | 6 | ○ |
| A79 0400 075 0600 400 R030 | | | 40 | 75 | 3.7 | 0.3 | 6 | ○ |
| A79 0400 060 0600 100 R050 | | | 10 | 60 | 3.7 | 0.5 | 6 | • |
| A79 0400 060 0600 150 R050 | | | 15 | 60 | 3.7 | 0.5 | 6 | • |
| A79 0400 060 0600 200 R050 | | | 20 | 60 | 3.7 | 0.5 | 6 | • |
| A79 0400 075 0600 250 R050 | | | 25 | 75 | 3.7 | 0.5 | 6 | • |
| A79 0400 075 0600 300 R050 | | | 30 | 75 | 3.7 | 0.5 | 6 | • |
| A79 0400 075 0600 400 R050 | | | 40 | 75 | 3.7 | 0.5 | 6 | • |

"o" Product on request (Minimum order quantity 2 pcs.) | Make to order | auf Anfrage | Faire sur commande

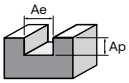
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | • | ○ | • | | ○ | • | • | | • | | • | | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P M K S H P

## SE 45 Miniature Long Neck Endmills, 2 Flutes - A03, A79



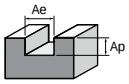

| Slotting | | K | | | P | | | M | | | S | | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | | Ductile Cast Iron | | | Prehardened Steel | | | Stainless Steel | | | Nickel Alloy | | | Hardened Steel | | |
| Properties | | - | | | - | | | Low Machinability | | | - | | | 45 ≤ HRC < 52 | | |
| D | Effective Length | Ap | N | Fz | Ap | N | Fz | Ap | N | Fz | Ap | N | Fz | Ap | N | Fz |
| 0.2 | 0.5 | 0.013 | 34380 | 0.004 | 0.014 | 38200 | 0.004 | 0.008 | 27000 | 0.002 | 0.006 | 16880 | 0.002 | 0.010 | 33750 | 0.002 |
| | 1.0 | 0.009 | 34430 | 0.003 | 0.010 | 38250 | 0.003 | 0.006 | 27000 | 0.002 | 0.004 | 16880 | 0.002 | 0.007 | 33750 | 0.002 |
| | 1.5 | 0.005 | 30990 | 0.003 | 0.006 | 34430 | 0.003 | 0.003 | 24300 | 0.002 | 0.002 | 15190 | 0.002 | 0.004 | 30380 | 0.002 |
| 0.3 | 1.0 | 0.014 | 30600 | 0.005 | 0.015 | 34000 | 0.005 | 0.008 | 24000 | 0.004 | 0.006 | 15000 | 0.004 | 0.011 | 30000 | 0.004 |
| | 2.0 | 0.007 | 27540 | 0.005 | 0.008 | 30600 | 0.005 | 0.005 | 21600 | 0.003 | 0.004 | 13500 | 0.003 | 0.006 | 27000 | 0.003 |
| | 3.0 | 0.005 | 27540 | 0.005 | 0.006 | 30600 | 0.005 | 0.003 | 21600 | 0.003 | 0.002 | 13500 | 0.003 | 0.004 | 27000 | 0.003 |
| 0.4 | 2.0 | 0.018 | 24480 | 0.007 | 0.020 | 27200 | 0.007 | 0.011 | 19200 | 0.007 | 0.008 | 12000 | 0.005 | 0.014 | 24000 | 0.006 |
| | 3.0 | 0.010 | 22030 | 0.006 | 0.011 | 24480 | 0.006 | 0.006 | 17280 | 0.006 | 0.005 | 10800 | 0.005 | 0.008 | 21600 | 0.005 |
| | 4.0 | 0.006 | 22030 | 0.006 | 0.007 | 24480 | 0.006 | 0.004 | 17280 | 0.006 | 0.003 | 10800 | 0.005 | 0.005 | 21600 | 0.005 |
| | 5.0 | 0.006 | 19580 | 0.005 | 0.007 | 21760 | 0.005 | 0.004 | 15360 | 0.005 | 0.003 | 9600 | 0.004 | 0.005 | 19200 | 0.004 |
| 0.5 | 2.0 | 0.023 | 24480 | 0.008 | 0.025 | 27200 | 0.008 | 0.014 | 19200 | 0.008 | 0.011 | 12000 | 0.006 | 0.018 | 24000 | 0.007 |
| | 4.0 | 0.013 | 22030 | 0.007 | 0.014 | 24480 | 0.007 | 0.008 | 17280 | 0.007 | 0.006 | 10800 | 0.005 | 0.010 | 21600 | 0.006 |
| | 6.0 | 0.008 | 19580 | 0.006 | 0.009 | 21760 | 0.006 | 0.005 | 15360 | 0.006 | 0.004 | 9600 | 0.005 | 0.007 | 19200 | 0.006 |
| | 8.0 | 0.005 | 19580 | 0.005 | 0.006 | 21760 | 0.005 | 0.003 | 15360 | 0.005 | 0.002 | 9600 | 0.005 | 0.004 | 19200 | 0.005 |
| 0.6 | 2.0 | 0.027 | 24480 | 0.009 | 0.029 | 27200 | 0.009 | 0.017 | 19200 | 0.009 | 0.013 | 12000 | 0.007 | 0.021 | 24000 | 0.008 |
| | 4.0 | 0.016 | 22030 | 0.008 | 0.017 | 24480 | 0.008 | 0.010 | 17280 | 0.008 | 0.007 | 10800 | 0.006 | 0.012 | 21600 | 0.007 |
| | 6.0 | 0.010 | 22030 | 0.007 | 0.011 | 24480 | 0.007 | 0.006 | 17280 | 0.007 | 0.005 | 10800 | 0.005 | 0.008 | 21600 | 0.006 |
| | 8.0 | 0.010 | 19580 | 0.007 | 0.011 | 21760 | 0.007 | 0.006 | 15360 | 0.006 | 0.005 | 9600 | 0.005 | 0.008 | 19200 | 0.005 |
| | 10.0 | 0.005 | 19580 | 0.006 | 0.006 | 21760 | 0.006 | 0.004 | 15360 | 0.006 | 0.003 | 9600 | 0.005 | 0.005 | 19200 | 0.005 |
| 0.7 | 2.0 | 0.046 | 24480 | 0.010 | 0.049 | 27200 | 0.010 | 0.028 | 19200 | 0.010 | 0.021 | 12000 | 0.008 | 0.035 | 24000 | 0.009 |
| | 4.0 | 0.032 | 22030 | 0.009 | 0.034 | 24480 | 0.009 | 0.020 | 17280 | 0.009 | 0.015 | 10800 | 0.007 | 0.025 | 21600 | 0.008 |
| | 6.0 | 0.012 | 22030 | 0.008 | 0.013 | 24480 | 0.008 | 0.007 | 17280 | 0.009 | 0.005 | 10800 | 0.007 | 0.009 | 21600 | 0.008 |
| | 8.0 | 0.012 | 19580 | 0.008 | 0.013 | 21760 | 0.008 | 0.007 | 15360 | 0.008 | 0.005 | 9600 | 0.006 | 0.009 | 19200 | 0.007 |
| | 10.0 | 0.012 | 19580 | 0.008 | 0.013 | 21760 | 0.008 | 0.007 | 15360 | 0.008 | 0.005 | 9600 | 0.006 | 0.009 | 19200 | 0.007 |
| 0.8 | 4.0 | 0.036 | 24480 | 0.012 | 0.039 | 27200 | 0.011 | 0.022 | 18560 | 0.012 | 0.017 | 11600 | 0.009 | 0.028 | 23200 | 0.010 |
| | 6.0 | 0.021 | 22030 | 0.012 | 0.022 | 24480 | 0.011 | 0.013 | 16640 | 0.012 | 0.010 | 10400 | 0.009 | 0.016 | 20800 | 0.010 |
| | 8.0 | 0.013 | 22030 | 0.011 | 0.014 | 24480 | 0.010 | 0.008 | 16480 | 0.010 | 0.006 | 10300 | 0.008 | 0.010 | 20600 | 0.009 |
| | 10.0 | 0.013 | 19580 | 0.009 | 0.014 | 21760 | 0.009 | 0.008 | 15360 | 0.008 | 0.006 | 9600 | 0.007 | 0.010 | 19200 | 0.008 |
| | 12.0 | 0.007 | 19580 | 0.008 | 0.008 | 21760 | 0.009 | 0.005 | 15360 | 0.008 | 0.004 | 9600 | 0.007 | 0.006 | 19200 | 0.008 |
| 0.9 | 6.0 | 0.023 | 22030 | 0.014 | 0.025 | 24480 | 0.013 | 0.014 | 17280 | 0.013 | 0.011 | 10800 | 0.012 | 0.018 | 21600 | 0.013 |
| | 8.0 | 0.015 | 22030 | 0.013 | 0.016 | 24480 | 0.012 | 0.009 | 17280 | 0.012 | 0.007 | 10800 | 0.011 | 0.012 | 21600 | 0.012 |
| | 10.0 | 0.015 | 19580 | 0.008 | 0.016 | 21760 | 0.008 | 0.009 | 15360 | 0.008 | 0.007 | 9600 | 0.007 | 0.012 | 19200 | 0.008 |
| | 15.0 | 0.015 | 19580 | 0.008 | 0.016 | 21760 | 0.008 | 0.009 | 15360 | 0.008 | 0.007 | 9600 | 0.007 | 0.012 | 19200 | 0.008 |

cont'd ▸

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P M K S H P

## SE 45 Miniature Long Neck Endmills, 2 Flutes - A03, A79




| Slotting | | K | | | P | | | M | | | S | | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | | Ductile Cast Iron | | | Prehardened Steel | | | Stainless Steel | | | Nickel Alloy | | | Hardened Steel | | |
| Properties | | - | | | - | | | Low Machinability | | | - | | | 45 ≤ HRC < 52 | | |
| D | Effective Length | Ap | N | Fz | Ap | N | Fz | Ap | N | Fz | Ap | N | Fz | Ap | N | Fz |
| 1.0 | 6.0 | 0.028 | 23400 | 0.014 | 0.032 | 26000 | 0.013 | 0.016 | 18400 | 0.015 | 0.012 | 11500 | 0.012 | 0.020 | 23000 | 0.013 |
| | 8.0 | 0.024 | 22500 | 0.013 | 0.028 | 25000 | 0.013 | 0.016 | 17520 | 0.014 | 0.012 | 10950 | 0.011 | 0.020 | 21900 | 0.012 |
| | 10.0 | 0.020 | 21600 | 0.012 | 0.024 | 24000 | 0.012 | 0.010 | 16720 | 0.013 | 0.008 | 10450 | 0.011 | 0.013 | 20900 | 0.012 |
| | 12.0 | 0.018 | 20700 | 0.012 | 0.020 | 23000 | 0.012 | 0.010 | 15920 | 0.012 | 0.008 | 9950 | 0.010 | 0.013 | 19900 | 0.011 |
| | 14.0 | 0.015 | 19800 | 0.012 | 0.016 | 22000 | 0.011 | 0.010 | 15120 | 0.012 | 0.008 | 9450 | 0.009 | 0.013 | 18900 | 0.010 |
| | 16.0 | 0.010 | 18900 | 0.011 | 0.011 | 21000 | 0.011 | 0.006 | 14320 | 0.011 | 0.005 | 8950 | 0.009 | 0.008 | 17900 | 0.010 |
| 1.2 | 6.0 | 0.055 | 20250 | 0.015 | 0.059 | 22500 | 0.015 | 0.034 | 15680 | 0.018 | 0.025 | 9800 | 0.014 | 0.042 | 19600 | 0.015 |
| | 8.0 | 0.048 | 19800 | 0.015 | 0.052 | 22000 | 0.014 | 0.022 | 15520 | 0.017 | 0.014 | 9700 | 0.013 | 0.030 | 19400 | 0.014 |
| | 10.0 | 0.041 | 19350 | 0.014 | 0.045 | 21500 | 0.014 | 0.012 | 15360 | 0.015 | 0.009 | 9600 | 0.012 | 0.020 | 19200 | 0.013 |
| | 12.0 | 0.026 | 18900 | 0.014 | 0.030 | 21000 | 0.013 | 0.012 | 15200 | 0.014 | 0.009 | 9500 | 0.011 | 0.015 | 19000 | 0.012 |
| 1.4 | 6.0 | 0.065 | 17820 | 0.018 | 0.070 | 19800 | 0.018 | 0.040 | 14000 | 0.021 | 0.030 | 8750 | 0.015 | 0.050 | 17500 | 0.017 |
| | 8.0 | 0.050 | 17640 | 0.017 | 0.060 | 19600 | 0.017 | 0.030 | 13840 | 0.020 | 0.020 | 8650 | 0.014 | 0.040 | 17300 | 0.016 |
| | 10.0 | 0.045 | 17460 | 0.016 | 0.050 | 19400 | 0.016 | 0.020 | 13680 | 0.018 | 0.015 | 8550 | 0.014 | 0.030 | 17100 | 0.015 |
| | 12.0 | 0.035 | 17280 | 0.015 | 0.040 | 19200 | 0.015 | 0.016 | 13520 | 0.017 | 0.012 | 8450 | 0.013 | 0.018 | 16900 | 0.014 |
| | 14.0 | 0.025 | 17100 | 0.014 | 0.030 | 19000 | 0.014 | 0.014 | 13360 | 0.016 | 0.010 | 8350 | 0.012 | 0.015 | 16700 | 0.013 |
| | 16.0 | 0.015 | 16920 | 0.013 | 0.020 | 18800 | 0.013 | 0.011 | 13200 | 0.015 | 0.009 | 8250 | 0.011 | 0.012 | 16500 | 0.012 |
| 1.5 | 6.0 | 0.070 | 17190 | 0.020 | 0.077 | 19100 | 0.019 | 0.044 | 13440 | 0.018 | 0.033 | 8400 | 0.016 | 0.055 | 16800 | 0.018 |
| | 8.0 | 0.060 | 16740 | 0.019 | 0.070 | 18600 | 0.018 | 0.032 | 13280 | 0.018 | 0.024 | 8300 | 0.016 | 0.040 | 16600 | 0.018 |
| | 10.0 | 0.055 | 16380 | 0.018 | 0.062 | 18200 | 0.017 | 0.024 | 12960 | 0.018 | 0.018 | 8100 | 0.016 | 0.030 | 16200 | 0.018 |
| | 12.0 | 0.045 | 16020 | 0.017 | 0.053 | 17800 | 0.017 | 0.024 | 12640 | 0.015 | 0.018 | 7900 | 0.014 | 0.030 | 15800 | 0.015 |
| | 14.0 | 0.035 | 15750 | 0.016 | 0.044 | 17500 | 0.017 | 0.015 | 12240 | 0.015 | 0.011 | 7650 | 0.014 | 0.019 | 15300 | 0.015 |
| | 16.0 | 0.030 | 15300 | 0.015 | 0.035 | 17000 | 0.016 | 0.015 | 11920 | 0.012 | 0.011 | 7450 | 0.011 | 0.019 | 14900 | 0.012 |
| | 18.0 | 0.028 | 14850 | 0.014 | 0.030 | 16500 | 0.015 | 0.015 | 11600 | 0.012 | 0.011 | 7250 | 0.011 | 0.019 | 14500 | 0.012 |
| | 20.0 | 0.025 | 14400 | 0.013 | 0.027 | 16000 | 0.013 | 0.015 | 11040 | 0.012 | 0.011 | 6900 | 0.011 | 0.019 | 13800 | 0.012 |
| 1.6 | 6.0 | 0.084 | 16650 | 0.021 | 0.091 | 18500 | 0.020 | 0.055 | 13120 | 0.020 | 0.040 | 8200 | 0.017 | 0.065 | 16400 | 0.019 |
| | 8.0 | 0.077 | 16200 | 0.020 | 0.084 | 18000 | 0.019 | 0.045 | 13040 | 0.019 | 0.030 | 8150 | 0.016 | 0.055 | 16300 | 0.018 |
| | 10.0 | 0.069 | 16020 | 0.019 | 0.076 | 17800 | 0.018 | 0.030 | 12880 | 0.018 | 0.023 | 8050 | 0.015 | 0.040 | 16100 | 0.017 |
| | 12.0 | 0.062 | 15840 | 0.018 | 0.069 | 17600 | 0.018 | 0.025 | 12720 | 0.017 | 0.020 | 7950 | 0.014 | 0.035 | 15900 | 0.016 |
| | 14.0 | 0.053 | 15660 | 0.017 | 0.060 | 17400 | 0.017 | 0.020 | 12560 | 0.016 | 0.018 | 7850 | 0.014 | 0.030 | 15700 | 0.015 |
| | 16.0 | 0.044 | 15480 | 0.016 | 0.051 | 17200 | 0.016 | 0.016 | 12400 | 0.015 | 0.013 | 7750 | 0.013 | 0.026 | 15500 | 0.014 |
| | 18.0 | 0.039 | 15300 | 0.015 | 0.046 | 17000 | 0.015 | 0.016 | 12240 | 0.014 | 0.013 | 7650 | 0.012 | 0.023 | 15300 | 0.013 |
| | 20.0 | 0.036 | 15120 | 0.014 | 0.043 | 16800 | 0.014 | 0.016 | 12080 | 0.013 | 0.012 | 7550 | 0.011 | 0.020 | 15100 | 0.012 |
| 1.8 | 6.0 | 0.105 | 15480 | 0.023 | 0.120 | 17200 | 0.021 | 0.065 | 12240 | 0.022 | 0.050 | 7650 | 0.018 | 0.075 | 15300 | 0.020 |
| | 8.0 | 0.095 | 15300 | 0.022 | 0.115 | 17000 | 0.020 | 0.055 | 12080 | 0.021 | 0.040 | 7550 | 0.018 | 0.065 | 15100 | 0.020 |
| | 10.0 | 0.085 | 15120 | 0.021 | 0.105 | 16800 | 0.019 | 0.035 | 11920 | 0.020 | 0.030 | 7450 | 0.017 | 0.045 | 14900 | 0.019 |
| | 12.0 | 0.080 | 14940 | 0.020 | 0.110 | 16600 | 0.019 | 0.030 | 11760 | 0.019 | 0.025 | 7350 | 0.016 | 0.035 | 14700 | 0.018 |
| | 14.0 | 0.080 | 14760 | 0.019 | 0.100 | 16400 | 0.018 | 0.020 | 11600 | 0.018 | 0.019 | 7250 | 0.015 | 0.021 | 14500 | 0.017 |
| | 16.0 | 0.070 | 14580 | 0.018 | 0.090 | 16200 | 0.017 | 0.020 | 11440 | 0.017 | 0.016 | 7150 | 0.014 | 0.021 | 14300 | 0.016 |
| | 18.0 | 0.060 | 14400 | 0.017 | 0.080 | 16000 | 0.016 | 0.018 | 11280 | 0.016 | 0.016 | 7050 | 0.014 | 0.021 | 14100 | 0.015 |
| | 20.0 | 0.050 | 14220 | 0.016 | 0.070 | 15800 | 0.015 | 0.018 | 11120 | 0.015 | 0.014 | 6950 | 0.013 | 0.020 | 13900 | 0.014 |
| 2.0 | 6.0 | 0.130 | 14400 | 0.025 | 0.145 | 16000 | 0.023 | 0.080 | 11520 | 0.024 | 0.060 | 7200 | 0.019 | 0.100 | 14400 | 0.021 |
| | 8.0 | 0.120 | 14220 | 0.024 | 0.140 | 15800 | 0.022 | 0.056 | 11360 | 0.023 | 0.042 | 7100 | 0.019 | 0.070 | 14200 | 0.021 |
| | 10.0 | 0.110 | 14040 | 0.023 | 0.130 | 15600 | 0.021 | 0.056 | 11200 | 0.022 | 0.042 | 7000 | 0.019 | 0.070 | 14000 | 0.021 |
| | 12.0 | 0.100 | 13680 | 0.022 | 0.120 | 15200 | 0.021 | 0.040 | 10880 | 0.021 | 0.030 | 6800 | 0.019 | 0.050 | 13600 | 0.021 |
| | 14.0 | 0.090 | 13500 | 0.022 | 0.110 | 15000 | 0.020 | 0.032 | 10720 | 0.021 | 0.024 | 6700 | 0.019 | 0.040 | 13400 | 0.021 |
| | 16.0 | 0.080 | 13140 | 0.021 | 0.100 | 14600 | 0.020 | 0.032 | 10480 | 0.019 | 0.024 | 6550 | 0.017 | 0.040 | 13100 | 0.019 |
| | 18.0 | 0.070 | 12870 | 0.020 | 0.090 | 14300 | 0.019 | 0.020 | 10240 | 0.019 | 0.015 | 6400 | 0.017 | 0.025 | 12800 | 0.019 |
| | 20.0 | 0.060 | 12600 | 0.019 | 0.080 | 14000 | 0.019 | 0.020 | 9920 | 0.019 | 0.015 | 6200 | 0.017 | 0.025 | 12400 | 0.019 |
| | 25.0 | 0.050 | 12330 | 0.018 | 0.070 | 13700 | 0.018 | 0.020 | 9680 | 0.017 | 0.015 | 6050 | 0.015 | 0.025 | 12100 | 0.017 |
| | 30.0 | 0.040 | 12150 | 0.017 | 0.060 | 13500 | 0.018 | 0.012 | 9520 | 0.017 | 0.009 | 5950 | 0.015 | 0.015 | 11900 | 0.017 |

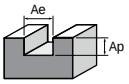
cont'd ▸

# Recommended Cutting Data

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P M K S H P

## SE 45 Miniature Long Neck Endmills, 2 Flutes - A03, A79

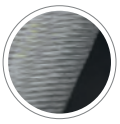



| Slotting | | K | | | P | | | M | | | S | | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | | Ductile Cast Iron | | | Prehardened Steel | | | Stainless Steel | | | Nickel Alloy | | | Hardened Steel | | |
| Properties | | - | | | - | | | Low Machinability | | | - | | | 45 ≤ HRC < 52 | | |
| D | Effective Length | Ap | N | Fz | Ap | N | Fz | Ap | N | Fz | Ap | N | Fz | Ap | N | Fz |
| 2.5 | 8.0 | 0.130 | 11520 | 0.031 | 0.145 | 12800 | 0.028 | 0.100 | 9280 | 0.030 | 0.080 | 5800 | 0.023 | 0.120 | 11600 | 0.026 |
| | 10.0 | 0.120 | 11390 | 0.030 | 0.135 | 12650 | 0.027 | 0.080 | 9120 | 0.030 | 0.060 | 5700 | 0.023 | 0.095 | 11400 | 0.026 |
| | 12.0 | 0.105 | 11250 | 0.029 | 0.125 | 12500 | 0.027 | 0.060 | 8960 | 0.029 | 0.050 | 5600 | 0.023 | 0.080 | 11200 | 0.025 |
| | 14.0 | 0.095 | 11120 | 0.028 | 0.115 | 12350 | 0.026 | 0.045 | 8800 | 0.028 | 0.035 | 5500 | 0.023 | 0.065 | 11000 | 0.024 |
| | 16.0 | 0.085 | 10980 | 0.027 | 0.105 | 12200 | 0.026 | 0.040 | 8560 | 0.027 | 0.030 | 5350 | 0.021 | 0.058 | 10700 | 0.023 |
| | 18.0 | 0.075 | 10890 | 0.026 | 0.095 | 12100 | 0.025 | 0.035 | 8480 | 0.026 | 0.025 | 5300 | 0.020 | 0.047 | 10600 | 0.022 |
| | 20.0 | 0.067 | 10800 | 0.025 | 0.085 | 12000 | 0.025 | 0.035 | 8400 | 0.026 | 0.025 | 5250 | 0.020 | 0.047 | 10500 | 0.022 |
| | 25.0 | 0.055 | 10350 | 0.024 | 0.070 | 11500 | 0.024 | 0.030 | 8160 | 0.025 | 0.020 | 5100 | 0.019 | 0.033 | 10200 | 0.021 |
| | 30.0 | 0.040 | 9900 | 0.023 | 0.065 | 11000 | 0.023 | 0.015 | 7840 | 0.024 | 0.012 | 4900 | 0.019 | 0.030 | 9800 | 0.020 |
| 3.0 | 8.0 | 0.140 | 9790 | 0.036 | 0.150 | 10880 | 0.034 | 0.120 | 7920 | 0.036 | 0.090 | 4950 | 0.028 | 0.140 | 9900 | 0.031 |
| | 10.0 | 0.130 | 9760 | 0.036 | 0.140 | 10840 | 0.033 | 0.100 | 7800 | 0.035 | 0.080 | 4880 | 0.028 | 0.120 | 9750 | 0.031 |
| | 12.0 | 0.110 | 9720 | 0.035 | 0.130 | 10800 | 0.032 | 0.085 | 7680 | 0.034 | 0.070 | 4800 | 0.026 | 0.105 | 9600 | 0.029 |
| | 14.0 | 0.100 | 9680 | 0.034 | 0.120 | 10750 | 0.032 | 0.070 | 7520 | 0.033 | 0.060 | 4700 | 0.025 | 0.090 | 9400 | 0.028 |
| | 16.0 | 0.090 | 9630 | 0.033 | 0.110 | 10700 | 0.032 | 0.055 | 7360 | 0.032 | 0.050 | 4600 | 0.024 | 0.075 | 9200 | 0.027 |
| | 18.0 | 0.080 | 9540 | 0.032 | 0.100 | 10600 | 0.031 | 0.043 | 7240 | 0.031 | 0.040 | 4530 | 0.023 | 0.068 | 9050 | 0.026 |
| | 20.0 | 0.075 | 9450 | 0.032 | 0.090 | 10500 | 0.029 | 0.038 | 7120 | 0.030 | 0.036 | 4450 | 0.023 | 0.060 | 8900 | 0.026 |
| | 25.0 | 0.062 | 9270 | 0.031 | 0.070 | 10300 | 0.029 | 0.032 | 7000 | 0.029 | 0.028 | 4380 | 0.023 | 0.040 | 8750 | 0.025 |
| 4.0 | 10.0 | 0.150 | 7520 | 0.047 | 0.160 | 8350 | 0.045 | 0.140 | 6000 | 0.042 | 0.120 | 3750 | 0.039 | 0.150 | 7500 | 0.043 |
| | 15.0 | 0.110 | 7380 | 0.046 | 0.120 | 8200 | 0.042 | 0.100 | 5840 | 0.040 | 0.084 | 3650 | 0.037 | 0.110 | 7300 | 0.041 |
| | 20.0 | 0.090 | 7200 | 0.045 | 0.100 | 8000 | 0.041 | 0.080 | 5720 | 0.038 | 0.070 | 3580 | 0.036 | 0.090 | 7150 | 0.040 |
| | 25.0 | 0.075 | 6930 | 0.043 | 0.080 | 7700 | 0.039 | 0.060 | 5600 | 0.036 | 0.050 | 3500 | 0.034 | 0.070 | 7000 | 0.038 |
| | 30.0 | 0.065 | 6660 | 0.038 | 0.070 | 7400 | 0.035 | 0.050 | 5440 | 0.030 | 0.040 | 3400 | 0.029 | 0.060 | 6800 | 0.032 |
| | 40.0 | 0.055 | 5820 | 0.033 | 0.060 | 6470 | 0.031 | 0.040 | 4800 | 0.026 | 0.030 | 3000 | 0.025 | 0.050 | 6000 | 0.028 |

FEATURES & BENEFITS

# BN 45

## 1. Eccentric Grinding



Optimum eccentric grinding in order to avoid rubbing, while maintaining maximum cutting tool strength.

## 2. Cutting Edge Preparation

-Reduces material adherence on the cutting edge to overcome stable machining.
-Improves wear resistance and reduces excessive friction to prolong tool life.

## 3. Superior Coating to Reduce Friction

-Increases hardness and higher abrasive wear resistance.
-Higher thermal resistance.
-Smoother chips evacuation.

## 4. Suitable for Material Groups

P M K S H

## CARATTERISTICHE TECNICHE

1. Rastrillo del filo de corte
   Rectificado orbital para una menor fricción con la máxima máxima resistencia del filo de corte

2. Preparación del ángulo del filo de corte
   Reduce la adherencia de material en el filo de corte para superar el mecanizado
   Mejora la resistencia al desgaste y reduce fricción excesiva para prolongar la vida útil de la herramienta

3. Recubrimiento de TiSiN
   Aumenta la dureza y la resistencia al desgaste
   Resistencia térmica superior
   Mejor evacuación de la viruta

4. Adecuado para material P, M, K, S, H

## MERKMALE UND VORTEILE

1. Exzentrischer Schliff
   Optimaler exzentrischer Schliff zur Reduzierung der Reibung unter Beibehaltung der maximalen Schneidenstabilität

2. Schneidkantenbehandlung
   VVerbessert die Werkzeuglebensdauer
   Verbessert die Verschleißfestigkeit und reduziert übermäßige Reibung

3. Ausgezeichnete Beschichtung zur Verringerung der Reibung
   Erhöht die Härte und und bietet bessere Verschleißfestigkeit
   Höhere Temperaturbeständigkeit
   Glatte Oberfläche für besseren Spänefluß

4. Geeignet für die Materialigruppen P, M, K, S, H

## CARACTÉRISTIQUES ET AVANTAGES

1. Meulage excentrique
   Meulage optimal diminuant le coeficient de friction tout en maintenant une bonne acuité de l'arête de coupe

2. Préparation des arêtes de coupes
   Réduit l'adhérence du matériau sur le tranchant pour surmonter l'usinage stable
   Améliore la résistance à l'usure et réduit le frottement excessif pour prolonger la durée de vie de l'outil

3. Revêtement supérieur pour réduire la friction
   Augmente la dureté et la résistance à l'abrasion
   Résistance thermique supérieure
   Évacuation des copeaux plus fluide

4. Adapté pour les matériaux P, M, K, S, H

# A57

36 - 50 HRC

HPMT

## BN 45 Ballnose Cutters, 2 Flutes

Fresas de punta esférica BN 45, 2 canales

BN 45 Radiusschaftfräser, 2 Zähne

BN 45, à bout hémisphérique, 2 dents



| Order Number | D (mm) | R | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| A57 0100 040 03 | 1 | 0.5 | 3 | | 40 | 3 | • |
| A57 0100 050 04 | | | | | 50 | 4 | • |
| A57 0150 040 03 | 1.5 | 0.75 | | | 40 | 3 | • |
| A57 0150 050 04 | | | | | 50 | 4 | • |
| A57 0200 040 03 | 2 | 1 | 4 | | 40 | 3 | • |
| A57 0200 050 04 | | | | | 50 | 4 | • |
| A57 0250 040 03 | 2.5 | 1.25 | | | 40 | 3 | • |
| A57 0250 050 04 | | | | | 50 | 4 | • |
| A57 0300 | 3 | 1.5 | 5 | | 40 | 3 | • |
| A57 0300 050 04 | | | | | 50 | 4 | • |
| A57 0300 050 06 | | | | | 50 | 6 | • |
| A57 0400 | 4 | 2 | 8 | | 50 | 4 | • |
| A57 0400 050 06 | | | | | 50 | 6 | • |
| A57 0500 | 5 | 2.5 | 9 | | 50 | 5 | • |
| A57 0500 050 06 | | | | | 50 | 6 | • |
| A57 0600 050 | 6 | 3 | 10 | | 50 | 6 | • |
| A57 0600 060 | | | | | 60 | 6 | • |
| A57 0800 | 8 | 4 | 12 | | 64 | 8 | • |
| A57 1000 | 10 | 5 | 14 | | 70 | 10 | • |
| A57 1200 | 12 | 6 | 16 | | 75 | 12 | • |
| A57 1400 | 14 | 7 | 32 | | 90 | 14 | • |
| A57 1600 | 16 | 8 | | | 90 | 16 | • |
| A57 1800 | 18 | 9 | 38 | | 100 | 18 | • |
| A57 2000 | 20 | 10 | | | 100 | 20 | • |
| A57 2200 | 22 | 11 | 40 | | 100 | 22 | • |
| A57 2500 | 25 | 12.5 | | | 100 | 25 | • |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

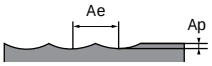
| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ○ | ● | ○ | ○ | ● | ○ | ● | ○ | ● | | ● | ○ | | |

# Recommended Cutting Data

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

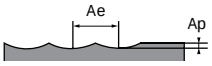
P M K S H P K

## BN 45 Ballnose Cutters, 2 Flutes - A57




| Roughing | K | | P | | M | | S | | H | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Working Material** | Ductile Cast Iron | | Prehardened Steel | | Stainless Steel | | Nickel Alloy | | Hardened Steel | |
| **Properties** | - | | - | | Low Machinability | | - | | 45 ≤ HRC < 52 | |
| **Cutting depth, ap** | 0.10 × D | | 0.10 × D | | 0.08 × D | | 0.08 × D | | 0.10 × D | |
| **Cutting Width, ae** | 0.30 × D | | 0.32 × D | | 0.080xD | | 0.24 × D | | 0.30 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.008 | | 0.013 | | 0.006 | | 0.006 | | 0.009 |
| 2 | | 0.018 | | 0.023 | | 0.012 | | 0.013 | | 0.020 |
| 3 | | 0.029 | | 0.036 | | 0.018 | | 0.020 | | 0.032 |
| 4 | | 0.043 | | 0.050 | | 0.025 | | 0.028 | | 0.044 |
| 5 | | 0.059 | | 0.065 | | 0.032 | | 0.035 | | 0.056 |
| 6 | | 0.075 | | 0.081 | | 0.038 | | 0.043 | | 0.068 |
| 8 | | 0.104 | | 0.112 | | 0.051 | | 0.058 | | 0.098 |
| 10 | 160 | 0.135 | 185 | 0.146 | 70 | 0.065 | 40 | 0.074 | 140 | 0.130 |
| 12 | | 0.168 | | 0.183 | | 0.080 | | 0.090 | | 0.162 |
| 14 | | 0.185 | | 0.206 | | 0.090 | | 0.099 | | 0.182 |
| 16 | | 0.206 | | 0.230 | | 0.103 | | 0.115 | | 0.198 |
| 18 | | 0.223 | | 0.252 | | 0.112 | | 0.128 | | 0.210 |
| 20 | | 0.238 | | 0.270 | | 0.125 | | 0.138 | | 0.224 |
| 22 | | 0.249 | | 0.289 | | 0.135 | | 0.148 | | 0.240 |
| 25 | | 0.264 | | 0.305 | | 0.146 | | 0.168 | | 0.252 |

## BN 45 Ballnose Cutters, 2 Flutes - A57




| Finishing | K | | P | | M | | S | | H | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Working Material** | Ductile Cast Iron | | Prehardened Steel | | Stainless Steel | | Nickel Alloy | | Hardened Steel | |
| **Properties** | - | | - | | Low Machinability | | - | | 45 ≤ HRC < 52 | |
| **Cutting depth, ap** | 0.05 × D | | 0.05 × D | | 0.05 × D | | 0.05 × D | | 0.05 × D | |
| **Cutting Width, ae** | 0.02 × D | | 0.02 × D | | 0.02 × D | | 0.02 × D | | 0.02 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.006 | | 0.011 | | 0.004 | | 0.004 | | 0.006 |
| 2 | | 0.015 | | 0.019 | | 0.008 | | 0.008 | | 0.016 |
| 3 | | 0.024 | | 0.029 | | 0.013 | | 0.013 | | 0.026 |
| 4 | | 0.034 | | 0.041 | | 0.018 | | 0.018 | | 0.035 |
| 5 | | 0.045 | | 0.054 | | 0.022 | | 0.025 | | 0.045 |
| 6 | | 0.056 | | 0.068 | | 0.028 | | 0.030 | | 0.054 |
| 8 | | 0.078 | | 0.094 | | 0.037 | | 0.042 | | 0.078 |
| 10 | 170 | 0.105 | 195 | 0.124 | 80 | 0.046 | 50 | 0.052 | 150 | 0.104 |
| 12 | | 0.134 | | 0.154 | | 0.058 | | 0.064 | | 0.130 |
| 14 | | 0.148 | | 0.173 | | 0.065 | | 0.072 | | 0.146 |
| 16 | | 0.162 | | 0.193 | | 0.072 | | 0.082 | | 0.158 |
| 18 | | 0.176 | | 0.211 | | 0.082 | | 0.090 | | 0.168 |
| 20 | | 0.186 | | 0.225 | | 0.089 | | 0.095 | | 0.179 |
| 22 | | 0.197 | | 0.238 | | 0.092 | | 0.105 | | 0.192 |
| 25 | | 0.220 | | 0.248 | | 0.105 | | 0.115 | | 0.202 |

# A59

36 - 50 HRC

HPMT

## BN 45 Long Ballnose Cutters, 2 Flutes

BN 45 Fresas de punta esférica larga, 2 canales

BN 45 Radiusschaftfräser, lang, 2 Zähne

BN 45 longues, à bout hémisphérique, 2 dents



| Order Number | D (mm) | R | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| A59 0100 060 03 | 1 | 0.5 | 3 | | 60 | 3 | • |
| A59 0100 075 04 | | | | | 75 | 4 | • |
| A59 0150 060 03 | 1.5 | 0.75 | | | 60 | 3 | • |
| A59 0150 075 04 | | | | | 75 | 4 | • |
| A59 0200 060 03 | 2 | 1 | 4 | | 60 | 3 | • |
| A59 0200 075 04 | | | | | 75 | 4 | • |
| A59 0250 060 03 | 2.5 | 1.25 | | | 60 | 3 | • |
| A59 0250 075 04 | | | | | 75 | 4 | • |
| A59 0300 | 3 | 1.5 | 5 | | 60 | 3 | • |
| A59 0300 075 06 | | | | | 75 | 6 | • |
| A59 0400 | 4 | 2 | 8 | | 60 | 4 | • |
| A59 0400 075 06 | | | | | 75 | 6 | • |
| A59 0500 | 5 | 2.5 | 9 | | 60 | 5 | • |
| A59 0500 075 06 | | | | | 75 | 6 | • |
| A59 0600 | 6 | 3 | 10 | | 75 | 6 | • |
| A59 0800 | 8 | 4 | 12 | | 75 | 8 | • |
| A59 1000 075 | 10 | 5 | 14 | | 75 | 10 | • |
| A59 1000 100 | | | | | 100 | 10 | • |
| A59 1200 | 12 | 6 | 16 | | 100 | 12 | • |
| A59 1400 | 14 | 7 | 32 | | 125 | 14 | • |
| A59 1600 | 16 | 8 | | | 125 | 16 | • |
| A59 1800 | 18 | 9 | 38 | | 125 | 18 | • |
| A59 2000 | 20 | 10 | | | 125 | 20 | • |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

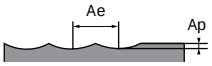
| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ○ | ● | ○ | ○ | ● | ○ | ● | ○ | ● | | ● | ○ | | |

# Recommended Cutting Data

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

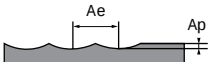
P M K S H P K

## BN 45 Long Ballnose Cutters, 2 Flutes - A59




| Roughing | K | | P | | M | | S | | H | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Working Material** | Ductile Cast Iron | | Prehardened Steel | | Stainless Steel | | Nickel Alloy | | Hardened Steel | |
| **Properties** | - | | - | | Low Machinability | | - | | 45 ≤ HRC < 52 | |
| **Cutting depth, ap** | 0.10 × D | | 0.10 × D | | 0.08 × D | | 0.08 × D | | 0.10 × D | |
| **Cutting Width, ae** | 0.30 × D | | 0.32 × D | | 0.24 × D | | 0.24 × D | | 0.30 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.007 | | 0.011 | | 0.006 | | 0.007 | | 0.009 |
| 2 | | 0.016 | | 0.021 | | 0.012 | | 0.014 | | 0.020 |
| 3 | | 0.026 | | 0.033 | | 0.018 | | 0.022 | | 0.032 |
| 4 | | 0.040 | | 0.047 | | 0.024 | | 0.030 | | 0.044 |
| 5 | | 0.056 | | 0.061 | | 0.030 | | 0.038 | | 0.054 |
| 6 | | 0.072 | | 0.077 | | 0.038 | | 0.046 | | 0.068 |
| 8 | 125 | 0.101 | 165 | 0.107 | 65 | 0.050 | 35 | 0.061 | 120 | 0.092 |
| 10 | | 0.132 | | 0.140 | | 0.063 | | 0.076 | | 0.122 |
| 12 | | 0.166 | | 0.183 | | 0.078 | | 0.097 | | 0.150 |
| 14 | | 0.181 | | 0.206 | | 0.088 | | 0.106 | | 0.170 |
| 16 | | 0.191 | | 0.220 | | 0.100 | | 0.121 | | 0.188 |
| 18 | | 0.203 | | 0.240 | | 0.113 | | 0.137 | | 0.204 |
| 20 | | 0.214 | | 0.247 | | 0.120 | | 0.152 | | 0.220 |

## BN 45 Long Ballnose Cutters, 2 Flutes - A59




| Finishing | K | | P | | M | | S | | H | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Working Material** | Ductile Cast Iron | | Prehardened Steel | | Stainless Steel | | Nickel Alloy | | Hardened Steel | |
| **Properties** | - | | - | | Low Machinability | | - | | 45 ≤ HRC < 52 | |
| **Cutting depth, ap** | 0.05 × D | | 0.05 × D | | 0.05 × D | | 0.05 × D | | 0.05 × D | |
| **Cutting Width, ae** | 0.02 × D | | 0.02 × D | | 0.02 × D | | 0.02 × D | | 0.02 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.005 | | 0.009 | | 0.003 | | 0.003 | | 0.006 |
| 2 | | 0.014 | | 0.017 | | 0.007 | | 0.007 | | 0.013 |
| 3 | | 0.022 | | 0.026 | | 0.011 | | 0.012 | | 0.020 |
| 4 | | 0.032 | | 0.037 | | 0.015 | | 0.017 | | 0.030 |
| 5 | | 0.043 | | 0.049 | | 0.019 | | 0.023 | | 0.040 |
| 6 | | 0.054 | | 0.062 | | 0.024 | | 0.027 | | 0.051 |
| 8 | 135 | 0.076 | 175 | 0.087 | 75 | 0.032 | 45 | 0.039 | 140 | 0.072 |
| 10 | | 0.103 | | 0.117 | | 0.040 | | 0.049 | | 0.095 |
| 12 | | 0.134 | | 0.145 | | 0.050 | | 0.063 | | 0.118 |
| 14 | | 0.147 | | 0.162 | | 0.056 | | 0.068 | | 0.132 |
| 16 | | 0.160 | | 0.179 | | 0.063 | | 0.078 | | 0.148 |
| 18 | | 0.172 | | 0.195 | | 0.071 | | 0.088 | | 0.162 |
| 20 | | 0.179 | | 0.206 | | 0.075 | | 0.090 | | 0.172 |

# A61

36 - 50 HRC

HPMT

## BN 45 Extra-Long Ballnose Cutters, 2 Flutes

BN 45 Fresas de punta esférica extralargas, 2 canales

BN 45 Radiusschaftfräser, extra-lang, 2 Zähne

BN 45 extra-longues, à bout hémisphérique, 2 dents




| Order Number | D (mm) | R | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| A61 0100 100 03 | 1 | 0.5 | 3 | | 100 | 3 | • |
| A61 0100 100 04 | | | | | 100 | 4 | • |
| A61 0150 100 03 | 1.5 | 0.75 | | | 100 | 3 | • |
| A61 0150 100 04 | | | | | 100 | 4 | • |
| A61 0200 100 03 | 2 | 1 | 4 | | 100 | 3 | • |
| A61 0200 100 04 | | | | | 100 | 4 | • |
| A61 0250 100 03 | 2.5 | 1.25 | | | 100 | 3 | • |
| A61 0250 100 04 | | | | | 100 | 4 | • |
| A61 0300 | 3 | 1.5 | 5 | | 100 | 3 | • |
| A61 0300 100 06 | | | | | 100 | 6 | • |
| A61 0400 | 4 | 2 | 8 | | 100 | 4 | • |
| A61 0400 100 06 | | | | | 100 | 6 | • |
| A61 0500 | 5 | 2.5 | 9 | | 100 | 5 | • |
| A61 0500 100 06 | | | | | 100 | 6 | • |
| A61 0600 100 | 6 | 3 | 10 | | 100 | 6 | • |
| A61 0600 150 | | | | | 150 | 6 | • |
| A61 0800 100 | 8 | 4 | 12 | | 100 | 8 | • |
| A61 0800 150 | | | | | 150 | 8 | • |
| A61 1000 125 | 10 | 5 | 14 | | 125 | 10 | • |
| A61 1000 150 | | | | | 150 | 10 | • |
| A61 1200 125 | 12 | 6 | 16 | | 125 | 12 | • |
| A61 1200 150 | | | | | 150 | 12 | • |
| A61 1400 150 | 14 | 7 | 32 | | 150 | 14 | • |
| A61 1400 200 | | | | | 200 | 14 | • |
| A61 1600 150 | 16 | 8 | | | 150 | 16 | • |
| A61 1600 200 | | | | | 200 | 16 | • |
| A61 1800 150 | 18 | 9 | 38 | | 150 | 18 | • |
| A61 1800 200 | | | | | 200 | 18 | • |
| A61 2000 150 | 20 | 10 | | | 150 | 20 | • |
| A61 2000 200 | | | | | 200 | 20 | • |

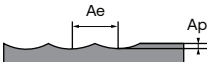
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ○ | ● | ○ | ○ | ● | ○ | ● | ○ | ● | | ● | ○ | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

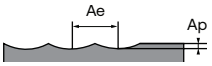
P M K S H P K

## BN 45 Extra-Long Ballnose Cutters, 2 Flutes - A61




| Roughing | K | | P | | M | | S | | H | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Working Material** | Ductile Cast Iron | | Prehardened Steel | | Stainless Steel | | Nickel Alloy | | Hardened Steel | |
| **Properties** | - | | - | | Low Machinability | | - | | 45 ≤ HRC < 52 | |
| **Cutting depth, ap** | 0.10 × D | | 0.10 × D | | 0.08 × D | | 0.08 × D | | 0.10 × D | |
| **Cutting Width, ae** | 0.30 × D | | 0.32 × D | | 0.24 × D | | 0.24 × D | | 0.30 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.004 | | 0.009 | | 0.005 | | 0.007 | | 0.008 |
| 2 | | 0.010 | | 0.020 | | 0.012 | | 0.014 | | 0.018 |
| 3 | | 0.016 | | 0.032 | | 0.017 | | 0.020 | | 0.029 |
| 4 | | 0.026 | | 0.045 | | 0.023 | | 0.029 | | 0.040 |
| 5 | | 0.037 | | 0.059 | | 0.029 | | 0.037 | | 0.049 |
| 6 | | 0.049 | | 0.075 | | 0.036 | | 0.044 | | 0.061 |
| 8 | 105 | 0.070 | 145 | 0.104 | 60 | 0.048 | 30 | 0.058 | 100 | 0.083 |
| 10 | | 0.092 | | 0.137 | | 0.060 | | 0.073 | | 0.110 |
| 12 | | 0.117 | | 0.182 | | 0.075 | | 0.094 | | 0.135 |
| 14 | | 0.126 | | 0.205 | | 0.084 | | 0.101 | | 0.153 |
| 16 | | 0.130 | | 0.216 | | 0.096 | | 0.117 | | 0.169 |
| 18 | | 0.136 | | 0.233 | | 0.107 | | 0.130 | | 0.184 |
| 20 | | 0.141 | | 0.238 | | 0.115 | | 0.146 | | 0.198 |

## BN 45 Extra-Long Ballnose Cutters, 2 Flutes - A61




| Finishing | K | | P | | M | | S | | H | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Working Material** | Ductile Cast Iron | | Prehardened Steel | | Stainless Steel | | Nickel Alloy | | Hardened Steel | |
| **Properties** | - | | - | | Low Machinability | | - | | 45 ≤ HRC < 52 | |
| **Cutting depth, ap** | 0.05 × D | | 0.05 × D | | 0.05 × D | | 0.05 × D | | 0.05 × D | |
| **Cutting Width, ae** | 0.02 × D | | 0.02 × D | | 0.02 × D | | 0.02 × D | | 0.02 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.003 | | 0.007 | | 0.003 | | 0.002 | | 0.005 |
| 2 | | 0.009 | | 0.015 | | 0.006 | | 0.003 | | 0.012 |
| 3 | | 0.015 | | 0.023 | | 0.010 | | 0.005 | | 0.018 |
| 4 | | 0.022 | | 0.034 | | 0.013 | | 0.008 | | 0.027 |
| 5 | | 0.030 | | 0.046 | | 0.017 | | 0.011 | | 0.036 |
| 6 | | 0.038 | | 0.058 | | 0.022 | | 0.013 | | 0.046 |
| 8 | 115 | 0.054 | 155 | 0.082 | 70 | 0.029 | 40 | 0.020 | 120 | 0.065 |
| 10 | | 0.075 | | 0.111 | | 0.036 | | 0.025 | | 0.086 |
| 12 | | 0.098 | | 0.140 | | 0.046 | | 0.032 | | 0.106 |
| 14 | | 0.106 | | 0.154 | | 0.050 | | 0.034 | | 0.119 |
| 16 | | 0.115 | | 0.170 | | 0.057 | | 0.039 | | 0.133 |
| 18 | | 0.122 | | 0.184 | | 0.065 | | 0.044 | | 0.146 |
| 20 | | 0.126 | | 0.192 | | 0.067 | | 0.045 | | 0.155 |

# A76

36 - 50 HRC

HPMT

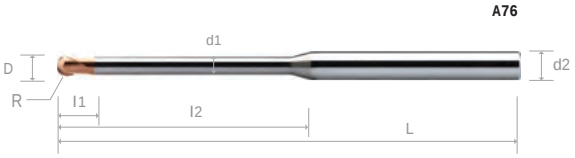
## BN 45 Miniature Ballnose Cutters with Long Neck, 2 Flutes

Mini fresas esféricas BN 45 con cuello largo, 2 canales

BN 45 Kleinstradiusfräser mit langem Hals, 2 Zähne

Micro-fraises BN 45 à bout hémisphérique avec cou long, 2 dents

DIN 6535 HA HB | UF+ | R+0/-0.02 | λ= 30° | HSC B0909 TiSiN





| Order Number | D (mm) | R | l 1 (mm) | l 2 (mm) | L (mm) | d1 (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|---|
| A76 0020 050 0400 | 0.2 | 0.10 | 0.2 | - | 50 | - | 4 | • |
| A76 0020 050 0400 005 | | | | 0.5 | 50 | 0.17 | 4 | • |
| A76 0020 050 0400 010 | | | | 1 | 50 | 0.17 | 4 | • |
| A76 0020 050 0400 015 | | | | 1.5 | 50 | 0.17 | 4 | • |
| A76 0030 050 0400 | 0.3 | 0.15 | 0.3 | - | 50 | - | 4 | • |
| A76 0030 050 0400 010 | | | | 1 | 50 | 0.27 | 4 | • |
| A76 0030 050 0400 020 | | | | 2 | 50 | 0.27 | 4 | • |
| A76 0030 050 0400 030 | | | | 3 | 50 | 0.27 | 4 | • |
| A76 0040 050 0400 | 0.4 | 0.20 | 0.4 | - | 50 | - | 4 | • |
| A76 0040 050 0400 010 | | | | 1 | 50 | 0.37 | 4 | • |
| A76 0040 050 0400 020 | | | | 2 | 50 | 0.37 | 4 | • |
| A76 0040 050 0400 030 | | | | 3 | 50 | 0.37 | 4 | • |
| A76 0040 050 0400 040 | | | | 4 | 50 | 0.37 | 4 | • |
| A76 0040 050 0400 050 | | | | 5 | 50 | 0.37 | 4 | • |
| A76 0050 050 0400 | 0.5 | 0.25 | | - | 50 | - | 4 | • |
| A76 0050 050 0400 020 | | | | 2 | 50 | 0.45 | 4 | • |
| A76 0050 050 0400 030 | | | | 3 | 50 | 0.45 | 4 | • |
| A76 0050 050 0400 040 | | | | 4 | 50 | 0.45 | 4 | • |
| A76 0050 050 0400 050 | | | | 5 | 50 | 0.45 | 4 | • |
| A76 0050 050 0400 060 | | | | 6 | 50 | 0.45 | 4 | • |
| A76 0050 050 0400 080 | | | | 8 | 50 | 0.45 | 4 | • |
| A76 0060 050 0400 | 0.6 | 0.30 | 0.5 | - | 50 | - | 4 | • |
| A76 0060 050 0400 020 | | | | 2 | 50 | 0.55 | 4 | • |
| A76 0060 050 0400 030 | | | | 3 | 50 | 0.55 | 4 | • |
| A76 0060 050 0400 040 | | | | 4 | 50 | 0.55 | 4 | • |
| A76 0060 050 0400 050 | | | | 5 | 50 | 0.55 | 4 | • |
| A76 0060 050 0400 060 | | | | 6 | 50 | 0.55 | 4 | • |
| A76 0060 050 0400 080 | | | | 8 | 50 | 0.55 | 4 | • |
| A76 0080 050 0400 | 0.8 | 0.40 | 0.6 | - | 50 | - | 4 | • |
| A76 0080 050 0400 020 | | | | 2 | 50 | 0.75 | 4 | • |
| A76 0080 050 0400 040 | | | | 4 | 50 | 0.75 | 4 | • |
| A76 0080 050 0400 050 | | | | 5 | 50 | 0.75 | 4 | • |
| A76 0080 050 0400 060 | | | | 6 | 50 | 0.75 | 4 | • |
| A76 0080 050 0400 070 | | | | 7 | 50 | 0.75 | 4 | • |
| A76 0080 050 0400 080 | | | | 8 | 50 | 0.75 | 4 | • |
| A76 0080 050 0400 100 | | | | 10 | 50 | 0.75 | 4 | • |
| A76 0100 050 0400 | 1.0 | 0.50 | 0.8 | - | 50 | - | 4 | • |
| A76 0100 050 0400 030 | | | | 3 | 50 | 0.9 | 4 | • |
| A76 0100 050 0400 040 | | | | 4 | 50 | 0.9 | 4 | • |
| A76 0100 050 0400 050 | | | | 5 | 50 | 0.9 | 4 | • |
| A76 0100 050 0400 060 | | | | 6 | 50 | 0.9 | 4 | • |
| A76 0100 050 0400 070 | | | | 7 | 50 | 0.9 | 4 | • |
| A76 0100 050 0400 080 | | | | 8 | 50 | 0.9 | 4 | • |
| A76 0100 050 0400 090 | | | | 9 | 50 | 0.9 | 4 | • |
| A76 0100 050 0400 100 | | | | 10 | 50 | 0.9 | 4 | • |
| A76 0100 050 0400 120 | | | | 12 | 50 | 0.9 | 4 | • |
| A76 0100 050 0400 140 | | | | 14 | 50 | 0.9 | 4 | • |
| A76 0100 050 0400 160 | | | | 16 | 50 | 0.9 | 4 | • |
| A76 0100 060 0400 | | | | - | 60 | - | 4 | • |
| A76 0100 060 0400 200 | | | | 20 | 60 | 0.9 | 4 | • |
| A76 0120 050 0400 | 1.2 | 0.60 | 1.0 | - | 50 | - | 4 | • |
| A76 0120 050 0400 060 | | | | 6 | 50 | 1.1 | 4 | • |
| A76 0120 050 0400 080 | | | | 8 | 50 | 1.1 | 4 | • |
| A76 0120 050 0400 100 | | | | 10 | 50 | 1.1 | 4 | • |
| A76 0120 050 0400 120 | | | | 12 | 50 | 1.1 | 4 | • |
| A76 0140 050 0400 | 1.4 | 0.70 | 1.1 | - | 50 | - | 4 | • |
| A76 0140 050 0400 080 | | | | 8 | 50 | 1.3 | 4 | • |
| A76 0140 050 0400 120 | | | | 12 | 50 | 1.3 | 4 | • |
| A76 0140 050 0400 160 | | | | 16 | 50 | 1.3 | 4 | • |

| Order Number | D (mm) | R | l 1 (mm) | l 2 (mm) | L (mm) | d1 (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|---|
| A76 0150 050 0400 | 1.5 | 0.75 | 1.2 | - | 50 | - | 4 | • |
| A76 0150 050 0400 080 | | | | 8 | 50 | 1.4 | 4 | • |
| A76 0150 050 0400 120 | | | | 12 | 50 | 1.4 | 4 | • |
| A76 0150 050 0400 160 | | | | 16 | 50 | 1.4 | 4 | • |
| A76 0150 060 0400 | | | | - | 60 | - | 4 | • |
| A76 0150 060 0400 180 | | | | 18 | 60 | 1.4 | 4 | • |
| A76 0160 050 0400 | 1.6 | 0.80 | 1.3 | - | 50 | - | 4 | • |
| A76 0160 050 0400 080 | | | | 8 | 50 | 1.5 | 4 | • |
| A76 0160 050 0400 120 | | | | 12 | 50 | 1.5 | 4 | • |
| A76 0160 050 0400 160 | | | | 16 | 50 | 1.5 | 4 | • |
| A76 0160 060 0400 | | | | - | 60 | - | 4 | • |
| A76 0160 060 0400 200 | | | | 20 | 60 | 1.5 | 4 | • |
| A76 0180 050 0400 | 1.8 | 0.90 | 1.4 | - | 50 | - | 4 | • |
| A76 0180 050 0400 080 | | | | 8 | 50 | 1.7 | 4 | • |
| A76 0180 050 0400 120 | | | | 12 | 50 | 1.7 | 4 | • |
| A76 0180 050 0400 160 | | | | 16 | 50 | 1.7 | 4 | • |
| A76 0180 060 0400 | | | | - | 60 | - | 4 | • |
| A76 0180 060 0400 200 | | | | 20 | 60 | 1.7 | 4 | • |
| A76 0200 050 0400 | 2 | 1 | 1.6 | - | 50 | - | 4 | • |
| A76 0200 050 0400 040 | | | | 4 | 50 | 1.9 | 4 | • |
| A76 0200 050 0400 060 | | | | 6 | 50 | 1.9 | 4 | • |
| A76 0200 050 0400 080 | | | | 8 | 50 | 1.9 | 4 | • |
| A76 0200 050 0400 100 | | | | 10 | 50 | 1.9 | 4 | • |
| A76 0200 050 0400 120 | | | | 12 | 50 | 1.9 | 4 | • |
| A76 0200 050 0400 140 | | | | 14 | 50 | 1.9 | 4 | • |
| A76 0200 050 0400 160 | | | | 16 | 50 | 1.9 | 4 | • |
| A76 0200 060 0400 | | | | - | 60 | - | 4 | • |
| A76 0200 060 0400 180 | | | | 18 | 60 | 1.9 | 4 | • |
| A76 0200 060 0400 200 | | | | 20 | 60 | 1.9 | 4 | • |
| A76 0200 060 0400 220 | | | | 22 | 60 | 1.9 | 4 | • |
| A76 0200 075 0400 | | | | - | 75 | - | 4 | • |
| A76 0200 075 0400 250 | | | | 25 | 75 | 1.9 | 4 | • |
| A76 0200 075 0400 300 | | | | 30 | 75 | 1.9 | 4 | • |
| A76 0300 050 0600 | 3.0 | 1.5 | 2.4 | - | 50 | - | 6 | • |
| A76 0300 050 0600 080 | | | | 8 | 50 | 2.8 | 6 | • |
| A76 0300 050 0600 100 | | | | 10 | 50 | 2.8 | 6 | • |
| A76 0300 060 0600 | | | | - | 60 | - | 6 | • |
| A76 0300 060 0600 160 | | | | 16 | 60 | 2.8 | 6 | • |
| A76 0300 060 0600 200 | | | | 20 | 60 | 2.8 | 6 | • |
| A76 0300 075 0600 | | | | - | 75 | - | 6 | • |
| A76 0300 075 0600 250 | | | | 25 | 75 | 2.8 | 6 | • |
| A76 0300 075 0600 300 | | | | 30 | 75 | 2.8 | 6 | • |
| A76 0300 075 0600 350 | | | | 35 | 75 | 2.8 | 6 | • |
| A76 0400 050 0600 | 4 | 2 | 3.2 | - | 50 | - | 6 | • |
| A76 0400 050 0600 100 | | | | 10 | 50 | 3.7 | 6 | • |
| A76 0400 060 0600 | | | | - | 60 | - | 6 | • |
| A76 0400 060 0600 160 | | | | 16 | 60 | 3.7 | 6 | • |
| A76 0400 060 0600 200 | | | | 20 | 60 | 3.7 | 6 | • |
| A76 0400 075 0600 | | | | - | 75 | - | 6 | • |
| A76 0400 075 0600 250 | | | | 25 | 75 | 3.7 | 6 | • |
| A76 0400 075 0600 300 | | | | 30 | 75 | 3.7 | 6 | • |
| A76 0400 075 0600 350 | | | | 35 | 75 | 3.7 | 6 | • |
| A76 0400 100 0600 | | | | - | 100 | - | 6 | • |
| A76 0400 100 0600 400 | | | | 40 | 100 | 3.7 | 6 | • |
| A76 0400 100 0600 450 | | | | 45 | 100 | 3.7 | 6 | • |
| A76 0400 100 0600 500 | | | | 50 | 100 | 3.7 | 6 | • |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

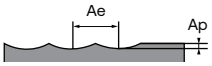
| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ○ | ● | ○ | ○ | ● | ○ | ● | ○ | ● | | ● | ○ | | |

HPMT

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P M K S H P K

## BN 45 Miniature Long Neck Ballnose Cutters, 2 Flutes - A76



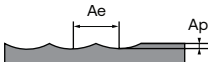

| Profiling | | K | | | P | | | M | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | | Ductile Cast Iron | | | Prehardened Steel | | | Stainless Steel | | |
| Properties | | - | | | - | | | Low Machinability | | |
| D | Effective Length | Ap | N | Fz | Ap | N | Fz | Ap | N | Fz |
| 0.2 | 0.5 | 0.011 | 45000 | 0.005 | 0.012 | 50000 | 0.005 | 0.010 | 34130 | 0.003 |
| | 1 | 0.009 | 45000 | 0.004 | 0.010 | 50000 | 0.004 | 0.007 | 34130 | 0.003 |
| | 1.5 | 0.007 | 45000 | 0.003 | 0.008 | 50000 | 0.003 | 0.004 | 30380 | 0.004 |
| 0.3 | 1 | 0.016 | 45000 | 0.005 | 0.018 | 50000 | 0.005 | 0.011 | 33750 | 0.005 |
| | 2 | 0.011 | 45000 | 0.004 | 0.012 | 50000 | 0.004 | 0.006 | 30380 | 0.004 |
| | 3 | 0.007 | 45000 | 0.003 | 0.008 | 50000 | 0.003 | 0.004 | 30380 | 0.004 |
| 0.4 | 1 | 0.029 | 45000 | 0.006 | 0.032 | 50000 | 0.006 | 0.016 | 27000 | 0.006 |
| | 2 | 0.020 | 45000 | 0.008 | 0.022 | 50000 | 0.008 | 0.015 | 27000 | 0.006 |
| | 3 | 0.008 | 45000 | 0.007 | 0.009 | 50000 | 0.007 | 0.008 | 24300 | 0.005 |
| | 4 | 0.004 | 45000 | 0.007 | 0.004 | 50000 | 0.007 | 0.005 | 24300 | 0.005 |
| | 5 | 0.002 | 45000 | 0.006 | 0.002 | 50000 | 0.006 | 0.004 | 21600 | 0.004 |
| 0.5 | 2 | 0.043 | 45000 | 0.009 | 0.048 | 50000 | 0.009 | 0.018 | 22500 | 0.010 |
| | 3 | 0.037 | 45000 | 0.008 | 0.041 | 50000 | 0.008 | 0.016 | 20250 | 0.009 |
| | 4 | 0.031 | 45000 | 0.008 | 0.034 | 50000 | 0.008 | 0.021 | 20250 | 0.009 |
| | 5 | 0.024 | 45000 | 0.007 | 0.027 | 50000 | 0.007 | 0.009 | 20250 | 0.007 |
| | 6 | 0.014 | 45000 | 0.007 | 0.016 | 50000 | 0.007 | 0.007 | 18000 | 0.009 |
| | 8 | 0.007 | 45000 | 0.006 | 0.008 | 50000 | 0.006 | 0.004 | 18000 | 0.009 |
| 0.6 | 2 | 0.049 | 39600 | 0.010 | 0.054 | 44000 | 0.010 | 0.022 | 22500 | 0.013 |
| | 3 | 0.042 | 39600 | 0.010 | 0.047 | 44000 | 0.010 | 0.018 | 22500 | 0.013 |
| | 4 | 0.036 | 38700 | 0.009 | 0.040 | 43000 | 0.009 | 0.012 | 20250 | 0.013 |
| | 5 | 0.030 | 37980 | 0.009 | 0.033 | 42200 | 0.009 | 0.010 | 20250 | 0.012 |
| | 6 | 0.022 | 37980 | 0.009 | 0.024 | 42200 | 0.009 | 0.008 | 18000 | 0.012 |
| | 8 | 0.011 | 37890 | 0.008 | 0.012 | 42100 | 0.008 | 0.008 | 18000 | 0.012 |
| 0.8 | 2 | 0.055 | 33300 | 0.014 | 0.061 | 37000 | 0.014 | 0.042 | 22500 | 0.017 |
| | 4 | 0.040 | 33300 | 0.014 | 0.045 | 37000 | 0.014 | 0.029 | 22500 | 0.017 |
| | 5 | 0.032 | 32400 | 0.013 | 0.036 | 36000 | 0.013 | 0.023 | 20250 | 0.015 |
| | 6 | 0.023 | 32400 | 0.013 | 0.026 | 36000 | 0.013 | 0.017 | 20250 | 0.015 |
| | 7 | 0.018 | 29700 | 0.013 | 0.020 | 33000 | 0.013 | 0.013 | 18000 | 0.016 |
| | 8 | 0.014 | 29700 | 0.013 | 0.016 | 33000 | 0.013 | 0.010 | 18000 | 0.015 |
| | 10 | 0.014 | 29700 | 0.012 | 0.016 | 33000 | 0.012 | 0.010 | 18000 | 0.014 |
| 1.0 | 3 | 0.050 | 27720 | 0.018 | 0.056 | 30800 | 0.018 | 0.052 | 20250 | 0.021 |
| | 4 | 0.049 | 27540 | 0.018 | 0.054 | 30600 | 0.018 | 0.036 | 20250 | 0.021 |
| | 5 | 0.047 | 27540 | 0.018 | 0.052 | 30600 | 0.018 | 0.034 | 20250 | 0.021 |
| | 6 | 0.045 | 27270 | 0.017 | 0.050 | 30300 | 0.017 | 0.032 | 18230 | 0.021 |
| | 7 | 0.043 | 26235 | 0.017 | 0.048 | 29150 | 0.017 | 0.030 | 18230 | 0.021 |
| | 8 | 0.041 | 26010 | 0.016 | 0.046 | 28900 | 0.016 | 0.027 | 18230 | 0.020 |
| | 9 | 0.036 | 25830 | 0.016 | 0.040 | 28700 | 0.016 | 0.024 | 18230 | 0.020 |
| | 10 | 0.032 | 25650 | 0.015 | 0.035 | 28500 | 0.015 | 0.021 | 18230 | 0.019 |
| | 12 | 0.023 | 25470 | 0.015 | 0.025 | 28300 | 0.015 | 0.013 | 17250 | 0.019 |
| | 14 | 0.020 | 25290 | 0.014 | 0.022 | 28100 | 0.014 | 0.010 | 16200 | 0.018 |
| | 16 | 0.017 | 24750 | 0.014 | 0.019 | 27500 | 0.014 | 0.008 | 16200 | 0.018 |
| | 20 | 0.014 | 23850 | 0.014 | 0.015 | 26500 | 0.014 | 0.005 | 12150 | 0.018 |
| 1.2 | 6 | 0.050 | 23400 | 0.021 | 0.056 | 26000 | 0.021 | 0.026 | 16200 | 0.024 |
| | 8 | 0.047 | 22950 | 0.020 | 0.052 | 25500 | 0.020 | 0.021 | 15900 | 0.023 |
| | 10 | 0.041 | 22500 | 0.019 | 0.045 | 25000 | 0.019 | 0.018 | 15830 | 0.022 |
| | 12 | 0.034 | 22050 | 0.018 | 0.038 | 24500 | 0.018 | 0.016 | 15750 | 0.022 |
| 1.4 | 8 | 0.056 | 20610 | 0.025 | 0.062 | 22900 | 0.025 | 0.029 | 14180 | 0.026 |
| | 12 | 0.038 | 19620 | 0.024 | 0.042 | 21800 | 0.024 | 0.018 | 14180 | 0.026 |
| | 16 | 0.031 | 18900 | 0.023 | 0.034 | 21000 | 0.023 | 0.016 | 12600 | 0.025 |
| 1.5 | 8 | 0.070 | 19800 | 0.027 | 0.078 | 22000 | 0.027 | 0.050 | 14180 | 0.027 |
| | 12 | 0.045 | 19080 | 0.026 | 0.050 | 21200 | 0.026 | 0.031 | 13880 | 0.027 |
| | 16 | 0.038 | 18360 | 0.026 | 0.042 | 20400 | 0.026 | 0.020 | 12600 | 0.025 |
| | 18 | 0.029 | 18000 | 0.026 | 0.032 | 20000 | 0.026 | 0.018 | 12600 | 0.025 |

cont'd ▸

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P M K S H P K

## BN 45 Miniature Long Neck Ballnose Cutters, 2 Flutes - A76

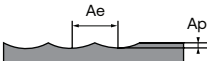



| Profiling | | K | | | P | | | M | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | | Ductile Cast Iron | | | Prehardened Steel | | | StainlessSteel | | |
| Properties | | - | | | - | | | Low Machinability | | |
| D | Effective Length | Ap | N | Fz | Ap | N | Fz | Ap | N | Fz |
| 1.6 | 8 | 0.079 | 19170 | 0.030 | 0.088 | 21300 | 0.030 | 0.057 | 14630 | 0.032 |
| | 12 | 0.054 | 18270 | 0.028 | 0.060 | 20300 | 0.028 | 0.042 | 13160 | 0.030 |
| | 16 | 0.045 | 17901 | 0.027 | 0.050 | 19890 | 0.027 | 0.034 | 13160 | 0.030 |
| | 20 | 0.036 | 17280 | 0.026 | 0.040 | 19200 | 0.026 | 0.026 | 11700 | 0.028 |
| 1.8 | 8 | 0.094 | 17550 | 0.035 | 0.104 | 19500 | 0.035 | 0.068 | 13200 | 0.036 |
| | 12 | 0.072 | 16740 | 0.032 | 0.080 | 18600 | 0.032 | 0.054 | 12750 | 0.033 |
| | 16 | 0.063 | 16380 | 0.031 | 0.070 | 18200 | 0.031 | 0.044 | 12300 | 0.033 |
| | 20 | 0.054 | 15912 | 0.030 | 0.060 | 17680 | 0.030 | 0.028 | 11850 | 0.031 |
| 2.0 | 4 | 0.144 | 16065 | 0.042 | 0.160 | 17850 | 0.042 | 0.104 | 12300 | 0.047 |
| | 6 | 0.144 | 15795 | 0.041 | 0.160 | 17550 | 0.041 | 0.104 | 12150 | 0.042 |
| | 8 | 0.101 | 15570 | 0.041 | 0.112 | 17300 | 0.041 | 0.073 | 12000 | 0.042 |
| | 10 | 0.101 | 15390 | 0.037 | 0.112 | 17100 | 0.037 | 0.073 | 11810 | 0.037 |
| | 12 | 0.095 | 15210 | 0.036 | 0.105 | 16900 | 0.036 | 0.067 | 11550 | 0.036 |
| | 14 | 0.095 | 15120 | 0.036 | 0.105 | 16800 | 0.036 | 0.067 | 11400 | 0.036 |
| | 16 | 0.086 | 15030 | 0.034 | 0.095 | 16700 | 0.034 | 0.062 | 11250 | 0.034 |
| | 18 | 0.086 | 14940 | 0.034 | 0.095 | 16600 | 0.034 | 0.042 | 11100 | 0.034 |
| | 20 | 0.072 | 14850 | 0.034 | 0.080 | 16500 | 0.034 | 0.042 | 10950 | 0.034 |
| | 22 | 0.068 | 14580 | 0.033 | 0.075 | 16200 | 0.033 | 0.026 | 10730 | 0.032 |
| | 25 | 0.068 | 14310 | 0.033 | 0.075 | 15900 | 0.033 | 0.026 | 10500 | 0.032 |
| | 30 | 0.045 | 13950 | 0.031 | 0.050 | 15500 | 0.031 | 0.016 | 10130 | 0.031 |
| 3.0 | 8 | 0.216 | 11340 | 0.062 | 0.240 | 12600 | 0.062 | 0.156 | 8250 | 0.069 |
| | 10 | 0.151 | 11205 | 0.058 | 0.168 | 12450 | 0.058 | 0.109 | 8100 | 0.069 |
| | 16 | 0.126 | 10980 | 0.056 | 0.140 | 12200 | 0.056 | 0.109 | 7800 | 0.062 |
| | 20 | 0.104 | 10620 | 0.052 | 0.115 | 11800 | 0.052 | 0.062 | 7580 | 0.062 |
| | 25 | 0.086 | 10260 | 0.050 | 0.095 | 11400 | 0.050 | 0.042 | 7350 | 0.062 |
| | 30 | 0.072 | 9900 | 0.046 | 0.080 | 11000 | 0.046 | 0.042 | 7200 | 0.062 |
| | 35 | 0.058 | 9450 | 0.042 | 0.064 | 10500 | 0.042 | 0.042 | 7200 | 0.059 |
| 4.0 | 10 | 0.288 | 8798 | 0.090 | 0.320 | 9775 | 0.090 | 0.208 | 6470 | 0.094 |
| | 16 | 0.202 | 8798 | 0.090 | 0.224 | 9775 | 0.090 | 0.146 | 6470 | 0.094 |
| | 20 | 0.202 | 8798 | 0.090 | 0.224 | 9775 | 0.090 | 0.146 | 6470 | 0.094 |
| | 25 | 0.115 | 7918 | 0.081 | 0.128 | 8798 | 0.081 | 0.083 | 5820 | 0.084 |
| | 30 | 0.115 | 7918 | 0.081 | 0.128 | 8798 | 0.081 | 0.083 | 5820 | 0.084 |
| | 35 | 0.072 | 7918 | 0.081 | 0.080 | 8798 | 0.081 | 0.052 | 5820 | 0.084 |
| | 40 | 0.072 | 7918 | 0.081 | 0.080 | 8798 | 0.081 | 0.052 | 5820 | 0.084 |
| | 45 | 0.058 | 7038 | 0.076 | 0.064 | 7820 | 0.076 | 0.052 | 5180 | 0.079 |
| | 50 | 0.050 | 7038 | 0.076 | 0.056 | 7820 | 0.076 | 0.052 | 5180 | 0.079 |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P M K S H P K

## BN 45 Miniature Long Neck Ballnose Cutters, 2 Flutes - A76



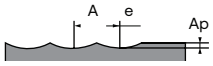

| Profiling | | S | | | H | | |
|---|---|---|---|---|---|---|---|
| Working Material | | Nickel Alloy | | | Hardened Steel | | |
| Properties | | - | | | 45 ≤ HRC < 52 | | |
| D | Effective Length | Ap | N | Fz | Ap | N | Fz |
| 0.2 | 0.5 | 0.008 | 22750 | 0.003 | 0.013 | 45500 | 0.003 |
| | 1 | 0.005 | 22750 | 0.003 | 0.009 | 45500 | 0.003 |
| | 1.5 | 0.003 | 20250 | 0.003 | 0.005 | 40500 | 0.003 |
| 0.3 | 1 | 0.008 | 22500 | 0.004 | 0.014 | 45000 | 0.004 |
| | 2 | 0.005 | 20250 | 0.003 | 0.008 | 40500 | 0.004 |
| | 3 | 0.003 | 20250 | 0.003 | 0.005 | 40500 | 0.004 |
| 0.4 | 1 | 0.012 | 18000 | 0.005 | 0.020 | 36000 | 0.005 |
| | 2 | 0.011 | 18000 | 0.005 | 0.018 | 36000 | 0.005 |
| | 3 | 0.006 | 16200 | 0.004 | 0.010 | 32400 | 0.004 |
| | 4 | 0.004 | 16200 | 0.004 | 0.007 | 32400 | 0.004 |
| | 5 | 0.003 | 14400 | 0.004 | 0.005 | 28800 | 0.004 |
| 0.5 | 2 | 0.014 | 15000 | 0.008 | 0.023 | 30000 | 0.009 |
| | 3 | 0.012 | 13500 | 0.007 | 0.020 | 27000 | 0.008 |
| | 4 | 0.016 | 13500 | 0.007 | 0.026 | 27000 | 0.008 |
| | 5 | 0.007 | 13500 | 0.006 | 0.012 | 27000 | 0.007 |
| | 6 | 0.005 | 12000 | 0.007 | 0.008 | 24000 | 0.008 |
| | 8 | 0.003 | 12000 | 0.007 | 0.005 | 24000 | 0.008 |
| 0.6 | 2 | 0.016 | 15000 | 0.011 | 0.027 | 30000 | 0.012 |
| | 3 | 0.013 | 15000 | 0.011 | 0.022 | 30000 | 0.012 |
| | 4 | 0.009 | 13500 | 0.010 | 0.016 | 27000 | 0.012 |
| | 5 | 0.008 | 13500 | 0.010 | 0.013 | 27000 | 0.011 |
| | 6 | 0.006 | 12000 | 0.010 | 0.010 | 24000 | 0.011 |
| | 8 | 0.006 | 12000 | 0.010 | 0.010 | 24000 | 0.011 |
| 0.8 | 2 | 0.031 | 15000 | 0.014 | 0.052 | 30000 | 0.015 |
| | 4 | 0.022 | 15000 | 0.014 | 0.036 | 30000 | 0.015 |
| | 5 | 0.018 | 13500 | 0.012 | 0.029 | 27000 | 0.014 |
| | 6 | 0.012 | 13500 | 0.012 | 0.021 | 27000 | 0.014 |
| | 7 | 0.010 | 12000 | 0.013 | 0.016 | 24000 | 0.014 |
| | 8 | 0.008 | 12000 | 0.012 | 0.013 | 24000 | 0.014 |
| | 10 | 0.008 | 12000 | 0.012 | 0.013 | 24000 | 0.013 |
| 1.0 | 3 | 0.039 | 13500 | 0.017 | 0.065 | 27000 | 0.019 |
| | 4 | 0.027 | 13500 | 0.017 | 0.046 | 27000 | 0.019 |
| | 5 | 0.026 | 13500 | 0.017 | 0.043 | 27000 | 0.019 |
| | 6 | 0.024 | 12150 | 0.017 | 0.040 | 24300 | 0.019 |
| | 7 | 0.022 | 12150 | 0.017 | 0.037 | 24300 | 0.019 |
| | 8 | 0.020 | 12150 | 0.016 | 0.034 | 24300 | 0.018 |
| | 9 | 0.018 | 12150 | 0.016 | 0.030 | 24300 | 0.018 |
| | 10 | 0.016 | 12150 | 0.015 | 0.026 | 24300 | 0.017 |
| | 12 | 0.010 | 11500 | 0.015 | 0.016 | 23000 | 0.017 |
| | 14 | 0.008 | 10800 | 0.014 | 0.013 | 21600 | 0.016 |
| | 16 | 0.006 | 10800 | 0.014 | 0.010 | 21600 | 0.016 |
| | 20 | 0.004 | 8100 | 0.014 | 0.007 | 16200 | 0.016 |
| 1.2 | 6 | 0.020 | 10800 | 0.020 | 0.033 | 21600 | 0.022 |
| | 8 | 0.016 | 10600 | 0.019 | 0.026 | 21200 | 0.021 |
| | 10 | 0.014 | 10550 | 0.018 | 0.023 | 21100 | 0.020 |
| | 12 | 0.012 | 10500 | 0.018 | 0.020 | 21000 | 0.020 |
| 1.4 | 8 | 0.021 | 9450 | 0.022 | 0.036 | 18900 | 0.024 |
| | 12 | 0.014 | 9450 | 0.021 | 0.023 | 18900 | 0.024 |
| | 16 | 0.012 | 8400 | 0.020 | 0.020 | 16800 | 0.022 |

cont'd ▸

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P M K S H P K

## BN 45 Miniature Long Neck Ballnose Cutters, 2 Flutes - A76




| Profiling | | S | | | H | | |
|---|---|---|---|---|---|---|---|
| Working Material | | Nickel Alloy | | | Hardened Steel | | |
| Properties | | - | | | 45 ≤ HRC < 52 | | |
| D | Effective Length | Ap | N | Fz | Ap | N | Fz |
| 1.5 | 8 | 0.037 | 9450 | 0.022 | 0.062 | 18900 | 0.024 |
| | 12 | 0.023 | 9250 | 0.022 | 0.039 | 18500 | 0.024 |
| | 16 | 0.015 | 8400 | 0.021 | 0.025 | 16800 | 0.023 |
| | 18 | 0.013 | 8400 | 0.021 | 0.022 | 16800 | 0.023 |
| 1.6 | 8 | 0.043 | 9750 | 0.026 | 0.072 | 19500 | 0.029 |
| | 12 | 0.031 | 8780 | 0.024 | 0.052 | 17550 | 0.027 |
| | 16 | 0.025 | 8780 | 0.024 | 0.042 | 17550 | 0.027 |
| | 20 | 0.019 | 7800 | 0.023 | 0.032 | 15600 | 0.025 |
| 1.8 | 8 | 0.051 | 8800 | 0.030 | 0.085 | 17600 | 0.033 |
| | 12 | 0.041 | 8500 | 0.027 | 0.068 | 17000 | 0.030 |
| | 16 | 0.033 | 8200 | 0.027 | 0.055 | 16400 | 0.030 |
| | 20 | 0.021 | 7900 | 0.025 | 0.035 | 15800 | 0.028 |
| 2.0 | 4 | 0.078 | 8200 | 0.039 | 0.130 | 16400 | 0.043 |
| | 6 | 0.078 | 8100 | 0.034 | 0.130 | 16200 | 0.038 |
| | 8 | 0.055 | 8000 | 0.034 | 0.091 | 16000 | 0.038 |
| | 10 | 0.055 | 7880 | 0.031 | 0.091 | 15750 | 0.034 |
| | 12 | 0.050 | 7700 | 0.030 | 0.084 | 15400 | 0.033 |
| | 14 | 0.050 | 7600 | 0.030 | 0.084 | 15200 | 0.033 |
| | 16 | 0.047 | 7500 | 0.028 | 0.078 | 15000 | 0.031 |
| | 18 | 0.031 | 7400 | 0.028 | 0.052 | 14800 | 0.031 |
| | 20 | 0.031 | 7300 | 0.028 | 0.052 | 14600 | 0.031 |
| | 22 | 0.020 | 7150 | 0.026 | 0.033 | 14300 | 0.029 |
| | 25 | 0.020 | 7000 | 0.026 | 0.033 | 14000 | 0.029 |
| | 30 | 0.012 | 6750 | 0.026 | 0.020 | 13500 | 0.028 |
| 3.0 | 8 | 0.117 | 5500 | 0.057 | 0.195 | 11000 | 0.063 |
| | 10 | 0.082 | 5400 | 0.057 | 0.137 | 10800 | 0.063 |
| | 16 | 0.082 | 5200 | 0.051 | 0.137 | 10400 | 0.057 |
| | 20 | 0.047 | 5050 | 0.051 | 0.078 | 10100 | 0.057 |
| | 25 | 0.031 | 4900 | 0.051 | 0.052 | 9800 | 0.057 |
| | 30 | 0.031 | 4800 | 0.051 | 0.052 | 9600 | 0.057 |
| | 35 | 0.031 | 4800 | 0.048 | 0.052 | 9600 | 0.054 |
| 4.0 | 10 | 0.156 | 4320 | 0.077 | 0.260 | 8630 | 0.085 |
| | 16 | 0.109 | 4320 | 0.077 | 0.182 | 8630 | 0.085 |
| | 20 | 0.109 | 4320 | 0.077 | 0.182 | 8630 | 0.085 |
| | 25 | 0.062 | 3880 | 0.068 | 0.104 | 7760 | 0.076 |
| | 30 | 0.062 | 3880 | 0.068 | 0.104 | 7760 | 0.076 |
| | 35 | 0.039 | 3880 | 0.068 | 0.065 | 7760 | 0.076 |
| | 40 | 0.039 | 3880 | 0.068 | 0.065 | 7760 | 0.076 |
| | 45 | 0.039 | 3450 | 0.065 | 0.065 | 6900 | 0.072 |
| | 50 | 0.039 | 3450 | 0.065 | 0.065 | 6900 | 0.072 |

FEATURES & BENEFITS

# SE 45X

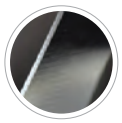
## 1 Gash Land Design

-Reinforce edge protection of the cutting tool corner.
-Higher mechanical strength to withstand greater cutting force.
-Longer machining time consistency and greater tool durability.

## 2 Differential Pitch (DP)


Reduces chatter to provide excellent surface finishing.

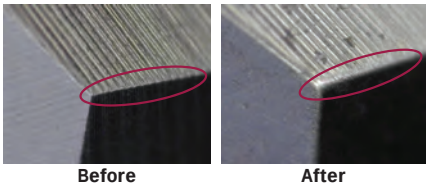
## 3 Ideal Cutting Edge



Provides edge protection to prolong tool life.

## 4 Cutting Edge Preparation

-Reduces material adherence on the cutting edge to overcome stable machining.
-Improves wear resistance and reduces excessive friction to prolong tool life.



Before | After

## 5 Superior Coating to Reduce Friction

Enhances Heat Resistance to prolong tool life.

## 6 Harder Material (MG+)

-Improves rigidity.
-Improves surface finishing and maximizes tool life.

## 7 Suitable for Materials

-For excellent finishing process in Mould & Die
-HRC 40 ~55 ( Ae ≤ 0.5mm )

P H

## CARATTERISTICHE TECNICHE

1. Diseño de la ranura
   Mayor protección de la hélice del filo de corte.
   Mayor resistencia mecánica a la fuerza de corte
   Mayor regularidad de los tiempos de mecanizado

2. Paso diferenciado (DP)
   Reduce las vibraciones y proporciona un acabado superficial

3. Bruñido del filo de corte
   Mayor protección del filo para prolongar la vida útil de la fresa

4. Preparación del ángulo del filo de corte
   Reduce la adherencia de material en el filo de corte para superar el mecanizado
   Mejora la resistencia al desgaste y reduce fricción excesiva para prolongar la vida útil de la herramienta

5. Recubrimiento TiSiN
   Aumenta la dureza y mayor resistencia al desgaste abrasivo.
   Mayor resistencia térmica.
   Evacuación más fácil de la viruta

6. Micrograno más fino (MG+)
   Mejora la rigidez.
   Mejora el acabado superficial y maximiza la vida útil de la herramienta

7. Adecuado para materiales
   Para un excelente proceso de acabado en Moldes y Matrices HRC 40 ~55 ( Ae ≤ 0,5mm )

## MERKMALE UND VORTEILE

1. Stirnschliff Design
   Verstärkung des Kantenschutzes der Schneidekanten.
   Höhere mechanische Festigkeit, um größeren Schneidkräften auszuhalten.
   Konstante Bearbeitungszeit und höhere Werkzeugstandzeit

2. Ungleiche Teilung (DP)
   Ungleiche Anordnung der Spannuten, um Eigenresonanz ufzulösen und Vibrationen zu reduzieren

3. Perfekte Schneide
   Bietet Schneidkantenschutz,um die Lebensdauer des Werkzeugs zu verlängern

4. Schneidkantenbehandlung
   VVerbessert die Werkzeuglebensdauer
   Verbessert die Verschleißfestigkeit und reduziert übermäßige Reibung

5. Ausgezeichnete Beschichtung zur Verringerung der Reibung
   Erhöht die Härte und und bietet bessere Verschleißfestigkeit
   Höhere Temperaturbeständigkeit
   Glatte Oberfläche für besseren Spänefluß

6. Härteres Material
   Verbessert die Steifigkeit
   Verbessert die Oberflächenbearbeitung und maximiert die Standzeit

7. Geeignet für Materialgruppen P,H
   Für exzellenten Veredelungsprozess in Mold & Die
   HRC 40 ~55 ( Ae ≤ 0.5mm )

## CARACTÉRISTIQUES ET AVANTAGES

1. Conception de fraise pour l'usinage general
   Renforcer la protection des bords du coin de l'outil de coupe
   Résistance mécanique plus élevée pour résister à une force de coupe plus importante
   Une durée d'usinage plus longue et une plus grande durabilité de l'outil

2. Conception à pas différentiel (DP)
   Réduire les vibrations pour obtenir une excellente finition de surface

3. Arête tranchante idéale
   Protège lesarêtes pour prolonger la durée de vie de l'outil

4. Préparation des arêtes de coupes
   Réduit l'adhérence du matériau sur le tranchant pour surmonter l'usinage stable
   Améliore la résistance à l'usure et réduit le frottement excessif pour prolonger la durée de vie de l'outil

5. Revêtement supérieur pour réduire la friction
   Augmente la dureté et la résistance à l'abrasion
   Résistance thermique supérieure
   Évacuation des copeaux plus fluide

6. Matériau plus dur
   Améliore la rigidité
   Améliore la finition de surface et maximise la durée de vie de l'outil

7. Convient aux matériaux
   Pour un excellent processus de finition dans Mold & Die
   HRC 40 ~55 ( Ae ≤ 0.5mm )

# A06

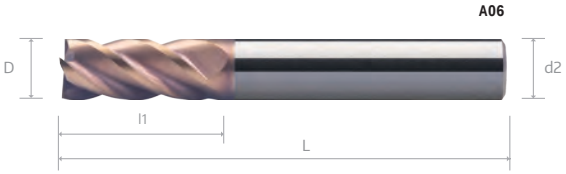
≤ 52 HRC HPMT

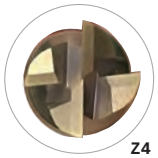
## SE 45X DP Endmills, 4 Flutes

SE 45X DP, 4 flautas

SE 45X DP Fräser, 4 Zähne

SE 45X DP - 4 dents


| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|
| A06 0100 050 04 | 1 | 3 | | 50 | 4 | • |
| A06 0150 050 04 | 1.5 | 4.5 | | 50 | 4 | • |
| A06 0200 050 04 | 2 | 6.5 | | 50 | 4 | • |
| A06 0250 050 04 | 2.5 | | | 50 | 4 | • |
| A06 0300 | 3 | 9 | | 40 | 3 | • |
| A06 0300 050 06 | | | | 50 | 6 | • |
| A06 0350 050 04 * | 3.5 | 12 | | 50 | 4 | • |
| A06 0400 * | 4 | | | 50 | 4 | • |
| A06 0400 050 06 | | | | 50 | 6 | • |
| A06 0450 050 05 * | 4.5 | 15 | | 50 | 5 | • |
| A06 0500 * | 5 | | | 50 | 5 | • |
| A06 0500 050 06 | | | | 50 | 6 | • |
| A06 0550 050 06 | 5.5 | | | 50 | 6 | • |
| A06 0600 050 | 6 | 16 | | 50 | 6 | • |
| A06 0600 060 | | 20 | | 60 | 6 | • |
| A06 0700 064 08 | 7 | | | 64 | 8 | • |
| A06 0800 | 8 | | | 64 | 8 | • |
| A06 0900 070 10 | 9 | 22 | | 70 | 10 | • |
| A06 1000 070 | 10 | | | 70 | 10 | • |
| A06 1100 075 12 | 11 | 25 | | 75 | 12 | • |
| A06 1200 | 12 | | | 75 | 12 | • |
| A06 1400 | 14 | 32 | | 90 | 14 | • |
| A06 1600 | 16 | | | 90 | 16 | • |
| A06 2000 | 20 | 38 | | 100 | 20 | • |

* - DIN 6535

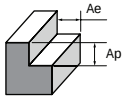
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | • | • | • | | | | | | • | | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

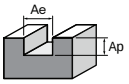
P H P

## SE 45X DP Endmills, 4 Flutes - A06




| Side Milling | P | | | | | | H | |
|---|---|---|---|---|---|---|---|---|
| Working Material | Carbon Steel | | Alloy Steel | | Prehardened Steel | | Hardened Steel | |
| Properties | - | | 520 < Rm < 1200 | | - | | 45 ≤ HRC < 52 | |
| Cutting depth, ap | 1.20 × D | | 1.20 × D | | 1.20 × D | | 1.20 × D | |
| Cutting Width, ae | 0.19 × D | | 0.14 × D | | 0.12 × D | | 0.10 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | 190 | 0.007 | 140 | 0.009 | 130 | 0.007 | 100 | 0.006 |
| 2 | | 0.016 | | 0.014 | | 0.016 | | 0.014 |
| 3 | | 0.030 | | 0.023 | | 0.025 | | 0.023 |
| 4 | | 0.042 | | 0.033 | | 0.035 | | 0.033 |
| 5 | | 0.058 | | 0.044 | | 0.046 | | 0.044 |
| 6 | | 0.070 | | 0.058 | | 0.060 | | 0.058 |
| 8 | | 0.099 | | 0.082 | | 0.085 | | 0.082 |
| 10 | | 0.124 | | 0.107 | | 0.112 | | 0.107 |
| 12 | | 0.152 | | 0.136 | | 0.142 | | 0.136 |
| 14 | | 0.168 | | 0.153 | | 0.156 | | 0.151 |
| 16 | | 0.174 | | 0.164 | | 0.167 | | 0.162 |
| 20 | | 0.211 | | 0.186 | | 0.194 | | 0.188 |

## SE 45X DP Endmills, 4 Flutes - A06




| Face Milling | P | | | | | | H | |
|---|---|---|---|---|---|---|---|---|
| Working Material | Carbon Steel | | Alloy Steel | | Prehardened Steel | | Hardened Steel | |
| Properties | - | | 520 < Rm < 1200 | | - | | 45 ≤ HRC < 52 | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 0.80 × D | | 1.20 × D | |
| Cutting Width, ae | 1.00 × D | | 1.00 × D | | 1.00 × D | | 0.10 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | 200 | 0.005 | 160 | 0.003 | 125 | 0.005 | 55 | 0.0 |
| 2 | | 0.008 | | 0.007 | | 0.008 | | 0.006 |
| 3 | | 0.012 | | 0.011 | | 0.013 | | 0.010 |
| 4 | | 0.016 | | 0.015 | | 0.018 | | 0.0 |
| 5 | | 0.020 | | 0.019 | | 0.023 | | 0.020 |
| 6 | | 0.025 | | 0.024 | | 0.028 | | 0.025 |
| 8 | | 0.036 | | 0.033 | | 0.038 | | 0.032 |
| 10 | | 0.047 | | 0.044 | | 0.049 | | 0.039 |
| 12 | | 0.060 | | 0.056 | | 0.059 | | 0.048 |
| 14 | | 0.068 | | 0.063 | | 0.070 | | 0.0 |
| 16 | | 0.076 | | 0.071 | | 0.078 | | 0.058 |
| 20 | | 0.089 | | 0.083 | | 0.094 | | 0.073 |

FEATURES & BENEFITS

# SE 60X Fin-Mill

## 1 4/6 Flutes

2x to 3x feed rate in comparison with conventional.
2 flutes cutter.

## 2 Tough PVD Silicon Based Coating

-Prolong the tool life.
-Enables higher cutting speeds.
-Increases hardness and higher abrasive wear resistance.
-Smoother chips evacuation.

## 3 Suitable for Material Groups

P H

## CARATTERISTICHE TECNICHE

1. 4/6 ranuras
   velocidades de avance de 2 a 3 veces superiores
   las fresas convencionales de 2 ranuras.

2. Recubrimiento TiSiN
   Prolonga la vida útil de la herramienta.
   Permite mayores velocidades de corte.
   Aumenta la resistencia al calor, por lo que es adecuado para mecanizado en seco.

3. Adecuado para material P, H

## MERKMALE UND VORTEILE

1. 4/6 Schneiden
   zwei- bzw. dreifacher Vorschub gegenüber Fräsern mit 2 Schneiden

2. PVD-Silizium-Hartbeschichtung
   verlängert die Lebensdauer des Werkzeugs
   ermöglicht höhere Schnittgeschwindigkeiten
   erhöht die Hitzebeständigkeit, deshalb sehr gut geeignet für Trockenbearbeitung

3. Geeignet für Materialgruppe P, H

## CARACTÉRISTIQUES ET AVANTAGES

1. 4/6 goujures
   Débit 2 à 3 fois plus élevé que les dispositifs de coupe conventionnels à 2 goujures

2. Revêtement à base de silicium sous forme de dépôt
   en phase vapeur résistant
   prolonge la durée de vie de l'outil
   permet des vitesses de coupe supérieures
   augmente la résistance à la chaleur, donc parfaitement adapté à l'usinage à sec

3. Adapté au matériaux P, H

# G78

40 - 60 HRC

HPMT

## SE 60X Fin-Mill Torus Endmills, 4 - 6 Flutes

SE 60X Fin-Mill Torus Fresas de mango, 4 - 6 canales

SE 60X Fin-Mill Torusfräser, 4 / 6 Zähne

Fraises 2 tailles SE 60X Fin-Mill toriques, 4 - 6 dents



Z4 / Z6

| Order Number | D (mm) | l 1 (mm) | L (mm) | d2 h6 (mm) | R | Z | Availability |
|---|---|---|---|---|---|---|---|
| G78 0200 060 0600 030 | 2 | 2 | 60 | 6 | 0.3 | 4 | • |
| G78 0200 060 0600 050 | | | 60 | 6 | 0.5 | 4 | • |
| G78 0300 060 0600 030 | 3 | 3 | 60 | 6 | 0.3 | 4 | • |
| G78 0300 060 0600 050 | | | 60 | 6 | 0.5 | 4 | • |
| G78 0400 060 0600 030 | 4 | 4 | 60 | 6 | 0.3 | 4 | • |
| G78 0400 060 0600 050 | | | 60 | 6 | 0.5 | 4 | • |
| G78 0600 060 0600 030 | 6 | 6 | 60 | 6 | 0.3 | 4 | • |
| G78 0600 060 0600 050 | | | 60 | 6 | 0.5 | 4 | • |
| G78 0600 060 0600 100 | | | 60 | 6 | 1 | 4 | • |
| G78 0800 064 0800 030 | 8 | 8 | 64 | 8 | 0.3 | 6 | • |
| G78 0800 064 0800 050 | | | 64 | 8 | 0.5 | 6 | • |
| G78 0800 064 0800 100 | | | 64 | 8 | 1 | 6 | • |
| G78 0800 064 0800 200 | | | 64 | 8 | 2 | 6 | • |
| G78 1000 075 1000 030 | 10 | 10 | 75 | 10 | 0.3 | 6 | • |
| G78 1000 075 1000 050 | | | 75 | 10 | 0.5 | 6 | • |
| G78 1000 075 1000 100 | | | 75 | 10 | 1 | 6 | • |
| G78 1000 075 1000 200 | | | 75 | 10 | 2 | 6 | • |
| G78 1200 075 1200 030 | 12 | 12 | 75 | 12 | 0.3 | 6 | • |
| G78 1200 075 1200 050 | | | 75 | 12 | 0.5 | 6 | • |
| G78 1200 075 1200 100 | | | 75 | 12 | 1 | 6 | • |
| G78 1200 075 1200 200 | | | 75 | 12 | 2 | 6 | • |

| CNC Repeatability |
|---|
| Ø1 - Ø3 within 10µm |
| Ø4 - Ø8 within 15µm |
| ≥ Ø10 within 20µm |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | • | | | | | | • | • | | |

# G86

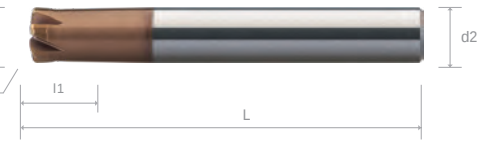
40 - 60 HRC HPMT

## SE 60X Sweep-Mill Torus Endmills, 4 - 6 Flutes

SE 60X Fresa de barrido Torus, 4 - 6 canales

SE 60X Sweep-Mill Torusfräser, 4/6 Schneiden

Fraises 2 tailles SE 60X Sweep-Mill toriques, 4 - 6 dents







Z4 / Z6

| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R(theo) | Z | Availability |
|---|---|---|---|---|---|---|---|---|
| G86 0300 057 0600 060 | 3 | 1.5 | 6 | 57 | 6 | 0.3 | 4 | • |
| G86 0300 057 0600 120 | | | 12 | 57 | 6 | 0.3 | 4 | • |
| G86 0400 057 0600 080 | 4 | | 8 | 57 | 6 | 0.4 | 4 | • |
| G86 0400 057 0600 150 | | | 15 | 57 | 6 | 0.4 | 4 | • |
| G86 0500 057 0600 100 | 5 | 2 | 10 | 57 | 6 | 0.5 | 4 | • |
| G86 0500 057 0600 210 | | | 22 | 57 | 6 | 0.5 | 4 | • |
| G86 0600 057 0600 120 | 6 | 2.5 | 12 | 57 | 6 | 0.6 | 4 | • |
| G86 0600 057 0600 260 | | | 26 | 57 | 6 | 0.6 | 4 | • |
| G86 0800 063 0800 160 | 8 | 3 | 16 | 63 | 8 | 0.8 | 6 | • |
| G86 0800 063 0800 310 | | | 32 | 63 | 8 | 0.8 | 6 | • |
| G86 1000 072 1000 200 | 10 | 3.5 | 20 | 72 | 10 | 1 | 6 | • |
| G86 1000 072 1000 360 | | | 36 | 72 | 10 | 1 | 6 | • |
| G86 1200 083 1200 240 | 12 | 4 | 24 | 83 | 12 | 1.2 | 6 | • |
| G86 1200 083 1200 410 | | | 43 | 83 | 12 | 1.2 | 6 | • |

| Ø mm | HPMT S tandard |
|---|---|
| 0.1 < 3.0 | -10 / -25 |
| 3.0 ~ 6.0 | -10 / -38 |
| 6.0 ~ 10.0 | -10 / -50 |
| 10.0 ~ 12.0 | -10 / -50 |

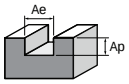
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | • | | | | | | • | • | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

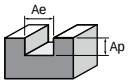
P H P

## SE 60X Fin-Mill Torus Endmills, 4 Flutes - G78



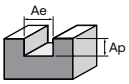

| Face Milling | P | | H | | | |
|---|---|---|---|---|---|---|
| Working Material | Prehardened Steel | | Hardened Steel | | Hardened Steel | |
| Properties | - | | 45 ≤ HRC < 52 | | 52 ≤ HRC < 68 | |
| Cutting depth, ap | 0.05 × D | | 0.05 × D | | 0.05 × D | |
| Cutting Width, ae | 0.40 × D | | 0.35 × D | | 0.15 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz |
| 2 | 150 | 0.021 | 130 | 0.019 | 110 | 0.018 |
| 3 | | 0.037 | | 0.033 | | 0.031 |
| 4 | | 0.060 | | 0.055 | | 0.052 |
| 6 | | 0.092 | | 0.085 | | 0.082 |

## SE 60X Fin-Mill Torus Endmills, 6 Flutes - G78



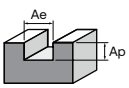

| Face Milling | P | | H | | | |
|---|---|---|---|---|---|---|
| Working Material | Prehardened Steel | | Hardened Steel | | Hardened Steel | |
| Properties | - | | 45 ≤ HRC < 52 | | 52 ≤ HRC < 68 | |
| Cutting depth, ap | 0.05 × D | | 0.05 × D | | 0.05 × D | |
| Cutting Width, ae | 0.40 × D | | 0.35 × D | | 0.30 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz |
| 8 | 150 | 0.096 | 130 | 0.088 | 110 | 0.085 |
| 10 | | 0.125 | | 0.114 | | 0.110 |
| 12 | | 0.155 | | 0.145 | | 0.140 |

## SE 60X Sweep-Mill Torus Endmill, 4 Flutes - G86




| Face Milling | P | | H | | | |
|---|---|---|---|---|---|---|
| Working Material | Prehardened Steel | | Hardened Steel | | Hardened Steel | |
| Properties | - | | 45 ≤ HRC < 52 | | 52 ≤ HRC < 68 | |
| Cutting depth, ap | 0.05 × D | | 0.04 × D | | 0.03 × D | |
| Cutting Width, ae | 0.40 × D | | 0.35 × D | | 0.30 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz |
| 3 | 160 | 0.062 | 140 | 0.060 | 120 | 0.060 |
| 4 | | 0.087 | | 0.085 | | 0.083 |
| 5 | | 0.114 | | 0.112 | | 0.110 |
| 6 | | 0.142 | | 0.140 | | 0.138 |

## SE 60X Sweep-Mill Torus Endmill, 6 Flutes - G86




| Face Milling | P | | H | | | |
|---|---|---|---|---|---|---|
| Working Material | Prehardened Steel | | Hardened Steel | | Hardened Steel | |
| Properties | - | | 45 ≤ HRC < 52 | | 52 ≤ HRC < 68 | |
| Cutting depth, ap | 0.05 × D | | 0.04 × D | | 0.03 × D | |
| Cutting Width, ae | 0.40 × D | | 0.35 × D | | 0.30 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz |
| 8 | 160 | 0.144 | 140 | 0.142 | 120 | 0.140 |
| 10 | | 0.184 | | 0.182 | | 0.180 |
| 12 | | 0.227 | | 0.225 | | 0.220 |

# A4G

40 - 60 HRC

HPMT

## SE 60X Fin-Mill Torus Endmills with Long Neck, 4 Flutes

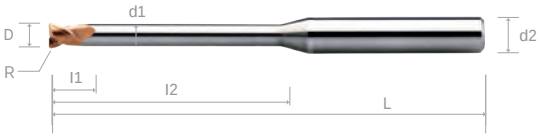
SE 60X Fin-mill Fresas Torus De Cuello Largo, 4 Filos

SE 60X Fin-Mill Torus-Kleinstfräser mit langem Hals, 4 Zähne

Micro-fraises SE 60X Fin-Mill toriques avec cou long, 4 dents

DIN 6535 HA HB | UF+ | R±0.010 | λ= 25° | HSC B0909 TiSiN

A4G




Z4

| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d1 (mm) | R | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|---|
| A4G 0250 060 0400 250 R030 | 2.5 | 2.5 | 25 | 60 | 2.4 | 0.3 | 4 | • |
| A4G 0250 075 0400 R030 | | | - | 75 | - | 0.3 | 4 | • |
| A4G 0250 075 0400 300 R030 | | | 30 | 75 | 2.4 | 0.3 | 4 | • |
| A4G 0250 050 0400 R050 | | | - | 50 | - | 0.5 | 4 | • |
| A4G 0250 050 0400 080 R050 | | | 8 | 50 | 2.4 | 0.5 | 4 | • |
| A4G 0250 050 0400 120 R050 | | | 12 | 50 | 2.4 | 0.5 | 4 | • |
| A4G 0250 050 0400 160 R050 | | | 16 | 50 | 2.4 | 0.5 | 4 | • |
| A4G 0250 060 0400 R050 | | | - | 60 | - | 0.5 | 4 | • |
| A4G 0250 060 0400 200 R050 | | | 20 | 60 | 2.4 | 0.5 | 4 | • |
| A4G 0250 060 0400 250 R050 | | | 25 | 60 | 2.4 | 0.5 | 4 | • |
| A4G 0250 075 0400 R050 | | | - | 75 | - | 0.5 | 4 | • |
| A4G 0250 075 0400 300 R050 | | | 30 | 75 | 2.4 | 0.5 | 4 | • |
| A4G 0300 050 0600 R020 | 3 | 3 | - | 50 | - | 0.2 | 6 | • |
| A4G 0300 050 0600 080 R020 | | | 8 | 50 | 2.8 | 0.2 | 6 | • |
| A4G 0300 050 0600 100 R020 | | | 10 | 50 | 2.8 | 0.2 | 6 | • |
| A4G 0300 050 0600 120 R020 | | | 12 | 50 | 2.8 | 0.2 | 6 | • |
| A4G 0300 050 0600 140 R020 | | | 14 | 50 | 2.8 | 0.2 | 6 | • |
| A4G 0300 060 0600 R020 | | | - | 60 | - | 0.2 | 6 | • |
| A4G 0300 060 0600 160 R020 | | | 16 | 60 | 2.8 | 0.2 | 6 | • |
| A4G 0300 060 0600 180 R020 | | | 18 | 60 | 2.8 | 0.2 | 6 | • |
| A4G 0300 060 0600 200 R020 | | | 20 | 60 | 2.8 | 0.2 | 6 | • |
| A4G 0300 075 0600 R020 | | | - | 75 | - | 0.2 | 6 | • |
| A4G 0300 075 0600 250 R020 | | | 25 | 75 | 2.8 | 0.2 | 6 | • |
| A4G 0300 050 0600 R030 | | | - | 50 | - | 0.3 | 6 | • |
| A4G 0300 050 0600 080 R030 | | | 8 | 50 | 2.8 | 0.3 | 6 | • |
| A4G 0300 050 0600 100 R030 | | | 10 | 50 | 2.8 | 0.3 | 6 | • |
| A4G 0300 050 0600 120 R030 | | | 12 | 50 | 2.8 | 0.3 | 6 | • |
| A4G 0300 050 0600 140 R030 | | | 14 | 50 | 2.8 | 0.3 | 6 | • |
| A4G 0300 060 0600 R030 | | | - | 60 | - | 0.3 | 6 | • |
| A4G 0300 060 0600 160 R030 | | | 16 | 60 | 2.8 | 0.3 | 6 | • |
| A4G 0300 060 0600 180 R030 | | | 18 | 60 | 2.8 | 0.3 | 6 | • |
| A4G 0300 060 0600 200 R030 | | | 20 | 60 | 2.8 | 0.3 | 6 | • |
| A4G 0300 075 0600 R030 | | | - | 75 | - | 0.3 | 6 | • |
| A4G 0300 075 0600 300 R030 | | | 30 | 75 | 2.8 | 0.3 | 6 | • |
| A4G 0300 050 0600 R050 | | | - | 50 | - | 0.5 | 6 | • |
| A4G 0300 050 0600 080 R050 | | | 8 | 50 | 2.8 | 0.5 | 6 | • |
| A4G 0300 050 0600 100 R050 | | | 10 | 50 | 2.8 | 0.5 | 6 | • |
| A4G 0300 050 0600 120 R050 | | | 12 | 50 | 2.8 | 0.5 | 6 | • |
| A4G 0300 050 0600 140 R050 | | | 14 | 50 | 2.8 | 0.5 | 6 | • |
| A4G 0300 060 0600 R050 | | | - | 60 | - | 0.5 | 6 | • |
| A4G 0300 060 0600 160 R050 | | | 16 | 60 | 2.8 | 0.5 | 6 | • |
| A4G 0300 060 0600 180 R050 | | | 18 | 60 | 2.8 | 0.5 | 6 | • |
| A4G 0300 060 0600 200 R050 | | | 20 | 60 | 2.8 | 0.5 | 6 | • |
| A4G 0300 075 0600 R050 | | | - | 75 | - | 0.5 | 6 | • |
| A4G 0300 075 0600 300 R050 | | | 30 | 75 | 2.8 | 0.5 | 6 | • |

| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d1 (mm) | R | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|---|
| A4G 0400 060 0600 R030 | 4 | 4 | - | 60 | - | 0.3 | 6 | • |
| A4G 0400 060 0600 100 R030 | | | 10 | 60 | 3.7 | 0.3 | 6 | • |
| A4G 0400 060 0600 150 R030 | | | 15 | 60 | 3.7 | 0.3 | 6 | • |
| A4G 0400 060 0600 200 R030 | | | 20 | 60 | 3.7 | 0.3 | 6 | • |
| A4G 0400 075 0600 R030 | | | - | 75 | - | 0.3 | 6 | • |
| A4G 0400 075 0600 250 R030 | | | 25 | 75 | 3.7 | 0.3 | 6 | • |
| A4G 0400 075 0600 320 R030 | | | 32 | 75 | 3.7 | 0.3 | 6 | • |
| A4G 0400 075 0600 400 R030 | | | 40 | 75 | 3.7 | 0.3 | 6 | • |
| A4G 0400 060 0600 R050 | | | - | 60 | - | 0.5 | 6 | • |
| A4G 0400 060 0600 100 R050 | | | 10 | 60 | 3.7 | 0.5 | 6 | • |
| A4G 0400 060 0600 150 R050 | | | 15 | 60 | 3.7 | 0.5 | 6 | • |
| A4G 0400 060 0600 200 R050 | | | 20 | 60 | 3.7 | 0.5 | 6 | • |
| A4G 0400 075 0600 R050 | | | - | 75 | - | 0.5 | 6 | • |
| A4G 0400 075 0600 250 R050 | | | 25 | 75 | 3.7 | 0.5 | 6 | • |
| A4G 0400 075 0600 320 R050 | | | 32 | 75 | 3.7 | 0.5 | 6 | • |
| A4G 0400 075 0600 400 R050 | | | 40 | 75 | 3.7 | 0.5 | 6 | • |

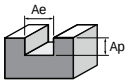
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | • | • | | | | | | • | • | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

H

## SE 60X Fin-Mill Torus Endmills with Miniature Long Neck, 4 Flutes - A4G



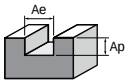

| Slotting | | H | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Working Material | | Hardened Steel | | | | Hardened Steel | | | |
| Properties | | 45 ≤ HRC < 52 | | | | 52 ≤ HRC < 68 | | | |
| D | Effective Length | Ap | Ae | N | Fz | Ap | Ae | N | Fz |
| 1.0 | - | 0.04 | 0.5 | 25300 | 0.043 | 0.03 | 0.5 | 18000 | 0.056 |
| | 4 | 0.04 | 0.5 | 25300 | 0.036 | 0.03 | 0.5 | 18000 | 0.044 |
| | 6 | 0.02 | 0.5 | 19800 | 0.035 | 0.01 | 0.5 | 14000 | 0.045 |
| | 8 | 0.02 | 0.5 | 17600 | 0.034 | 0.01 | 0.5 | 12000 | 0.044 |
| | 10 | 0.01 | 0.5 | 15400 | 0.032 | 0.007 | 0.5 | 10000 | 0.040 |
| 1.2 | - | 0.03 | 0.6 | 19800 | 0.045 | 0.02 | 0.6 | 14000 | 0.054 |
| | 6 | 0.03 | 0.6 | 19800 | 0.035 | 0.02 | 0.6 | 14000 | 0.043 |
| | 8 | 0.02 | 0.6 | 17600 | 0.034 | 0.01 | 0.6 | 12000 | 0.042 |
| | 10 | 0.02 | 0.6 | 13200 | 0.038 | 0.01 | 0.6 | 10000 | 0.043 |
| | 12 | 0.01 | 0.6 | 11000 | 0.045 | 0.007 | 0.6 | 9000 | 0.044 |
| 1.5 | - | 0.04 | 0.75 | 22000 | 0.048 | 0.03 | 0.75 | 18000 | 0.053 |
| | 6 | 0.04 | 0.75 | 22000 | 0.036 | 0.03 | 0.75 | 18000 | 0.039 |
| | 8 | 0.03 | 0.75 | 19800 | 0.033 | 0.03 | 0.75 | 14000 | 0.043 |
| | 10 | 0.03 | 0.75 | 17600 | 0.031 | 0.02 | 0.75 | 14000 | 0.036 |
| | 12 | 0.02 | 0.75 | 15400 | 0.032 | 0.02 | 0.75 | 12000 | 0.035 |
| | 14 | 0.02 | 0.75 | 13200 | 0.030 | 0.01 | 0.75 | 10000 | 0.038 |
| | 16 | 0.01 | 0.75 | 11000 | 0.033 | 0.007 | 0.75 | 9000 | 0.033 |
| 1.8 | - | 0.05 | 0.9 | 19800 | 0.053 | 0.04 | 0.9 | 15000 | 0.060 |
| | 6 | 0.05 | 0.9 | 19800 | 0.045 | 0.04 | 0.9 | 15000 | 0.050 |
| | 8 | 0.04 | 0.9 | 17600 | 0.045 | 0.03 | 0.9 | 12000 | 0.050 |
| | 10 | 0.04 | 0.9 | 15400 | 0.045 | 0.03 | 0.9 | 12000 | 0.042 |
| | 12 | 0.03 | 0.9 | 13200 | 0.045 | 0.02 | 0.9 | 10000 | 0.050 |
| | 14 | 0.03 | 0.9 | 13200 | 0.045 | 0.02 | 0.9 | 10000 | 0.043 |
| | 16 | 0.02 | 0.9 | 11000 | 0.045 | 0.01 | 0.9 | 9200 | 0.043 |
| | 18 | 0.02 | 0.9 | 10120 | 0.041 | 0.01 | 0.9 | 8500 | 0.044 |
| 2.0 | - | 0.06 | 1 | 19800 | 0.056 | 0.05 | 1 | 15000 | 0.060 |
| | 6 | 0.06 | 1 | 19800 | 0.045 | 0.05 | 1 | 15000 | 0.050 |
| | 8 | 0.05 | 1 | 17600 | 0.045 | 0.04 | 1 | 12000 | 0.054 |
| | 10 | 0.05 | 1 | 15400 | 0.045 | 0.04 | 1 | 12000 | 0.050 |
| | 12 | 0.04 | 1 | 13200 | 0.049 | 0.03 | 1 | 10000 | 0.055 |
| | 14 | 0.03 | 1 | 13200 | 0.045 | 0.02 | 1 | 10000 | 0.048 |
| | 16 | 0.03 | 1 | 11000 | 0.045 | 0.02 | 1 | 9200 | 0.046 |
| | 18 | 0.02 | 1 | 10120 | 0.041 | 0.01 | 1 | 8500 | 0.044 |
| | 20 | 0.02 | 1 | 10120 | 0.038 | 0.01 | 1 | 8500 | 0.040 |

cont'd ▸

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

H

## SE 60X Fin-Mill Torus Endmills with Miniature Long Neck, 4 Flutes - A4G




| Slotting | | H | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Working Material | | Hardened Steel | | | | Hardened Steel | | | |
| Properties | | 45 ≤ HRC < 52 | | | | 52 ≤ HRC < 68 | | | |
| D | Effective Length | Ap | Ae | N | Fz | Ap | Ae | N | Fz |
| 2.5 | - | 0.07 | 1.25 | 15400 | 0.065 | 0.05 | 1.25 | 10000 | 0.088 |
| | 8 | 0.07 | 1.25 | 15400 | 0.052 | 0.05 | 1.25 | 10000 | 0.070 |
| | 12 | 0.06 | 1.25 | 13200 | 0.053 | 0.04 | 1.25 | 9600 | 0.063 |
| | 16 | 0.05 | 1.25 | 11000 | 0.055 | 0.02 | 1.25 | 8500 | 0.059 |
| | 20 | 0.05 | 1.25 | 9020 | 0.055 | 0.02 | 1.25 | 7500 | 0.067 |
| | 25 | 0.03 | 1.25 | 7700 | 0.052 | 0.01 | 1.25 | 6500 | 0.052 |
| 3.0 | - | 0.1 | 1.5 | 15400 | 0.065 | 0.07 | 1.5 | 10000 | 0.090 |
| | 8 | 0.1 | 1.5 | 15400 | 0.058 | 0.07 | 1.5 | 10000 | 0.080 |
| | 12 | 0.08 | 1.5 | 13200 | 0.061 | 0.06 | 1.5 | 9200 | 0.076 |
| | 16 | 0.07 | 1.5 | 11000 | 0.068 | 0.05 | 1.5 | 8500 | 0.076 |
| | 20 | 0.07 | 1.5 | 9900 | 0.071 | 0.04 | 1.5 | 7800 | 0.077 |
| | 25 | 0.06 | 1.5 | 9020 | 0.072 | 0.03 | 1.5 | 7000 | 0.079 |
| | 30 | 0.03 | 1.5 | 7700 | 0.078 | 0.02 | 1.5 | 6500 | 0.077 |
| 4.0 | - | 0.15 | 2 | 10450 | 0.110 | 0.08 | 2 | 8000 | 0.131 |
| | 12 | 0.15 | 2 | 10450 | 0.096 | 0.08 | 2 | 8000 | 0.100 |
| | 16 | 0.1 | 2 | 8800 | 0.085 | 0.06 | 2 | 7000 | 0.100 |
| | 25 | 0.07 | 2 | 6600 | 0.106 | 0.04 | 2 | 5200 | 0.115 |
| | 30 | 0.05 | 2 | 5280 | 0.095 | 0.03 | 2 | 4200 | 0.101 |
| | 35 | 0.04 | 2 | 4620 | 0.095 | 0.02 | 2 | 3800 | 0.095 |
| | 40 | 0.03 | 2 | 3960 | 0.091 | 0.01 | 2 | 3000 | 0.100 |
| 5.0 | - | 0.12 | 2.5 | 7700 | 0.149 | 0.08 | 2.5 | 5500 | 0.182 |
| | 16 | 0.12 | 2.5 | 7700 | 0.117 | 0.08 | 2.5 | 5500 | 0.145 |
| | 25 | 0.07 | 2.5 | 6380 | 0.110 | 0.05 | 2.5 | 4200 | 0.143 |
| | 35 | 0.05 | 2.5 | 4620 | 0.097 | 0.03 | 2.5 | 3500 | 0.114 |
| | 50 | 0.03 | 2.5 | 3080 | 0.101 | 0.02 | 2.5 | 2500 | 0.100 |
| 6.0 | - | 0.18 | 3 | 7150 | 0.147 | 0.08 | 3 | 4500 | 0.211 |
| | 20 | 0.18 | 3 | 7150 | 0.112 | 0.08 | 3 | 4500 | 0.156 |
| | 30 | 0.12 | 3 | 4950 | 0.121 | 0.06 | 3 | 3500 | 0.143 |
| | 40 | 0.08 | 3 | 3300 | 0.152 | 0.03 | 3 | 2500 | 0.160 |
| | 50 | 0.05 | 3 | 2750 | 0.127 | 0.02 | 3 | 2000 | 0.125 |

FEATURES & BENEFITS

# BN 60X

## 1 Radius Tolerance

BN60X Radius Tolerance

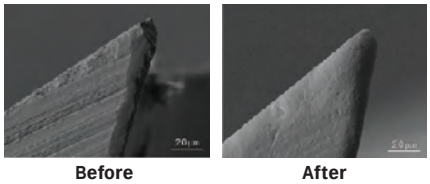
| Diameter | Radius Tolerance |
|---|---|
| Ø ≤ 6 | +0.000<br>-0.012 |
| Ø > 6 | +0.000<br>-0.020 |

## 2 Enhanced Geometry Design

-Higher stability to reduce vibration and chattering
-Shaper radius rake angle to reduce spindle load
-Increases tool life and productivity performance

## 3 Unique Cutting Edge Treatment

-Reduces tool chipping.
-Prolongs tool life.



Before | After

## 4 Suitable to machine material from 40 to 60 HRC for

-Profilling application.
-Semi finishing application.
-Finishing application.

## 5 Suitable for Materials

P H

End face view -
Different grinding method

BN60X Ballnose | HPMT Standard Ballnose

## CARATTERISTICHE TECNICHE

1. Tolerancia de radio
   Tolerancia de radio BN60X
2. Diseño geométrico mejorado
   Mejora la aplicación del acabado.
   Mejora la estabilidad y rigidez de la herramienta.
3. Perfil tecnológicamente avanzado
   Reduce el astillado de la herramienta.
   Prolonga la vida útil de la herramienta.
4. Adecuado para el mecanizado de materiales de 40 a 60 HRC.
   Aplicación de perfilado.
   Aplicación de semiacabado.
   Aplicación de acabado.
5. Adecuado para materiales P, H

## MERKMALE UND VORTEILE

1. Radiustoleranz
   BN60X Radiustoleranz
2. VWerbesserte Geometrie
   Höhere Stabilität zur Reduzierung von Vibrationen
   Schärferer Spanwinkel zur Reduzierung der Spindelbelastung
   Erhöht die Werkzeugstandzeit und Produktivität
3. Einzigartige Behandlung der Schneidkanten
   Reduziert das Absplittern des Werkzeugs
   Verlängert die Werkzeuglebensdauer
4. Geeignet Für Materialhärte von 40 bis 60 HRC an:
   Profilfräsanwendung
   Vorschlichtfräsanwendung
   Schlichtfräsanwendung
5. Geeignet für die Materialigruppen P, H

## CARACTÉRISTIQUES ET AVANTAGES

1. Tolerance du Rayon
   BN60X Radius Toleranc e
2. Conception de géométrie améliorée
   Stabilité plus élevée pour réduire les vibrations
   et les vibrations
   Angle de coupe du rayon du shaper pour réduire la charge
   de la broche
   Augmente la durée de vie de l'outil et les performances
   de productivité
3. Preparation Unique de L'arete de Coupe
   Réduit l'écaillage des outils
   Prolonge la durée de vie de l'outil
4. Convient pour L'usinage des Matieres de 40 À 60 HRC
   Application de copiage
   Application de semi finition
   Application de finition
5. Adapté aux matériaux P, H

# A4Q

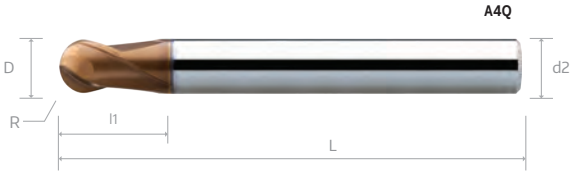
40 - 60 HRC HPMT

## BN 60X Ballnose Cutters, 2 Flutes

Fresas de punta esférica BN 60X, 2 filos

BN 60X Radiusschaftfräser, 2 Zähne

BN 60X, à bout hémisphérique, 2 dents



| Order Number | D (mm) | R | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| A4Q 0050 | 0.5 | 0.25 | 0.5 | | 50 | 4 | • |
| A4Q 0060 | 0.6 | 0.3 | 0.6 | | 50 | 4 | • |
| A4Q 0080 | 0.8 | 0.4 | 0.8 | | 50 | 4 | • |
| A4Q 0100 | 1 | 0.5 | 1 | | 50 | 4 | • |
| A4Q 0150 | 1.5 | 0.75 | 1.5 | | 50 | 4 | • |
| A4Q 0200 | 2 | 1 | 2 | | 50 | 4 | • |
| A4Q 0250 | 2.5 | 1.25 | 2.5 | | 50 | 4 | • |
| A4Q 0300 050 04 | 3 | 1.5 | 3 | | 50 | 4 | • |
| A4Q 0300 050 06 | | | | | 50 | 6 | • |
| A4Q 0400 050 06 | 4 | 2 | 4 | | 50 | 6 | • |
| A4Q 0500 050 06 | 5 | 2.5 | 5 | | 50 | 6 | • |
| A4Q 0600 050 | 6 | 3 | 6 | | 50 | 6 | • |
| A4Q 0600 060 | | | | | 60 | 6 | • |
| A4Q 0800 | 8 | 4 | 8 | | 64 | 8 | • |
| A4Q 1000 | 10 | 5 | 10 | | 70 | 10 | • |
| A4Q 1200 | 12 | 6 | 12 | | 75 | 12 | • |
| A4Q 1600 | 16 | 8 | 16 | | 90 | 16 | • |
| A4Q 1800 | 18 | 9 | 18 | | 100 | 18 | • |
| A4Q 2000 | 20 | 10 | 20 | | 100 | 20 | • |

| Diameter (mm) | Radius Tolerance |
|---|---|
| R ≤ 2.5 | ±0.005 |
| 2.5 ≤ R ≤ 6 | ±0.010 |
| 6 < R | ±0.015 |

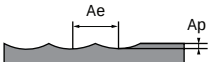
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ○ | ● | | | | | | ● | ● | | |

# Recommended Cutting Data

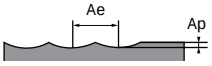
Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition


## BN 60X Ballnose Cutters, 2 Flutes - A4Q




| Roughing | P | | H | | | |
|---|---|---|---|---|---|---|
| **Working Material** | Prehardened Steel | | Hardened Steel | | Hardened Steel | |
| **Properties** | - | | 45 ≤ HRC < 52 | | 52 ≤ HRC < 68 | |
| **Cutting depth, ap** | 0.06 × D | | 0.05 × D | | 0.03 × D | |
| **Cutting Width, ae** | 0.30 × D | | 0.25 × D | | 0.15 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | 250 | 0.020 | 220 | 0.016 | 180 | 0.012 |
| 2 | | 0.027 | | 0.024 | | 0.022 |
| 3 | | 0.041 | | 0.037 | | 0.035 |
| 4 | | 0.056 | | 0.051 | | 0.049 |
| 5 | | 0.072 | | 0.065 | | 0.063 |
| 6 | | 0.087 | | 0.081 | | 0.079 |
| 8 | | 0.118 | | 0.109 | | 0.107 |
| 10 | | 0.153 | | 0.145 | | 0.140 |
| 12 | | 0.190 | | 0.180 | | 0.178 |
| 16 | | 0.244 | | 0.233 | | 0.225 |
| 18 | | 0.262 | | 0.257 | | 0.248 |
| 20 | | 0.278 | | 0.275 | | 0.270 |

## BN 60X Ballnose Cutters, 2 Flutes - A4Q




| Finishing | P | | H | | | |
|---|---|---|---|---|---|---|
| **Working Material** | Prehardened Steel | | Hardened Steel | | Hardened Steel | |
| **Properties** | - | | 45 ≤ HRC < 52 | | 52 ≤ HRC < 68 | |
| **Cutting depth, ap** | 0.05 × D | | 0.05 × D | | 0.04 × D | |
| **Cutting Width, ae** | 0.02 × D | | 0.02 × D | | 0.02 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | 260 | 0.017 | 230 | 0.014 | 190 | 0.011 |
| 2 | | 0.021 | | 0.020 | | 0.019 |
| 3 | | 0.033 | | 0.032 | | 0.030 |
| 4 | | 0.048 | | 0.044 | | 0.041 |
| 5 | | 0.062 | | 0.057 | | 0.053 |
| 6 | | 0.076 | | 0.070 | | 0.066 |
| 8 | | 0.105 | | 0.096 | | 0.091 |
| 10 | | 0.134 | | 0.123 | | 0.118 |
| 12 | | 0.167 | | 0.156 | | 0.149 |
| 16 | | 0.216 | | 0.199 | | 0.190 |
| 18 | | 0.235 | | 0.218 | | 0.210 |
| 20 | | 0.254 | | 0.232 | | 0.226 |

# A4S

40 - 60 HRC

HPMT

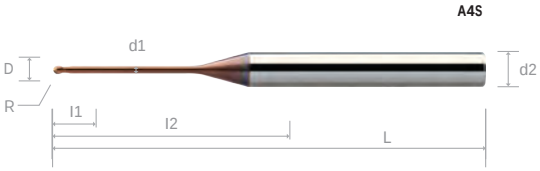
## BN 60X Miniature Ballnose Cutters with Long Neck, 2 Flutes

BN 60X Mini fresas esféricas con cuello largo, 2 canales

BN 60X Kleinstradiusfräser mit langem Hals, 2 Zähne

Micro-fraises BN 60X à bout hémisphérique avec cou long, 2 dents

DIN 6535 HA HB | UF+ | $\lambda$= 30° | HSC B0909 TiSiN





| Order Number | D (mm) | R | l 1 (mm) | l 2 (mm) | L (mm) | d1 (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|---|
| A4S 0020 050 0400 | 0.2 | 0.10 | 0.15 | - | 50 | - | 4 | • |
| A4S 0020 050 0400 005 | | | | 0.5 | 50 | 0.17 | 4 | • |
| A4S 0020 050 0400 010 | | | | 1 | 50 | 0.17 | 4 | • |
| A4S 0020 050 0400 015 | | | | 1.5 | 50 | 0.17 | 4 | • |
| A4S 0030 050 0400 | 0.3 | 0.15 | 0.23 | - | 50 | - | 4 | • |
| A4S 0030 050 0400 010 | | | | 1 | 50 | 0.27 | 4 | • |
| A4S 0030 050 0400 020 | | | | 2 | 50 | 0.27 | 4 | • |
| A4S 0030 050 0400 030 | | | | 3 | 50 | 0.27 | 4 | • |
| A4S 0040 050 0400 | 0.4 | 0.20 | 0.30 | - | 50 | - | 4 | • |
| A4S 0040 050 0400 010 | | | | 1 | 50 | 0.37 | 4 | • |
| A4S 0040 050 0400 020 | | | | 2 | 50 | 0.37 | 4 | • |
| A4S 0040 050 0400 030 | | | | 3 | 50 | 0.37 | 4 | • |
| A4S 0040 050 0400 040 | | | | 4 | 50 | 0.37 | 4 | • |
| A4S 0040 050 0400 050 | | | | 5 | 50 | 0.37 | 4 | • |
| A4S 0050 050 0400 | 0.5 | 0.25 | 0.35 | - | 50 | - | 4 | • |
| A4S 0050 050 0400 020 | | | | 2 | 50 | 0.45 | 4 | • |
| A4S 0050 050 0400 030 | | | | 3 | 50 | 0.45 | 4 | • |
| A4S 0050 050 0400 040 | | | | 4 | 50 | 0.45 | 4 | • |
| A4S 0050 050 0400 050 | | | | 5 | 50 | 0.45 | 4 | • |
| A4S 0050 050 0400 060 | | | | 6 | 50 | 0.45 | 4 | • |
| A4S 0050 050 0400 080 | | | | 8 | 50 | 0.45 | 4 | • |
| A4S 0060 050 0400 | 0.6 | 0.30 | 0.42 | - | 50 | - | 4 | • |
| A4S 0060 050 0400 020 | | | | 2 | 50 | 0.55 | 4 | • |
| A4S 0060 050 0400 030 | | | | 3 | 50 | 0.55 | 4 | • |
| A4S 0060 050 0400 040 | | | | 4 | 50 | 0.55 | 4 | • |
| A4S 0060 050 0400 050 | | | | 5 | 50 | 0.55 | 4 | • |
| A4S 0060 050 0400 060 | | | | 6 | 50 | 0.55 | 4 | • |
| A4S 0060 050 0400 080 | | | | 8 | 50 | 0.55 | 4 | • |
| A4S 0080 050 0400 | 0.8 | 0.40 | 0.48 | - | 50 | - | 4 | • |
| A4S 0080 050 0400 020 | | | | 2 | 50 | 0.75 | 4 | • |
| A4S 0080 050 0400 040 | | | | 4 | 50 | 0.75 | 4 | • |
| A4S 0080 050 0400 050 | | | | 5 | 50 | 0.75 | 4 | • |
| A4S 0080 050 0400 060 | | | | 6 | 50 | 0.75 | 4 | • |
| A4S 0080 050 0400 070 | | | | 7 | 50 | 0.75 | 4 | • |
| A4S 0080 050 0400 080 | | | | 8 | 50 | 0.75 | 4 | • |
| A4S 0080 050 0400 100 | | | | 10 | 50 | 0.75 | 4 | • |
| A4S 0100 050 0400 | 1.0 | 0.50 | 0.80 | - | 50 | - | 4 | • |
| A4S 0100 050 0400 030 | | | | 3 | 50 | 0.9 | 4 | • |
| A4S 0100 050 0400 040 | | | | 4 | 50 | 0.9 | 4 | • |
| A4S 0100 050 0400 050 | | | | 5 | 50 | 0.9 | 4 | • |
| A4S 0100 050 0400 060 | | | | 6 | 50 | 0.9 | 4 | • |
| A4S 0100 050 0400 070 | | | | 7 | 50 | 0.9 | 4 | • |
| A4S 0100 050 0400 080 | | | | 8 | 50 | 0.9 | 4 | • |
| A4S 0100 050 0400 090 | | | | 9 | 50 | 0.9 | 4 | • |
| A4S 0100 050 0400 100 | | | | 10 | 50 | 0.9 | 4 | • |
| A4S 0100 050 0400 120 | | | | 12 | 50 | 0.9 | 4 | • |
| A4S 0100 050 0400 140 | | | | 14 | 50 | 0.9 | 4 | • |
| A4S 0100 050 0400 160 | | | | 16 | 50 | 0.9 | 4 | • |
| A4S 0100 060 0400 | | | | - | 60 | - | 4 | • |
| A4S 0100 060 0400 200 | | | | 20 | 60 | 0.9 | 4 | • |
| A4S 0120 050 0400 | 1.2 | 0.60 | 1.08 | - | 50 | - | 4 | • |
| A4S 0120 050 0400 060 | | | | 6 | 50 | 1.1 | 4 | • |
| A4S 0120 050 0400 080 | | | | 8 | 50 | 1.1 | 4 | • |
| A4S 0120 050 0400 100 | | | | 10 | 50 | 1.1 | 4 | • |
| A4S 0120 050 0400 120 | | | | 12 | 50 | 1.1 | 4 | • |
| A4S 0140 050 0400 | 1.4 | 0.70 | 1.26 | - | 50 | - | 4 | • |
| A4S 0140 050 0400 080 | | | | 8 | 50 | 1.3 | 4 | • |
| A4S 0140 050 0400 120 | | | | 12 | 50 | 1.3 | 4 | • |
| A4S 0140 050 0400 160 | | | | 16 | 50 | 1.3 | 4 | • |

| Order Number | D (mm) | R | l 1 (mm) | l 2 (mm) | L (mm) | d1 (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|---|
| A4S 0150 050 0400 | 1.5 | 0.75 | 1.35 | - | 50 | - | 4 | • |
| A4S 0150 050 0400 080 | | | | 8 | 50 | 1.4 | 4 | • |
| A4S 0150 050 0400 120 | | | | 12 | 50 | 1.4 | 4 | • |
| A4S 0150 050 0400 160 | | | | 16 | 50 | 1.4 | 4 | • |
| A4S 0150 060 0400 | | | | - | 60 | - | 4 | • |
| A4S 0150 060 0400 180 | | | | 18 | 60 | 1.4 | 4 | • |
| A4S 0160 050 0400 | 1.6 | 0.80 | 1.44 | - | 50 | - | 4 | • |
| A4S 0160 050 0400 080 | | | | 8 | 50 | 1.5 | 4 | • |
| A4S 0160 050 0400 120 | | | | 12 | 50 | 1.5 | 4 | • |
| A4S 0160 050 0400 160 | | | | 16 | 50 | 1.5 | 4 | • |
| A4S 0160 060 0400 | | | | - | 60 | - | 4 | • |
| A4S 0160 060 0400 200 | | | | 20 | 60 | 1.5 | 4 | • |
| A4S 0180 050 0400 | 1.8 | 0.90 | 1.62 | - | 50 | - | 4 | • |
| A4S 0180 050 0400 080 | | | | 8 | 50 | 1.7 | 4 | • |
| A4S 0180 050 0400 120 | | | | 12 | 50 | 1.7 | 4 | • |
| A4S 0180 050 0400 160 | | | | 16 | 50 | 1.7 | 4 | • |
| A4S 0180 060 0400 | | | | - | 60 | - | 4 | • |
| A4S 0180 060 0400 200 | | | | 20 | 60 | 1.7 | 4 | • |
| A4S 0200 050 0400 | 2 | 1 | 1.70 | - | 50 | - | 4 | • |
| A4S 0200 050 0400 040 | | | | 4 | 50 | 1.9 | 4 | • |
| A4S 0200 050 0400 060 | | | | 6 | 50 | 1.9 | 4 | • |
| A4S 0200 050 0400 080 | | | | 8 | 50 | 1.9 | 4 | • |
| A4S 0200 050 0400 100 | | | | 10 | 50 | 1.9 | 4 | • |
| A4S 0200 050 0400 120 | | | | 12 | 50 | 1.9 | 4 | • |
| A4S 0200 050 0400 140 | | | | 14 | 50 | 1.9 | 4 | • |
| A4S 0200 050 0400 160 | | | | 16 | 50 | 1.9 | 4 | • |
| A4S 0200 060 0400 | | | | - | 60 | - | 4 | • |
| A4S 0200 060 0400 180 | | | | 18 | 60 | 1.9 | 4 | • |
| A4S 0200 060 0400 200 | | | | 20 | 60 | 1.9 | 4 | • |
| A4S 0200 060 0400 220 | | | | 22 | 60 | 1.9 | 4 | • |
| A4S 0200 075 0400 | | | | - | 75 | - | 4 | • |
| A4S 0200 075 0400 250 | | | | 25 | 75 | 1.9 | 4 | • |
| A4S 0200 075 0400 300 | | | | 30 | 75 | 1.9 | 4 | • |
| A4S 0300 050 0600 | 3.0 | 1.5 | 2.40 | - | 50 | - | 6 | • |
| A4S 0300 050 0600 080 | | | | 8 | 50 | 2.8 | 6 | • |
| A4S 0300 050 0600 100 | | | | 10 | 50 | 2.8 | 6 | • |
| A4S 0300 060 0600 | | | | - | 60 | - | 6 | • |
| A4S 0300 060 0600 160 | | | | 16 | 60 | 2.8 | 6 | • |
| A4S 0300 060 0600 200 | | | | 20 | 60 | 2.8 | 6 | • |
| A4S 0300 075 0600 | | | | - | 75 | - | 6 | • |
| A4S 0300 075 0600 250 | | | | 25 | 75 | 2.8 | 6 | • |
| A4S 0300 075 0600 300 | | | | 30 | 75 | 2.8 | 6 | • |
| A4S 0300 075 0600 350 | | | | 35 | 75 | 2.8 | 6 | • |
| A4S 0400 050 0600 | 4 | 2 | 3.00 | - | 50 | - | 6 | • |
| A4S 0400 050 0600 100 | | | | 10 | 50 | 3.7 | 6 | • |
| A4S 0400 060 0600 | | | | - | 60 | - | 6 | • |
| A4S 0400 060 0600 160 | | | | 16 | 60 | 3.7 | 6 | • |
| A4S 0400 060 0600 200 | | | | 20 | 60 | 3.7 | 6 | • |
| A4S 0400 075 0600 | | | | - | 75 | - | 6 | • |
| A4S 0400 075 0600 250 | | | | 25 | 75 | 3.7 | 6 | • |
| A4S 0400 075 0600 300 | | | | 30 | 75 | 3.7 | 6 | • |
| A4S 0400 075 0600 350 | | | | 35 | 75 | 3.7 | 6 | • |
| A4S 0400 100 0600 | | | | - | 100 | - | 6 | • |
| A4S 0400 100 0600 400 | | | | 40 | 100 | 3.7 | 6 | • |
| A4S 0400 100 0600 450 | | | | 45 | 100 | 3.7 | 6 | • |
| A4S 0400 100 0600 500 | | | | 50 | 100 | 3.7 | 6 | • |

| Diameter | Radius Tolerance |
|---|---|
| Ø ≤ 3 | +0.000 -0.012 |
| Ø > 3 | +0.000 -0.020 |

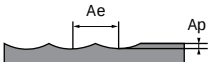
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ○ | ● | | | | | | ● | ● | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P H P

## BN 60X Miniature Ballnose Cutters with Long Neck, 2 Flutes - A4S



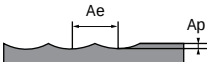

| Profiling | | P | | | H | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | | Prehardened Steel | | | Hardened Steel | | | Hardened Steel | | |
| Properties | | - | | | 45 ≤ HRC < 52 | | | 52 ≤ HRC < 68 | | |
| D | Effective Length | Ap | N | Fz | Ap | N | Fz | Ap | N | Fz |
| 0.2 | 0.5 | 0.016 | 50000 | 0.003 | 0.013 | 45500 | 0.003 | 0.012 | 42000 | 0.003 |
| | 1.0 | 0.011 | 50000 | 0.003 | 0.009 | 45500 | 0.003 | 0.008 | 42000 | 0.003 |
| | 1.5 | 0.006 | 45900 | 0.003 | 0.005 | 40500 | 0.003 | 0.005 | 37800 | 0.002 |
| 0.3 | 1.0 | 0.017 | 50000 | 0.005 | 0.014 | 45000 | 0.004 | 0.013 | 42000 | 0.004 |
| | 2.0 | 0.010 | 45900 | 0.004 | 0.008 | 40500 | 0.004 | 0.007 | 37800 | 0.004 |
| | 3.0 | 0.006 | 45900 | 0.004 | 0.005 | 40500 | 0.004 | 0.005 | 37800 | 0.004 |
| 0.4 | 1.0 | 0.032 | 50000 | 0.007 | 0.024 | 46800 | 0.007 | 0.024 | 43680 | 0.007 |
| | 2.0 | 0.022 | 50000 | 0.005 | 0.018 | 46800 | 0.005 | 0.017 | 43680 | 0.005 |
| | 3.0 | 0.013 | 36720 | 0.005 | 0.010 | 32400 | 0.005 | 0.010 | 36288 | 0.004 |
| | 4.0 | 0.008 | 36720 | 0.005 | 0.007 | 32400 | 0.005 | 0.006 | 36288 | 0.004 |
| | 5.0 | 0.006 | 32640 | 0.005 | 0.005 | 32400 | 0.005 | 0.005 | 26880 | 0.004 |
| 0.5 | 2.0 | 0.028 | 44200 | 0.016 | 0.023 | 39000 | 0.011 | 0.021 | 36400 | 0.009 |
| | 3.0 | 0.024 | 39780 | 0.008 | 0.020 | 35100 | 0.008 | 0.018 | 25200 | 0.008 |
| | 4.0 | 0.016 | 30600 | 0.008 | 0.013 | 32400 | 0.008 | 0.012 | 25200 | 0.008 |
| | 5.0 | 0.014 | 30600 | 0.008 | 0.012 | 32400 | 0.008 | 0.011 | 25200 | 0.008 |
| | 6.0 | 0.010 | 27200 | 0.008 | 0.008 | 24000 | 0.007 | 0.008 | 22400 | 0.007 |
| | 8.0 | 0.006 | 27200 | 0.008 | 0.005 | 24000 | 0.007 | 0.005 | 22400 | 0.007 |
| 0.6 | 2.0 | 0.050 | 50000 | 0.019 | 0.041 | 48000 | 0.018 | 0.038 | 44800 | 0.015 |
| | 3.0 | 0.033 | 50000 | 0.016 | 0.027 | 48000 | 0.014 | 0.025 | 44800 | 0.011 |
| | 4.0 | 0.021 | 48960 | 0.015 | 0.017 | 43200 | 0.013 | 0.016 | 40320 | 0.009 |
| | 5.0 | 0.016 | 39780 | 0.012 | 0.013 | 35100 | 0.011 | 0.012 | 32760 | 0.009 |
| | 6.0 | 0.012 | 39780 | 0.012 | 0.010 | 35100 | 0.011 | 0.009 | 32760 | 0.009 |
| | 8.0 | 0.012 | 27200 | 0.011 | 0.010 | 24000 | 0.010 | 0.009 | 22400 | 0.008 |
| 0.8 | 2.0 | 0.096 | 50000 | 0.024 | 0.078 | 48000 | 0.027 | 0.072 | 44800 | 0.021 |
| | 4.0 | 0.062 | 50000 | 0.024 | 0.051 | 48000 | 0.027 | 0.047 | 44800 | 0.021 |
| | 5.0 | 0.047 | 48960 | 0.022 | 0.038 | 43200 | 0.025 | 0.035 | 40320 | 0.019 |
| | 6.0 | 0.034 | 42840 | 0.020 | 0.027 | 37800 | 0.019 | 0.025 | 35280 | 0.018 |
| | 7.0 | 0.025 | 39100 | 0.017 | 0.020 | 34500 | 0.016 | 0.019 | 32200 | 0.016 |
| | 8.0 | 0.016 | 35360 | 0.015 | 0.013 | 31200 | 0.014 | 0.012 | 29120 | 0.013 |
| | 10.0 | 0.016 | 27200 | 0.013 | 0.013 | 24000 | 0.013 | 0.012 | 22400 | 0.012 |
| 1.0 | 3.0 | 0.160 | 45900 | 0.033 | 0.130 | 43200 | 0.032 | 0.120 | 37800 | 0.030 |
| | 4.0 | 0.112 | 45900 | 0.033 | 0.091 | 43200 | 0.032 | 0.084 | 37800 | 0.030 |
| | 5.0 | 0.072 | 39780 | 0.032 | 0.059 | 43200 | 0.029 | 0.054 | 32760 | 0.028 |
| | 6.0 | 0.048 | 38556 | 0.030 | 0.039 | 38880 | 0.029 | 0.036 | 29484 | 0.023 |
| | 7.0 | 0.048 | 33048 | 0.020 | 0.039 | 31590 | 0.021 | 0.036 | 27216 | 0.020 |
| | 8.0 | 0.048 | 33048 | 0.020 | 0.039 | 31590 | 0.021 | 0.036 | 27216 | 0.018 |
| | 9.0 | 0.036 | 33048 | 0.020 | 0.029 | 31590 | 0.021 | 0.027 | 27216 | 0.018 |
| | 10.0 | 0.030 | 33048 | 0.020 | 0.025 | 31590 | 0.021 | 0.023 | 27216 | 0.018 |
| | 12.0 | 0.020 | 24480 | 0.019 | 0.016 | 21600 | 0.018 | 0.015 | 20160 | 0.017 |
| | 14.0 | 0.016 | 24480 | 0.019 | 0.013 | 21600 | 0.018 | 0.012 | 20160 | 0.017 |
| | 16.0 | 0.012 | 24480 | 0.019 | 0.010 | 21600 | 0.018 | 0.009 | 20160 | 0.017 |
| | 20.0 | 0.008 | 18360 | 0.018 | 0.007 | 16200 | 0.016 | 0.006 | 15120 | 0.016 |
| 1.2 | 6.0 | 0.088 | 31824 | 0.032 | 0.072 | 30240 | 0.034 | 0.066 | 26208 | 0.020 |
| | 8.0 | 0.048 | 31824 | 0.032 | 0.039 | 30240 | 0.034 | 0.036 | 26208 | 0.020 |
| | 10.0 | 0.042 | 29376 | 0.022 | 0.034 | 27000 | 0.020 | 0.032 | 24192 | 0.018 |
| | 12.0 | 0.036 | 29376 | 0.022 | 0.029 | 25920 | 0.020 | 0.027 | 24192 | 0.018 |
| 1.4 | 8.0 | 0.088 | 27846 | 0.032 | 0.072 | 24570 | 0.031 | 0.066 | 22932 | 0.030 |
| | 12.0 | 0.042 | 25704 | 0.024 | 0.034 | 22680 | 0.023 | 0.032 | 21168 | 0.022 |
| | 16.0 | 0.028 | 19040 | 0.023 | 0.023 | 16800 | 0.022 | 0.021 | 15680 | 0.021 |
| 1.5 | 8.0 | 0.072 | 27846 | 0.033 | 0.059 | 24570 | 0.029 | 0.054 | 22932 | 0.027 |
| | 12.0 | 0.072 | 25704 | 0.027 | 0.059 | 22680 | 0.025 | 0.054 | 21168 | 0.027 |
| | 16.0 | 0.030 | 19040 | 0.025 | 0.025 | 16800 | 0.023 | 0.023 | 15680 | 0.021 |
| | 18.0 | 0.030 | 19040 | 0.025 | 0.025 | 16800 | 0.023 | 0.023 | 15680 | 0.021 |

cont'd ▸

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P H P

## BN 60X Miniature Ballnose Cutters with Long Neck, 2 Flutes - A4S




| Profiling | | P | | | H | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | | Prehardened Steel | | | Hardened Steel | | | Hardened Steel | | |
| Properties | | - | | | 45 ≤ HRC < 52 | | | 52 ≤ HRC < 68 | | |
| D | Effective Length | Ap | N | Fz | Ap | N | Fz | Ap | N | Fz |
| 1.6 | 8.0 | 0.176 | 30940 | 0.040 | 0.143 | 27300 | 0.039 | 0.132 | 23660 | 0.034 |
| | 12.0 | 0.078 | 27846 | 0.039 | 0.064 | 24570 | 0.038 | 0.059 | 21294 | 0.030 |
| | 16.0 | 0.048 | 23868 | 0.028 | 0.039 | 21060 | 0.027 | 0.036 | 19656 | 0.025 |
| | 20.0 | 0.032 | 17680 | 0.026 | 0.026 | 15600 | 0.025 | 0.024 | 14560 | 0.024 |
| 1.8 | 8.0 | 0.208 | 28730 | 0.042 | 0.169 | 25350 | 0.040 | 0.156 | 23660 | 0.036 |
| | 12.0 | 0.084 | 23868 | 0.032 | 0.068 | 21060 | 0.030 | 0.063 | 19656 | 0.027 |
| | 16.0 | 0.054 | 23868 | 0.032 | 0.044 | 21060 | 0.030 | 0.041 | 19656 | 0.027 |
| | 20.0 | 0.036 | 17680 | 0.029 | 0.029 | 15600 | 0.025 | 0.027 | 14560 | 0.025 |
| 2.0 | 4.0 | 0.320 | 26775 | 0.067 | 0.260 | 23625 | 0.064 | 0.240 | 22050 | 0.060 |
| | 6.0 | 0.320 | 26775 | 0.060 | 0.260 | 23625 | 0.057 | 0.240 | 22050 | 0.054 |
| | 8.0 | 0.224 | 26775 | 0.060 | 0.182 | 23625 | 0.057 | 0.168 | 22050 | 0.054 |
| | 10.0 | 0.168 | 24990 | 0.054 | 0.137 | 22050 | 0.051 | 0.126 | 19110 | 0.039 |
| | 12.0 | 0.096 | 22491 | 0.054 | 0.078 | 19845 | 0.051 | 0.072 | 17199 | 0.038 |
| | 14.0 | 0.096 | 22491 | 0.047 | 0.078 | 18428 | 0.044 | 0.072 | 15876 | 0.032 |
| | 16.0 | 0.096 | 20885 | 0.032 | 0.078 | 18428 | 0.040 | 0.072 | 15876 | 0.029 |
| | 18.0 | 0.072 | 19278 | 0.032 | 0.059 | 18428 | 0.037 | 0.054 | 15876 | 0.029 |
| | 20.0 | 0.060 | 19278 | 0.032 | 0.049 | 18428 | 0.030 | 0.045 | 15876 | 0.029 |
| | 22.0 | 0.040 | 15173 | 0.030 | 0.033 | 13388 | 0.028 | 0.030 | 14994 | 0.027 |
| | 25.0 | 0.040 | 14280 | 0.030 | 0.033 | 12600 | 0.028 | 0.030 | 14112 | 0.026 |
| | 30.0 | 0.024 | 14280 | 0.030 | 0.020 | 12600 | 0.028 | 0.018 | 14112 | 0.026 |
| 3.0 | 8.0 | 0.480 | 20400 | 0.100 | 0.390 | 18000 | 0.085 | 0.360 | 16800 | 0.090 |
| | 10.0 | 0.336 | 20400 | 0.100 | 0.273 | 18000 | 0.085 | 0.252 | 16800 | 0.090 |
| | 16.0 | 0.252 | 19040 | 0.080 | 0.205 | 16800 | 0.068 | 0.189 | 14560 | 0.065 |
| | 20.0 | 0.144 | 15912 | 0.060 | 0.117 | 14040 | 0.056 | 0.108 | 12096 | 0.054 |
| | 25.0 | 0.096 | 15912 | 0.060 | 0.078 | 14040 | 0.056 | 0.072 | 12096 | 0.054 |
| | 30.0 | 0.096 | 14668 | 0.060 | 0.078 | 12960 | 0.055 | 0.072 | 12096 | 0.054 |
| | 35.0 | 0.064 | 10880 | 0.057 | 0.052 | 9600 | 0.053 | 0.048 | 10752 | 0.050 |
| 4.0 | 10.0 | 0.480 | 14663 | 0.134 | 0.390 | 12938 | 0.125 | 0.360 | 12075 | 0.119 |
| | 16.0 | 0.336 | 14663 | 0.134 | 0.273 | 12938 | 0.125 | 0.252 | 12075 | 0.119 |
| | 20.0 | 0.336 | 12708 | 0.108 | 0.273 | 11213 | 0.101 | 0.252 | 10465 | 0.100 |
| | 25.0 | 0.192 | 11437 | 0.098 | 0.156 | 10092 | 0.101 | 0.144 | 9419 | 0.086 |
| | 30.0 | 0.128 | 10558 | 0.081 | 0.104 | 9316 | 0.077 | 0.096 | 8694 | 0.072 |
| | 35.0 | 0.080 | 10558 | 0.081 | 0.065 | 9316 | 0.077 | 0.060 | 8694 | 0.072 |
| | 40.0 | 0.080 | 10558 | 0.081 | 0.065 | 9316 | 0.077 | 0.060 | 8694 | 0.072 |
| | 45.0 | 0.080 | 7820 | 0.076 | 0.065 | 6900 | 0.070 | 0.060 | 6440 | 0.067 |
| | 50.0 | 0.080 | 7820 | 0.076 | 0.065 | 6900 | 0.070 | 0.060 | 6440 | 0.067 |

# A52

53 - 68 HRC

HPMT

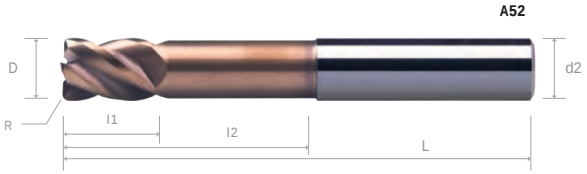
## SE 60R Long Reach Torus Endmills, Short Flutes - Long with Recess, 4 Flutes

SE 60R Fresas de mango toroidales de largo alcance, canales cortos - largas con rebaje, 4 canales

SE 60R Long Reach Fräser, lang, mit kurzen Nuten, 4 Zähne

SE 60R Long Reach toriques longues, dents courtes, 4 dents

DIN 6535 HA HB | UF | R±0.010 | λ= 40° | HSC B0909 TiSiN





| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R | Availability |
|---|---|---|---|---|---|---|---|
| A52 0200 075 0600 020 * | 2 | 4 | 30 | 75 | 6 | 0.2 | • |
| A52 0200 075 0600 030 * | | | 30 | 75 | 6 | 0.3 | • |
| A52 0300 075 0600 020 | 3 | 5 | 30 | 75 | 6 | 0.2 | • |
| A52 0300 075 0600 030 | | | 30 | 75 | 6 | 0.3 | • |
| A52 0300 075 0600 050 | | | 30 | 75 | 6 | 0.5 | • |
| A52 0400 075 0600 020 | 4 | 8 | 32 | 75 | 6 | 0.2 | • |
| A52 0400 075 0600 030 | | | 32 | 75 | 6 | 0.3 | • |
| A52 0400 075 0600 050 | | | 32 | 75 | 6 | 0.5 | • |
| A52 0500 075 0600 020 | 5 | 9 | 32 | 75 | 6 | 0.2 | • |
| A52 0500 075 0600 030 | | | 32 | 75 | 6 | 0.3 | • |
| A52 0500 075 0600 050 | | | 32 | 75 | 6 | 0.5 | • |
| A52 0600 075 0600 020 | 6 | 10 | 40 | 75 | 6 | 0.2 | • |
| A52 0600 075 0600 030 | | | 40 | 75 | 6 | 0.3 | • |
| A52 0600 075 0600 050 | | | 40 | 75 | 6 | 0.5 | • |
| A52 0600 075 0600 100 | | | 40 | 75 | 6 | 1 | • |
| A52 0800 075 0800 020 | 8 | 12 | 40 | 75 | 8 | 0.2 | • |
| A52 0800 075 0800 030 | | | 40 | 75 | 8 | 0.3 | • |
| A52 0800 075 0800 050 | | | 40 | 75 | 8 | 0.5 | • |
| A52 0800 075 0800 100 | | | 40 | 75 | 8 | 1 | • |
| A52 1000 075 1000 020 | 10 | 14 | 40 | 75 | 10 | 0.2 | • |
| A52 1000 075 1000 030 | | | 40 | 75 | 10 | 0.3 | • |
| A52 1000 075 1000 050 | | | 40 | 75 | 10 | 0.5 | • |
| A52 1000 075 1000 100 | | | 40 | 75 | 10 | 1 | • |
| A52 1000 075 1000 200 | | | 40 | 75 | 10 | 2 | • |
| A52 1000 100 1000 020 * | | | 60 | 100 | 10 | 0.2 | • |
| A52 1000 100 1000 030 * | | | 60 | 100 | 10 | 0.3 | • |
| A52 1000 100 1000 050 * | | | 60 | 100 | 10 | 0.5 | • |
| A52 1000 100 1000 100 * | | | 60 | 100 | 10 | 1 | • |
| A52 1000 100 1000 200 * | | | 60 | 100 | 10 | 2 | • |
| A52 1200 100 1200 020 | 12 | 16 | 60 | 100 | 12 | 0.2 | • |
| A52 1200 100 1200 030 | | | 60 | 100 | 12 | 0.3 | • |
| A52 1200 100 1200 050 | | | 60 | 100 | 12 | 0.5 | • |
| A52 1200 100 1200 100 | | | 60 | 100 | 12 | 1 | • |
| A52 1200 100 1200 200 | | | 60 | 100 | 12 | 2 | • |
| A52 1600 125 1600 030 | 16 | 22 | 85 | 125 | 16 | 0.3 | • |
| A52 1600 125 1600 050 | | | 85 | 125 | 16 | 0.5 | • |
| A52 1600 125 1600 100 | | | 85 | 125 | 16 | 1 | • |
| A52 1600 125 1600 200 | | | 85 | 125 | 16 | 2 | • |
| A52 1600 125 1600 300 | | | 85 | 125 | 16 | 3 | • |

* - DIN 6535

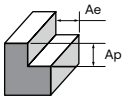
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | • | • | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

H

## SE 60R Long Reach Torus Endmills, Short Flutes - Long with Recess, 4 Flutes - A52




| Side Milling | H | | | |
|---|---|---|---|---|
| Working Material | Hardened steel | | Hardened steel | |
| Properties | 45 ≤ HRC < 52 | | 52 ≤ HRC < 68 | |
| Cutting depth, ap 0.25 | 0.25 × D | | 0.20 × D | |
| Cutting Width, ae | 0.35 × D | | 0.35 × D | |
| D | Vc | Fz | Vc | Fz |
| 2 | 90 | 0.009 | 60 | 0.006 |
| 3 | | 0.014 | | 0.010 |
| 4 | | 0.020 | | 0.013 |
| 5 | | 0.024 | | 0.017 |
| 6 | | 0.030 | | 0.020 |
| 8 | | 0.041 | | 0.028 |
| 10 | | 0.052 | | 0.035 |
| 12 | | 0.063 | | 0.044 |
| 14 | | 0.072 | | 0.050 |
| 16 | | 0.082 | | 0.057 |
| 18 | | 0.091 | | 0.061 |
| 20 | | 0.101 | | 0.068 |

FEATURES & BENEFITS

# DM70 (SE 70)

## 1 Multi-Flute (MF)

-Large number of cutting edges up to 7 flutes.
-Higher feed rate (up to 75% more compared to 4 flutes design).
-Greater core strength and minimized tool deflection.
-Higher quality of surface finishing.

## 2 Differential Helix (DH)


**Reduces the cutting force:**

- Allows high speed machining, increasing productivity.
- Improves surface finishing.

## 3 High Helix Angle

-Higher stability to reduce vibration and chattering.
-Shaper radius rake angle to reduce spindle load.
-Increases tool life and productivity performance.

## 4 S-Gash Radius Design

-Perfect joining between corner radius and outer diameter to achieve higher accuracy radius contour.
-More reliablity corner radius with lower risk of chipping.
-Better surface finishing quality.
-Stronger corner radius design to increase tool life.
-More quiet during machining and good to production machinist well-being.


## 5 Suitable for Material

M S H

## CARATTERISTICHE TECNICHE

1. Multi-cuchilla
   Hasta 7 filos de corte.
   Mayor velocidad de avance (hasta un 75 % más que 4 filos).
   Desviación mínima de la herramienta.
   Óptima calidad de acabado superficial.

2. Hélice Variable (DH)*
   Reduce la fuerza de corte
   Permite el mecanizado a alta velocidad, aumentando productividad
   Mejora el acabado superficial

3. Ángulo de hélice elevado
   Menor fuerza de corte radial para reducir la vibración.
   Mejor calidad de acabado superficial.
   Mayor eficacia en la evacuación de la viruta.

4. Diseño del perfil del filo de corte
   Ajuste ideal entre el perfil interior y el diámetro exterior.
   Menor riesgo de astillado.
   Mejor calidad de acabado superficial.
   Mayor duración de la herramienta.
   Mecanizado más suave.

5. Adecuado para material H

## MERKMALE UND VORTEILE

1. Mehrschneidig (MF)
   Große Anzahl von Schneidkanten mit bis zu 7 Schneiden
   Höhere Vorschubgeschwindigkeiten und Produktivität (75% mehr Vorschub im Vergleich zu 4 Schneiden)
   Höhere Kernfestigkeit und minimierte Werkzeugdurchbiegung
   Höhere Qualität der Oberflächenbearbeitung

2. Ungleiche Drallsteigung (DH)
   Minimierung von Vibrationen und Resonanzen während der Bearbeitung
   Erhöht die Werkzeugstandzeit und Produktivität
   Halten Sie die Oberfläche fest, um sich selbst zu zentrieren

3. Hoher Drallwinkel
   Geringere radiale Schnittkraft zur Reduzierung von Vibrationen während der Bearbeitung
   Bessere Scherung für eine höhere Qualität der Oberflächengüte.
   Höhere Effizienz bei der Spanabfuhr mit geringerem Eingriff in die Schneidkante

4. S-Gash-Radius Geometrie
   perfekte Übergänge zwischen Eckenradius und Außendurchmesser für eine höhere Genauigkeit der Radiuskontur
   zuverlässigerer Eckenradius mit geringerem Risiko von Ausbrüchen
   bessere Oberflächengüte bei der Bearbeitung von Bauteilen
   verstärkte Eckenradien zur Erhöhung der Werkzeugstandzeit
   ruhiger bei der Bearbeitung und gut für das Wohlbefinden des Produktionsmitarbeiters.

5. Geeignet für Materialgruppe H

## CARACTÉRISTIQUES ET AVANTAGES

1. Multi-Flûte (MF)
   Grand nombre d'arêtes de coupe jusqu'à 7 goujures
   Vitesses d'avance et productivité significativement plus élevées (Augmenter la vitesse d'avance de 75% par rapport à 4 goujures)
   Plus grande résistance du noyau et déviation de l'outil minimisée
   Meilleure qualité de finition de surface

2. Conception à hélice variable (DH)
   Réduit la force de coupe
   Permet l'usinage à grande vitesse, augmentant la productivité
   Améliore la finition de surface

3. Angle d'hélice élevé
   Force de coupe radiale inférieure pour réduire les vibrations pendant l'usinage
   Meilleur cisaillement pour une meilleure qualité de finition de surface
   Plus efficace dans l'évacuation des copeaux avec un engagement plus faible dans l'arête de coupe

4. Conception de rayon S-Gash
   Jointure parfaite entre le rayon d'angle et le diamètre extérieur pour obtenir un contour de rayon plus précis
   Rayon d'angle plus fiable avec moins de risque d'écaillage
   Meilleure qualité de finition de surface sur le composant d'usinage
   Conception de rayon de coin plus fort pour augmenter la durée de vie de l'outil
   Plus silencieux pendant l'usinage et bon pour le bien- être des machinistes de production

5. Adapté aux matériaux H

# K73

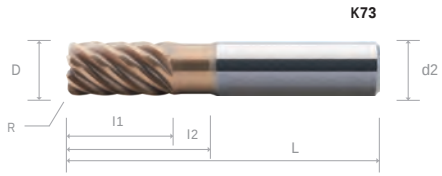
50 - 70 HRC HPMT

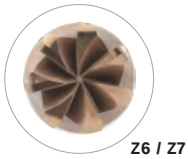
## SE 70 Torus DH Multiflute Endmills, 6/7 Flutes

SE 70 Torus DH Multiflute Endmills, 6/7 Flautas

SE 70 DH Mehrzahnfräser - 6/7 Zähne

Fraises Multidents SE 70 DH, 6/7 dents




| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R | Z | Availability |
|---|---|---|---|---|---|---|---|---|
| K73 0300 057 0600 020 | 3 | 8 | 20 | 57 | 6 | 0.2 | 6 | • |
| K73 0400 057 0600 020 | 4 | 11 | 20 | 57 | 6 | 0.2 | 6 | • |
| K73 0500 057 0600 030 | 5 | 12 | 20 | 57 | 6 | 0.3 | 6 | • |
| K73 0600 057 0600 050 | 6 | 15 | 20 | 57 | 6 | 0.5 | 7 | • |
| K73 0600 057 0600 100 | | | 20 | 57 | 6 | 1 | 7 | • |
| K73 0800 064 0800 050 | 8 | 20 | 26 | 64 | 8 | 0.5 | 7 | • |
| K73 0800 064 0800 080 | | | 26 | 64 | 8 | 0.8 | 7 | • |
| K73 1000 072 1000 050 | 10 | 22 | 30 | 72 | 10 | 0.5 | 7 | • |
| K73 1000 072 1000 080 | | | 30 | 72 | 10 | 0.8 | 7 | • |
| K73 1000 072 1000 100 | | | 30 | 72 | 10 | 1 | 7 | • |
| K73 1200 083 1200 050 | 12 | 25 | 36 | 83 | 12 | 0.5 | 7 | • |
| K73 1200 083 1200 100 | | | 36 | 83 | 12 | 1 | 7 | • |
| K73 1200 083 1200 150 | | | 36 | 83 | 12 | 1.5 | 7 | • |
| K73 1600 092 1600 200 | 16 | 30 | 42 | 92 | 16 | 2 | 7 | • |
| K73 1600 092 1600 300 | | | 42 | 92 | 16 | 3 | 7 | • |
| K73 2000 104 2000 300 | 20 | 38 | 52 | 104 | 20 | 3 | 7 | • |

| Diameter (mm) | Tolerance |
|---|---|
| D ≤ 2.5 | -0.015 ~ +0 |
| 2.5 ≤ D ≤ 5 | -0.020 ~ +0 |
| 6 ≤ D ≤ 10 | -0.025 ~ +0 |
| 10 < D ≤ 12 | -0.005 ~ -0.030 |
| D > 12 | -0.010 ~ -0.035 |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | • | | • | | • | • | | |

# K76 / K77

50 - 70 HRC

HPMT

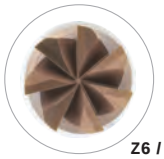
## SE 70 DH Multiflute / with Recess Endmills, 6/7 Flutes

SE 70 DH Multiflute / Con rebaje, 6/7 canales

SE 70 DH Mehrzahnfräser - 6/7 Zähne

Fraises Multidents SE 70 DH, 6/7 dents


K76

Z6 / Z7

K77


| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Z | Availability |
|---|---|---|---|---|---|---|---|
| K76 0300 057 06 | 3 | 8 | 20 | 57 | 6 | 6 | • |
| K76 0400 057 06 | 4 | 11 | 20 | 57 | 6 | 6 | • |
| K76 0500 057 06 | 5 | 12 | 20 | 57 | 6 | 6 | • |
| K76 0600 057 | 6 | 15 | 20 | 57 | 6 | 7 | • |
| K76 0800 064 | 8 | 20 | 26 | 64 | 8 | 8 | • |
| K76 1000 072 | 10 | 22 | 30 | 72 | 10 | 7 | • |
| K76 1200 083 | 12 | 25 | 36 | 83 | 12 | 7 | • |
| K76 1600 092 | 16 | 30 | 42 | 92 | 16 | 7 | • |
| K76 2000 104 | 20 | 38 | 52 | 104 | 20 | 7 | • |

| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Z | Availability |
|---|---|---|---|---|---|---|---|
| K77 0300 057 06 | 3 | 8 | | 57 | 6 | 6 | • |
| K77 0400 057 06 | 4 | 11 | | 57 | 6 | 6 | • |
| K77 0500 057 06 | 5 | 12 | | 57 | 6 | 6 | • |
| K77 0600 057 | 6 | 15 | | 57 | 6 | 7 | • |
| K77 0800 064 | 8 | 20 | | 64 | 8 | 7 | • |
| K77 1000 072 | 10 | 22 | | 72 | 10 | 7 | • |
| K77 1200 083 | 12 | 25 | | 83 | 12 | 7 | • |
| K77 1600 092 | 16 | 30 | | 92 | 16 | 7 | • |
| K77 2000 104 | 20 | 38 | | 104 | 20 | 7 | • |

| Diameter (mm) | Tolerance |
|---|---|
| D ≤ 2.5 | -0.015 ~ +0 |
| 2.5 ≤ D ≤ 5 | -0.020 ~ +0 |
| 6 ≤ D ≤ 10 | -0.025 ~ +0 |
| 10 < D ≤ 12 | -0.005 ~ -0.030 |
| D > 12 | -0.010 ~ -0.035 |

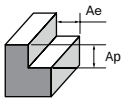
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | • | | • | | • | • | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

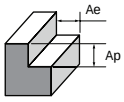
M S H

## SE 70 Torus DH Multiflute / with Recess Endmills, 6 Flutes - K73, K76, K77




| Side Milling | M | | S | | H | | | |
|---|---|---|---|---|---|---|---|---|
| Working Material | Stainless Steel | | Nickel Alloy | | Hardened Steel | | Hardened Steel | |
| Properties | Low Machinability | | - | | 45 ≤ HRC < 52 | | 52 ≤ HRC < 68 | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| Cutting Width, ae | 0.05 × D | | 0.05 × D | | 0.05 × D | | 0.05 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 3 | 70 | 0.021 | 60 | 0.023 | 150 | 0.011 | 110 | 0.010 |
| 4 | | 0.026 | | 0.024 | | 0.016 | | 0.015 |
| 5 | | 0.030 | | 0.027 | | 0.021 | | 0.019 |

## SE 70 Torus DH Multiflute / with Recess Endmills, 7 Flutes - K73, K76, K77




| Side Milling | M | | S | | H | | | |
|---|---|---|---|---|---|---|---|---|
| Working Material | Stainless Steel | | Nickel Alloy | | Hardened Steel | | Hardened Steel | |
| Properties | Low Machinability | | - | | 45 ≤ HRC < 52 | | 52 ≤ HRC < 68 | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| Cutting Width, ae | 0.05 × D | | 0.05 × D | | 0.05 × D | | 0.05 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 6 | 70 | 0.032 | 60 | 0.030 | 150 | 0.027 | 110 | 0.025 |
| 8 | | 0.037 | | 0.034 | | 0.038 | | 0.035 |
| 10 | | 0.042 | | 0.039 | | 0.050 | | 0.046 |
| 12 | | 0.047 | | 0.042 | | 0.066 | | 0.059 |
| 16 | | 0.056 | | 0.049 | | 0.085 | | 0.075 |
| 20 | | 0.061 | | 0.055 | | 0.099 | | 0.090 |

HPMT

# ENDMILLS

## Endmills for Exotic Material, Stainless Steel & Super Alloys

FEATURES & BENEFITS

# NiTiCo 30 DH

## 1. 5 Flutes Design

Significantly increased feedrate(25% over 4 flute).

## 2 Differential Helix (DH)


**Reduces the cutting force:**

- Allows high speed machining, increasing productivity.
- Improves surface finishing.

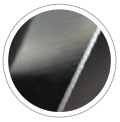
## 3. Optimized Tool Geometry

Allows for improved shearing and decreased spindle loads

## 4. Small Corner Radius

For less chipping of the cutting edges and longer tool life.

## 5. Ideal Cutting Edge



Provides edge protection to prolong tool life.

## CARATTERISTICHE TECNICHE

1. Diseño de 5 bordes
   rainurage, de profilage et de semifinition.

2. Hélice Variable (DH)*
   Reduce la fuerza de corte
   Permite el mecanizado a alta velocidad, aumentando productividad
   Mejora el acabado superficial

3. Geometría optimizada de la herramienta
   Permite un mejor corte y una carga
   carga en el eje del husillo de trabajo.

4. Filo de corte ligeramente redondeado
   Reduce el astillado del filo de corte asegurando una vida útil de la herramienta.

5. Ángulo de corte ideal
   Proporciona protección en las esquinas para prolongar la vida de la herramienta.

## MERKMALE UND VORTEILE

1. 5 Flöten-Design
   Das 5-Schnitt-Design bietet gegenüber 4-Schnitt-Werkzeugen erhöhte Vorschubgeschwindigkeiten von bis zu 25 %

2. Ungleiche Drallsteigung (DH)
   Minimierung von Vibrationen und Resonanzen während der Bearbeitung
   Erhöht die Werkzeugstandzeit und Produktivität
   Halten Sie die Oberfläche fest, um sich selbst zu zentrieren

3. Optimierte Werkzeuggeometrie
   Ermöglicht verbessertes Scheren und verringerte Spindellasten

4. Kleiner Eckenradius
   Für weniger Ausbrüche der Schneidkanten und längere Standzeiten.

5. Perfekte Schneide
   Bietet Schneidkantenschutz,um die Lebensdauer des Werkzeugs zu verlängern

## CARACTÉRISTIQUES ET AVANTAGES

1. Conception de 5 flûtes
   La conception à 5 dents offre des vitesses d'avance accrues jusqu'à 25 % par rapport aux outils à 4 dents et peut être utilisée dans

2. Conception à hélice variable (DH)
   Réduit la force de coupe
   Permet l'usinage à grande vitesse, augmentant la productivité
   Améliore la finition de surface

3. Géométrie d'Outil Optimisée
   Permet une amélioration du cisaillement et une diminution de la charge de broche de travail

4. Petit rayon d'angle
   Pour moins d'écaillage des arêtes de coupe et une plus longue durée de vie de l'outil.

5. Arête tranchante idéale
   Protège les arêtes pour prolonger la durée de vie de l'outil

# J89 / J90

<35 HRC

HPMT

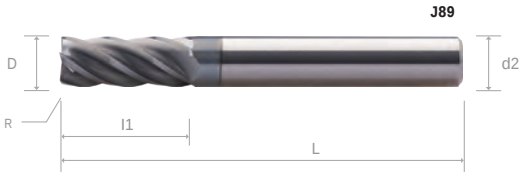
## NiTiCo 30 DH / with Weldon Endmills, 5 Flutes

NiTiCo 30 DH / Con fresas Weldon, 5 canales

NiTiCo 30 DH Fräser,5 Zähne

Fraises NiTiCo 30 DH à pas décalés, 5 dents

DIN 6535 HA HB | MG | R±0.010 | λ = 35°/36°/37° | HPT G6110 AlCrN | 2 x D






| Order Number HA | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R | Availability |
|---|---|---|---|---|---|---|---|
| J89 0400 057 06 | 4 | 12 | | 57 | 6 | 0.1 | • |
| J89 0500 057 06 | 5 | 13 | | 57 | 6 | 0.1 | • |
| J89 0600 057 | 6 | | | 57 | 6 | 0.1 | • |
| J89 0800 064 | 8 | 20 | | 64 | 8 | 0.2 | • |
| J89 1000 072 | 10 | 22 | | 72 | 10 | 0.2 | • |
| J89 1200 083 | 12 | 26 | | 83 | 12 | 0.3 | • |
| J89 1600 092 | 16 | 32 | | 92 | 16 | 0.3 | • |
| J89 2000 104 | 20 | 38 | | 104 | 20 | 0.3 | • |

| Order Number HB | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R | Availability |
|---|---|---|---|---|---|---|---|
| J90 0400 057 06 | 4 | 12 | | 57 | 6 | 0.1 | • |
| J90 0500 057 06 | 5 | 13 | | 57 | 6 | 0.1 | • |
| J90 0600 057 | 6 | | | 57 | 6 | 0.1 | • |
| J90 0800 064 | 8 | 20 | | 64 | 8 | 0.2 | • |
| J90 1000 072 | 10 | 22 | | 72 | 10 | 0.2 | • |
| J90 1200 083 | 12 | 26 | | 83 | 12 | 0.3 | • |
| J90 1600 092 | 16 | 32 | | 92 | 16 | 0.3 | • |
| J90 2000 104 | 20 | 38 | | 104 | 20 | 0.3 | • |

| CNC Repeatability |
|---|
| Ø1 - Ø3 within 10µm |
| Ø4 - Ø8 within 15µm |
| ≥ Ø10 within 20µm |

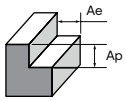
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | • | | • | • | | • | | • | • | • | | | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P M K S P K

## NiTiCo 30 DH / with Weldon Endmills, 5 Flutes - J89, J90




| Side Milling | K | | P | | | | M | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Grey Cast Iron | | Carbon Steel | | Alloy Steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | - | | 520 < Rm < 1200 | | High Machinability | | - | | - | | - | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| Cutting Width, ae | 0.25 × D | | 0.25 × D | | 0.20 × D | | 0.18 × D | | 0.15 × D | | 0.10 × D | | 0.10 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 4 | 250 | 0.017 | 280 | 0.018 | 230 | 0.018 | 160 | 0.018 | 85 | 0.024 | 60 | 0.020 | 50 | 0.019 |
| 5 | | 0.022 | | 0.023 | | 0.022 | | 0.023 | | 0.030 | | 0.027 | | 0.026 |
| 6 | | 0.027 | | 0.028 | | 0.027 | | 0.028 | | 0.037 | | 0.034 | | 0.032 |
| 8 | | 0.036 | | 0.038 | | 0.038 | | 0.039 | | 0.051 | | 0.047 | | 0.045 |
| 10 | | 0.049 | | 0.048 | | 0.049 | | 0.050 | | 0.065 | | 0.062 | | 0.059 |
| 12 | | 0.059 | | 0.057 | | 0.062 | | 0.063 | | 0.081 | | 0.079 | | 0.075 |
| 16 | | 0.077 | | 0.074 | | 0.076 | | 0.077 | | 0.103 | | 0.096 | | 0.092 |
| 20 | | 0.086 | | 0.089 | | 0.086 | | 0.088 | | 0.122 | | 0.111 | | 0.106 |

## NiTiCo 30 DH / with Weldon Endmills, 5 Flutes - J89, J90

| Trochoidal Milling | K | | P | | | | M | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Grey Cast Iron | | Carbon Steel | | Alloy Steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | - | | 520 < Rm < 1200 | | High Machinability | | - | | - | | - | |
| Maximum Slot Width | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | |
| Cutting depth, ap | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | |
| Cutting Width, ae | 0.15 × D | | 0.15 × D | | 0.12 × D | | 0.10 × D | | 0.10 × D | | 0.08 × D | | 0.08 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 4 | 300 | 0.015 | 330 | 0.015 | 280 | 0.016 | 200 | 0.017 | 110 | 0.024 | 70 | 0.018 | 60 | 0.017 |
| 5 | | 0.021 | | 0.020 | | 0.022 | | 0.023 | | 0.031 | | 0.023 | | 0.022 |
| 6 | | 0.027 | | 0.028 | | 0.030 | | 0.031 | | 0.038 | | 0.029 | | 0.028 |
| 8 | | 0.038 | | 0.039 | | 0.043 | | 0.044 | | 0.054 | | 0.042 | | 0.040 |
| 10 | | 0.051 | | 0.051 | | 0.058 | | 0.059 | | 0.071 | | 0.057 | | 0.055 |
| 12 | | 0.064 | | 0.064 | | 0.078 | | 0.079 | | 0.092 | | 0.076 | | 0.072 |
| 16 | | 0.080 | | 0.082 | | 0.095 | | 0.096 | | 0.115 | | 0.089 | | 0.085 |
| 20 | | 0.094 | | 0.093 | | 0.108 | | 0.109 | | 0.135 | | 0.096 | | 0.091 |

# J92 / J93

<35 HRC

HPMT

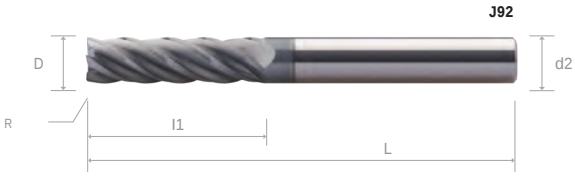
## NiTiCo 30 DH Long / with Weldon Endmills, 5 Flutes

NiTiCo 30 DH Largo / Con Fresas Weldon, 5 Filos

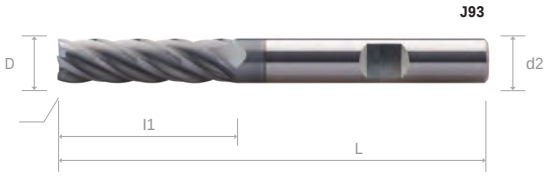
NiTiCo 30 DH Fräser, lang, 5 Zähne

Fraises NiTiCo 30 DH Long à pas décalés, 5 dents

DIN 6535 HA HB | MG | R±0.010 | λ = 35°/36°/37° | HPT G6110 AlCrN | 4 x D








| Order Number HA | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R | Availability |
|---|---|---|---|---|---|---|---|
| J92 0600 075 | 6 | 25 | | 75 | 6 | 0.1 | • |
| J92 0800 075 | 8 | | | 75 | 8 | 0.2 | • |
| J92 1000 100 | 10 | 38 | | 100 | 10 | 0.2 | • |
| J92 1200 100 | 12 | 45 | | 100 | 12 | 0.3 | • |
| J92 1600 125 | 16 | 55 | | 125 | 16 | 0.3 | • |
| J92 2000 125 | 20 | 65 | | 125 | 20 | 0.3 | • |

| Order Number HB | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R | Availability |
|---|---|---|---|---|---|---|---|
| J93 0600 075 | 6 | 25 | | 75 | 6 | 0.1 | • |
| J93 0800 075 | 8 | | | 75 | 8 | 0.2 | • |
| J93 1000 100 | 10 | 38 | | 100 | 10 | 0.2 | • |
| J93 1200 100 | 12 | 45 | | 100 | 12 | 0.3 | • |
| J93 1600 125 | 16 | 55 | | 125 | 16 | 0.3 | • |
| J93 2000 125 | 20 | 65 | | 125 | 20 | 0.3 | • |

| CNC Repeatability |
|---|
| Ø1 - Ø3 within 10µm |
| Ø4 - Ø8 within 15µm |
| ≥ Ø10 within 20µm |

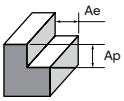
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | • | | • | • | | • | | • | • | • | | | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P M K S P K

## NiTiCo 30 DH Long / with Weldon Endmills, 5 Flutes - J92, J93



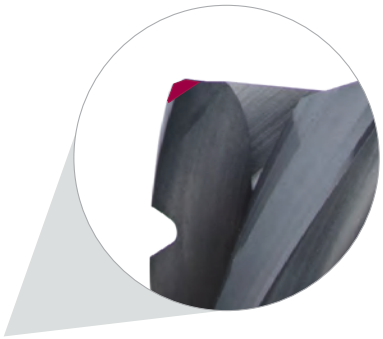

| Side Milling | K | | P | | | | M | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Grey Cast Iron | | Carbon Steel | | Alloy Steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | - | | 520 < Rm < 1200 | | High Machinability | | - | | - | | - | |
| Cutting depth, ap | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.00 × D | | 1.00 × D | |
| Cutting Width, ae | 0.15 × D | | 0.15 × D | | 0.12 × D | | 0.10 × D | | 0.10 × D | | 0.10 × D | | 0.10 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 4 | 230 | 0.014 | 260 | 0.015 | 210 | 0.016 | 140 | 0.017 | 75 | 0.023 | 50 | 0.020 | 40 | 0.019 |
| 5 | | 0.019 | | 0.019 | | 0.020 | | 0.021 | | 0.029 | | 0.026 | | 0.024 |
| 6 | | 0.024 | | 0.023 | | 0.025 | | 0.027 | | 0.036 | | 0.033 | | 0.031 |
| 8 | | 0.031 | | 0.032 | | 0.035 | | 0.037 | | 0.049 | | 0.046 | | 0.043 |
| 10 | | 0.041 | | 0.041 | | 0.046 | | 0.048 | | 0.063 | | 0.060 | | 0.057 |
| 12 | | 0.053 | | 0.050 | | 0.057 | | 0.060 | | 0.078 | | 0.075 | | 0.071 |
| 16 | | 0.066 | | 0.062 | | 0.071 | | 0.074 | | 0.099 | | 0.093 | | 0.088 |
| 20 | | 0.078 | | 0.073 | | 0.080 | | 0.085 | | 0.119 | | 0.108 | | 0.103 |

## NiTiCo 30 DH Long / with Weldon Endmills, 5 Flutes - J92, J93

| Trochoidal Milling | K | | P | | | | M | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Grey Cast Iron | | Carbon Steel | | Alloy Steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | - | | 520 < Rm < 1200 | | High Machinability | | - | | - | | - | |
| Maximum Slot Width | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | |
| Cutting depth, ap | 2.00 × D | | 2.00 × D | | 2.00 × D | | 2.00 × D | | 2.00 × D | | 1.50 × D | | 1.50 × D | |
| Cutting Width, ae | 0.12 × D | | 0.12 × D | | 0.10 × D | | 0.08 × D | | 0.08 × D | | 0.08 × D | | 0.08 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 4 | 270 | 0.014 | 300 | 0.014 | 260 | 0.014 | 170 | 0.016 | 95 | 0.021 | 60 | 0.015 | 50 | 0.014 |
| 5 | | 0.018 | | 0.018 | | 0.020 | | 0.022 | | 0.027 | | 0.021 | | 0.020 |
| 6 | | 0.023 | | 0.025 | | 0.027 | | 0.029 | | 0.035 | | 0.027 | | 0.026 |
| 8 | | 0.034 | | 0.035 | | 0.040 | | 0.042 | | 0.049 | | 0.039 | | 0.037 |
| 10 | | 0.047 | | 0.046 | | 0.054 | | 0.056 | | 0.065 | | 0.053 | | 0.050 |
| 12 | | 0.061 | | 0.059 | | 0.070 | | 0.071 | | 0.083 | | 0.068 | | 0.065 |
| 16 | | 0.068 | | 0.068 | | 0.089 | | 0.090 | | 0.106 | | 0.082 | | 0.078 |
| 20 | | 0.080 | | 0.078 | | 0.101 | | 0.103 | | 0.126 | | 0.090 | | 0.085 |

FEATURES & BENEFITS

# NiTiCo 30 DH (Without Oil Feed)



## 1. 5 Flutes Design

Significantly increased feedrate(25% over 4 flute).

## 2 Differential Helix (DH)


**Reduces the cutting force:**

- Allows high speed machining, increasing productivity.
- Improves surface finishing.

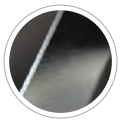
## 3. Optimized Geometry with Chipbreakers

Efficiently shears work materials and shortens chips for improved chips removal.

## 4. Small Corner Radius

For less chipping of the cutting edges and longer tool life.

## 5. Ideal Cutting Edge



Provide edge protection to prolong tool life.

## CARATTERISTICHE TECNICHE

1. Diseño de 5 bordes
   rainurage, de profilage et de semifinition
2. Hélice Variable (DH)*
   Reduce la fuerza de corte
   Permite el mecanizado a alta velocidad, aumentando productividad
   Mejora el acabado superficial
3. Filo de corte discontinuo
   Reduce la longitud de la viruta permitiendo una mejor evacuación de la misma.
   Mejor evacuación de la viruta.
4. Filo de corte ligeramente radial
   Reduce el astillamiento del filo de corte garantizando una mayor duración de la herramienta.
5. Ángulo de corte ideal
   Proporciona protección en las esquinas para prolongar la vida de la herramienta.

## MERKMALE UND VORTEILE

1. 5 Flöten-Design
   Das 5-Schnitt-Design bietet gegenüber 4-Schnitt-Werkzeugen erhöhte Vorschubgeschwindigkeiten von bis zu 25 %
2. Ungleiche Drallsteigung (DH)
   Minimierung von Vibrationen und Resonanzen während der Bearbeitung
   Erhöht die Werkzeugstandzeit und Produktivität
   Halten Sie die Oberfläche fest, um sich selbst zu zentrieren
3. Spanbrechergeometrie
   Erzeugt kontrollierte, kurze Spane
4. Kleiner Eckenradius
   Für weniger Ausbrüche der Schneidkanten und längere Standzeiten.
5. Perfekte Schneide
   Bietet Schneidkantenschutz,um die Lebensdauer des Werkzeugs zu verlängern

## CARACTÉRISTIQUES ET AVANTAGES

1. Conception de 5 flûtes
   La conception à 5 dents offre des vitesses d'avance accrues jusqu'à 25 % par rapport aux outils à 4 dents et peut être utilisée dans
2. Conception à hélice variable (DH)
   Réduit la force de coupe
   Permet l'usinage à grande vitesse, augmentant la productivité
   Améliore la finition de surface
3. Géométrie optimisée avec brise-copeaux
   Cisaille efficacement les matériaux de travail et raccourcit les copeaux pour une meilleure élimination des copeaux.
4. Petit rayon d'angle
   Pour moins d'écaillage des arêtes de coupe et une plus longue durée de vie de l'outil.
5. Arête tranchante idéale
   Protège les arêtes pour prolonger la durée de vie de l'outil

# K50

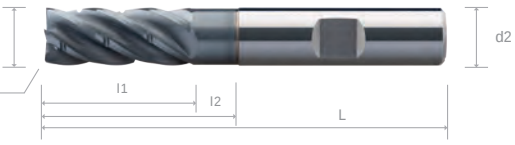


## NiTiCo 30 DH Standard Internal Oil Hole, 2xD, Weldon, Recess, 5 Flutes

NiTiCo 30 DH Estándar Agujero interno para aceite, 2xD, Weldon, Hueco, 5 canales

NiTiCo 30 DH Fräser,mit Spanbrecher, Freistellung und Weldon, 5 Zähne

Fraises NiTiCo 30 DH, brise-copeaux, évidement et Weldon , 5 dents








| Order Number | | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R | Availability |
|---|---|---|---|---|---|---|---|---|
| K50 0400 057 06 | | 4 | 10 | 15 | 57 | 6 | 0.1 | • |
| K50 0600 057 | * | 6 | 15 | 20 | 57 | 6 | 0.1 | • |
| K50 0800 064 | | 8 | 20 | 25 | 64 | 8 | 0.15 | • |
| K50 1000 072 | * | 10 | 25 | 30 | 72 | 10 | 0.2 | • |
| K50 1200 083 | * | 12 | 30 | 38 | 83 | 12 | 0.2 | • |
| K50 1600 092 | * | 16 | 39 | 44 | 92 | 16 | 0.3 | • |
| K50 2000 104 | * | 20 | 48 | 54 | 104 | 20 | 0.3 | • |

* - DIN 6535

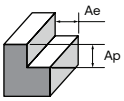
| CNC Repeatability |
|---|
| Ø1 - Ø3 within 10µm |
| Ø4 - Ø8 within 15µm |
| ≥ Ø10 within 20µm |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | • | | • | • | | • | | • | • | • | | | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P M K S P K




## NiTiCo 30 DH Standard Internal Oil Hole, 2xD, Weldon, Recess, 5 Flutes - K50

| Side Milling | K | | P | | | | M | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Grey Cast Iron | | Carbon Steel | | Alloy Steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | - | | 520 < Rm < 1200 | | High Machinability | | - | | - | | - | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| Cutting Width, ae | 0.25 × D | | 0.25 × D | | 0.20 × D | | 0.18 × D | | 0.15 × D | | 0.15 × D | | 0.15 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 4 | 265 | 0.017 | 295 | 0.017 | 240 | 0.018 | 135 | 0.017 | 90 | 0.022 | 45 | 0.022 | 35 | 0.021 |
| 5 | | 0.021 | | 0.022 | | 0.024 | | 0.022 | | 0.028 | | 0.028 | | 0.027 |
| 6 | | 0.026 | | 0.027 | | 0.029 | | 0.027 | | 0.034 | | 0.034 | | 0.032 |
| 8 | | 0.036 | | 0.037 | | 0.040 | | 0.037 | | 0.047 | | 0.047 | | 0.045 |
| 10 | | 0.047 | | 0.047 | | 0.052 | | 0.047 | | 0.060 | | 0.060 | | 0.057 |
| 12 | | 0.057 | | 0.057 | | 0.065 | | 0.057 | | 0.074 | | 0.074 | | 0.070 |
| 16 | | 0.074 | | 0.073 | | 0.082 | | 0.072 | | 0.093 | | 0.093 | | 0.088 |
| 20 | | 0.085 | | 0.089 | | 0.097 | | 0.085 | | 0.111 | | 0.111 | | 0.105 |

## NiTiCo 30 DH Standard Internal Oil Hole, 2xD, Weldon, Recess, 5 Flutes - K50

| Trochoidal Milling | K | | P | | | | M | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Grey Cast Iron | | Carbon Steel | | Alloy Steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Proprietà | - | | - | | 520 < Rm < 1200 | | High Machinability | | - | | - | | - | |
| Maximum Slot Width | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | |
| Cutting depth, ap | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | |
| Cutting Width, ae | 0.15 × D | | 0.15 × D | | 0.12 × D | | 0.10 × D | | 0.10 × D | | 0.10 × D | | 0.10 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 4 | 315 | 0.018 | 345 | 0.018 | 290 | 0.020 | 170 | 0.019 | 120 | 0.028 | 60 | 0.028 | 47 | 0.027 |
| 5 | | 0.024 | | 0.024 | | 0.028 | | 0.026 | | 0.036 | | 0.036 | | 0.034 |
| 6 | | 0.031 | | 0.032 | | 0.037 | | 0.035 | | 0.045 | | 0.045 | | 0.043 |
| 8 | | 0.044 | | 0.044 | | 0.052 | | 0.048 | | 0.063 | | 0.063 | | 0.060 |
| 10 | | 0.059 | | 0.059 | | 0.071 | | 0.064 | | 0.082 | | 0.082 | | 0.078 |
| 12 | | 0.076 | | 0.075 | | 0.094 | | 0.084 | | 0.108 | | 0.108 | | 0.103 |
| 16 | | 0.094 | | 0.094 | | 0.116 | | 0.104 | | 0.133 | | 0.133 | | 0.126 |
| 20 | | 0.109 | | 0.107 | | 0.131 | | 0.117 | | 0.157 | | 0.157 | | 0.149 |

# K51

<35 HRC

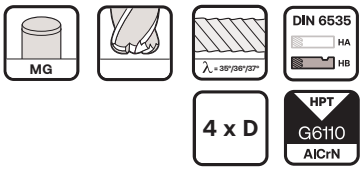
HPMT

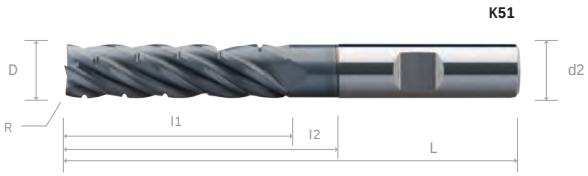
## NiTiCo 30 DH Long Internal Oil Hole, 4xD, Weldon, Recess, 5 Flutes

NiTiCo 30 DH Agujero interno largo para aceite, 4xD, Weldon, rebaje, 5 canales

NiTiCo 30 DH Fräser, lang, mit Spanbrecher, Freistellung und Weldon, 5 Zähne

Fraises NiTiCo 30 DH Long brise-copeaux, évidement et Weldon , 5 dents





| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R | Availability |
|---|---|---|---|---|---|---|---|
| K51 0600 075 | 6 | 26 | 32 | 75 | 6 | 0.1 | • |
| K51 0800 075 * | 8 | 32 | 38 | 75 | 8 | 0.2 | • |
| K51 1000 100 | 10 | 42 | 52 | 100 | 10 | 0.2 | • |
| K51 1200 100 * | 12 | | 54 | 100 | 12 | 0.2 | • |
| K51 1600 125 | 16 | 60 | 68 | 125 | 16 | 0.3 | • |
| K51 2000 125 * | 20 | 67 | 75 | 125 | 20 | 0.3 | • |

* - DIN 6535

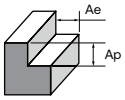
| CNC Repeatability |
|---|
| Ø1 - Ø3 within 10µm |
| Ø4 - Ø8 within 15µm |
| ≥ Ø10 within 20µm |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | • | | • | • | | • | | • | • | • | | | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P M K S P K




## NiTiCo 30 DH Long Internal Oil Hole, 4xD, Weldon, Recess, 5 Flutes - K51

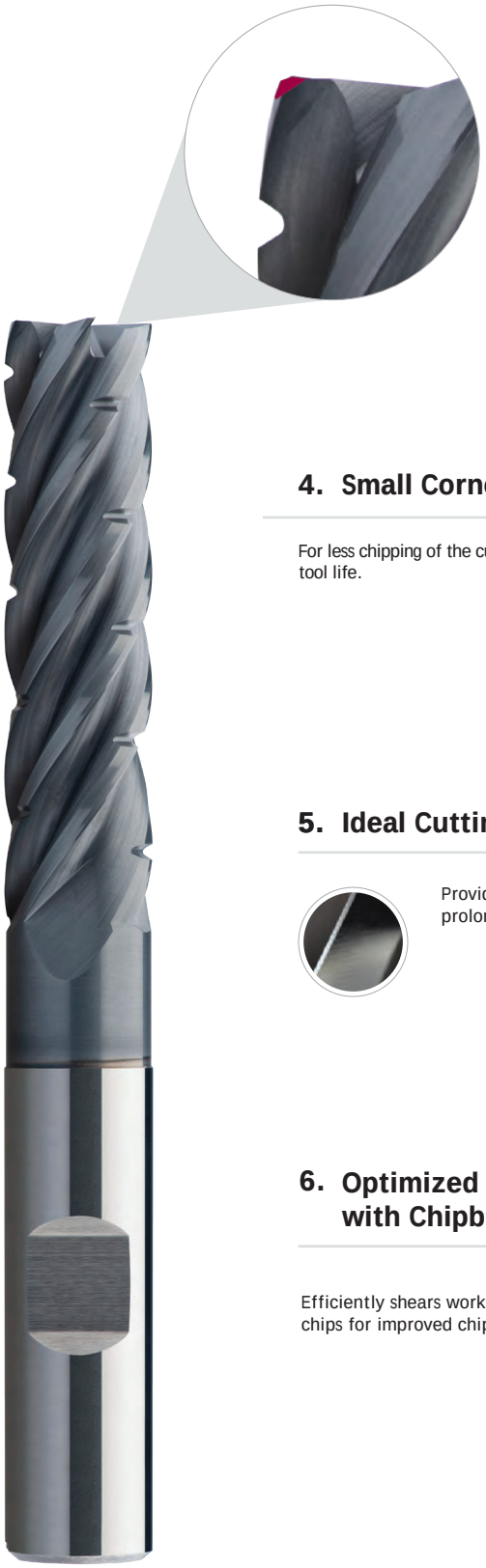
| Side Milling | K | | P | | | | M | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Grey Cast Iron | | Carbon Steel | | Alloy Steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | - | | 520 < Rm < 1200 | | High Machinability | | - | | - | | - | |
| Cutting depth, ap | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | |
| Cutting Width, ae | 0.15 × D | | 0.15 × D | | 0.12 × D | | 0.10 × D | | 0.10 × D | | 0.10 × D | | 0.10 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 4 | 240 | 0.014 | 270 | 0.015 | 220 | 0.017 | 120 | 0.017 | 80 | 0.019 | 40 | 0.019 | 30 | 0.018 |
| 5 | | 0.019 | | 0.019 | | 0.022 | | 0.020 | | 0.024 | | 0.024 | | 0.023 |
| 6 | | 0.023 | | 0.024 | | 0.027 | | 0.025 | | 0.030 | | 0.030 | | 0.029 |
| 8 | | 0.031 | | 0.032 | | 0.037 | | 0.034 | | 0.043 | | 0.043 | | 0.041 |
| 10 | | 0.041 | | 0.041 | | 0.048 | | 0.043 | | 0.055 | | 0.055 | | 0.052 |
| 12 | | 0.053 | | 0.052 | | 0.060 | | 0.054 | | 0.070 | | 0.070 | | 0.067 |
| 16 | | 0.067 | | 0.066 | | 0.077 | | 0.069 | | 0.089 | | 0.089 | | 0.085 |
| 20 | | 0.079 | | 0.078 | | 0.090 | | 0.080 | | 0.106 | | 0.106 | | 0.101 |

## NiTiCo 30 DH Long Internal Oil Hole, 4xD, Weldon, Recess, 5 Flutes - K51

| Trochoidal Milling | K | | P | | | | M | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Grey Cast Iron | | Carbon Steel | | Alloy Steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Proprietà | - | | - | | 520 < Rm < 1200 | | High Machinability | | - | | - | | - | |
| Maximum Slot Width | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | |
| Cutting depth, ap | 2.00 × D | | 2.00 × D | | 2.00 × D | | 2.00 × D | | 2.00 × D | | 2.00 × D | | 2.00 × D | |
| Cutting Width, ae | 0.12 × D | | 0.12 × D | | 0.10 × D | | 0.08 × D | | 0.08 × D | | 0.08 × D | | 0.08 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 4 | 285 | 0.013 | 315 | 0.014 | 270 | 0.014 | 150 | 0.014 | 105 | 0.018 | 53 | 0.018 | 39 | 0.017 |
| 5 | | 0.018 | | 0.019 | | 0.021 | | 0.019 | | 0.024 | | 0.024 | | 0.023 |
| 6 | | 0.024 | | 0.025 | | 0.028 | | 0.026 | | 0.030 | | 0.030 | | 0.029 |
| 8 | | 0.034 | | 0.035 | | 0.040 | | 0.036 | | 0.042 | | 0.042 | | 0.040 |
| 10 | | 0.046 | | 0.046 | | 0.055 | | 0.049 | | 0.056 | | 0.056 | | 0.053 |
| 12 | | 0.060 | | 0.060 | | 0.071 | | 0.063 | | 0.074 | | 0.074 | | 0.070 |
| 16 | | 0.070 | | 0.071 | | 0.089 | | 0.077 | | 0.091 | | 0.091 | | 0.086 |
| 20 | | 0.080 | | 0.080 | | 0.100 | | 0.088 | | 0.107 | | 0.107 | | 0.102 |

FEATURES & BENEFITS

# NiTiCo 30 DH
## (With Oil Feed)



### 1. 5 Flutes Design

Significantly increased feedrate(25% over 4 flute).

### 2 Differential Helix (DH)


**Reduces the cutting force:**

- Allows high speed machining, increasing productivity.
- Improves surface finishing.

### 3. Oil Hole for High Performance Milling

-Improves welding resistance.
-Enables a wide range of machining processes.
-Especially beneficial for difficult to cut materials, offering stable machining.

### 4. Small Corner Radius

For less chipping of the cutting edges and longer tool life.

### 5. Ideal Cutting Edge



Provide edge protection to prolong tool life.

### 6. Optimized Geometry with Chipbreakers

Efficiently shears work materials and shortens chips for improved chips removal.

## CARATTERISTICHE TECNICHE

Frese NiTiCo 30 DH

1. Diseño de 5 bordes
   rainurage, de profilage et de semifinition

2. Hélice Variable (DH)*
   Reduce la fuerza de corte
   Permite el mecanizado a alta velocidad, aumentando productividad
   Mejora el acabado superficial

3. Agujero de refrigeración de fresado de alto rendimiento.
   Mejora la resistencia de la soldadura.
   Permite una amplia gama de procesos de mecanizado.
   Especialmente útil para materiales difíciles de cortar, ofreciendo un mecanizado estable.

4. Filo de corte radial
   Reduce el astillado del filo de corte, garantizando una mayor duración de la herramienta.

5. Ángulo de corte ideal
   Proporciona protección en las esquinas para prolongar la vida de la herramienta.

6. Geometría optimizada
   Reduce la longitud de las virutas para una mejor evacuación de las mismas.
   mejor evacuación.

## MERKMALE UND VORTEILE

NiTiCo 30 DH

1. 5 Flöten-Design
   Das 5-Schnitt-Design bietet gegenüber 4-Schnitt-Werkzeugen erhöhte Vorschubgeschwindigkeiten von bis zu 25 %

2. Ungleiche Drallsteigung (DH)
   Minimierung von Vibrationen und Resonanzen während der Bearbeitung
   Erhöht die Werkzeugstandzeit und Produktivität
   Halten Sie die Oberfläche fest, um sich selbst zu zentrieren

3. Große Kühlkanalbohrungen für Hochleistungsfräsen
   Verbessert die Spanabfuhr
   Ermöglicht umfangreiche Applikationen
   Große Vorteile für die Bearbeitung festerer

4. Kleiner Eckenradius
   Für weniger Ausbrüche der Schneidkanten und längere Standzeiten.

5. Perfekte Schneide
   Bietet Schneidkantenschutz,um die Lebensdauer des Werkzeugs zu verlängern

6. Spanbrechergeome trie
   Erzeugt kontrollierte, kurze Spane

## CARACTÉRISTIQUES ET AVANTAGES

NiTiCo 30 DH

1. Conception de 5 flûtes
   La conception à 5 dents offre des vitesses d'avance accrues jusqu'à 25 % par rapport aux outils à 4 dents et peut être utilisée dans

2. Conception à hélice variable (DH)
   Réduit la force de coupe
   Permet l'usinage à grande vitesse, augmentant la productivité
   Améliore la finition de surface

3. Trou d'huile pour le fraisage haute performance
   Améliore la résistance au soudage
   Permet une large gamme de processus d'usinage
   Particulièrement bénéfique pour les

4. Petit rayon d'angle
   Pour moins d'écaillage des arêtes de coupe et une plus longue durée de vie de l'outil.

5. Arête tranchante idéale
   Protège les arêtes pour prolonger la durée de vie de l'outil

6. Géométrie optimisée avec brise-copeaux
   Cisaille efficacement les matériaux de travail et raccourcit les copeaux pour une meilleure élimination des copeaux.

# K65

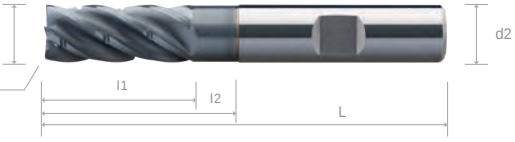


## NiTiCo 30 DH 2xD Standard Internal Oil Hole, Weldon, Recess, 5 Flutes

NiTiCo 30 DH 2xD Agujero interno estándar para aceite, Weldon, rebaje, 5 canales

NiTiCo 30 DH Standard Fräser, lang, mit Spanbrecher, Freistellung und Weldon, 5 Zähne

Fraises NiTiCo 30 DH Standard à pas décalés avec hélice différentielle, brise-copeaux, évidement et Weldon , 5 dents








| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R | Availability |
|---|---|---|---|---|---|---|---|
| K65 0400 057 06 | 4 | 10 | 15 | 57 | 6 | 0.1 | • |
| K65 0600 057 * | 6 | 15 | 20 | 57 | 6 | 0.1 | • |
| K65 0800 064 | 8 | 20 | 25 | 64 | 8 | 0.15 | • |
| K65 1000 072 * | 10 | 25 | 30 | 72 | 10 | 0.2 | • |
| K65 1200 083 * | 12 | 30 | 38 | 83 | 12 | 0.2 | • |
| K65 1600 092 * | 16 | 39 | 44 | 92 | 16 | 0.3 | • |
| K65 2000 104 * | 20 | 48 | 54 | 104 | 20 | 0.3 | • |

* - DIN 6535

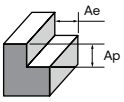
| CNC Repeatability |
|---|
| Ø1 - Ø3 within 10µm |
| Ø4 - Ø8 within 15µm |
| ≥ Ø10 within 20µm |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | • | | • | • | | • | | • | • | • | | | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P M K S P K




## NiTiCo 30 DH 2xD Standard Internal Oil Hole, Weldon, Recess, 5 Flutes - K65

| Side Milling | K | | P | | | | M | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Grey Cast Iron | | Carbon Steel | | Alloy Steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | - | | 520 < Rm < 1200 | | High Machinability | | - | | - | | - | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| Cutting Width, ae | 0.25 × D | | 0.25 × D | | 0.20 × D | | 0.18 × D | | 0.15 × D | | 0.15 × D | | 0.15 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 4 | 280 | 0.016 | 310 | 0.017 | 250 | 0.019 | 180 | 0.021 | 100 | 0.025 | 50 | 0.025 | 40 | 0.023 |
| 5 | | 0.021 | | 0.022 | | 0.025 | | 0.027 | | 0.032 | | 0.032 | | 0.030 |
| 6 | | 0.025 | | 0.027 | | 0.031 | | 0.033 | | 0.039 | | 0.039 | | 0.037 |
| 8 | | 0.035 | | 0.036 | | 0.043 | | 0.045 | | 0.054 | | 0.054 | | 0.051 |
| 10 | | 0.045 | | 0.046 | | 0.055 | | 0.057 | | 0.069 | | 0.069 | | 0.065 |
| 12 | | 0.056 | | 0.056 | | 0.069 | | 0.071 | | 0.087 | | 0.087 | | 0.082 |
| 16 | | 0.071 | | 0.072 | | 0.087 | | 0.089 | | 0.108 | | 0.108 | | 0.103 |
| 20 | | 0.084 | | 0.088 | | 0.107 | | 0.109 | | 0.128 | | 0.128 | | 0.122 |

## NiTiCo 30 DH 2xD Standard Internal Oil Hole, Weldon, Recess, 5 Flutes - K65

| Trochoidal Milling | K | | P | | | | M | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Grey Cast Iron | | Carbon Steel | | Alloy Steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Proprietà | - | | - | | 520 < Rm < 1200 | | High Machinability | | - | | - | | - | |
| Maximum Slot Width | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | |
| Cutting depth, ap | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | |
| Cutting Width, ae | 0.15 × D | | 0.15 × D | | 0.12 × D | | 0.10 × D | | 0.10 × D | | 0.10 × D | | 0.10 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 4 | 330 | 0.015 | 360 | 0.016 | 300 | 0.017 | 220 | 0.019 | 130 | 0.025 | 65 | 0.025 | 52 | 0.023 |
| 5 | | 0.020 | | 0.021 | | 0.023 | | 0.025 | | 0.032 | | 0.032 | | 0.030 |
| 6 | | 0.026 | | 0.027 | | 0.031 | | 0.033 | | 0.040 | | 0.040 | | 0.038 |
| 8 | | 0.037 | | 0.037 | | 0.044 | | 0.046 | | 0.055 | | 0.055 | | 0.052 |
| 10 | | 0.049 | | 0.049 | | 0.059 | | 0.061 | | 0.072 | | 0.072 | | 0.069 |
| 12 | | 0.063 | | 0.064 | | 0.078 | | 0.080 | | 0.096 | | 0.096 | | 0.091 |
| 16 | | 0.078 | | 0.079 | | 0.097 | | 0.099 | | 0.117 | | 0.117 | | 0.112 |
| 20 | | 0.089 | | 0.089 | | 0.110 | | 0.112 | | 0.138 | | 0.138 | | 0.131 |

# K67

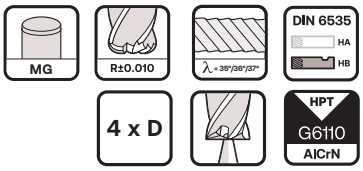


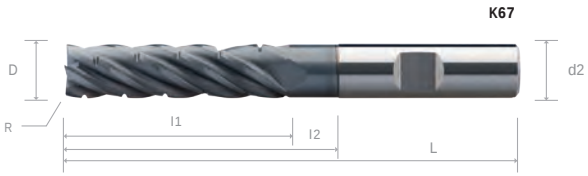
## NiTiCo 30 DH 4xD Long Internal Oil Hole, Weldon, Recess, 5 Flutes

NiTiCo 30 DH 4xD Agujero interno largo para aceite, Weldon, rebaje, 5 canales

NiTiCo 30 DH Fräser, lang, mit Spanbrecher, Freistellung und Weldon, 5 Zähne

Fraises NiTiCo 30 DH Long à pas décalés avec hélice différentielle, brise-copeaux, évidement et Weldon , 5 dents





| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R | Availability |
|---|---|---|---|---|---|---|---|
| K67 0600 075 | 6 | 26 | 32 | 75 | 6 | 0.1 | • |
| K67 0800 075 * | 8 | 32 | 38 | 75 | 8 | 0.2 | • |
| K67 1000 100 | 10 | 42 | 52 | 100 | 10 | 0.2 | • |
| K67 1200 100 * | 12 | | 54 | 100 | 12 | 0.2 | • |
| K67 1600 125 | 16 | 60 | 68 | 125 | 16 | 0.3 | • |
| K67 2000 125 * | 20 | 67 | 75 | 125 | 20 | 0.3 | • |

* - DIN 6535

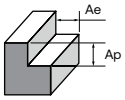
| CNC Repeatability |
|---|
| Ø1 - Ø3 within 10µm |
| Ø4 - Ø8 within 15µm |
| ≥ Ø10 within 20µm |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | • | | • | • | | • | | • | • | • | | | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P M K S P K




## NiTiCo 30 DH 4xD Long Internal Oil Hole, Weldon, Recess, 5 Flutes - K67

| Side Milling | K | | P | | | | M | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Grey Cast Iron | | Carbon Steel | | Alloy Steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | - | | 520 < Rm < 1200 | | High Machinability | | - | | - | | - | |
| Cutting depth, ap | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | |
| Cutting Width, ae | 0.15 × D | | 0.15 × D | | 0.12 × D | | 0.10 × D | | 0.10 × D | | 0.10 × D | | 0.10 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 4 | 250 | 0.014 | 280 | 0.014 | 230 | 0.018 | 160 | 0.020 | 85 | 0.020 | 45 | 0.020 | 35 | 0.019 |
| 5 | | 0.019 | | 0.019 | | 0.023 | | 0.025 | | 0.027 | | 0.027 | | 0.026 |
| 6 | | 0.023 | | 0.024 | | 0.029 | | 0.031 | | 0.035 | | 0.035 | | 0.033 |
| 8 | | 0.031 | | 0.032 | | 0.039 | | 0.041 | | 0.050 | | 0.050 | | 0.047 |
| 10 | | 0.041 | | 0.041 | | 0.050 | | 0.052 | | 0.066 | | 0.066 | | 0.062 |
| 12 | | 0.053 | | 0.054 | | 0.063 | | 0.065 | | 0.084 | | 0.084 | | 0.080 |
| 16 | | 0.068 | | 0.069 | | 0.082 | | 0.084 | | 0.107 | | 0.107 | | 0.101 |
| 20 | | 0.080 | | 0.083 | | 0.099 | | 0.101 | | 0.126 | | 0.126 | | 0.120 |

## NiTiCo 30 DH 4xD Long Internal Oil Hole, Weldon, Recess, 5 Flutes - K67

| Trochoidal Milling | K | | P | | | | M | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Grey Cast Iron | | Carbon Steel | | Alloy Steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Proprietà | - | | - | | 520 < Rm < 1200 | | High Machinability | | - | | - | | - | |
| Maximum Slot Width | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | |
| Cutting depth, ap | 2.00 × D | | 2.00 × D | | 2.00 × D | | 2.00 × D | | 2.00 × D | | 2.00 × D | | 2.00 × D | |
| Cutting Width, ae | 0.12 × D | | 0.12 × D | | 0.10 × D | | 0.08 × D | | 0.08 × D | | 0.08 × D | | 0.08 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 4 | 300 | 0.013 | 330 | 0.014 | 280 | 0.014 | 200 | 0.016 | 115 | 0.021 | 61 | 0.021 | 47 | 0.020 |
| 5 | | 0.018 | | 0.019 | | 0.021 | | 0.023 | | 0.028 | | 0.028 | | 0.026 |
| 6 | | 0.024 | | 0.025 | | 0.028 | | 0.030 | | 0.035 | | 0.035 | | 0.034 |
| 8 | | 0.034 | | 0.035 | | 0.040 | | 0.042 | | 0.049 | | 0.049 | | 0.046 |
| 10 | | 0.045 | | 0.046 | | 0.055 | | 0.057 | | 0.066 | | 0.066 | | 0.062 |
| 12 | | 0.059 | | 0.060 | | 0.072 | | 0.074 | | 0.089 | | 0.089 | | 0.084 |
| 16 | | 0.072 | | 0.074 | | 0.088 | | 0.090 | | 0.107 | | 0.107 | | 0.101 |
| 20 | | 0.081 | | 0.082 | | 0.099 | | 0.101 | | 0.123 | | 0.123 | | 0.117 |

FEATURES & BENEFITS

# NiTiCo 30 DP/DH

## 1 Differential Helix (DH)


**Reduces the cutting force:**

- Allows high speed machining, increasing productivity.
- Improves surface finishing.

## 2 Differential Pitch (DP)


Reduces chatter to provide excellent surface finishing.

## 3 Stable Cutting Edge

Allows for high speeds and feed rates greatly improving productivity.

## 4 Corner Radius




-Reducing chipping and providing longer tool life.
-Standardized corner radius for aerospace components.

## 5 The Perfect Edge Design



Provides a stable cutting edge with much reduced possibility of chipping while prolonging the tool life.

## 6 Suitable for Materials

P M K S

## CARATTERISTICHE TECNICHE

1. Hélice Variable (DH)*
   Reduce la fuerza de corte
   Permite el mecanizado a alta velocidad, aumentando productividad
   Mejora el acabado superficial

2. Paso diferenciado (DP)
   Reduce las vibraciones y proporciona un acabado superficial

3. Filo de corte estable
   Permite altas velocidades y avances mejorando considerablemente la productividad.

4. Radio de esquina
   Reducción de virutas y mayor vida útil de la herramienta.
   Radio de esquina normalizado para componentes aeroespacial.

5. El diseño de filo prefecto
   Proporciona un filo de corte estable con una posibilidad de astillado al tiempo que alarga la vida de la herramienta.
   posibilidad reducida de astillado a la vez que prolonga la vida de la herramienta.

6. Adecuado para materiales P, M, K, S.

## MERKMALE UND VORTEILE

1. Ungleiche Drallsteigung (DH)
   Minimierung von Vibrationen und Resonanzen während der Bearbeitung
   Erhöht die Werkzeugstandzeit und Produktivität
   Halten Sie die Oberfläche fest, um sich selbst zu zentrieren

2. Ungleiche Teilung (DP)
   Ungleiche Anordnung der Spannuten, um Eigenresonanz ufzulösen und Vibrationen zu reduzieren

3. Stabile Schneide
   Ermöglicht hohe Geschwindigkeiten und Vorschubgeschwindigkeiten, wodurch die Producktivität erheblich verbessert wird

4. Eckenradius
   Eckenradiusher vorragender Schneideckenschutz sorgt für längere Werkzeuglebensdauer genormte Eckenradien für Aerospace Bauteile
   Standardisierter Eckradius für Aerospace-Komponenten

5. Kleinstfase entlang der Schneiden
   Eine optimale Schneidkantenpräparation ermöglicht eine stabile Schneidkante und sorgt für einen gleichmäßigen und kontrollierten Verschleiß. Dadurch wird ebenfalls die Standzeit optimiert und Ermöglicht hohe Geschwindigkeiten und Vorschübe und verbessert die Produktivivität.
   Ermöglicht hohe CNC-Wiederholbarkeit innerhalb 0.01mm

6. Geeignet für die Materialigruppen P, M, K, S

## CARACTÉRISTIQUES ET AVANTAGES

1. Conception à hélice variable (DH)
   Réduit la force de coupe
   Permet l'usinage à grande vitesse, augmentant la productivité
   Améliore la finition de surface

2. Marge de craquelure
   Fournit un tranchant stable avec beaucoup possibilité réduite d'écaillage en prolongeant la durée de vie de l'outil
   Très bonne répétabilité de l'usinage sur cnc à moins de 0,010 mm

3. Conception à pas différentiel (DP)
   Réduire les vibrations pour obtenir une excellente finition de surface

4. Rayon d'angle
   Réduire l'écaillage et prolonger la durée de vie de l'outil
   Rayon d'angle normalisé pour les composants aérospatiaux (XQ Alu)

5. Bord de coupe stable
   Permet des vitesses et des vitesses d'avance élevées améliorant considérablement la productivité

6. Adapté aux matériaux P, M, K, S

# 949 / C49

<35 HRC

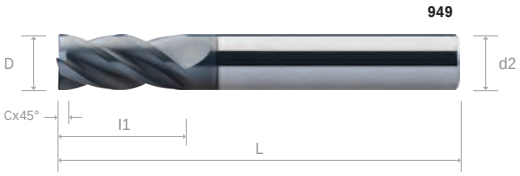
HPMT

## NiTiCo 30 DP/DH / with Weldon Endmills, 4 Flutes

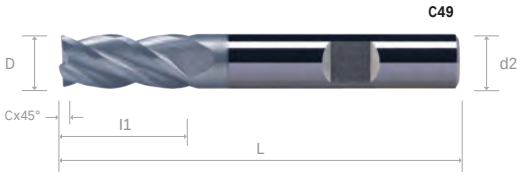
NiTiCo 30 DP/DH / Con fresas Weldon, 4 hélices

NiTiCo 30 DP/DH Fräser, 4 Zähne

Fraises NiTiCo 30 DP/DH à pas décalés et hélices différentes, 4 dents






| Order Number HA | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | C | Availability |
|---|---|---|---|---|---|---|---|
| 949 0400 | 4 | 11 | | 57 | 6 | 0.1 | • |
| 949 0500 | 5 | 13 | | 57 | 6 | 0.1 | • |
| 949 0600 | 6 | | | 57 | 6 | 0.1 | • |
| 949 0800 | 8 | 20 | | 64 | 8 | 0.2 | • |
| 949 1000 | 10 | 22 | | 72 | 10 | 0.2 | • |
| 949 1200 | 12 | 26 | | 83 | 12 | 0.2 | • |
| 949 1400 | 14 | | | 83 | 14 | 0.3 | • |
| 949 1600 | 16 | 32 | | 92 | 16 | 0.3 | • |
| 949 1800 | 18 | | | 92 | 18 | 0.3 | • |
| 949 2000 | 20 | 38 | | 104 | 20 | 0.4 | • |

| Order Number HB | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | C | Availability |
|---|---|---|---|---|---|---|---|
| C49 0400 | 4 | 11 | | 57 | 6 | 0.1 | • |
| C49 0500 | 5 | 13 | | 57 | 6 | 0.1 | • |
| C49 0600 | 6 | | | 57 | 6 | 0.1 | • |
| C49 0800 | 8 | 20 | | 64 | 8 | 0.2 | • |
| C49 1000 | 10 | 22 | | 72 | 10 | 0.2 | • |
| C49 1200 | 12 | 26 | | 83 | 12 | 0.2 | • |
| C49 1400 | 14 | | | 83 | 14 | 0.3 | • |
| C49 1600 | 16 | 32 | | 92 | 16 | 0.3 | • |
| C49 1800 | 18 | | | 92 | 18 | 0.3 | • |
| C49 2000 | 20 | 38 | | 104 | 20 | 0.4 | • |

| CNC Repeatability |
|---|
| Ø1 - Ø3 within 10µm |
| Ø4 - Ø8 within 15µm |
| ≥ Ø10 within 20µm |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | • | • | • | • | • | • | • | • | • | • | | | | |

Cutting Parameter

143

# K78

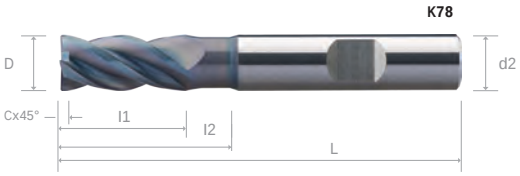


## NiTiCo 30 DP/DH Endmills with Recess, 4 Flutes

NiTiCo 30 DP/DH Fresas de mango con rebaje, 4 canales

NiTiCo 30 DP/DH Fräser mit Freistellung, 4 Zähne

Fraises NiTiCo 30 DP/DH avec queue d'huile Weldon and dégagement - 4 dents



| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | C | Availability |
|---|---|---|---|---|---|---|---|
| K78 0400 | 4 | 11 | 15 | 57 | 6 | 0.1 | • |
| K78 0500 | 5 | 13 | 18 | 57 | 6 | 0.1 | • |
| K78 0600 | 6 | | 19 | 57 | 6 | 0.1 | • |
| K78 0800 | 8 | 20 | 26 | 64 | 8 | 0.2 | • |
| K78 1000 | 10 | 22 | 30 | 72 | 10 | 0.2 | • |
| K78 1200 | 12 | 26 | 36 | 83 | 12 | 0.2 | • |
| K78 1400 | 14 | | 36 | 83 | 14 | 0.3 | • |
| K78 1600 | 16 | 32 | 42 | 92 | 16 | 0.3 | • |
| K78 2000 | 20 | 38 | 52 | 104 | 20 | 0.4 | • |

| CNC Repeatability |
|---|
| Ø1 - Ø3 within 10µm |
| Ø4 - Ø8 within 15µm |
| ≥ Ø10 within 20µm |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | • | • | • | • | • | • | • | • | • | • | • | | | | |

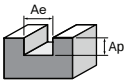
# Recommended Cutting Data

HPMT

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

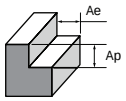
P M K N S | P K

## NiTiCo 30 DP/DH / with Weldon Endmills, 4 Flutes - 949, C49, K78




| Slotting | K | | | | P | | | | | | M | | | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Grey Cast Iron | | Ductile Cast Iron | | Carbon Steel | | Alloy Steel | | Prehardened Steel | | Stainless Steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | - | | - | | 520 < Rm < 1200 | | - | | High Machinability | | Low Machinability | | - | | - | | - | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| Cutting Width, ae | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.004 | | 0.004 | | 0.005 | | 0.003 | | 0.003 | | 0.003 | | 0.003 | | 0.003 | | 0.003 | | 0.003 |
| 2 | | 0.008 | | 0.008 | | 0.008 | | 0.007 | | 0.007 | | 0.006 | | 0.007 | | 0.005 | | 0.005 | | 0.005 |
| 3 | | 0.012 | | 0.012 | | 0.012 | | 0.011 | | 0.011 | | 0.010 | | 0.011 | | 0.008 | | 0.008 | | 0.008 |
| 4 | | 0.016 | | 0.017 | | 0.016 | | 0.015 | | 0.015 | | 0.013 | | 0.015 | | 0.011 | | 0.011 | | 0.010 |
| 5 | | 0.021 | | 0.022 | | 0.020 | | 0.019 | | 0.019 | | 0.017 | | 0.019 | | 0.014 | | 0.014 | | 0.013 |
| 6 | | 0.026 | | 0.029 | | 0.025 | | 0.024 | | 0.024 | | 0.020 | | 0.023 | | 0.017 | | 0.017 | | 0.016 |
| 8 | 160 | 0.036 | 104 | 0.039 | 200 | 0.036 | 160 | 0.033 | 150 | 0.033 | 180 | 0.029 | 120 | 0.033 | 60 | 0.024 | 30 | 0.024 | 30 | 0.023 |
| 10 | | 0.048 | | 0.051 | | 0.047 | | 0.044 | | 0.043 | | 0.038 | | 0.044 | | 0.032 | | 0.032 | | 0.030 |
| 12 | | 0.060 | | 0.063 | | 0.060 | | 0.056 | | 0.056 | | 0.049 | | 0.056 | | 0.040 | | 0.040 | | 0.038 |
| 14 | | 0.068 | | 0.071 | | 0.068 | | 0.063 | | 0.063 | | 0.055 | | 0.063 | | 0.046 | | 0.046 | | 0.044 |
| 16 | | 0.076 | | 0.077 | | 0.076 | | 0.071 | | 0.072 | | 0.061 | | 0.069 | | 0.050 | | 0.050 | | 0.048 |
| 18 | | 0.083 | | 0.084 | | 0.083 | | 0.077 | | 0.080 | | 0.065 | | 0.074 | | 0.055 | | 0.055 | | 0.052 |
| 20 | | 0.089 | | 0.090 | | 0.089 | | 0.083 | | 0.086 | | 0.071 | | 0.080 | | 0.058 | | 0.058 | | 0.055 |

## NiTiCo 30 DP/DH / with Weldon Endmills, 4 Flutes - 949, C49, K78




| Side Milling | K | | | | P | | | | | | M | | | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Grey Cast Iron | | Ductile Cast Iron | | Carbon Steel | | Alloy Steel | | Prehardened Steel | | Stainless Steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | - | | - | | 520 < Rm < 1200 | | - | | High Machinability | | Low Machinability | | - | | - | | - | |
| Cutting depth, ap | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.25 × D | | 1.5 × D | | 1.5 × D | | 1.00 × D | |
| Cutting Width, ae | 0.25 × D | | 0.25 × D | | 0.25 × D | | 0.20 × D | | 0.20 × D | | 0.18 × D | | 0.18 × D | | 0.15 × D | | 0.15 × D | | 0.10 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.007 | | 0.007 | | 0.008 | | 0.006 | | 0.006 | | 0.006 | | 0.006 | | 0.006 | | 0.006 | | 0.006 |
| 2 | | 0.010 | | 0.010 | | 0.010 | | 0.010 | | 0.010 | | 0.010 | | 0.012 | | 0.012 | | 0.012 | | 0.011 |
| 3 | | 0.016 | | 0.016 | | 0.016 | | 0.015 | | 0.015 | | 0.016 | | 0.018 | | 0.018 | | 0.018 | | 0.017 |
| 4 | | 0.022 | | 0.024 | | 0.022 | | 0.021 | | 0.021 | | 0.022 | | 0.025 | | 0.024 | | 0.024 | | 0.023 |
| 5 | | 0.029 | | 0.031 | | 0.029 | | 0.027 | | 0.027 | | 0.028 | | 0.031 | | 0.031 | | 0.031 | | 0.029 |
| 6 | | 0.035 | | 0.039 | | 0.035 | | 0.033 | | 0.033 | | 0.033 | | 0.038 | | 0.038 | | 0.038 | | 0.036 |
| 8 | 220 | 0.050 | 143 | 0.054 | 200 | 0.050 | 200 | 0.047 | 188 | 0.047 | 195 | 0.046 | 130 | 0.052 | 60 | 0.052 | 30 | 0.052 | 30 | 0.049 |
| 10 | | 0.066 | | 0.070 | | 0.066 | | 0.061 | | 0.059 | | 0.058 | | 0.067 | | 0.068 | | 0.068 | | 0.065 |
| 12 | | 0.083 | | 0.087 | | 0.083 | | 0.077 | | 0.077 | | 0.071 | | 0.082 | | 0.084 | | 0.084 | | 0.080 |
| 14 | | 0.095 | | 0.099 | | 0.095 | | 0.088 | | 0.088 | | 0.081 | | 0.093 | | 0.093 | | 0.093 | | 0.088 |
| 16 | | 0.106 | | 0.108 | | 0.107 | | 0.099 | | 0.101 | | 0.091 | | 0.103 | | 0.101 | | 0.101 | | 0.096 |
| 18 | | 0.116 | | 0.118 | | 0.118 | | 0.109 | | 0.113 | | 0.099 | | 0.112 | | 0.109 | | 0.109 | | 0.104 |
| 20 | | 0.126 | | 0.128 | | 0.129 | | 0.118 | | 0.122 | | 0.108 | | 0.121 | | 0.115 | | 0.115 | | 0.109 |

# Recommended Cutting Data

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P M K S P K

## NiTiCo 30 DP/DH / with Weldon Endmills, 4 Flutes - 949, C49, K78

| Ramp/Helical | K | | | | P | | | | | | M | | | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Grey Cast Iron | | Ductile Cast Iron | | Carbon Steel | | Alloy Steel | | Prehardened Steel | | Stainless Steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | - | | - | | 520 < Rm < 1200 | | - | | High Machinability | | Low Machinability | | - | | - | | - | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| Ramping Angle | 5° | | 5° | | 5° | | 5° | | 5° | | 3° | | 3° | | 2° | | 2° | | 2° | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 3 | | 0.012 | | 0.012 | | 0.015 | | 0.014 | | 0.014 | | 0.014 | | 0.000 | | 0.009 | | 0.009 | | 0.024 |
| 4 | | 0.017 | | 0.018 | | 0.020 | | 0.019 | | 0.019 | | 0.021 | | 0.000 | | 0.014 | | 0.014 | | 0.030 |
| 5 | | 0.021 | | 0.022 | | 0.027 | | 0.024 | | 0.024 | | 0.028 | | 0.000 | | 0.020 | | 0.020 | | 0.037 |
| 6 | | 0.027 | | 0.030 | | 0.033 | | 0.031 | | 0.031 | | 0.035 | | 0.000 | | 0.025 | | 0.025 | | 0.051 |
| 8 | 220 | 0.038 | 150 | 0.041 | 200 | 0.047 | 140 | 0.045 | 133 | 0.045 | 80 | 0.055 | 60 | 0.000 | 50 | 0.037 | 25 | 0.037 | 85 | 0.065 |
| 10 | | 0.050 | | 0.053 | | 0.062 | | 0.058 | | 0.056 | | 0.076 | | 0.000 | | 0.055 | | 0.055 | | 0.081 |
| 12 | | 0.063 | | 0.066 | | 0.076 | | 0.074 | | 0.074 | | 0.102 | | 0.000 | | 0.072 | | 0.072 | | 0.103 |
| 14 | | 0.071 | | 0.074 | | 0.086 | | 0.084 | | 0.084 | | 0.111 | | 0.000 | | 0.081 | | 0.081 | | 0.122 |
| 16 | | 0.078 | | 0.079 | | 0.095 | | 0.092 | | 0.094 | | 0.118 | | 0.000 | | 0.086 | | 0.086 | | 0.140 |
| 18 | | 0.084 | | 0.085 | | 0.101 | | 0.099 | | 0.102 | | 0.121 | | 0.000 | | 0.091 | | 0.091 | | 0.160 |
| 20 | | 0.090 | | 0.091 | | 0.108 | | 0.106 | | 0.109 | | 0.123 | | 0.000 | | 0.093 | | 0.093 | | 0.200 |

## NiTiCo 30 DP/DH / with Weldon Endmills, 4 Flutes - 949, C49, K78

| Trochoidal Milling | K | | | | P | | | | | | M | | | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Grey Cast Iron | | Ductile Cast Iron | | Carbon Steel | | Alloy Steel | | Prehardened Steel | | Stainless Steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | - | | - | | 520 < Rm < 1200 | | - | | High Machinability | | Low Machinability | | - | | - | | - | |
| Cutting depth, ap | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | | 1.50 × D | |
| Ramping Angle | 0.10 × D | | 0.10 × D | | 0.10 × D | | 0.10 × D | | 0.10 × D | | 0.10 × D | | 0.10 × D | | 0.10 × D | | 0.10 × D | | 0.10 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 3 | | 0.025 | | 00.025 | | 0.026 | | 0.024 | | 0.024 | | 0.027 | | 0.030 | | 0.024 | | 0.024 | | 0.024 |
| 4 | | 0.034 | | 0.037 | | 0.035 | | 0.033 | | 0.033 | | 0.037 | | 0.043 | | 0.034 | | 0.034 | | 0.030 |
| 5 | | 0.043 | | 0.046 | | 0.044 | | 0.043 | | 0.043 | | 0.048 | | 0.054 | | 0.045 | | 0.045 | | 0.037 |
| 6 | | 0.053 | | 0.059 | | 0.054 | | 0.053 | | 0.053 | | 0.060 | | 0.068 | | 0.057 | | 0.057 | | 0.051 |
| 8 | 220 | 0.073 | 150 | 0.079 | 200 | 0.075 | 1400 | 0.073 | 130 | 0.073 | 200 | 0.084 | 150 | 0.096 | 50 | 0.084 | 24 | 0.084 | 85 | 0.065 |
| 10 | | 0.095 | | 0.101 | | 0.098 | | 0.096 | | 0.093 | | 0.112 | | 0.130 | | 0.116 | | 0.116 | | 0.081 |
| 12 | | 0.118 | | 0.124 | | 0.121 | | 0.120 | | 0.120 | | 0.142 | | 0.163 | | 0.151 | | 0.151 | | 0.103 |
| 14 | | 0.133 | | 0.139 | | 0.138 | | 0.136 | | 0.136 | | 0.158 | | 0.182 | | 0.165 | | 0.165 | | 0.122 |
| 16 | | 0.147 | | 0.150 | | 0.153 | | 0.149 | | 0.152 | | 0.173 | | 0.195 | | 0.176 | | 0.176 | | 0.140 |
| 18 | | 0.160 | | 0.163 | | 0.167 | | 0.162 | | 0.168 | | 0.186 | | 0.211 | | 0.184 | | 0.184 | | 0.160 |
| 20 | | 0.172 | | 0.175 | | 0.180 | | 0.174 | | 0.179 | | 0.197 | | 0.221 | | 0.189 | | 0.189 | | 0.200 |

## NiTiCo 30 DP/DH / with Weldon Endmills, 4 Flutes - 949, C49, K78

| Drilling / Plunging | K | | | | P | | | | | | M | | | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Materiale di lavoro | Grey Cast Iron | | Ductile Cast Iron | | Carbon Steel | | Alloy Steel | | Prehardened Steel | | Stainless Steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | - | | - | | 520 < Rm < 1200 | | - | | High Machinability | | Low Machinability | | - | | - | | - | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| Cutting Width, ae | | | | | | | | | | | | | | | | | | | - | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 3 | | 0.026 | | 0.026 | | 0.028 | | 0.024 | | 0.024 | | 0.025 | | 0.028 | | 0.018 | | 0.018 | | 0.024 |
| 4 | | 0.035 | | 0.038 | | 0.038 | | 0.033 | | 0.033 | | 0.035 | | 0.039 | | 0.024 | | 0.024 | | 0.030 |
| 5 | | 0.044 | | 0.047 | | 0.048 | | 0.042 | | 0.042 | | 0.044 | | 0.049 | | 0.031 | | 0.031 | | 0.037 |
| 6 | | 0.054 | | 0.060 | | 0.058 | | 0.051 | | 0.051 | | 0.054 | | 0.061 | | 0.038 | | 0.038 | | 0.051 |
| 8 | 110 | 0.074 | 75 | 0.079 | 120 | 0.080 | 110 | 0.070 | 130 | 0.070 | 80 | 0.074 | 60 | 0.084 | 40 | 0.052 | 20 | 0.052 | 85 | 0.065 |
| 10 | | 0.095 | | 0.100 | | 0.102 | | 0.091 | | 0.088 | | 0.095 | | 0.110 | | 0.067 | | 0.067 | | 0.081 |
| 12 | | 0.116 | | 0.122 | | 0.126 | | 0.113 | | 0.113 | | 0.118 | | 0.135 | | 0.083 | | 0.083 | | 0.103 |
| 14 | | 0.134 | | 0.140 | | 0.144 | | 0.129 | | 0.129 | | 0.136 | | 0.156 | | 0.095 | | 0.095 | | 0.122 |
| 16 | | 0.150 | | 0.153 | | 0.162 | | 0.144 | | 0.147 | | 0.154 | | 0.174 | | 0.107 | | 0.107 | | 0.140 |
| 18 | | 0.167 | | 0.170 | | 0.180 | | 0.159 | | 0.164 | | 0.172 | | 0.195 | | 0.120 | | 0.120 | | 0.160 |
| 20 | | 0.182 | | 0.185 | | 0.196 | | 0.171 | | 0.177 | | 0.189 | | 0.212 | | 0.131 | | 0.131 | | 0.200 |

# C46



## NiTiCo 30 DP Torus Endmills, 4 Flutes

NiTiCo 30 DP Fresas de mango Torus, 4 canales

Optimum DP Torusfräser , 4 Zähne

Optimum DP toriques à pas décalés, 4 dents




| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R | Availability |
|---|---|---|---|---|---|---|---|
| C46 0400 057 0600 100 | 4 | 12 | | 57 | 6 | 1 | • |
| C46 0500 057 0600 050 | 5 | 15 | | 57 | 6 | 0.5 | • |
| C46 0600 060 0600 030 | 6 | 20 | | 60 | 6 | 0.3 | • |
| C46 0600 060 0600 050 | | | | 60 | 6 | 0.5 | • |
| C46 0600 060 0600 100 | | | | 60 | 6 | 1 | • |
| C46 0800 064 0800 030 | 8 | | | 64 | 8 | 0.3 | • |
| C46 0800 064 0800 050 | | | | 64 | 8 | 0.5 | • |
| C46 0800 064 0800 100 | | | | 64 | 8 | 1 | • |
| C46 1000 075 1000 030 | 10 | 22 | | 75 | 10 | 0.3 | • |
| C46 1000 075 1000 050 | | | | 75 | 10 | 0.5 | • |
| C46 1000 075 1000 100 | | | | 75 | 10 | 1 | • |
| C46 1200 083 1200 030 | 12 | 26 | | 83 | 12 | 0.3 | • |
| C46 1200 083 1200 050 | | | | 83 | 12 | 0.5 | • |
| C46 1200 083 1200 100 | | | | 83 | 12 | 1 | • |
| C46 1200 083 1200 200 | | | | 83 | 12 | 2 | • |
| C46 1400 090 1400 050 | 14 | 32 | | 90 | 14 | 0.5 | • |
| C46 1400 090 1400 100 | | | | 90 | 14 | 1 | • |
| C46 1400 090 1400 150 | | | | 90 | 14 | 1.5 | • |
| C46 1400 090 1400 200 | | | | 90 | 14 | 2 | • |
| C46 1600 092 1600 030 | 16 | | | 92 | 16 | 0.3 | • |
| C46 1600 092 1600 050 | | | | 92 | 16 | 0.5 | • |
| C46 1600 092 1600 100 | | | | 92 | 16 | 1 | • |
| C46 1600 092 1600 200 | | | | 92 | 16 | 2 | • |
| C46 1600 092 1600 300 | | | | 92 | 16 | 3 | • |
| C46 1800 100 1800 050 | 18 | 38 | | 100 | 18 | 0.5 | • |
| C46 1800 100 1800 100 | | | | 100 | 18 | 1 | • |
| C46 1800 100 1800 150 | | | | 100 | 18 | 1.5 | • |
| C46 1800 100 1800 200 | | | | 100 | 18 | 2 | • |
| C46 1800 100 1800 300 | | | | 100 | 18 | 3 | • |
| C46 2000 104 2000 030 | 20 | | | 104 | 20 | 0.3 | • |
| C46 2000 104 2000 050 | | | | 104 | 20 | 0.5 | • |
| C46 2000 104 2000 100 | | | | 104 | 20 | 1 | • |
| C46 2000 104 2000 200 | | | | 104 | 20 | 2 | • |
| C46 2000 104 2000 250 | | | | 104 | 20 | 2.5 | • |
| C46 2000 104 2000 300 | | | | 104 | 20 | 3 | • |
| C46 2000 104 2000 400 | | | | 104 | 20 | 4 | • |

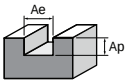
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | • | | • | • | | • | | • | • | • | | | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

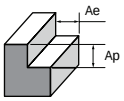
P M K S P K

## NiTiCo 30 DP Torus Endmills, 4 Flutes - C46




| Slotting | K | | P | | | | M | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Grey Cast Iron | | Carbon Steel | | Alloy steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | - | | 520 < Rm < 1200 | | High Machinability | | - | | - | | - | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 0.50 × D | | 0.50 × D | | 0.50 × D | |
| Cutting Width, ae | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | 170 | 0.003 | 200 | 0.003 | 160 | 0.002 | 120 | 0.003 | 60 | 0.004 | 30 | 0.004 | 20 | 0.003 |
| 2 | | 0.005 | | 0.005 | | 0.005 | | 0.006 | | 0.008 | | 0.008 | | 0.007 |
| 3 | | 0.008 | | 0.008 | | 0.008 | | 0.009 | | 0.013 | | 0.013 | | 0.012 |
| 4 | | 0.011 | | 0.011 | | 0.011 | | 0.012 | | 0.017 | | 0.017 | | 0.016 |
| 5 | | 0.015 | | 0.015 | | 0.014 | | 0.016 | | 0.023 | | 0.023 | | 0.021 |
| 6 | | 0.018 | | 0.018 | | 0.018 | | 0.020 | | 0.027 | | 0.027 | | 0.026 |
| 8 | | 0.025 | | 0.025 | | 0.025 | | 0.028 | | 0.039 | | 0.039 | | 0.037 |
| 10 | | 0.033 | | 0.033 | | 0.033 | | 0.037 | | 0.052 | | 0.052 | | 0.049 |
| 12 | | 0.041 | | 0.042 | | 0.041 | | 0.048 | | 0.064 | | 0.064 | | 0.061 |
| 14 | | 0.048 | | 0.047 | | 0.047 | | 0.054 | | 0.074 | | 0.074 | | 0.070 |
| 16 | | 0.054 | | 0.053 | | 0.053 | | 0.060 | | 0.081 | | 0.081 | | 0.077 |
| 18 | | 0.058 | | 0.058 | | 0.058 | | 0.065 | | 0.086 | | 0.086 | | 0.082 |
| 20 | | 0.063 | | 0.063 | | 0.063 | | 0.069 | | 0.093 | | 0.093 | | 0.088 |

## NiTiCo 30 DP Torus Endmills, 4 Flutes - C46




| Side Milling | K | | P | | | | M | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Grey Cast Iron | | Carbon Steel | | Alloy steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | - | | 520 < Rm < 1200 | | High Machinability | | - | | - | | - | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 0.50 × D | |
| Cutting Width, ae | 0.25 × D | | 0.25 × D | | 0.25 × D | | 0.18 × D | | 0.15 × D | | 0.15 × D | | 1.00 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | 250 | 0.007 | 280 | 0.008 | 230 | 0.006 | 160 | 0.004 | 85 | 0.006 | 43 | 0.006 | 28 | 0.005 |
| 2 | | 0.010 | | 0.010 | | 0.009 | | 0.010 | | 0.012 | | 0.012 | | 0.011 |
| 3 | | 0.016 | | 0.016 | | 0.014 | | 0.015 | | 0.019 | | 0.019 | | 0.018 |
| 4 | | 0.021 | | 0.022 | | 0.019 | | 0.021 | | 0.026 | | 0.026 | | 0.024 |
| 5 | | 0.027 | | 0.028 | | 0.025 | | 0.027 | | 0.033 | | 0.033 | | 0.031 |
| 6 | | 0.033 | | 0.034 | | 0.030 | | 0.034 | | 0.040 | | 0.040 | | 0.038 |
| 8 | | 0.046 | | 0.047 | | 0.043 | | 0.046 | | 0.057 | | 0.057 | | 0.054 |
| 10 | | 0.060 | | 0.060 | | 0.056 | | 0.059 | | 0.075 | | 0.075 | | 0.071 |
| 12 | | 0.075 | | 0.074 | | 0.069 | | 0.074 | | 0.094 | | 0.094 | | 0.089 |
| 14 | | 0.086 | | 0.086 | | 0.080 | | 0.084 | | 0.105 | | 0.105 | | 0.100 |
| 16 | | 0.097 | | 0.097 | | 0.090 | | 0.095 | | 0.115 | | 0.115 | | 0.109 |
| 18 | | 0.106 | | 0.107 | | 0.099 | | 0.103 | | 0.123 | | 0.123 | | 0.117 |
| 20 | | 0.114 | | 0.117 | | 0.107 | | 0.110 | | 0.130 | | 0.130 | | 0.124 |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P M K S P K

## NiTiCo 30 DP Torus Endmills, 4 Flutes - C46

| Ramp/Helical | K | | P | | | | M | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Grey Cast Iron | | Carbon Steel | | Alloy steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | - | | 520 < Rm < 1200 | | High Machinability | | - | | - | | - | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| Ramping Angle | 5° | | 5° | | 5° | | 3° | | 2° | | 2° | | 2° | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 3 | 200 | 0.007 | 200 | 0.007 | 140 | 0.006 | 70 | 0.006 | 50 | 0.004 | 30 | 0.004 | 20 | 0.003 |
| 4 | | 0.010 | | 0.010 | | 0.009 | | 0.010 | | 0.006 | | 0.006 | | 0.005 |
| 5 | | 0.013 | | 0.014 | | 0.013 | | 0.014 | | 0.010 | | 0.010 | | 0.010 |
| 6 | | 0.016 | | 0.017 | | 0.016 | | 0.019 | | 0.013 | | 0.013 | | 0.012 |
| 8 | | 0.023 | | 0.024 | | 0.023 | | 0.028 | | 0.021 | | 0.021 | | 0.020 |
| 10 | | 0.030 | | 0.032 | | 0.031 | | 0.038 | | 0.030 | | 0.030 | | 0.028 |
| 12 | | 0.038 | | 0.040 | | 0.039 | | 0.051 | | 0.038 | | 0.038 | | 0.036 |
| 14 | | 0.043 | | 0.046 | | 0.045 | | 0.058 | | 0.042 | | 0.042 | | 0.040 |
| 16 | | 0.048 | | 0.051 | | 0.049 | | 0.063 | | 0.045 | | 0.045 | | 0.043 |
| 18 | | 0.051 | | 0.056 | | 0.053 | | 0.064 | | 0.047 | | 0.047 | | 0.045 |
| 20 | | 0.054 | | 0.059 | | 0.055 | | 0.063 | | 0.047 | | 0.047 | | 0.045 |

# C47 / C64



## NiTiCo 30 DP/DH with Weldon Endmills, 4 Flutes

NiTiCo 30 DP/DH Con Fresas Weldon, 4 Filos

NiTiCo 30 DP/DH Fräser, 4 Zähne

Fraises NiTiCo 30 DP/DH à pas décalés et hélices différentes, 4 dents





| Order Number HA | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | C | Availability |
|---|---|---|---|---|---|---|---|
| C47 0600 050 | 6 | 16 | | 50 | 6 | 0.1 | • |
| C47 0600 057 | | | | 57 | 6 | 0.1 | • |
| C47 0800 064 | 8 | 20 | | 64 | 8 | 0.2 | • |
| C47 1000 070 | 10 | 22 | | 70 | 10 | 0.2 | • |
| C47 1200 083 | 12 | 26 | | 83 | 12 | 0.2 | • |
| C47 1400 083 | 14 | | | 83 | 14 | 0.3 | • |
| C47 1600 090 | 16 | 32 | | 90 | 16 | 0.3 | • |
| C47 1600 092 | | | | 92 | 16 | 0.3 | • |
| C47 1800 092 | 18 | | | 92 | 18 | 0.3 | • |
| C47 1800 100 | | 38 | | 100 | 18 | 0.3 | • |
| C47 2000 100 | 20 | | | 100 | 20 | 0.4 | • |
| C47 2000 104 | | | | 104 | 20 | 0.4 | • |

| Order Number HB | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | C | Availability |
|---|---|---|---|---|---|---|---|
| C64 0600 050 | 6 | 16 | | 50 | 6 | 0.1 | • |
| C64 0600 057 | | | | 57 | 6 | 0.1 | • |
| C64 0800 064 | 8 | 20 | | 64 | 8 | 0.2 | • |
| C64 1000 070 | 10 | 22 | | 70 | 10 | 0.2 | • |
| C64 1200 083 | 12 | 26 | | 83 | 12 | 0.2 | • |
| C64 1400 083 | 14 | | | 83 | 14 | 0.3 | • |
| C64 1600 090 | 16 | 32 | | 90 | 16 | 0.3 | • |
| C64 1600 092 | | | | 92 | 16 | 0.3 | • |
| C64 1800 092 | 18 | | | 92 | 18 | 0.3 | • |
| C64 1800 100 | | 38 | | 100 | 18 | 0.3 | • |
| C64 2000 100 | 20 | | | 100 | 20 | 0.4 | • |
| C64 2000 104 | | | | 104 | 20 | 0.4 | • |

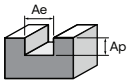
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | • | | • | • | | • | | • | • | • | | | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

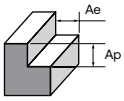
P M K S P K

## NiTiCo 30 DP/DH with Weldon Endmills, 4 Flutes - C47, C64




| Slotting | K | | P | | | | M | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Grey Cast Iron | | Carbon Steel | | Alloy steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | - | | 520 < Rm < 1200 | | High Machinability | | - | | - | | - | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 0.50 × D | | 1.00 × D | | 1.00 × D | |
| Cutting Width, ae | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 0.15 × D | | 1.00 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 6 | 190 | 0.020 | 220 | 0.020 | 175 | 0.020 | 130 | 0.022 | 65 | 0.032 | 100 | 0.032 | 90 | 0.030 |
| 8 | | 0.027 | | 0.027 | | 0.027 | | 0.030 | | 0.042 | | 0.042 | | 0.040 |
| 10 | | 0.035 | | 0.035 | | 0.035 | | 0.039 | | 0.054 | | 0.054 | | 0.052 |
| 12 | | 0.043 | | 0.043 | | 0.042 | | 0.048 | | 0.067 | | 0.067 | | 0.064 |
| 14 | | 0.049 | | 0.050 | | 0.048 | | 0.055 | | 0.076 | | 0.076 | | 0.072 |
| 16 | | 0.056 | | 0.057 | | 0.054 | | 0.062 | | 0.085 | | 0.085 | | 0.081 |
| 18 | | 0.062 | | 0.063 | | 0.060 | | 0.068 | | 0.093 | | 0.093 | | 0.089 |
| 20 | | 0.069 | | 0.069 | | 0.066 | | 0.075 | | 0.102 | | 0.102 | | 0.097 |

## NiTiCo 30 DP/DH with Weldon Endmills, 4 Flutes - C47, C64




| Side Milling | K | | P | | | | M | | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Grey Cast Iron | | Carbon Steel | | Alloy steel | | Stainless Steel | | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | - | | 520 < Rm < 1200 | | High Machinability | | - | | - | | - | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| Cutting Width, ae | 0.25 × D | | 0.25 × D | | 0.20 × D | | 0.18 × D | | 0.15 × D | | 0.15 × D | | 0.10 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 6 | 275 | 0.035 | 310 | 0.037 | 255 | 0.034 | 175 | 0.036 | 95 | 0.043 | 135 | 0.002 | 120 | 0.002 |
| 8 | | 0.048 | | 0.050 | | 0.046 | | 0.048 | | 0.059 | | 0.003 | | 0.003 |
| 10 | | 0.060 | | 0.063 | | 0.059 | | 0.061 | | 0.075 | | 0.005 | | 0.005 |
| 12 | | 0.075 | | 0.076 | | 0.072 | | 0.075 | | 0.093 | | 0.007 | | 0.007 |
| 14 | | 0.086 | | 0.087 | | 0.084 | | 0.086 | | 0.106 | | 0.010 | | 0.009 |
| 16 | | 0.095 | | 0.096 | | 0.093 | | 0.095 | | 0.119 | | 0.012 | | 0.011 |
| 18 | | 0.103 | | 0.105 | | 0.102 | | 0.103 | | 0.131 | | 0.015 | | 0.014 |
| 20 | | 0.113 | | 0.116 | | 0.111 | | 0.113 | | 0.141 | | 0.017 | | 0.016 |

FEATURES & BENEFITS

# NiTiCo 45 DP/DH Square

## 1. Differential Pitch (DP)


Reduces chatter to provide excellent surface finishing

## 2. Differential Helix (DH)


Reduces the cutting force:
-Allowing high speed machining
-Improves surface finishing

## 3. Ideal Cutting Edge

Provides edge protection to prolong tool life

## 4. Superior Coating to Reduce Friction

-Enhances heat resistance to reduce tool wear
-Increases hardness and higher abrasive wear resistance
-Higher thermal resistance
-Smoother chip evacuation

## 5. Suitable for Material Groups

P M K S

## CARATTERISTICHE TECNICHE

1. Paso diferenciado (DP)
   Reduce las vibraciones y proporciona un acabado superficial

2. Hélice Variable (DH)
   Reduce la fuerza de corte
   Permite el mecanizado a alta velocidad
   Mejora el acabado superficial

3. La cuchilla ideal
   Protege los bordes para prolongar la vida útil de la herramienta

4. Recubrimiento superior para reducir la fricción
   Mejora la resistencia al calor para reducir el desgaste de las herramientas
   Aumenta la dureza y la resistencia al desgaste abrasivo
   Mayor resistencia térmica
   Evacuación más suave de la viruta

5. Adecuado para materiales P, M, K, S

## MERKMALE UND VORTEILE

1. Ungleiche Teilung (DP)
   Ungleiche Anordnung der Spannuten, um Eigenresonanz ufzulösen und Vibrationen zu reduzieren

2. Ungleiche Drallsteigung (DH)
   Minimierung von Vibrationen und Resonanzen während der Bearbeitung
   Erhöht die Werkzeugstandzeit und Produktivität
   Ausgezeichnete Oberflächengüte

3. Perfekte Schneide
   Bietet Schneidkantenschutz,um die Lebensdauer des Werkzeugs zu verlängern

4. Überlegene Beschichtung zur Reduzierung der Reibung
   Erhöht die Hitzebeständigkeit und reduziert den Werkzeugverschleiß
   Erhöhte Härte und höhere Abriebfestigkeit
   Höhere thermische Beständigkeit
   Sanfterer Spanabtransport

5. Geeignet für Materialgruppen P, M, K, S

## CARACTÉRISTIQUES ET AVANTAGES

1. Conception à pas différentiel (DP)
   Réduire les vibrations pour obtenir une excellente finition de surface

2. Conception à hélice variable (DH)
   Riduce la forza di taglio
   Consente lavorazioni ad alta velocità
   Migliora la finitura superficiale

3. Angolo di taglio ideale
   Offre una protezione degli angoli per prolungare la durata dello strumento

4. Revêtement supérieur pour réduire le frottement
   Améliore la résistance à la chaleur pour réduire l'usure des outils
   Augmente la dureté et la résistance à l'usure abrasive
   Meilleure résistance thermique
   Evacuation plus douce des copeaux

5. Adapté aux matériaux P, M, K, S

# K93 / K95

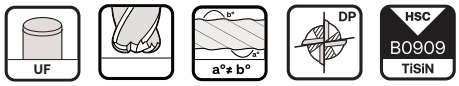
NEW 36 - 52 HRC HPMT

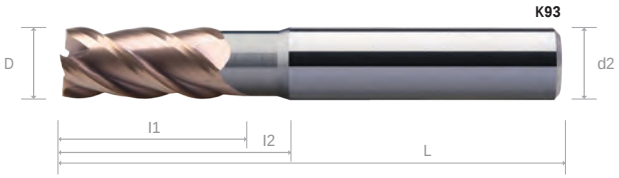
## NiTiCo 45 DP/DH Endmills with Recess / with Recess and Weldon, 4 Flutes

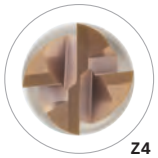
NiTiCo 45 DP/DH Fresas de mango con rebaje / con rebaje y Weldon, 4 canales

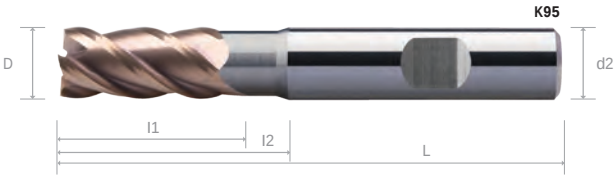
NiTiCo 45 DP/DH Schaftfräser mit Aussparung / mit Aussparung und Weldon, 4 Schneiden

NiTiCo 45 DP/DH Fraises à surfacer / à surfacer et à souder, 4 goujures




| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|
| K93 0300 | 3 | 8 | 14 | 57 | 6 | • |
| K93 0400 | 4 | 11 | 18 | 57 | 6 | • |
| K93 0500 | 5 | 13 | 18 | 57 | 6 | • |
| K93 0600 | 6 | | 20 | 57 | 6 | • |
| K93 0800 | 8 | 19 | 26 | 63 | 8 | • |
| K93 1000 | 10 | 22 | 32 | 72 | 10 | • |
| K93 1200 | 12 | 26 | 36 | 83 | 12 | • |
| K93 1400 | 14 | | 36 | 83 | 14 | • |
| K93 1600 | 16 | 32 | 42 | 92 | 16 | • |
| K93 1800 | 18 | | 42 | 92 | 18 | • |
| K93 2000 | 20 | 38 | 52 | 104 | 20 | • |

| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|
| K95 0300 | 3 | 8 | 14 | 57 | 6 | • |
| K95 0400 | 4 | 11 | 18 | 57 | 6 | • |
| K95 0500 | 5 | 13 | 18 | 57 | 6 | • |
| K95 0600 | 6 | | 20 | 57 | 6 | • |
| K95 0800 | 8 | 19 | 26 | 63 | 8 | • |
| K95 1000 | 10 | 22 | 32 | 72 | 10 | • |
| K95 1200 | 12 | 26 | 36 | 83 | 12 | • |
| K95 1400 | 14 | | 36 | 83 | 14 | • |
| K95 1600 | 16 | 32 | 42 | 92 | 16 | • |
| K95 1800 | 18 | | 42 | 92 | 18 | • |
| K95 2000 | 20 | 38 | 52 | 104 | 20 | • |

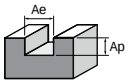
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ○ | | | ○ | | ● | | ● | | | | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

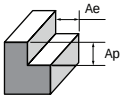
M S

## NiTiCo 45 DP/DH Endmills with Recess / with Recess and Weldon, 4 Flutes - K93, K95




| Slotting | M | | S | |
|---|---|---|---|---|
| Working Material | Stainless Steel | | Nickel Alloy | |
| Properties | Low Machinability | | - | |
| Cutting depth, ap | 0.45 x D | | 0.30 x D | |
| Cutting Width, ae | 1.00 × D | | 1.00 × D | |
| D | Vc | Fz | Vc | Fz |
| 3 | 55 | 0.014 | 25 | 0.011 |
| 4 | | 0.018 | | 0.015 |
| 5 | | 0.023 | | 0.019 |
| 6 | | 0.029 | | 0.024 |
| 8 | | 0.039 | | 0.032 |
| 10 | | 0.050 | | 0.043 |
| 12 | | 0.061 | | 0.054 |
| 14 | | 0.070 | | 0.060 |
| 16 | | 0.078 | | 0.065 |
| 18 | | 0.087 | | 0.073 |
| 20 | | 0.095 | | 0.079 |

## NiTiCo 45 DP/DH Endmills with Recess / with Recess and Weldon, 4 Flutes - K93, K95




| Side Milling | M | | S | |
|---|---|---|---|---|
| Working Material | Stainless Steel | | Nickel Alloy | |
| Properties | Low Machinability | | - | |
| Cutting depth, ap | 1.00 x D | | 1.00 x D | |
| Cutting Width, ae | 0.18 × D | | 0.10 × D | |
| D | Vc | Fz | Vc | Fz |
| 3 | 70 | 0.016 | 35 | 0.014 |
| 4 | | 0.023 | | 0.019 |
| 5 | | 0.029 | | 0.024 |
| 6 | | 0.035 | | 0.030 |
| 8 | | 0.048 | | 0.041 |
| 10 | | 0.062 | | 0.052 |
| 12 | | 0.078 | | 0.067 |
| 14 | | 0.088 | | 0.076 |
| 16 | | 0.098 | | 0.084 |
| 18 | | 0.106 | | 0.094 |
| 20 | | 0.113 | | 0.101 |

FEATURES & BENEFITS

# NiTiCo 45 DP/DH Torus

## 1. Differential Pitch (DP)


Reduces chatter to provide excellent surface finishing.

## 2. Differential Helix (DH)


Reduces the cutting force:
-Allowing high speed machining
-Improves surface finishing

## 3. Ideal Cutting Edge

Provides edge protection to prolong tool life

## 4. Superior Coating to Reduce Friction

-Enhances heat resistance to reduce tool wear
-Increases hardness and higher abrasive wear resistance
-Higher thermal resistance
-Smoother chip evacuation

## 5. Corner Radius


Reduces chipping and providing longer tool life

## 6. Suitable for Material Groups

P M K S

## CARATTERISTICHE TECNICHE

1. Paso diferenciado (DP)
   Reduce las vibraciones y proporciona un acabado superficial

2. Hélice Variable (DH)
   Reduce la fuerza de corte
   Permite el mecanizado a alta velocidad
   Mejora el acabado superficial

3. La cuchilla ideal
   Protege los bordes para prolongar la vida útil de la herramienta

4. Recubrimiento superior para reducir la fricción
   Mejora la resistencia al calor para reducir el desgaste de las herramientas
   Aumenta la dureza y la resistencia al desgaste abrasivo
   Mayor resistencia térmica
   Evacuación más suave de la viruta

5. Radio de esquina
   Reduce el astillado y prolonga la vida útil de la herramienta

6. Adecuado para materiales P, M, K, S

## MERKMALE UND VORTEILE

1. Ungleiche Teilung (DP)
   Ungleiche Anordnung der Spannuten, um Eigenresonanz ufzulösen und Vibrationen zu reduzieren

2. Ungleiche Drallsteigung (DH)
   Minimierung von Vibrationen und Resonanzen während der Bearbeitung
   Erhöht die Werkzeugstandzeit und Produktivität
   Ausgezeichnete Oberflächengüte

3. Perfekte Schneide
   Bietet Schneidkantenschutz,um die Lebensdauer des Werkzeugs zu verlängern

4. Überlegene Beschichtung zur Reduzierung der Reibung
   Erhöht die Hitzebeständigkeit und reduziert den Werkzeugverschleiß
   Erhöhte Härte und höhere Abriebfestigkeit
   Höhere thermische Beständigkeit
   Sanfterer Spanabtransport

5. Eckenradius
   Eckenradiushervorragender Schneideckenschutz sorgt für längere Werkzeuglebensdauer

6. Geeignet für Materialgruppen P, M, K, S

## CARACTÉRISTIQUES ET AVANTAGES

1. Conception à pas différentiel (DP)
   Réduire les vibrations pour obtenir une excellente finition de surface

2. Conception à hélice variable (DH)
   Riduce la forza di taglio
   Consente lavorazioni ad alta velocità
   Migliora la finitura superficiale

3. Angolo di taglio ideale
   Offre una protezione degli angoli per prolungare la durata dello strumento

4. Revêtement supérieur pour réduire le frottement
   Améliore la résistance à la chaleur pour réduire l'usure des outils
   Augmente la dureté et la résistance à l'usure abrasive
   Meilleure résistance thermique
   Evacuation plus douce des copeaux

5. Raggio d'angolo
   Riduzione dei trucioli e maggiore durata dell'utensile

6. Adapté aux matériaux P, M, K, S

# K97 / K99

NEW 36 - 52 HRC HPMT

## NiTiCo 45 DP/DH Torus Endmills with Recess / with Recess and Weldon, 4 Flutes

NiTiCo 45 DP/DH Fresas Torus con rebaje / con rebaje y Weldon, 4 canales

NiTiCo 45 DP/DH Torusfräser mit Aussparung / mit Aussparung und Weldon, 4 Schneiden

NiTiCo 45 DP/DH Fraises toriques avec évidement / avec évidement et soudure, 4 goujures

UF | R±0.010 | a°≠ b° | DP | HSC B0909 TiSiN




| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R | Availability |
|---|---|---|---|---|---|---|---|
| K97 0300 050 0600 030 | 3 | 8 | 15 | 57 | 6 | 0.3 | • |
| K97 0300 050 0600 050 | | | 15 | 57 | 6 | 0.5 | • |
| K97 0400 057 0600 030 | 4 | 11 | 18 | 57 | 6 | 0.3 | • |
| K97 0400 057 0600 050 | | | 18 | 57 | 6 | 0.5 | • |
| K97 0400 057 0600 100 | | | 18 | 57 | 6 | 1 | • |
| K97 0500 057 0600 030 | 5 | 13 | 18 | 57 | 6 | 0.3 | • |
| K97 0500 057 0600 050 | | | 18 | 57 | 6 | 0.5 | • |
| K97 0600 057 0600 030 | 6 | | 20 | 57 | 6 | 0.3 | • |
| K97 0600 057 0600 050 | | | 20 | 57 | 6 | 0.5 | • |
| K97 0600 057 0600 100 | | | 20 | 57 | 6 | 1 | • |
| K97 0800 064 0800 030 | 8 | 19 | 26 | 63 | 8 | 0.3 | • |
| K97 0800 064 0800 050 | | | 26 | 63 | 8 | 0.5 | • |
| K97 0800 064 0800 100 | | | 26 | 63 | 8 | 1 | • |
| K97 0800 064 0800 150 | | | 26 | 63 | 8 | 1.5 | • |
| K97 0800 064 0800 200 | | | 26 | 63 | 8 | 2 | • |
| K97 1000 072 1000 030 | 10 | 22 | 30 | 72 | 10 | 0.3 | • |
| K97 1000 072 1000 050 | | | 30 | 72 | 10 | 0.5 | • |
| K97 1000 072 1000 100 | | | 30 | 72 | 10 | 1 | • |
| K97 1000 072 1000 150 | | | 30 | 72 | 10 | 1.5 | • |
| K97 1000 072 1000 200 | | | 30 | 72 | 10 | 2 | • |
| K97 1200 083 1200 030 | 12 | 26 | 36 | 83 | 12 | 0.3 | • |
| K97 1200 083 1200 050 | | | 36 | 83 | 12 | 0.5 | • |
| K97 1200 083 1200 100 | | | 36 | 83 | 12 | 1 | • |
| K97 1200 083 1200 200 | | | 36 | 83 | 12 | 2 | • |
| K97 1200 083 1200 250 | | | 36 | 83 | 12 | 2.5 | • |
| K97 1200 083 1200 300 | | | 36 | 83 | 12 | 3 | • |
| K97 1400 083 1400 030 | 14 | | 36 | 83 | 14 | 0.3 | • |
| K97 1400 083 1400 050 | | | 36 | 83 | 14 | 0.5 | • |
| K97 1400 083 1400 100 | | | 36 | 83 | 14 | 1 | • |
| K97 1400 083 1400 200 | | | 36 | 83 | 14 | 2 | • |
| K97 1400 083 1400 300 | | | 36 | 83 | 14 | 3 | • |
| K97 1600 092 1600 030 | 16 | 32 | 42 | 92 | 16 | 0.3 | • |
| K97 1600 092 1600 050 | | | 42 | 92 | 16 | 0.5 | • |
| K97 1600 092 1600 100 | | | 42 | 92 | 16 | 1 | • |
| K97 1600 092 1600 200 | | | 42 | 92 | 16 | 2 | • |
| K97 1600 092 1600 250 | | | 42 | 92 | 16 | 2.5 | • |
| K97 1600 092 1600 300 | | | 42 | 92 | 16 | 3 | • |
| K97 1600 092 1600 400 | | | 42 | 92 | 16 | 4 | • |
| K97 1800 092 1800 030 | 18 | | 42 | 92 | 18 | 0.3 | • |
| K97 1800 092 1800 050 | | | 42 | 92 | 18 | 0.5 | • |
| K97 1800 092 1800 100 | | | 42 | 92 | 18 | 1 | • |
| K97 1800 092 1800 200 | | | 42 | 92 | 18 | 2 | • |
| K97 1800 092 1800 300 | | | 42 | 92 | 18 | 3 | • |
| K97 2000 104 2000 030 | 20 | 38 | 52 | 104 | 20 | 0.3 | • |
| K97 2000 104 2000 050 | | | 52 | 104 | 20 | 0.5 | • |
| K97 2000 104 2000 100 | | | 52 | 104 | 20 | 1 | • |
| K97 2000 104 2000 200 | | | 52 | 104 | 20 | 2 | • |
| K97 2000 104 2000 250 | | | 52 | 104 | 20 | 2.5 | • |
| K97 2000 104 2000 300 | | | 52 | 104 | 20 | 3 | • |
| K97 2000 104 2000 400 | | | 52 | 104 | 20 | 4 | • |

| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R | Availability |
|---|---|---|---|---|---|---|---|
| K99 0300 050 0600 030 | 3 | 8 | 15 | 57 | 6 | 0.3 | • |
| K99 0300 050 0600 050 | | | 15 | 57 | 6 | 0.5 | • |
| K99 0400 057 0600 030 | 4 | 11 | 18 | 57 | 6 | 0.3 | • |
| K99 0400 057 0600 050 | | | 18 | 57 | 6 | 0.5 | • |
| K99 0400 057 0600 100 | | | 18 | 57 | 6 | 1 | • |
| K99 0500 057 0600 030 | 5 | 13 | 18 | 57 | 6 | 0.3 | • |
| K99 0500 057 0600 050 | | | 18 | 57 | 6 | 0.5 | • |
| K99 0600 057 0600 030 | 6 | | 20 | 57 | 6 | 0.3 | • |
| K99 0600 057 0600 050 | | | 20 | 57 | 6 | 0.5 | • |
| K99 0600 057 0600 100 | | | 20 | 57 | 6 | 1 | • |
| K99 0800 064 0800 030 | 8 | 19 | 26 | 63 | 8 | 0.3 | • |
| K99 0800 064 0800 050 | | | 26 | 63 | 8 | 0.5 | • |
| K99 0800 064 0800 100 | | | 26 | 63 | 8 | 1 | • |
| K99 0800 064 0800 150 | | | 26 | 63 | 8 | 1.5 | • |
| K99 0800 064 0800 200 | | | 26 | 63 | 8 | 2 | • |
| K99 1000 072 1000 030 | 10 | 22 | 30 | 72 | 10 | 0.3 | • |
| K99 1000 072 1000 050 | | | 30 | 72 | 10 | 0.5 | • |
| K99 1000 072 1000 100 | | | 30 | 72 | 10 | 1 | • |
| K99 1000 072 1000 150 | | | 30 | 72 | 10 | 1.5 | • |
| K99 1000 072 1000 200 | | | 30 | 72 | 10 | 2 | • |
| K99 1200 083 1200 030 | 12 | 26 | 36 | 83 | 12 | 0.3 | • |
| K99 1200 083 1200 050 | | | 36 | 83 | 12 | 0.5 | • |
| K99 1200 083 1200 100 | | | 36 | 83 | 12 | 1 | • |
| K99 1200 083 1200 200 | | | 36 | 83 | 12 | 2 | • |
| K99 1200 083 1200 250 | | | 36 | 83 | 12 | 2.5 | • |
| K99 1200 083 1200 300 | | | 36 | 83 | 12 | 3 | • |
| K99 1400 083 1400 030 | 14 | | 36 | 83 | 14 | 0.3 | • |
| K99 1400 083 1400 050 | | | 36 | 83 | 14 | 0.5 | • |
| K99 1400 083 1400 100 | | | 36 | 83 | 14 | 1 | • |
| K99 1400 083 1400 200 | | | 36 | 83 | 14 | 2 | • |
| K99 1400 083 1400 300 | | | 36 | 83 | 14 | 3 | • |
| K99 1600 092 1600 030 | 16 | 32 | 42 | 92 | 16 | 0.3 | • |
| K99 1600 092 1600 050 | | | 42 | 92 | 16 | 0.5 | • |
| K99 1600 092 1600 100 | | | 42 | 92 | 16 | 1 | • |
| K99 1600 092 1600 200 | | | 42 | 92 | 16 | 2 | • |
| K99 1600 092 1600 250 | | | 42 | 92 | 16 | 2.5 | • |
| K99 1600 092 1600 300 | | | 42 | 92 | 16 | 3 | • |
| K99 1600 092 1600 400 | | | 42 | 92 | 16 | 4 | • |
| K99 1800 092 1800 030 | 18 | | 42 | 92 | 18 | 0.3 | • |
| K99 1800 092 1800 050 | | | 42 | 92 | 18 | 0.5 | • |
| K99 1800 092 1800 100 | | | 42 | 92 | 18 | 1 | • |
| K99 1800 092 1800 200 | | | 42 | 92 | 18 | 2 | • |
| K99 1800 092 1800 300 | | | 42 | 92 | 18 | 3 | • |
| K99 2000 104 2000 030 | 20 | 38 | 52 | 104 | 20 | 0.3 | • |
| K99 2000 104 2000 050 | | | 52 | 104 | 20 | 0.5 | • |
| K99 2000 104 2000 100 | | | 52 | 104 | 20 | 1 | • |
| K99 2000 104 2000 200 | | | 52 | 104 | 20 | 2 | • |
| K99 2000 104 2000 250 | | | 52 | 104 | 20 | 2.5 | • |
| K99 2000 104 2000 300 | | | 52 | 104 | 20 | 3 | • |
| K99 2000 104 2000 400 | | | 52 | 104 | 20 | 4 | • |

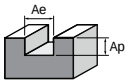
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ○ | | | ○ | | ● | | ● | | | | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

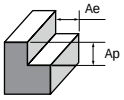
M S

## NiTiCo 45 DP/DH Torus Endmills with Recess / with Recess and Weldon, 4 Flutes - K97, K99




| Slotting | M | | S | |
|---|---|---|---|---|
| Working Material | Stainless Steel | | Nickel Alloy | |
| Properties | Low Machinability | | - | |
| Cutting depth, ap | 0.80 x D | | 0.30 x D | |
| Cutting Width, ae | 1.00 × D | | 1.00 × D | |
| D | Vc | Fz | Vc | Fz |
| 3 | 100 | 0.013 | 30 | 0.011 |
| 4 | | 0.018 | | 0.016 |
| 5 | | 0.024 | | 0.020 |
| 6 | | 0.029 | | 0.027 |
| 8 | | 0.039 | | 0.036 |
| 10 | | 0.049 | | 0.047 |
| 12 | | 0.060 | | 0.056 |
| 14 | | 0.069 | | 0.066 |
| 16 | | 0.077 | | 0.071 |
| 18 | | 0.087 | | 0.080 |
| 20 | | 0.097 | | 0.089 |

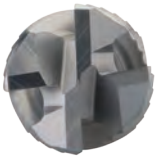
## NiTiCo 45 DP/DH Torus Endmills with Recess / with Recess and Weldon, 4 Flutes - K97, K99




| Side Milling | M | | S | |
|---|---|---|---|---|
| Working Material | Stainless Steel | | Nickel Alloy | |
| Properties | Low Machinability | | - | |
| Cutting depth, ap | 1.00 x D | | 1.00 x D | |
| Cutting Width, ae | 0.18 × D | | 0.10 × D | |
| D | Vc | Fz | Vc | Fz |
| 3 | 85 | 0.017 | 45 | 0.013 |
| 4 | | 0.023 | | 0.019 |
| 5 | | 0.030 | | 0.024 |
| 6 | | 0.036 | | 0.029 |
| 8 | | 0.050 | | 0.041 |
| 10 | | 0.064 | | 0.051 |
| 12 | | 0.081 | | 0.067 |
| 14 | | 0.091 | | 0.074 |
| 16 | | 0.102 | | 0.081 |
| 18 | | 0.112 | | 0.091 |
| 20 | | 0.117 | | 0.101 |

FEATURES & BENEFITS

# NiTiCo 45 DP Roughing



## 1. Differential Pitch (DP)


Reduces chatter to provide excellent surface finishing

## 2. Superior Coating to Reduce Friction

-Enhances heat resistance to reduce tool wear
-Increases hardness and higher abrasive wear resistance
-Higher thermal resistance
-Smoother chip evacuation

## 3. Suitable for Material Groups

P M K S

## CARATTERISTICHE TECNICHE

1. Paso diferenciado (DP)
   Reduce las vibraciones y proporciona un acabado superficial

2. Recubrimiento superior para reducir la fricción
   Mejora la resistencia al calor para reducir el desgaste de las herramientas
   Aumenta la dureza y la resistencia al desgaste abrasivo
   Mayor resistencia térmica
   Evacuación más suave de la viruta

3. Adecuado para materiales P, M, K, S

## MERKMALE UND VORTEILE

1. Ungleiche Teilung (DP)
   Ungleiche Anordnung der Spannuten, um Eigenresonanz ufzulösen und Vibrationen zu reduzieren

2. Überlegene Beschichtung zur Reduzierung der Reibung
   Erhöht die Hitzebeständigkeit und reduziert den Werkzeugverschleiß
   Erhöhte Härte und höhere Abriebfestigkeit
   Höhere thermische Beständigkeit
   Sanfterer Spanabtransport

3. Geeignet für Materialgruppen P, M, K, S

## CARACTÉRISTIQUES ET AVANTAGES

1. Conception à pas différentiel (DP)
   Réduire les vibrations pour obtenir une excellente finition de surface

2. Revêtement supérieur pour réduire le frottement
   Améliore la résistance à la chaleur pour réduire l'usure des outils
   Augmente la dureté et la résistance à l'usure abrasive
   Meilleure résistance thermique
   Evacuation plus douce des copeaux

3. Adapté aux matériaux P, M, K, S

# G47

36 - 52 HRC

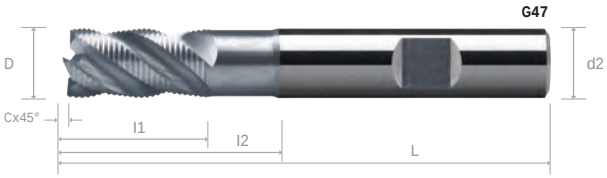
HPMT

## NiTiCo 45 DP Roughing Endmills with Weldon and Recess, 4 Flutes

NiTiCo 45 DP Fresas de Desbaste con Soldadura y Hueco, 4 Filos

NiTiCo 45 DP Schruppfräser mit Schweissnaht und Einstich, 4 Schneiden

NiTiCo 45 DP Fraises d'ébauche à souder et à dépouille, 4 goujures





| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | C | Availability |
|---|---|---|---|---|---|---|---|
| G47 0600 * | 6 | 13 | 20 | 57 | 6 | 0.1 | • |
| G47 0800 | 8 | 20 | 30 | 64 | 8 | 0.2 | • |
| G47 1000 * | 10 | 22 | 32 | 72 | 10 | 0.2 | • |
| G47 1200 * | 12 | 26 | 37 | 83 | 12 | 0.2 | • |
| G47 1400 | 14 | | 44 | 83 | 14 | 0.3 | • |
| G47 1600 | 16 | 32 | 46 | 92 | 16 | 0.3 | • |
| G47 1800 | 18 | | 53 | 92 | 18 | 0.3 | • |
| G47 2000 | 20 | 38 | 58 | 104 | 20 | 0.4 | • |

* - DIN 6535

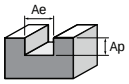
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ● | ○ | | ● | ○ | ● | ● | ● | ● | ● | | | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

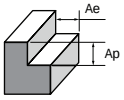
P M K S P

## NiTiCo 45 DP Roughing Endmills with Weldon and Recess, 4 Flutes - G47




| Slotting | K | | P | | M | | S | |
|---|---|---|---|---|---|---|---|---|
| Working Material | Ductile Cast Iron | | Prehardened steel | | Stainless Steel | | Nickel Alloy | |
| Properties | - | | 35 ≤ HRC < 45 | | Low Machinability | | - | |
| Cutting depth, ap | 0.80 x D | | 0.80 x D | | 0.45 x D | | 0.30 x D | |
| Cutting Width, ae | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 6 | 90 | 0.033 | 115 | 0.034 | 55 | 0.035 | 35 | 0.030 |
| 8 | | 0.044 | | 0.046 | | 0.048 | | 0.040 |
| 10 | | 0.056 | | 0.059 | | 0.061 | | 0.052 |
| 12 | | 0.069 | | 0.073 | | 0.075 | | 0.065 |
| 14 | | 0.079 | | 0.084 | | 0.086 | | 0.072 |
| 16 | | 0.089 | | 0.095 | | 0.096 | | 0.079 |
| 18 | | 0.099 | | 0.106 | | 0.108 | | 0.089 |
| 20 | | 0.108 | | 0.116 | | 0.116 | | 0.098 |

## NiTiCo 45 DP Roughing Endmills with Weldon and Recess, 4 Flutes - G47




| Side Milling | K | | P | | M | | S | |
|---|---|---|---|---|---|---|---|---|
| Working Material | Ductile Cast Iron | | Prehardened steel | | Stainless Steel | | Nickel Alloy | |
| Properties | - | | 35 ≤ HRC < 45 | | Low Machinability | | - | |
| Cutting depth, ap | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | |
| Cutting Width, ae | 0.18 × D | | 0.18 × D | | 0.18 × D | | 0.10 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 6 | 100 | 0.038 | 130 | 0.041 | 65 | 0.043 | 45 | 0.037 |
| 8 | | 0.053 | | 0.055 | | 0.058 | | 0.051 |
| 10 | | 0.066 | | 0.070 | | 0.076 | | 0.063 |
| 12 | | 0.083 | | 0.088 | | 0.096 | | 0.081 |
| 14 | | 0.093 | | 0.099 | | 0.108 | | 0.092 |
| 16 | | 0.105 | | 0.110 | | 0.119 | | 0.101 |
| 18 | | 0.115 | | 0.121 | | 0.129 | | 0.113 |
| 20 | | 0.125 | | 0.132 | | 0.139 | | 0.122 |

HPMT

# ALU LINE

## Endmills for Non-Ferrous Materials

# 303

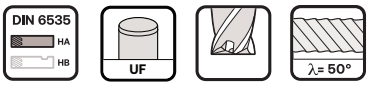
For Aluminium HPMT

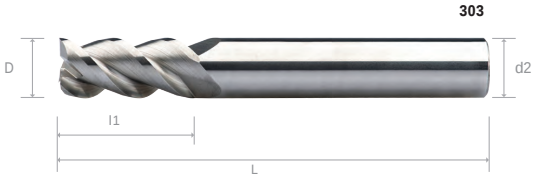
## AL SE Endmills, 3 Flutes

AL SE Fresas de mango, 3 canales

AL SE Schaftfräser, 3 Flöten

Fraises en bout AL SE, 3 cannelures





| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|
| 303 0100 040 03 | 1 | 3 | | 40 | 3 | • |
| 303 0150 040 03 | 1.5 | 4.5 | | 40 | 3 | • |
| 303 0200 040 03 | 2 | 6.5 | | 40 | 3 | • |
| 303 0250 040 03 | 2.5 | | | 40 | 3 | • |
| 303 0300 | 3 | 9 | | 40 | 3 | • |
| 303 0300 050 06 | | | | 50 | 6 | • |
| 303 0400 050 06 | 4 | 12 | | 50 | 6 | • |
| 303 0500 050 06 | 5 | 15 | | 50 | 6 | • |
| 303 0600 060 | 6 | 20 | | 60 | 6 | • |
| 303 0800 | 8 | | | 64 | 8 | • |
| 303 1000 075 | 10 | 22 | | 75 | 10 | • |
| 303 1200 | 12 | 25 | | 75 | 12 | • |
| 303 1400 | 14 | 32 | | 90 | 14 | • |
| 303 1600 | 16 | | | 90 | 16 | • |
| 303 1800 | 18 | 38 | | 100 | 18 | • |
| 303 2000 | 20 | | | 100 | 20 | • |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| • | • | • | | | | | | | | | | | | | • | |

# K30

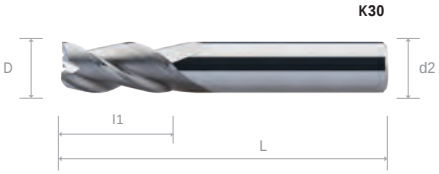
For Aluminium HPMT

## AL SE DP Endmills, 3 Flutes

AL SE DP Fresas de mango, 3 hélices

AL SE DP Schaftfräser, 3 Schneiden

Fraises en bout AL SE DP, 3 goujures



| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|
| K30 0100 040 04 | 1 | 3 | | 40 | 4 | • |
| K30 0150 040 04 | 1.5 | 4.5 | | 40 | 4 | • |
| K30 0200 040 04 | 2 | 6.5 | | 40 | 4 | • |
| K30 0250 040 04 | 2.5 | | | 40 | 4 | • |
| K30 0300 050 06 | 3 | 9 | | 50 | 6 | • |
| K30 0400 050 06 | 4 | 12 | | 50 | 6 | • |
| K30 0500 050 06 | 5 | 15 | | 50 | 6 | • |
| K30 0600 060 | 6 | 20 | | 60 | 6 | • |
| K30 0800 | 8 | | | 64 | 8 | • |
| K30 1000 075 | 10 | 31 | | 75 | 10 | • |
| K30 1200 | 12 | 25 | | 75 | 12 | • |
| K30 1400 | 14 | 32 | | 90 | 14 | • |
| K30 1600 | 16 | 32 | | 90 | 16 | • |

| Ø mm | Tol. µm |
|---|---|
| 0.1 ~ 2.9 | -0 / -20 |
| 3.0 ~ 6.0 | -0 / -25 |
| 6.0 ~ 30.0 | -0 / -30 |

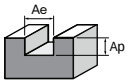
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| • | • | • | | | | | | | | | | | | | • | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

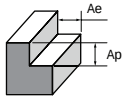
N O

## AL SE DP Endmills, 3 Flutes - 303, K30




| Slotting | N | | | | | | O | |
|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper alloy | | Thermoplastic | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | |
| Cutting depth, ap | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | |
| Cutting Width, ae | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.008 | | 0.006 | | 0.003 | | 0.007 |
| 2 | | 0.010 | | 0.008 | | 0.006 | | 0.009 |
| 3 | | 0.016 | | 0.014 | | 0.010 | | 0.015 |
| 4 | | 0.026 | | 0.022 | | 0.017 | | 0.024 |
| 5 | | 0.033 | | 0.029 | | 0.023 | | 0.031 |
| 6 | | 0.041 | | 0.036 | | 0.029 | | 0.038 |
| 8 | 330 | 0.056 | 290 | 0.049 | 200 | 0.040 | 310 | 0.052 |
| 10 | | 0.071 | | 0.063 | | 0.053 | | 0.067 |
| 12 | | 0.088 | | 0.078 | | 0.067 | | 0.084 |
| 14 | | 0.100 | | 0.089 | | 0.075 | | 0.095 |
| 16 | | 0.112 | | 0.098 | | 0.083 | | 0.106 |
| 18 | | 0.123 | | 0.107 | | 0.089 | | 0.116 |
| 20 | | 0.133 | | 0.116 | | 0.094 | | 0.125 |

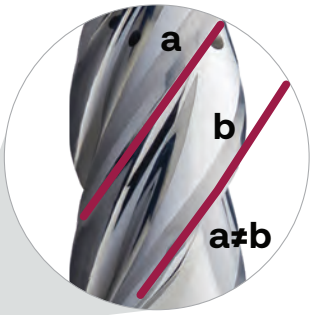
## AL SE DP Endmills, 3 Flutes - 303, K30




| Side Milling | N | | | | | | O | |
|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper alloy | | Thermoplastic | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | |
| Cutting depth, ap | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | |
| Cutting Width, ae | 0.30 x D | | 0.30 x D | | 0.30 x D | | 0.30 x D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 1 | | 0.011 | | 0.009 | | 0.006 | | 0.010 |
| 2 | | 0.013 | | 0.010 | | 0.008 | | 0.010 |
| 3 | | 0.018 | | 0.016 | | 0.014 | | 0.017 |
| 4 | | 0.030 | | 0.027 | | 0.022 | | 0.028 |
| 5 | | 0.038 | | 0.035 | | 0.029 | | 0.036 |
| 6 | | 0.047 | | 0.042 | | 0.036 | | 0.045 |
| 8 | 380 | 0.064 | 340 | 0.058 | 250 | 0.050 | 360 | 0.061 |
| 10 | | 0.081 | | 0.074 | | 0.064 | | 0.078 |
| 12 | | 0.099 | | 0.091 | | 0.080 | | 0.096 |
| 14 | | 0.114 | | 0.103 | | 0.091 | | 0.110 |
| 16 | | 0.128 | | 0.116 | | 0.101 | | 0.123 |
| 18 | | 0.141 | | 0.128 | | 0.109 | | 0.135 |
| 20 | | 0.154 | | 0.139 | | 0.117 | | 0.147 |

FEATURES & BENEFITS

# XQ Alu Cutters




## 1. Differential Pitch (DP)


Reduces chatter to provide excellent surface finishing.

## 2. Polished Flutes


Ensures fast and effective chips evacuation and drasticaly reduces built-up edge.

## 3. Differential Fluting (DF)

With optimized core diameter, counteracts the forces generated and ensures greater milling performance.

## 4 Differential Helix (DH)


**Reduces the cutting force:**

- Allows high speed machining, increasing productivity.
- Improves surface finishing.

## 5. Oil Hole for High Performance Milling

-Improves welding resistance.
-Enables a wide range of machining processes.
-Especially beneficial for difficult to cut materials, offering stable machining.

## CARATTERISTICHE TECNICHE

1. Paso diferenciado (DP)
   Reduce las vibraciones y proporciona un acabado superficial

2. Ranuras lapeadas
   Garantiza una evacuación rápida y ettcaz de la viruta
   Reduce drásticamente el filo de corte

3. Núcleo cónico (DF)
   Con un diámetro de núcleo optimizado, contrarresta las fuerzas generadas y garantiza un mayor rendimiento de fresado

4. Hélice Variable (DH)*
   Reduce la fuerza de corte
   Permite el mecanizado a alta velocidad, aumentando productividad
   Mejora el acabado superficial

5. Orificio de refrigerante para fresado de alta
   Mejora la resistencia de la soldadura
   Permite una amplia gama de procesos de mecanizado
   Especialmente útil para materiales difíciles de cortar, ofreciendo un mecanizado estable

## MERKMALE UND VORTEILE

1. Ungleiche Teilung (DP)
   Ungleiche Anordnung der Spannuten, um Eigenresonanz ufzulösen und Vibrationen zu reduzieren

2. Polierte Schneiden
   Sorgt für schnellen effizienten Spänefluß und reduziert die Bildung von Aufbauschneiden

3. Ungleiche Spannutentiefe (DF)
   Optimierter Kerndurchmesser wirkt den erzeugten Kräften entgegen und ermöglicht einen stabileren Fräsprozess

4. Ungleiche Drallsteigung (DH)
   Minimierung von Vibrationen und Resonanzen während der Bearbeitung
   Erhöht die Werkzeugstandzeit und Produktivität
   Halten Sie die Oberfläche fest, um sich selbst zu zentrieren

5. Große Kühlkanalbohrungen für Hochleistungsfräsen
   Verbessert die Spanabfuhr
   Ermöglicht umfangreiche Applikationen
   Große Vorteile für die Bearbeitung festerer AluminiumlegierungenXQ

## CARACTÉRISTIQUES ET AVANTAGES

1. Conception à pas différentiel (DP)
   Réduire les vibrations pour obtenir une excellente finition de surface

2. Flûtes polies
   Assure une évacuation rapide et efficace des copeaux et réduit considérablement les bords accumulés

3. Cannelures différentielles (DF)
   Avec un diamètre de noyau optimisé, contrecarre les forces générées et assure de meilleures performances de fraisage

4. Conception à hélice variable (DH)
   Réduit la force de coupe
   Permet l'usinage à grande vitesse, augmentant la productivité
   Améliore la finition de surface

5. Trou d'huile pour le fraisage haute performance
   Améliore la résistance au soudage
   Permet une large gamme de processus d'usinage
   Particulièrement bénéfique pour les matériaux difficiles à couper, offrant un usinage stable

# K60

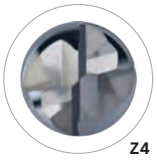
For Aluminium HPMT

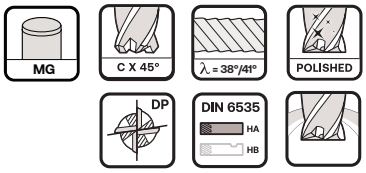
## XQ Alu Cutters DP/DH/DF Endmills with Recess, 4 Flutes

Fresas de mango XQ Alu DP/DH/DF con rebaje, 4 canales

XQ Alu Fräser DP/DH/DF Schaftfräser mit Einstich, 4 Schneiden

Fraises XQ Alu DP/DH/DF avec dépouille, 4 goujures


| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | C | Availability |
|---|---|---|---|---|---|---|---|
| K60 0600 * | 6 | 13 | 20 | 57 | 6 | 0.1 | • |
| K60 0800 * | 8 | 20 | 26 | 64 | 8 | 0.1 | • |
| K60 1000 * | 10 | 22 | 30 | 72 | 10 | 0.2 | • |
| K60 1200 * | 12 | 26 | 36 | 83 | 12 | 0.2 | • |
| K60 1400 * | 14 | | 38 | 83 | 14 | 0.2 | • |
| K60 1600 * | 16 | 32 | 42 | 92 | 16 | 0.2 | • |
| K60 1800 * | 18 | | 42 | 92 | 18 | 0.3 | • |
| K60 2000 * | 20 | 38 | 52 | 104 | 20 | 0.3 | • |

* - DIN 6535

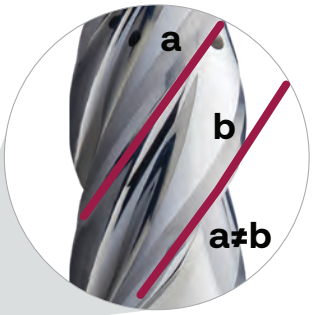
| CNC Repeatability |
|---|
| Ø1 - Ø3 within 10µm |
| Ø4 - Ø8 within 15µm |
| ≥ Ø10 within 20µm |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | | | | | | | | | | | | | ● | ○ |

FEATURES & BENEFITS

# XQ Alu Cutters




## 1. Differential Pitch (DP)


Reduces chatter to provide excellent surface finishing.

## 2. Polished Flutes


Ensures fast and effective chips evacuation and drastically reduces built-up edge.

## 3. Differential Fluting (DF)

With optimized core diameter, counteracts the forces generated and ensures greater milling performance.

## 4 Differential Helix (DH)


**Reduces the cutting force:**

- Allows high speed machining, increasing productivity.
- Improves surface finishing.

## 5. Oil Hole for High Performance Milling

-Improves welding resistance
-Enables a wide range of machining processes.
-Especially beneficial for difficult to cut materials, offering stable machining.

## 6. Chipbreakers

Efficiently shears work materials and shortens chips for improved chips removal.

## CARATTERISTICHE TECNICHE

1. Paso diferenciado (DP)
   Reduce las vibraciones y proporciona un acabado superficial

2. Ranuras lapeadas
   Garantiza una evacuación rápida y eficaz de la viruta
   Reduce drásticamente el filo de corte.

3. Núcleo cónico (DF)
   Con un diámetro de núcleo optimizado, contrarresta contrarresta las fuerzas generadas y rendimiento de fresado.

4. Hélice Variable (DH)*
   Reduce la fuerza de corte
   Permite el mecanizado a alta velocidad, aumentando productividad
   Mejora el acabado superficial

5. Orificio de refrigeración de fresado de alto rendimiento.
   Mejora la resistencia de la soldadura.
   Permite una amplia gama de procesos de mecanizado.
   Especialmente útil para materiales difíciles de cortar,
   Ofrece un mecanizado estable.

6. Filo de corte discontinuo
   Corta eficientemente los materiales de trabajo y acorta virutas para una mejor evacuación de las mismas.

## MERKMALE UND VORTEILE

1. Ungleiche Teilung (DP)
   Ungleiche Anordnung der Spannuten, um Eigenresonanz ufzulösen und Vibrationen zu reduzieren

2. Polierte Schneiden
   Sorgt für schnellen effizienten Spänefluß und reduziert die Bildung von Aufbauschneiden

3. Ungleiche Spannutentiefe (DF)
   Optimierter Kerndurchmesser wirkt den erzeugten Kräften entgegen und ermöglicht einen stabileren Fräsprozess

4. Ungleiche Drallsteigung (DH)
   Minimierung von Vibrationen und Resonanzen während der Bearbeitung
   Erhöht die Werkzeugstandzeit und Produktivität
   Halten Sie die Oberfläche fest, um sich selbst zu zentrieren

5. Große Kühlkanalbohrungen für Hochleistungsfräsen
   Verbessert die Spanabfuhr
   Ermöglicht umfangreiche Applikationen
   Große Vorteile für die Bearbeitung festerer AluminiumlegierungenXQ

6. Spanbrecher
   Sorgt für kurze Späne auch bei langspanenden Werkstoffen und verhindert somit Spanstau im Prozess und bei der Spanabfuhr

## CARACTÉRISTIQUES ET AVANTAGES

1. Conception à pas différentiel (DP)
   Réduire les vibrations pour obtenir une excellente finition de surface

2. Flûtes polies
   Assure une évacuation rapide et efficace des copeaux et réduit considérablement les bords accumulés

3. Cannelures différentielles (DF)
   Avec un diamètre de noyau optimisé, contrecarre les forces générées et assure de meilleures performances de fraisage

4. Conception à hélice variable (DH)
   Réduit la force de coupe
   Permet l'usinage à grande vitesse, augmentant la productivité
   Améliore la finition de surface

5. Trou d'huile pour le fraisage haute performance
   Améliore la résistance au soudage
   Permet une large gamme de processus d'usinage
   Particulièrement bénéfique pour les matériaux difficiles à couper, offrant un usinage stable

6. Brise-copeaux
   Cisaille efficacement les matériaux de travail et raccourcit les copeaux pour une meilleure élimination des copeaux

# K61

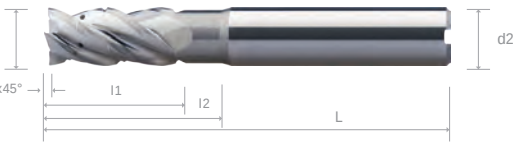
**For Aluminium** HPMT

## XQ Alu Cutters DP/DH/DF Endmills, with Recess and Chip Breakers, 4 Flutes

Fresas de mango XQ DP/DH/DF para aluminio, con rebaje y rompevirutas, 4 canales

XQ Alu-Fräser DP/DH/DF Schaftfräser, mit Einstich und Spanbrecher, 4 Schneiden

Fraises XQ Alu DP/DH/DF, avec évidement et brise-copeaux, 4 goujures








| Order Number DIN 6535 | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | C | Availability |
|---|---|---|---|---|---|---|---|
| K61 0600 * | 6 | 13 | 20 | 57 | 6 | 0.1 | • |
| K61 0800 * | 8 | 20 | 26 | 64 | 8 | 0.1 | • |
| K61 1000 * | 10 | 22 | 30 | 72 | 10 | 0.2 | • |
| K61 1200 * | 12 | 26 | 36 | 83 | 12 | 0.2 | • |
| K61 1400 * | 14 | | 38 | 83 | 14 | 0.2 | • |
| K61 1600 * | 16 | 32 | 42 | 92 | 16 | 0.2 | • |
| K61 1800 * | 18 | | 42 | 92 | 18 | 0.3 | • |
| K61 2000 * | 20 | 38 | 52 | 104 | 20 | 0.3 | • |

* - DIN 6535

| CNC Repeatability |
|---|
| Ø1 - Ø3 within 10µm |
| Ø4 - Ø8 within 15µm |
| ≥ Ø10 within 20µm |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | | | | | | | | | | | | | ● | ○ |

FEATURES & BENEFITS

# XQ Alu Cutters

## 1. Differential Pitch (DP)


Reduces chatter to provide excellent surface finishing.

## 2. Oil Hole for High Performance Milling

-Improves welding resistance.
-Enables a wide range of machining processes.
-Especially beneficial for difficult to cut materials, offering stable machining.

## 3. Polished Flutes


Ensures fast and effective chips evacuation and drastically reduces built-up edge.

## 4. Differential Fluting (DF)

With optimized core diameter, counteracts the forces generated and ensures greater milling performance.

## 5. Corner Radius


-Reducing chipping and providing longer tool life.
-Standardized corner radius for aerospace components.

## 6 Differential Helix (DH)


**Reduces the cutting force:**

- Allows high speed machining, increasing productivity.
- Improves surface finishing.

## CARATTERISTICHE TECNICHE

1. Paso diferenciado (DP)
   Reduce las vibraciones y proporciona un acabado superficial

2. Orificio para refrigerante para fresado de alto rendimiento
   Mejora la resistencia de la soldadura.
   Permite una amplia gama de procesos de mecanizado.
   Especialmente útil para materiales difíciles de cortar,
   Ofrece un mecanizado estable.

3. Ranuras lapeadas
   Garantiza una evacuación rápida y eficaz de la viruta
   Reduce drásticamente el filo de acumulación.

4. Núcleo cónico (DF)
   Con un diámetro de núcleo optimizado, contrarresta las fuerzas generadas y garantiza un mayor rendimiento de fresado.

5. Radio angular
   Reducción de virutas y mayor vida útil de la herramienta.
   Radio de esquina normalizado para componentes aeroespaciales (XQ Alu).

6. Hélice Variable (DH)*
   Reduce la fuerza de corte
   Permite el mecanizado a alta velocidad, aumentando productividad
   Mejora el acabado superficial

## MERKMALE UND VORTEILE

1. Ungleiche Teilung (DP)
   Ungleiche Anordnung der Spannuten, um Eigenresonanz ufzulösen und Vibrationen zu reduzieren

2. Große Kühlkanalbohrungen für Hochleistungsfräsen
   Verbessert die Spanabfuhr
   Ermöglicht umfangreiche Applikationen
   Große Vorteile für die Bearbeitung festerer AluminiumlegierungenXQ

3. Polierte Schneiden
   Sorgt für schnellen effizienten Spänefluß und reduziert die Bildung von Aufbauschneiden

4. Ungleiche Spannutentiefe (DF)
   Optimierter Kerndurchmesser wirkt den erzeugten Kräften entgegen und ermöglicht einen stabileren Fräsprozess

5. Eckenradius
   Eckenradiushervorragender Schneideckenschutz sorgt für längere Werkzeuglebensdauer genormte Eckenradien für Aerospace Bauteile
   Standardisierter Eckradius für Aerospace-Komponenten (XQ Alu)

6. Ungleiche Drallsteigung (DH)
   Minimierung von Vibrationen und Resonanzen während der Bearbeitung
   Erhöht die Werkzeugstandzeit und Produktivität
   Halten Sie die Oberfläche fest, um sich selbst zu zentrieren

## CARACTÉRISTIQUES ET AVANTAGES

1. Conception à pas différentiel (DP)
   Réduire les vibrations pour obtenir une excellente finition de surface

2. Trou d'huile pour le fraisage haute performance
   Améliore la résistance au soudage
   Permet une large gamme de processus d'usinage
   Particulièrement bénéfique pour les matériaux difficiles à couper, offrant un usinage stable

3. Flûtes polies
   Assure une évacuation rapide et efficace des copeaux et réduit considérablement les bords accumulés

4. Cannelures différentielles (DF)
   Avec un diamètre de noyau optimisé, contrecarre les forces générées et assure de meilleures performances de fraisage

5. Rayon d'angle
   Réduire l'écaillage et prolonger la durée de vie de l'outil
   Rayon d'angle normalisé pour les composants aérospatiaux (XQ Alu)

6. Conception à hélice variable (DH)
   Réduit la force de coupe
   Permet l'usinage à grande vitesse, augmentant la productivité
   Améliore la finition de surface

# K62

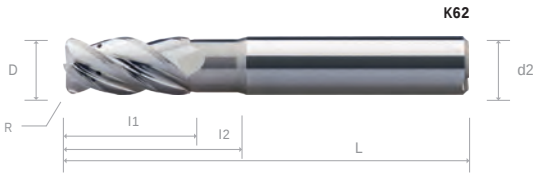
For Aluminium HPMT

## XQ Alu Cutters DP/DH/DF Torus Endmills with Recess, 4 Flutes

Fresas de mango XQ Alu DP/DH/DF Torus con rebaje, 4 canales

XQ Alu-Fräser DP/DH/DF Torusfräser mit Einstich, 4 Schneiden

XQ Alu Cutters DP/DH/DF Torus Endmills with Recess, 4 Flutes



| Order Number DIN 6535 | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R | Availability |
|---|---|---|---|---|---|---|---|
| K62 1000 072 1000 200 * | 10 | 22 | 30 | 72 | 10 | 2 | • |
| K62 1200 083 1200 200 * | 12 | 26 | 36 | 83 | 12 | 2 | • |
| K62 1600 092 1600 200 * | 16 | 32 | 42 | 92 | 16 | 2 | • |
| K62 2000 104 2000 200 * | 20 | 38 | 52 | 104 | 20 | 2 | • |

* - DIN 6535

| CNC Repeatability |
|---|
| Ø1 - Ø3 within 10µm |
| Ø4 - Ø8 within 15µm |
| ≥ Ø10 within 20µm |

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | | | | | | | | | | | | | ● | ○ |

FEATURES & BENEFITS

# XQ Alu Cutters

## 1. Differential Pitch (DP)


Reduces chatter to provide excellent surface finishing.

## 2. Oil Hole for High Performance Milling

-Improves welding resistance.
-Enables a wide range of machining processes.
-Especially beneficial for difficult to cut materials, offering stable machining.

## 3. Polished Flutes


Ensures fast and effective chips evacuation and drastically reduces built-up edge.

## 4. Differential Fluting (DF)

With optimized core diameter, counteracts the forces generated and ensures greater milling performance.

## 5. Corner Radius


-Reducing chipping and providing longer tool life.
-Standardized corner radius for aerospace components.

## 6. Chipbreakers

Efficiently shears work materials and shortens chips for improved chips removal.

## 7 Differential Helix (DH)


**Reduces the cutting force:**

- Allows high speed machining, increasing productivity.
- Improves surface finishing.

## CARATTERISTICHE TECNICHE

1. Paso diferenciado (DP)
   Reduce las vibraciones y proporciona un acabado superficial

2. Orificio para refrigerante para fresado de alto rendimiento
   Mejora la resistencia de la soldadura.
   Permite una amplia gama de procesos de mecanizado.
   Especialmente útil para materiales difíciles de cortar,
   Ofrece un mecanizado estable.

3. Ranuras lapeadas
   Garantiza una evacuación rápida y eficaz de la viruta
   Reduce drásticamente el filo de acumulación.

4. Núcleo cónico (DF)
   Con un diámetro de núcleo optimizado, contrarresta las fuerzas
   generadas y garantiza un mayor rendimiento
   rendimiento de fresado.

5. Radio angular
   Reducción de virutas y mayor vida útil de la herramienta.
   Radio de esquina normalizado para componentes aeroespaciales (XQ Alu).

6. Filo de corte discontinuo
   Corta eficientemente los materiales de trabajo y acorta virutas para un mejor arranque.

7. Hélice Variable (DH)*
   Reduce la fuerza de corte
   Permite el mecanizado a alta velocidad, aumentando productividad
   Mejora el acabado superficial

## CARACTÉRISTIQUES ET AVANTAGES

1. Conception à pas différentiel (DP)
   Réduire les vibrations pour obtenir une excellente finition de surface

2. Trou d'huile pour le fraisage haute performance
   Améliore la résistance au soudage
   Permet une large gamme de processus d'usinage
   Particulièrement bénéfique pour les matériaux difficiles à couper, offrant un usinage stable

3. Flûtes polies
   Assure une évacuation rapide et efficace des copeaux et réduit considérablement les bords accumulés

4. Cannelures différentielles (DF)
   Avec un diamètre de noyau optimisé, contrecarre les forces générées et assure de meilleures performances de fraisage

5. Rayon d'angle
   Réduire l'écaillage et prolonger la durée de vie de l'outil
   Rayon d'angle normalisé pour les composants aérospatiaux (XQ Alu)

6. Brise-copeaux
   Cisaille efficacement les matériaux de travail et raccourcit les copeaux pour une meilleure élimination des copeaux

7. Conception à hélice variable (DH)
   Réduit la force de coupe
   Permet l'usinage à grande vitesse, augmentant la productivité
   Améliore la finition de surface

## MERKMALE UND VORTEILE

1. Ungleiche Teilung (DP)
   Ungleiche Anordnung der Spannuten, um Eigenresonanz ufzulösen und Vibrationen zu reduzieren

2. Große Kühlkanalbohrungen für Hochleistungsfräsen
   Verbessert die Spanabfuhr
   Ermöglicht umfangreiche Applikationen
   Große Vorteile für die Bearbeitung festerer AluminiumlegierungenXQ

3. Polierte Schneiden
   Sorgt für schnellen effizienten Spänefluß und reduziert die Bildung von Aufbauschneiden

4. Ungleiche Spannutentiefe (DF)
   Optimierter Kerndurchmesser wirkt den erzeugten Kräften entgegen und ermöglicht einen stabileren Fräsprozess

5. Eckenradius
   Eckenradiushervorragender Schneideckenschutz sorgt für längere Werkzeuglebensdauer genormte Eckenradien für Aerospace Bauteile
   Standardisierter Eckradius für Aerospace-Komponenten (XQ Alu)

6. Spanbrecher
   Sorgt für kurze Späne auch bei langspanenden Werkstoffen und verhindert somit Spanstau im Prozess und bei der Spanabfuhr

7. Ungleiche Drallsteigung (DH)
   Minimierung von Vibrationen und Resonanzen während der Bearbeitung
   Erhöht die Werkzeugstandzeit und Produktivität
   Halten Sie die Oberfläche fest, um sich selbst zu zentrieren

# K63

**For Aluminium** HPMT

## XQ Alu Cutters DP/DH/DF Torus Endmills with Chip Breaker and Recess, 4 Flutes

Fresas XQ Alu DP/DH/DF Torus con rompevirutas y rebaje, 4 canales

XQ Alu-Fräser DP/DH/DF Torusfräser mit Spanbrecher und Einstich, 4 Schneiden

Fraises toriques DP/DH/DF avec brise-copeaux et évidement, 4 goujures






| Order Number DIN 6535 | D (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | R | Availability |
|---|---|---|---|---|---|---|---|
| K63 1000 072 1000 200 * | 10 | 22 | 30 | 72 | 10 | 2 | • |
| K63 1000 072 1000 250 * | | | 30 | 72 | 10 | 2.5 | • |
| K63 1000 072 1000 300 * | | | 30 | 72 | 10 | 3 | • |
| K63 1000 072 1000 400 * | | | 30 | 72 | 12 | 4 | • |
| K63 1200 083 1200 200 * | 12 | 26 | 36 | 83 | 12 | 2 | • |
| K63 1200 083 1200 250 * | | | 36 | 83 | 12 | 2.5 | • |
| K63 1200 083 1200 300 * | | | 36 | 83 | 12 | 3 | • |
| K63 1200 083 1200 400 * | | | 36 | 83 | 12 | 4 | • |
| K63 1600 092 1600 200 * | 16 | 32 | 42 | 92 | 16 | 2 | • |
| K63 1600 092 1600 250 * | | | 42 | 92 | 16 | 2.5 | • |
| K63 1600 092 1600 300 * | | | 42 | 92 | 16 | 3 | • |
| K63 1600 092 1600 400 * | | | 42 | 92 | 16 | 4 | • |
| K63 2000 104 2000 200 * | 20 | 38 | 52 | 104 | 20 | 2 | • |
| K63 2000 104 2000 250 * | | | 52 | 104 | 20 | 2.5 | • |
| K63 2000 104 2000 300 * | | | 52 | 104 | 20 | 3 | • |
| K63 2000 104 2000 400 | | | 52 | 104 | 20 | 4 | • |

* - DIN 6535

| CNC Repeatability |
|---|
| Ø1 - Ø3 within 10µm |
| Ø4 - Ø8 within 15µm |
| ≥ Ø10 within 20µm |

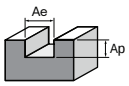
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | | | | | | | | | | | | | ● | ○ |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

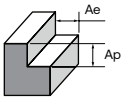
N O

## XQ Alu Cutters DP/DH/DF Endmills, 4 Flutes - K60, K61, K62, K63




| Slotting | N | | | | | | O | |
|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper alloy | | Thermoplastic | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | |
| Cutting depth, ap | 1.00 × D | | 1.00 × D | | 1.00 × D | | 1.00 × D | |
| Cutting Width, ae | 1.00 × D | | 1.00 × D | | 0.30 x D | | 1.00 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 6 | 650 | 0.034 | 550 | 0.027 | 400 | 0.023 | 600 | 0.030 |
| 8 | | 0.046 | | 0.037 | | 0.032 | | 0.040 |
| 10 | | 0.059 | | 0.048 | | 0.042 | | 0.051 |
| 12 | | 0.073 | | 0.060 | | 0.054 | | 0.063 |
| 14 | | 0.083 | | 0.068 | | 0.060 | | 0.071 |
| 16 | | 0.093 | | 0.075 | | 0.065 | | 0.078 |
| 18 | | 0.102 | | 0.081 | | 0.069 | | 0.084 |
| 20 | | 0.111 | | 0.087 | | 0.073 | | 0.090 |

## XQ Alu Cutters DP/DH/DF Endmills, 4 Flutes - K60, K61, K62, K63




| Side Milling | N | | | | | | O | |
|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper alloy | | Thermoplastic | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | |
| Cutting depth, ap | 1.00 x D | | 1.00 x D | | 1.00 x D | | 1.00 x D | |
| Cutting Width, ae | 0.30 x D | | 0.30 x D | | 0.30 x D | | 0.30 x D | |
| **D** | **Vc** | **Fz** | **Vc** | **Fz** | **Vc** | **Fz** | **Vc** | **Fz** |
| **6** | 750 | 0.039 | 700 | 0.030 | 500 | 0.025 | 720 | 0.033 |
| **8** | | 0.053 | | 0.042 | | 0.034 | | 0.045 |
| **10** | | 0.067 | | 0.054 | | 0.045 | | 0.057 |
| **12** | | 0.082 | | 0.067 | | 0.057 | | 0.070 |
| **14** | | 0.094 | | 0.077 | | 0.063 | | 0.080 |
| **16** | | 0.105 | | 0.086 | | 0.069 | | 0.089 |
| **18** | | 0.116 | | 0.094 | | 0.075 | | 0.097 |
| **20** | | 0.126 | | 0.102 | | 0.080 | | 0.105 |

# G74 / G75

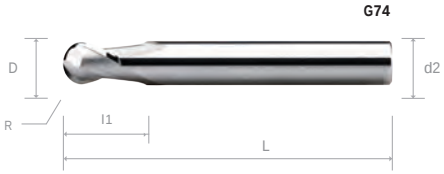
**For Aluminium** HPMT

## AL BN Ballnose Cutters with Recess, 2 Flutes

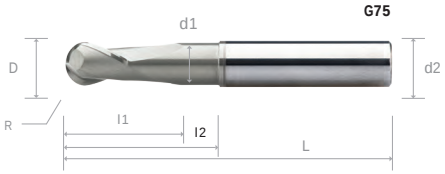
AL BN Fresas de punta esférica con rebaje, 2 canales

AL BN Kugelfräser mit Aussparung, 2 Schneiden

AL BN Fraises bille à évidement, 2 goujures






| Order Number | D (mm) | R | l 1 (mm) | l 2 (mm) | d1 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|---|
| G74 0300 | 3 | 1.5 | 5 | | | 57 | 6 | • |
| G74 0400 | 4 | 2 | 6 | | | 57 | 6 | • |
| G74 0600 | 6 | 3 | 8 | | | 57 | 6 | • |
| G74 0800 | 8 | 4 | 10 | | | 57 | 8 | • |
| G74 1000 | 10 | 5 | 12 | | | 72 | 10 | • |
| G74 1200 | 12 | 6 | 14 | | | 83 | 12 | • |
| G74 1600 | 16 | 8 | 18 | | | 92 | 16 | • |
| G74 2000 | 20 | 10 | 22 | | | 104 | 20 | • |

| Order Number | D (mm) | R | l 1 (mm) | l 2 (mm) | d1 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|---|
| G75 0300 | 3 | 1.5 | 5 | 20 | 2.8 | 57 | 6 | • |
| G75 0400 | 4 | 2 | 6 | 20 | 3.7 | 57 | 6 | • |
| G75 0600 | 6 | 3 | 8 | 20 | 5.5 | 57 | 6 | • |
| G75 0800 | 8 | 4 | 10 | 25 | 7.4 | 57 | 8 | • |
| G75 1000 | 10 | 5 | 12 | 35 | 9.2 | 72 | 10 | • |
| G75 1200 | 12 | 6 | 14 | 35 | 11 | 83 | 12 | • |
| G75 1600 | 16 | 8 | 18 | 45 | 15 | 92 | 16 | • |
| G75 2000 | 20 | 10 | 22 | 50 | 19 | 104 | 20 | • |

| Ø mm | Tol. µm |
|---|---|
| ~ Ø2.5 | +0 -0.020 |
| Ø3 ~ Ø6 | +0 -0.025 |
| >Ø6 | +0 -0.030 |

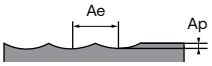
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| • | • | • | | | | | | | | | | | | | • | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

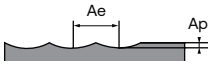
N O

## AL BN Ballnose Cutters, 2 Flutes - G74, G75




| Roughing | N | | | | | | O | |
|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper alloy | | Thermoplastic | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | |
| Cutting depth, ap | 0.10 × D | | 0.10 × D | | 0.10 × D | | 0.10 × D | |
| Cutting Width, ae | 0.35 × D | | 0.35 × D | | 0.30 x D | | 0.35 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 3 | | 0.027 | | 0.023 | | 0.019 | | 0.020 |
| 4 | | 0.037 | | 0.032 | | 0.026 | | 0.027 |
| 5 | | 0.048 | | 0.041 | | 0.033 | | 0.035 |
| 6 | | 0.059 | | 0.050 | | 0.041 | | 0.043 |
| 8 | 450 | 0.080 | 400 | 0.069 | 350 | 0.057 | 380 | 0.059 |
| 10 | | 0.102 | | 0.088 | | 0.074 | | 0.076 |
| 12 | | 0.126 | | 0.108 | | 0.092 | | 0.094 |
| 16 | | 0.164 | | 0.141 | | 0.119 | | 0.122 |
| 20 | | 0.202 | | 0.173 | | 0.144 | | 0.149 |

## AL BN Ballnose Cutters, 2 Flutes - G74, G75




| Finishing | N | | | | | | O | |
|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper alloy | | Thermoplastic | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | |
| Cutting depth, ap | 0.05 × D | | 0.05 × D | | 0.05 × D | | 0.05 × D | |
| Cutting Width, ae | 0.02 × D | | 0.02 × D | | 0.02 × D | | 0.02 × D | |
| D | Vc | Fz | Vc | Fz | Vc | Fz | Vc | Fz |
| 3 | | 0.021 | | 0.018 | | 0.014 | | 0.015 |
| 4 | | 0.028 | | 0.024 | | 0.020 | | 0.021 |
| 5 | | 0.037 | | 0.031 | | 0.025 | | 0.027 |
| 6 | | 0.045 | | 0.038 | | 0.031 | | 0.033 |
| 8 | 470 | 0.061 | 420 | 0.052 | 370 | 0.043 | 400 | 0.045 |
| 10 | | 0.078 | | 0.067 | | 0.056 | | 0.058 |
| 12 | | 0.097 | | 0.083 | | 0.069 | | 0.072 |
| 16 | | 0.126 | | 0.108 | | 0.090 | | 0.093 |
| 20 | | 0.155 | | 0.132 | | 0.109 | | 0.113 |

# G76

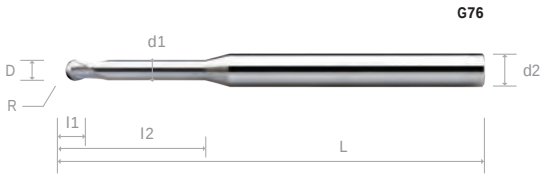
For Aluminium HPMT

## AL BN Miniature Ballnose Cutters with Long Neck, 2 Flutes

AL BN Mini fresas esféricas con cuello largo, 2 canales

AL BN Miniatur-Kugelfräser mit langem Hals, 2 Schneiden

AL BN Fraises bille miniatures à long col, 2 goujures





| Order Number | D (mm) | R | l 1 (mm) | l 2 (mm) | d1 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|---|
| G76 0020 050 0400 | 0.2 | 0.10 | 0.15 | - | - | 50 | 4 | • |
| G76 0020 050 0400 005 | | | | 0.5 | 0.17 | 50 | 4 | • |
| G76 0020 050 0400 010 | | | | 1 | 0.17 | 50 | 4 | • |
| G76 0020 050 0400 015 | 0.3 | 0.15 | 0.23 | 1.5 | 0.17 | 50 | 4 | • |
| G76 0030 050 0400 | | | | - | - | 50 | 4 | • |
| G76 0030 050 0400 010 | | | | 1 | 0.27 | 50 | 4 | • |
| G76 0030 050 0400 020 | | | | 2 | 0.27 | 50 | 4 | • |
| G76 0030 050 0400 030 | | | | 3 | 0.27 | 50 | 4 | • |
| G76 0040 050 0400 | 0.4 | 0.20 | 0.30 | - | - | 50 | 4 | • |
| G76 0040 050 0400 010 | | | | 1 | 0.37 | 50 | 4 | • |
| G76 0040 050 0400 020 | | | | 2 | 0.37 | 50 | 4 | • |
| G76 0040 050 0400 030 | | | | 3 | 0.37 | 50 | 4 | • |
| G76 0040 050 0400 040 | | | | 4 | 0.37 | 50 | 4 | • |
| G76 0040 050 0400 050 | | | | 5 | 0.37 | 50 | 4 | • |
| G76 0050 050 0400 | 0.5 | 0.25 | 0.35 | - | - | 50 | 4 | • |
| G76 0050 050 0400 020 ▲ | | | | 2 | 0.45 | 50 | 4 | ○ |
| G76 0050 050 0400 030 | | | | 3 | 0.45 | 50 | 4 | • |
| G76 0050 050 0400 040 | | | | 4 | 0.45 | 50 | 4 | • |
| G76 0050 050 0400 050 | | | | 5 | 0.45 | 50 | 4 | • |
| G76 0050 050 0400 060 | | | | 6 | 0.45 | 50 | 4 | • |
| G76 0050 050 0400 080 ▲ | | | | 8 | 0.45 | 50 | 4 | ○ |
| G76 0060 050 0400 ▲ | 0.6 | 0.30 | 0.42 | - | - | 50 | 4 | ○ |
| G76 0060 050 0400 020 | | | | 2 | 0.55 | 50 | 4 | • |
| G76 0060 050 0400 030 | | | | 3 | 0.55 | 50 | 4 | • |
| G76 0060 050 0400 040 | | | | 4 | 0.55 | 50 | 4 | • |
| G76 0060 050 0400 050 ▲ | | | | 5 | 0.55 | 50 | 4 | ○ |
| G76 0060 050 0400 060 | | | | 6 | 0.55 | 50 | 4 | • |
| G76 0060 050 0400 080 ▲ | | | | 8 | 0.55 | 50 | 4 | ○ |
| G76 0080 050 0400 | 0.8 | 0.40 | 0.48 | - | - | 50 | 4 | • |
| G76 0080 050 0400 020 | | | | 2 | 0.75 | 50 | 4 | • |
| G76 0080 050 0400 040 | | | | 4 | 0.75 | 50 | 4 | • |
| G76 0080 050 0400 050 | | | | 5 | 0.75 | 50 | 4 | • |
| G76 0080 050 0400 060 ▲ | | | | 6 | 0.75 | 50 | 4 | ○ |
| G76 0080 050 0400 070 | | | | 7 | 0.75 | 50 | 4 | • |
| G76 0080 050 0400 080 | | | | 8 | 0.75 | 50 | 4 | • |
| G76 0080 050 0400 100 ▲ | | | | 10 | 0.75 | 50 | 4 | ○ |
| G76 0100 050 0400 | 1.0 | 0.50 | 0.80 | - | - | 50 | 4 | • |
| G76 0100 050 0400 030 | | | | 3 | 0.9 | 50 | 4 | • |
| G76 0100 050 0400 040 | | | | 4 | 0.9 | 50 | 4 | • |
| G76 0100 050 0400 050 | | | | 5 | 0.9 | 50 | 4 | • |
| G76 0100 050 0400 060 | | | | 6 | 0.9 | 50 | 4 | • |
| G76 0100 050 0400 070 ▲ | | | | 7 | 0.9 | 50 | 4 | ○ |
| G76 0100 050 0400 080 | | | | 8 | 0.9 | 50 | 4 | • |
| G76 0100 050 0400 090 | | | | 9 | 0.9 | 50 | 4 | • |
| G76 0100 050 0400 100 | | | | 10 | 0.9 | 50 | 4 | • |
| G76 0100 050 0400 120 | | | | 12 | 0.9 | 50 | 4 | • |
| G76 0100 050 0400 140 | | | | 14 | 0.9 | 50 | 4 | • |
| G76 0100 050 0400 160 | | | | 16 | 0.9 | 50 | 4 | • |
| G76 0100 060 0400 | | | | - | - | 60 | 4 | • |
| G76 0100 060 0400 200 | | | | 20 | 0.9 | 60 | 4 | • |
| G76 0120 050 0400 | 1.2 | 0.60 | 1.08 | - | - | 50 | 4 | • |
| G76 0120 050 0400 060 | | | | 6 | 1.1 | 50 | 4 | • |
| G76 0120 050 0400 080 | | | | 8 | 1.1 | 50 | 4 | • |
| G76 0120 050 0400 100 | | | | 10 | 1.1 | 50 | 4 | • |
| G76 0120 050 0400 120 | | | | 12 | 1.1 | 50 | 4 | • |
| G76 0140 050 0400 | 1.4 | 0.70 | 1.26 | - | - | 50 | 4 | • |
| G76 0140 050 0400 080 | | | | 8 | 1.3 | 50 | 4 | • |
| G76 0140 050 0400 120 ▲ | | | | 12 | 1.3 | 50 | 4 | ○ |
| G76 0140 050 0400 160 ▲ | | | | 16 | 1.3 | 50 | 4 | ○ |

| Order Number | D (mm) | R | l 1 (mm) | l 2 (mm) | d1 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|---|
| G76 0150 050 0400 | 1.5 | 0.75 | 1.35 | - | - | 50 | 4 | • |
| G76 0150 050 0400 080 | | | | 8 | 1.4 | 50 | 4 | • |
| G76 0150 050 0400 120 | | | | 12 | 1.4 | 50 | 4 | • |
| G76 0150 050 0400 160 | | | | 16 | 1.4 | 50 | 4 | • |
| G76 0150 060 0400 | | | | - | - | 60 | 4 | • |
| G76 0150 060 0400 180 | | | | 18 | 1.4 | 60 | 4 | • |
| G76 0160 050 0400 | 1.6 | 0.80 | 1.44 | - | - | 50 | 4 | • |
| G76 0160 050 0400 080 | | | | 8 | 1.5 | 50 | 4 | • |
| G76 0160 050 0400 120 | | | | 12 | 1.5 | 50 | 4 | • |
| G76 0160 050 0400 160 | | | | 16 | 1.5 | 50 | 4 | • |
| G76 0160 060 0400 | | | | - | - | 60 | 4 | • |
| G76 0160 060 0400 200 | | | | 20 | 1.5 | 60 | 4 | • |
| G76 0180 050 0400 | 1.8 | 0.90 | 1.62 | - | - | 50 | 4 | • |
| G76 0180 050 0400 080 ▲ | | | | 8 | 1.7 | 50 | 4 | ○ |
| G76 0180 050 0400 120 ▲ | | | | 12 | 1.7 | 50 | 4 | ○ |
| G76 0180 050 0400 160 ▲ | | | | 16 | 1.7 | 50 | 4 | ○ |
| G76 0180 060 0400 | | | | - | - | 60 | 4 | • |
| G76 0180 060 0400 200 | | | | 20 | 1.7 | 60 | 4 | • |
| G76 0200 050 0400 | 2 | 1 | 1.70 | - | - | 50 | 4 | • |
| G76 0200 050 0400 040 | | | | 4 | 1.9 | 50 | 4 | • |
| G76 0200 050 0400 060 | | | | 6 | 1.9 | 50 | 4 | • |
| G76 0200 050 0400 080 | | | | 8 | 1.9 | 50 | 4 | • |
| G76 0200 050 0400 100 | | | | 10 | 1.9 | 50 | 4 | • |
| G76 0200 050 0400 120 | | | | 12 | 1.9 | 50 | 4 | • |
| G76 0200 050 0400 140 | | | | 14 | 1.9 | 50 | 4 | • |
| G76 0200 050 0400 160 | | | | 16 | 1.9 | 50 | 4 | • |
| G76 0200 060 0400 | | | | - | - | 60 | 4 | • |
| G76 0200 060 0400 180 | | | | 18 | 1.9 | 60 | 4 | • |
| G76 0200 060 0400 200 | | | | 20 | 1.9 | 60 | 4 | • |
| G76 0200 060 0400 220 | | | | 22 | 1.9 | 60 | 4 | • |
| G76 0200 075 0400 ▲ | | | | - | - | 75 | 4 | ○ |
| G76 0200 075 0400 250 | | | | 25 | 1.9 | 75 | 4 | • |
| G76 0200 075 0400 300 | | | | 30 | 1.9 | 75 | 4 | • |
| G76 0300 050 0600 | 3.0 | 1.5 | 2.40 | - | - | 50 | 6 | • |
| G76 0300 050 0600 080 | | | | 8 | 2.8 | 50 | 6 | • |
| G76 0300 050 0600 100 | | | | 10 | 2.8 | 50 | 6 | • |
| G76 0300 060 0600 | | | | - | - | 60 | 6 | • |
| G76 0300 060 0600 160 | | | | 16 | 2.8 | 60 | 6 | • |
| G76 0300 060 0600 200 | | | | 20 | 2.8 | 60 | 6 | • |
| G76 0300 075 0600 | | | | - | - | 75 | 6 | • |
| G76 0300 075 0600 250 | | | | 25 | 2.8 | 75 | 6 | • |
| G76 0300 075 0600 300 | | | | 30 | 2.8 | 75 | 6 | • |
| G76 0300 075 0600 350 | | | | 35 | 2.8 | 75 | 6 | • |
| G76 0400 050 0600 | 4 | 2 | 3.00 | - | - | 50 | 6 | • |
| G76 0400 050 0600 100 | | | | 10 | 3.7 | 50 | 6 | • |
| G76 0400 060 0600 | | | | - | - | 60 | 6 | • |
| G76 0400 060 0600 160 | | | | 16 | 3.7 | 60 | 6 | • |
| G76 0400 060 0600 200 | | | | 20 | 3.7 | 60 | 6 | • |
| G76 0400 075 0600 | | | | - | - | 75 | 6 | • |
| G76 0400 075 0600 250 | | | | 25 | 3.7 | 75 | 6 | • |
| G76 0400 075 0600 300 | | | | 30 | 3.7 | 75 | 6 | • |
| G76 0400 075 0600 350 | | | | 35 | 3.7 | 75 | 6 | • |
| G76 0400 100 0600 ▲ | | | | - | - | 100 | 6 | ○ |
| G76 0400 100 0600 400 | | | | 40 | 3.7 | 100 | 6 | • |
| G76 0400 100 0600 450 | | | | 45 | 3.7 | 100 | 6 | • |
| G76 0400 100 0600 500 | | | | 50 | 3.7 | 100 | 6 | • |

"o" Prodotto su richiesta (Minimo d'ordine 2 pcs.) | Make to order | auf Anfrage | Faire sur commande

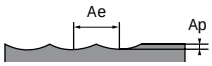
**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | | | | | | | | | | | | | ● | ○ |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

N O

## AL BN Miniature Ballnose Cutters With Long Neck, 2 Flutes - G76



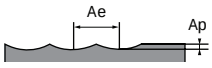

| Profiling | | N | | | | | | | | | O | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | | Wrought Aluminium | | | Cast Aluminium | | | Copper alloy | | | Thermoplastic | | |
| Properties | | Si < 9% | | | Si ≥ 9% | | | - | | | - | | |
| D | Effective Length | Ap | N | Fz | Ap | N | Fz | Ap | N | Fz | Ap | N | Fz |
| 0.2 | 0.5 | 0.029 | 50000 | 0.007 | 0.026 | 50000 | 0.007 | 0.024 | 50000 | 0.006 | 0.026 | 50000 | 0.006 |
| | 1.0 | 0.020 | 50000 | 0.007 | 0.018 | 50000 | 0.007 | 0.017 | 50000 | 0.006 | 0.018 | 50000 | 0.006 |
| | 1.5 | 0.012 | 50000 | 0.007 | 0.011 | 50000 | 0.007 | 0.010 | 50000 | 0.006 | 0.010 | 50000 | 0.006 |
| 0.3 | 1.0 | 0.030 | 50000 | 0.007 | 0.028 | 50000 | 0.007 | 0.025 | 50000 | 0.006 | 0.027 | 50000 | 0.006 |
| | 2.0 | 0.017 | 50000 | 0.006 | 0.016 | 50000 | 0.006 | 0.014 | 50000 | 0.005 | 0.016 | 50000 | 0.005 |
| | 3.0 | 0.012 | 50000 | 0.006 | 0.011 | 50000 | 0.006 | 0.010 | 50000 | 0.005 | 0.010 | 50000 | 0.005 |
| 0.4 | 1.0 | 0.058 | 50000 | 0.011 | 94.000 | 50000 | 0.010 | 0.048 | 50000 | 0.009 | 0.052 | 50000 | 0.010 |
| | 2.0 | 0.040 | 50000 | 0.010 | 0.037 | 50000 | 0.009 | 0.034 | 50000 | 0.008 | 0.036 | 50000 | 0.009 |
| | 3.0 | 0.023 | 50000 | 0.008 | 0.021 | 50000 | 0.008 | 0.019 | 50000 | 0.007 | 0.021 | 50000 | 0.008 |
| | 4.0 | 0.014 | 50000 | 0.007 | 0.013 | 50000 | 0.007 | 0.012 | 50000 | 0.006 | 0.013 | 50000 | 0.006 |
| | 5.0 | 0.012 | 50000 | 0.006 | 0.011 | 50000 | 0.006 | 0.010 | 50000 | 0.005 | 0.010 | 50000 | 0.005 |
| 0.5 | 2.0 | 0.050 | 50000 | 0.014 | 0.046 | 50000 | 0.013 | 0.042 | 50000 | 0.012 | 0.045 | 50000 | 0.013 |
| | 3.0 | 0.043 | 50000 | 0.013 | 0.040 | 50000 | 0.012 | 0.036 | 50000 | 0.011 | 0.039 | 50000 | 0.012 |
| | 4.0 | 0.029 | 50000 | 0.012 | 0.026 | 50000 | 0.011 | 0.024 | 50000 | 0.010 | 0.026 | 50000 | 0.011 |
| | 5.0 | 0.026 | 50000 | 0.011 | 0.024 | 50000 | 0.010 | 0.022 | 50000 | 0.009 | 0.023 | 50000 | 0.010 |
| | 6.0 | 0.019 | 50000 | 0.010 | 0.017 | 50000 | 0.009 | 0.016 | 50000 | 0.008 | 0.017 | 50000 | 0.009 |
| | 8.0 | 0.012 | 50000 | 0.008 | 0.011 | 50000 | 0.008 | 0.010 | 50000 | 0.007 | 0.010 | 50000 | 0.008 |
| 0.6 | 2.0 | 0.091 | 50000 | 0.024 | 0.083 | 50000 | 0.022 | 0.076 | 50000 | 0.020 | 0.082 | 50000 | 0.022 |
| | 3.0 | 0.059 | 50000 | 0.022 | 0.054 | 50000 | 0.020 | 0.049 | 50000 | 0.018 | 0.053 | 50000 | 0.019 |
| | 4.0 | 0.037 | 50000 | 0.020 | 0.034 | 50000 | 0.019 | 0.031 | 50000 | 0.017 | 0.034 | 50000 | 0.018 |
| | 5.0 | 0.029 | 50000 | 0.017 | 0.026 | 50000 | 0.015 | 0.024 | 50000 | 0.014 | 0.026 | 50000 | 0.015 |
| | 6.0 | 0.022 | 50000 | 0.016 | 0.020 | 50000 | 0.014 | 0.018 | 50000 | 0.013 | 0.019 | 50000 | 0.014 |
| | 8.0 | 0.022 | 50000 | 0.014 | 0.020 | 50000 | 0.013 | 0.018 | 50000 | 0.012 | 0.019 | 50000 | 0.013 |
| 0.8 | 2.0 | 0.173 | 50000 | 0.031 | 0.158 | 50000 | 0.029 | 0.144 | 50000 | 0.026 | 0.156 | 50000 | 0.028 |
| | 4.0 | 0.112 | 50000 | 0.030 | 0.103 | 50000 | 0.028 | 0.094 | 50000 | 0.025 | 0.101 | 50000 | 0.027 |
| | 5.0 | 0.085 | 50000 | 0.029 | 0.078 | 50000 | 0.026 | 0.071 | 50000 | 0.024 | 0.076 | 50000 | 0.026 |
| | 6.0 | 0.060 | 50000 | 0.026 | 0.055 | 50000 | 0.024 | 0.050 | 50000 | 0.022 | 0.054 | 50000 | 0.024 |
| | 7.0 | 0.044 | 50000 | 0.023 | 0.041 | 50000 | 0.021 | 0.037 | 50000 | 0.019 | 0.040 | 50000 | 0.021 |
| | 8.0 | 0.029 | 50000 | 0.019 | 0.026 | 50000 | 0.018 | 0.024 | 49920 | 0.016 | 0.026 | 50000 | 0.017 |
| | 10.0 | 0.029 | 50000 | 0.018 | 0.026 | 50000 | 0.017 | 0.024 | 46000 | 0.015 | 0.026 | 49680 | 0.016 |
| 1.0 | 3.0 | 0.288 | 50000 | 0.032 | 0.264 | 50000 | 0.030 | 0.240 | 50000 | 0.027 | 0.259 | 50000 | 0.029 |
| | 4.0 | 0.202 | 50000 | 0.031 | 0.185 | 50000 | 0.029 | 0.168 | 50000 | 0.026 | 0.181 | 50000 | 0.028 |
| | 5.0 | 0.130 | 50000 | 0.030 | 0.119 | 50000 | 0.028 | 0.108 | 50000 | 0.025 | 0.117 | 50000 | 0.027 |
| | 6.0 | 0.086 | 50000 | 0.029 | 0.079 | 50000 | 0.026 | 0.072 | 50000 | 0.024 | 0.078 | 50000 | 0.026 |
| | 7.0 | 0.086 | 50000 | 0.028 | 0.079 | 50000 | 0.025 | 0.072 | 46660 | 0.023 | 0.078 | 50000 | 0.025 |
| | 8.0 | 0.086 | 50000 | 0.028 | 0.079 | 50000 | 0.025 | 0.072 | 46660 | 0.023 | 0.078 | 50000 | 0.025 |
| | 9.0 | 0.065 | 50000 | 0.026 | 0.059 | 50000 | 0.024 | 0.054 | 46660 | 0.022 | 0.058 | 50000 | 0.024 |
| | 10.0 | 0.055 | 50000 | 0.025 | 0.050 | 50000 | 0.023 | 0.046 | 46660 | 0.021 | 0.049 | 50000 | 0.023 |
| | 12.0 | 0.036 | 41470 | 0.025 | 0.033 | 38020 | 0.023 | 0.030 | 34560 | 0.021 | 0.032 | 37330 | 0.023 |
| | 14.0 | 0.029 | 41470 | 0.025 | 0.026 | 38020 | 0.023 | 0.024 | 34560 | 0.021 | 0.026 | 37330 | 0.023 |
| | 16.0 | 0.022 | 41470 | 0.024 | 0.020 | 38020 | 0.022 | 0.018 | 34560 | 0.020 | 0.019 | 37330 | 0.022 |
| | 20.0 | 0.014 | 31100 | 0.024 | 0.013 | 28510 | 0.022 | 0.012 | 25920 | 0.020 | 0.013 | 27990 | 0.022 |

cont'd ▸

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

N O

## AL BN Miniature Ballnose Cutters With Long Neck, 2 Flutes - G76




| Profiling | | N | | | | | | | | | O | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | | Wrought Aluminium | | | Cast Aluminium | | | Copper alloy | | | Thermoplastic | | |
| Properties | | Si < 9% | | | Si ≥ 9% | | | - | | | - | | |
| D | Lunghezza effettiva | Ap | N | Fz | Ap | N | Fz | Ap | N | Fz | Ap | N | Fz |
| 1.2 | 6.0 | 0.158 | 50000 | 0.034 | 0.145 | 49420 | 0.031 | 0.132 | 44930 | 0.028 | 0.143 | 48520 | 0.030 |
| | 8.0 | 0.086 | 50000 | 0.034 | 0.079 | 49280 | 0.031 | 0.072 | 44800 | 0.028 | 0.078 | 48380 | 0.030 |
| | 10.0 | 0.076 | 49760 | 0.029 | 0.070 | 45620 | 0.026 | 0.064 | 41470 | 0.024 | 0.069 | 44790 | 0.026 |
| | 12.0 | 0.065 | 49760 | 0.028 | 0.059 | 45620 | 0.025 | 0.054 | 41470 | 0.023 | 0.058 | 44790 | 0.025 |
| 1.4 | 8.0 | 0.158 | 47170 | 0.041 | 0.145 | 43240 | 0.037 | 0.132 | 39310 | 0.034 | 0.143 | 42460 | 0.037 |
| | 12.0 | 0.076 | 43550 | 0.032 | 0.070 | 39920 | 0.030 | 0.064 | 36290 | 0.027 | 0.069 | 39190 | 0.029 |
| | 16.0 | 0.050 | 32260 | 0.030 | 0.046 | 29570 | 0.028 | 0.042 | 26880 | 0.025 | 0.045 | 29030 | 0.027 |
| 1.5 | 8.0 | 0.173 | 47170 | 0.043 | 0.158 | 43240 | 0.040 | 0.144 | 39310 | 0.036 | 0.156 | 42460 | 0.039 |
| | 12.0 | 0.130 | 43550 | 0.036 | 0.119 | 39920 | 0.033 | 0.108 | 36290 | 0.030 | 0.117 | 39190 | 0.032 |
| | 16.0 | 0.055 | 36000 | 0.034 | 0.050 | 33000 | 0.031 | 0.046 | 30000 | 0.028 | 0.049 | 32400 | 0.030 |
| | 18.0 | 0.055 | 32260 | 0.032 | 0.050 | 29570 | 0.030 | 0.046 | 26880 | 0.027 | 0.049 | 29030 | 0.029 |
| 1.6 | 8.0 | 0.317 | 50000 | 0.048 | 0.290 | 48050 | 0.044 | 0.264 | 43680 | 0.040 | 0.285 | 47170 | 0.043 |
| | 12.0 | 0.141 | 44880 | 0.038 | 0.129 | 41140 | 0.035 | 0.118 | 37400 | 0.032 | 0.127 | 40390 | 0.035 |
| | 16.0 | 0.086 | 40440 | 0.037 | 0.079 | 37070 | 0.034 | 0.072 | 33700 | 0.031 | 0.078 | 36400 | 0.033 |
| | 20.0 | 0.058 | 29950 | 0.036 | 0.053 | 27460 | 0.033 | 0.048 | 24960 | 0.030 | 0.052 | 26960 | 0.032 |
| 1.8 | 8.0 | 0.374 | 48670 | 0.058 | 0.343 | 44620 | 0.053 | 0.312 | 40560 | 0.048 | 0.337 | 43810 | 0.052 |
| | 12.0 | 0.151 | 40440 | 0.043 | 0.139 | 37070 | 0.040 | 0.126 | 33700 | 0.036 | 0.136 | 36400 | 0.039 |
| | 16.0 | 0.098 | 38400 | 0.040 | 0.090 | 35200 | 0.036 | 0.082 | 32000 | 0.033 | 0.088 | 34560 | 0.036 |
| | 20.0 | 0.065 | 29950 | 0.040 | 0.059 | 27460 | 0.036 | 0.054 | 24960 | 0.033 | 0.058 | 26960 | 0.036 |
| 2.0 | 4.0 | 0.576 | 45360 | 0.090 | 0.528 | 41580 | 0.083 | 0.480 | 37800 | 0.075 | 0.518 | 40820 | 0.081 |
| | 6.0 | 0.576 | 45360 | 0.082 | 0.528 | 41580 | 0.075 | 0.480 | 37800 | 0.068 | 0.518 | 40820 | 0.073 |
| | 8.0 | 0.403 | 45360 | 0.082 | 0.370 | 41580 | 0.075 | 0.336 | 37800 | 0.068 | 0.363 | 40820 | 0.073 |
| | 10.0 | 0.302 | 42340 | 0.072 | 0.277 | 38808 | 0.066 | 0.252 | 35280 | 0.060 | 0.272 | 38100 | 0.065 |
| | 12.0 | 0.017 | 38100 | 0.067 | 0.016 | 34930 | 0.062 | 0.014 | 31750 | 0.056 | 0.016 | 34290 | 0.060 |
| | 14.0 | 0.173 | 38100 | 0.067 | 0.158 | 34930 | 0.062 | 0.144 | 31750 | 0.056 | 0.156 | 34290 | 0.060 |
| | 16.0 | 0.173 | 35380 | 0.043 | 0.158 | 32430 | 0.040 | 0.144 | 29480 | 0.036 | 0.156 | 31840 | 0.039 |
| | 18.0 | 0.130 | 32660 | 0.042 | 0.119 | 29940 | 0.039 | 0.108 | 27220 | 0.035 | 0.117 | 29400 | 0.038 |
| | 20.0 | 0.108 | 32660 | 0.042 | 0.099 | 29940 | 0.039 | 0.090 | 27220 | 0.035 | 0.097 | 29400 | 0.038 |
| | 22.0 | 0.072 | 25700 | 0.041 | 0.066 | 23560 | 0.037 | 0.060 | 21420 | 0.034 | 0.065 | 23130 | 0.037 |
| | 25.0 | 0.072 | 24190 | 0.040 | 0.066 | 22180 | 0.036 | 0.060 | 20160 | 0.033 | 0.065 | 21770 | 0.036 |
| | 30.0 | 0.043 | 24190 | 0.040 | 0.040 | 22180 | 0.036 | 0.036 | 20160 | 0.033 | 0.039 | 21770 | 0.036 |
| 3.0 | 8.0 | 0.720 | 32160 | 0.134 | 0.660 | 29480 | 0.123 | 0.600 | 26800 | 0.112 | 0.648 | 28940 | 0.121 |
| | 10.0 | 0.605 | 31800 | 0.134 | 0.554 | 29150 | 0.123 | 0.504 | 26500 | 0.112 | 0.544 | 28620 | 0.121 |
| | 16.0 | 0.454 | 31440 | 0.097 | 0.416 | 28820 | 0.089 | 0.378 | 26200 | 0.081 | 0.408 | 28300 | 0.087 |
| | 20.0 | 0.259 | 26950 | 0.080 | 0.238 | 24710 | 0.074 | 0.216 | 22460 | 0.067 | 0.233 | 24260 | 0.072 |
| | 25.0 | 0.173 | 25440 | 0.080 | 0.158 | 23320 | 0.074 | 0.144 | 21200 | 0.067 | 0.156 | 22900 | 0.072 |
| | 30.0 | 0.173 | 23400 | 0.079 | 0.158 | 21450 | 0.073 | 0.144 | 19500 | 0.066 | 0.156 | 21060 | 0.071 |
| | 35.0 | 0.115 | 18430 | 0.077 | 0.106 | 16900 | 0.070 | 0.096 | 15360 | 0.064 | 0.104 | 16590 | 0.069 |
| 4.0 | 10.0 | 0.720 | 24840 | 0.180 | 0.660 | 22770 | 0.165 | 0.600 | 20700 | 0.150 | 0.648 | 22360 | 0.162 |
| | 16.0 | 0.605 | 24840 | 0.180 | 0.554 | 22770 | 0.165 | 0.504 | 20700 | 0.150 | 0.544 | 22360 | 0.162 |
| | 20.0 | 0.454 | 21530 | 0.144 | 0.416 | 19730 | 0.132 | 0.378 | 17940 | 0.120 | 0.408 | 19380 | 0.130 |
| | 25.0 | 0.346 | 19380 | 0.130 | 0.317 | 17770 | 0.119 | 0.288 | 16150 | 0.108 | 0.311 | 17440 | 0.117 |
| | 30.0 | 0.230 | 17880 | 0.107 | 0.211 | 16390 | 0.098 | 0.192 | 14900 | 0.089 | 0.207 | 16090 | 0.096 |
| | 35.0 | 0.173 | 17880 | 0.107 | 0.173 | 16390 | 0.098 | 0.144 | 14900 | 0.089 | 0.156 | 16090 | 0.096 |
| | 40.0 | 0.144 | 17880 | 0.107 | 0.144 | 16390 | 0.098 | 0.120 | 14900 | 0.089 | 0.130 | 16090 | 0.096 |
| | 45.0 | 0.115 | 13250 | 0.102 | 0.115 | 12144 | 0.094 | 0.096 | 11040 | 0.085 | 0.104 | 11920 | 0.092 |
| | 50.0 | 0.115 | 13250 | 0.102 | 0.115 | 12144 | 0.094 | 0.096 | 11040 | 0.085 | 0.104 | 11920 | 0.092 |

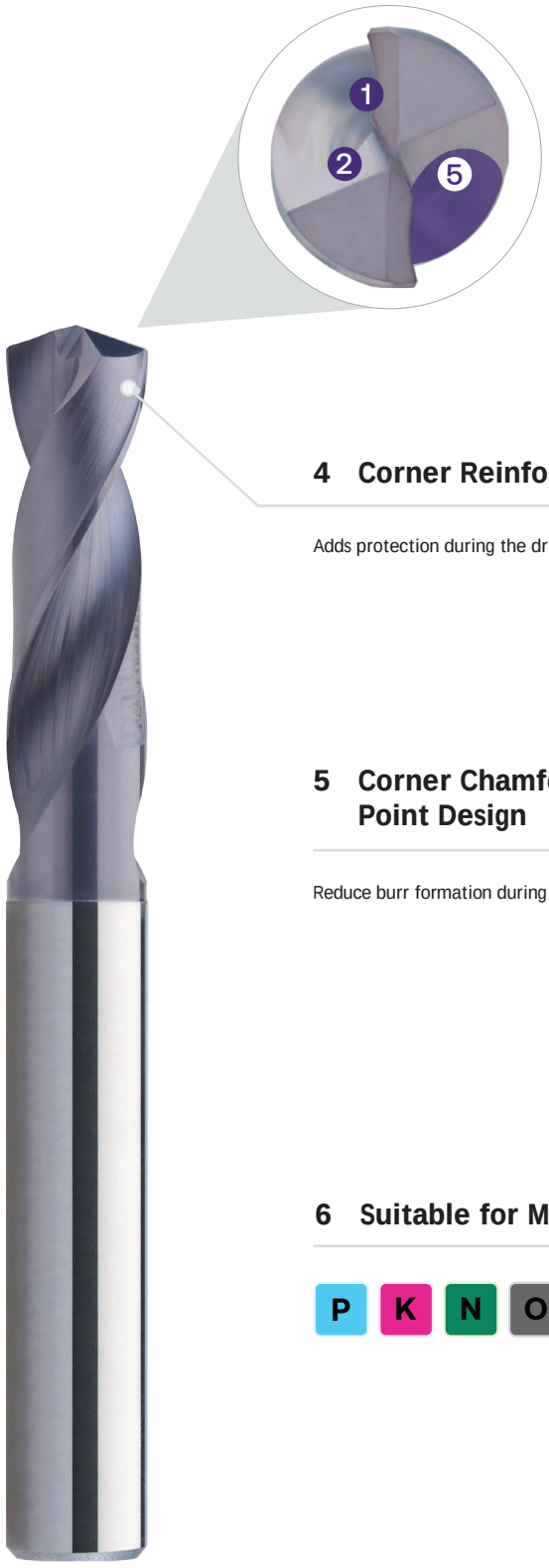
HPMT

# DRILL

## Drills (ø1-ø16) for EZ Line

FEATURES & BENEFITS

# EZ Line




## 1 Split Point Design

Provide Self Centering capability and reduce thrust.

## 2 C Flute Shape

-Produce small chips.
-Improve chip evacuation.

## 3 Effective Clearance and Gash

-Lower cutting forces.
-Improve chip formation and control.

## 4 Corner Reinforcement

Adds protection during the drilling process.

## 5 Corner Chamfer on Point Design

Reduce burr formation during through hole machining.

## 6 Suitable for Material

P K N O

## CARATTERISTICHE TECNICHE

1. Estructura de punto de ruptura
   Ofrece capacidad de autocentrado y empuje reducido.
2. Forma de ranura en C
   Produce virutas pequeñas.
   Mejora la evacuación de la viruta.
3. Despeje y desbaste eficaces
   Menores fuerzas de corte.
   Mejora la formación y el control de la viruta.
4. Refuerzo de esquinas
   Añade protección durante el proceso de taladrado.
5. Filo de corte biselado
   Ideal para fundición y mejora el acabado superficial.
6. Adecuado para materiales P, K, N, O

## MERKMALE UND VORTEILE

1. Kreuzanschliff
   Bietet Selbstzentrierung und reduzierten Axialdruck
2. C-förmige Nuten
   Erzeugt kleine Späne
   verbessert den Spänefluß
3. Effektiver Abstand und Schnitt
   Niedrigere Schnittkräfte
   Verbessert die Spanbildung und Kontrolle
4. Schneideckenverstärkung
   sorgt für mehr Schutz beim Bohren
5. Schneideckenfase
   Ideal für Gussbearbeitung und bessere
   Oberflächengüte
6. Geeignet für die Materialien P, K, N, O

## CARACTÉRISTIQUES ET AVANTAGES

1. Conception à affûtage 4 faces croisées
   auto centrant, éfforts de coupes réduit
2. Goujure à forme en C
   très bon brise copeaux
   Améliore l'évacuation des copeaux
3. Dégagement et rainure de logement efficaces
   Forces de coupe inférieures
   Améliore la formation et le contrôle des copeaux
4. Rayon torique sur les arêtes
   pour une meilleur protection pendant le percage
5. Arête chanfrein de coin
   Idéal pour la fonte et meilleure finition de surface
6. Adapté aux matériaux P, K, N, O

# W16

≤ 35 HRC

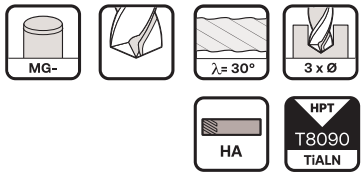
HPMT

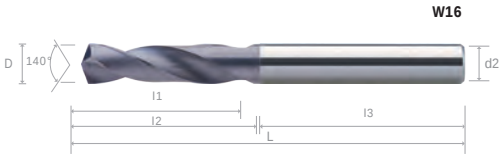
## EZ Twist Drills DIN 6537K - 3 x Ø, Point Angle 140°, 2 Flutes

Brocas EZ Twist DIN 6537K - 3 x Ø, Ángulo de punta 140°, 2 canales

EZ-Spiralbohrer DIN 6537K - 3 x Ø, Spitzenwinkel 140°, 2 Schneiden

Forets EZ Twist DIN 6537K - 3 x Ø, Angle de pointe 140°, 2 goujures





| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | l 3 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| W16 0100 | 1 | 4 | 7 | 33 | 45 | 3 | • |
| W16 0110 | 1.1 | | 7 | 33 | 45 | 3 | • |
| W16 0120 | 1.2 | | 7 | 33 | 45 | 3 | • |
| W16 0130 | 1.3 | | 7 | 33 | 45 | 3 | • |
| W16 0140 | 1.4 | | 7 | 33 | 45 | 3 | • |
| W16 0150 | 1.5 | 10 | 14 | 35 | 50 | 3 | • |
| W16 0160 | 1.6 | | 14 | 35 | 50 | 3 | • |
| W16 0170 | 1.7 | | 14 | 35 | 50 | 3 | • |
| W16 0180 | 1.8 | | 14 | 35 | 50 | 3 | • |
| W16 0190 | 1.9 | | 14 | 35 | 50 | 3 | • |
| W16 0200 | 2 | 14 | 20 | 36 | 55 | 4 | • |
| W16 0210 | 2.1 | | 20 | 36 | 55 | 4 | • |
| W16 0220 | 2.2 | | 20 | 36 | 55 | 4 | • |
| W16 0230 | 2.3 | | 20 | 36 | 55 | 4 | • |
| W16 0240 | 2.4 | | 20 | 36 | 55 | 4 | • |
| W16 0250 | 2.5 | | 20 | 36 | 55 | 4 | • |
| W16 0260 | 2.6 | | 20 | 36 | 55 | 4 | • |
| W16 0270 | 2.7 | | 20 | 36 | 55 | 4 | • |
| W16 0280 | 2.8 | | 20 | 36 | 55 | 4 | • |
| W16 0290 | 2.9 | | 20 | 36 | 55 | 4 | • |
| W16 0300 | 3 | 17 | 20 | 36 | 62 | 6 | • |
| W16 0310 | 3.1 | | 20 | 36 | 62 | 6 | • |
| W16 0320 | 3.2 | | 20 | 36 | 62 | 6 | • |
| W16 0330 | 3.3 | | 20 | 36 | 62 | 6 | • |
| W16 0340 | 3.4 | | 20 | 36 | 62 | 6 | • |
| W16 0350 | 3.5 | | 20 | 36 | 62 | 6 | • |
| W16 0360 | 3.6 | | 20 | 36 | 62 | 6 | • |
| W16 0370 | 3.7 | | 20 | 36 | 62 | 6 | • |
| W16 0380 | 3.8 | 21 | 24 | 36 | 66 | 6 | • |
| W16 0390 | 3.9 | | 24 | 36 | 66 | 6 | • |
| W16 0400 | 4 | | 24 | 36 | 66 | 6 | • |
| W16 0410 | 4.1 | | 24 | 36 | 66 | 6 | • |
| W16 0420 | 4.2 | | 24 | 36 | 66 | 6 | • |
| W16 0430 | 4.3 | | 24 | 36 | 66 | 6 | • |
| W16 0440 | 4.4 | | 24 | 36 | 66 | 6 | • |
| W16 0450 | 4.5 | | 24 | 36 | 66 | 6 | • |
| W16 0460 | 4.6 | | 24 | 36 | 66 | 6 | • |
| W16 0470 | 4.7 | | 24 | 36 | 66 | 6 | • |
| W16 0480 | 4.8 | 25 | 28 | 36 | 66 | 6 | • |
| W16 0490 | 4.9 | | 28 | 36 | 66 | 6 | • |
| W16 0500 | 5 | | 28 | 36 | 66 | 6 | • |
| W16 0510 | 5.1 | | 28 | 36 | 66 | 6 | • |
| W16 0520 | 5.2 | | 28 | 36 | 66 | 6 | • |
| W16 0530 | 5.3 | | 28 | 36 | 66 | 6 | • |
| W16 0540 | 5.4 | | 28 | 36 | 66 | 6 | • |
| W16 0550 | 5.5 | | 28 | 36 | 66 | 6 | • |
| W16 0560 | 5.6 | | 28 | 36 | 66 | 6 | • |
| W16 0570 | 5.7 | | 28 | 36 | 66 | 6 | • |
| W16 0580 | 5.8 | | 28 | 36 | 66 | 6 | • |
| W16 0590 | 5.9 | | 28 | 36 | 66 | 6 | • |
| W16 0600 | 6 | | 28 | 36 | 66 | 6 | • |
| W16 0610 | 6.1 | 31 | 34 | 36 | 79 | 8 | • |

| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | l 3 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| W16 0620 | 6.2 | 31 | 34 | 36 | 79 | 8 | • |
| W16 0630 | 6.3 | | 34 | 36 | 79 | 8 | • |
| W16 0640 | 6.4 | | 34 | 36 | 79 | 8 | • |
| W16 0650 | 6.5 | | 34 | 36 | 79 | 8 | • |
| W16 0660 | 6.6 | | 34 | 36 | 79 | 8 | • |
| W16 0670 | 6.7 | | 34 | 36 | 79 | 8 | • |
| W16 0680 | 6.8 | | 34 | 36 | 79 | 8 | • |
| W16 0690 | 6.9 | | 34 | 36 | 79 | 8 | • |
| W16 0700 | 7 | | 34 | 36 | 79 | 8 | • |
| W16 0710 | 7.1 | 35 | 41 | 36 | 79 | 8 | • |
| W16 0720 | 7.2 | | 41 | 36 | 79 | 8 | • |
| W16 0730 | 7.3 | | 41 | 36 | 79 | 8 | • |
| W16 0740 | 7.4 | | 41 | 36 | 79 | 8 | • |
| W16 0750 | 7.5 | | 41 | 36 | 79 | 8 | • |
| W16 0760 | 7.6 | | 41 | 36 | 79 | 8 | • |
| W16 0770 | 7.7 | | 41 | 36 | 79 | 8 | • |
| W16 0780 | 7.8 | | 41 | 36 | 79 | 8 | • |
| W16 0790 | 7.9 | | 41 | 36 | 79 | 8 | • |
| W16 0800 | 8 | | 41 | 36 | 79 | 8 | • |
| W16 0810 | 8.1 | 41 | 47 | 40 | 89 | 10 | • |
| W16 0820 | 8.2 | | 47 | 40 | 89 | 10 | • |
| W16 0830 | 8.3 | | 47 | 40 | 89 | 10 | • |
| W16 0840 | 8.4 | | 47 | 40 | 89 | 10 | • |
| W16 0850 | 8.5 | | 47 | 40 | 89 | 10 | • |
| W16 0860 | 8.6 | | 47 | 40 | 89 | 10 | • |
| W16 0870 | 8.7 | | 47 | 40 | 89 | 10 | • |
| W16 0880 | 8.8 | | 47 | 40 | 89 | 10 | • |
| W16 0890 | 8.9 | | 47 | 40 | 89 | 10 | • |
| W16 0900 | 9 | | 47 | 40 | 89 | 10 | • |
| W16 0910 | 9.1 | | 47 | 40 | 89 | 10 | • |
| W16 0920 | 9.2 | | 47 | 40 | 89 | 10 | • |
| W16 0930 | 9.3 | | 47 | 40 | 89 | 10 | • |
| W16 0940 | 9.4 | | 47 | 40 | 89 | 10 | • |
| W16 0950 | 9.5 | | 47 | 40 | 89 | 10 | • |
| W16 0960 | 9.6 | | 47 | 40 | 89 | 10 | • |
| W16 0970 | 9.7 | | 47 | 40 | 89 | 10 | • |
| W16 0980 | 9.8 | | 47 | 40 | 89 | 10 | • |
| W16 0990 | 9.9 | | 47 | 40 | 89 | 10 | • |
| W16 1000 | 10 | | 47 | 40 | 89 | 10 | • |
| W16 1010 | 10.1 | 55 | 55 | 45 | 102 | 12 | • |
| W16 1020 | 10.2 | | 55 | 45 | 102 | 12 | • |
| W16 1030 | 10.3 | | 55 | 45 | 102 | 12 | • |
| W16 1040 | 10.4 | | 55 | 45 | 102 | 12 | • |
| W16 1050 | 10.5 | | 55 | 45 | 102 | 12 | • |
| W16 1060 | 10.6 | | 55 | 45 | 102 | 12 | • |
| W16 1070 | 10.7 | | 55 | 45 | 102 | 12 | • |
| W16 1080 | 10.8 | | 55 | 45 | 102 | 12 | • |
| W16 1090 | 10.9 | | 55 | 45 | 102 | 12 | • |
| W16 1100 | 11 | | 55 | 45 | 102 | 12 | • |
| W16 1110 | 11.1 | | 55 | 45 | 102 | 12 | • |
| W16 1120 | 11.2 | | 55 | 45 | 102 | 12 | • |
| W16 1130 | 11.3 | | 55 | 45 | 102 | 12 | • |

cont'd ▸

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ○ | ○ | ○ | ○ | ○ | | | | | | | | | |

# W16

≤ 35 HRC

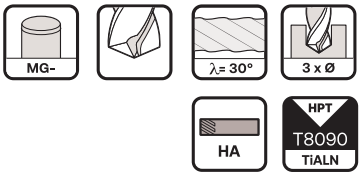
HPMT

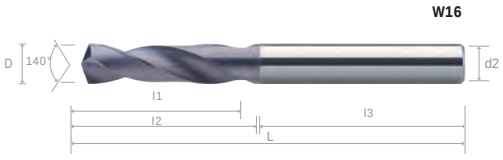
## EZ Twist Drills DIN 6537K - 3 x Ø, Point Angle 140°, 2 Flutes

Brocas EZ Twist DIN 6537K - 3 x Ø, Ángulo de punta 140°, 2 canales

EZ-Spiralbohrer DIN 6537K - 3 x Ø, Spitzenwinkel 140°, 2 Schneiden

Forets EZ Twist DIN 6537K - 3 x Ø, Angle de pointe 140°, 2 goujures





| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | l 3 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| W16 1140 | 11.4 | 49 | 55 | 45 | 102 | 12 | • |
| W16 1150 | 11.5 | | 55 | 45 | 102 | 12 | • |
| W16 1160 | 11.6 | | 55 | 45 | 102 | 12 | • |
| W16 1170 | 11.7 | | 55 | 45 | 102 | 12 | • |
| W16 1180 | 11.8 | | 55 | 45 | 102 | 12 | • |
| W16 1190 | 11.9 | | 55 | 45 | 102 | 12 | • |
| W16 1200 | 12 | | 55 | 45 | 102 | 12 | • |
| W16 1220 | 12.2 | 50 | 60 | 45 | 107 | 14 | • |
| W16 1250 | 12.5 | | 60 | 45 | 107 | 14 | • |
| W16 1270 | 12.7 | | 60 | 45 | 107 | 14 | • |
| W16 1280 | 12.8 | | 60 | 45 | 107 | 14 | • |
| W16 1300 | 13 | | 60 | 45 | 107 | 14 | • |
| W16 1350 | 13.5 | | 60 | 45 | 107 | 14 | • |
| W16 1370 | 13.7 | | 60 | 45 | 107 | 14 | • |
| W16 1380 | 13.8 | | 60 | 45 | 107 | 14 | • |
| W16 1400 | 14 | | 60 | 45 | 107 | 14 | • |
| W16 1420 | 14.2 | 65 | 65 | 48 | 115 | 16 | • |
| W16 1450 | 14.5 | | 65 | 48 | 115 | 16 | • |
| W16 1480 | 14.8 | | 65 | 48 | 115 | 16 | • |
| W16 1500 | 15 | | 65 | 48 | 115 | 16 | • |
| W16 1550 | 15.5 | | 65 | 48 | 115 | 16 | • |
| W16 1580 | 15.8 | | 65 | 48 | 115 | 16 | • |
| W16 1600 | 16 | | 65 | 48 | 115 | 16 | • |

| Order Number | D (mm) | l 1 (mm) | l 2 (mm) | l 3 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ○ | ○ | ○ | ○ | ○ | | | | | | | | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P K N O P K

## EZ Twist Drills DIN 6537K - 3 x Ø, Point Angle 140°, 2 Flutes - W16

| Drilling | N | | | | | | K | | | | P | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper alloy | | Grey Cast Iron | | Ductile Cast Iron | | Carbon Steel | | Alloy Steel | | Prehardened Steel | |
| Proprietà | Si < 9% | | Si ≥ 9% | | - | | - | | - | | - | | | | - | |
| D | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn |
| 1 | | 0.019 | | 0.018 | | 0.018 | | 0.020 | | 0.012 | | 0.021 | | 0.015 | | 0.016 |
| 2 | | 0.040 | | 0.038 | | 0.038 | | 0.042 | | 0.025 | | 0.043 | | 0.032 | | 0.032 |
| 3 | | 0.062 | | 0.060 | | 0.060 | | 0.064 | | 0.039 | | 0.068 | | 0.051 | | 0.050 |
| 4 | | 0.085 | | 0.083 | | 0.083 | | 0.088 | | 0.056 | | 0.094 | | 0.069 | | 0.068 |
| 5 | | 0.110 | | 0.107 | | 0.108 | | 0.115 | | 0.074 | | 0.122 | | 0.088 | | 0.083 |
| 6 | | 0.138 | | 0.133 | | 0.132 | | 0.140 | | 0.094 | | 0.149 | | 0.109 | | 0.105 |
| 7 | | 0.165 | | 0.158 | | 0.161 | | 0.166 | | 0.114 | | 0.178 | | 0.130 | | 0.125 |
| 8 | 150 | 0.195 | 130 | 0.190 | 100 | 0.190 | 75 | 0.200 | 60 | 0.142 | 80 | 0.216 | 65 | 0.154 | 35 | 0.150 |
| 9 | | 0.224 | | 0.222 | | 0.219 | | 0.226 | | 0.159 | | 0.245 | | 0.178 | | 0.162 |
| 10 | | 0.260 | | 0.250 | | 0.253 | | 0.263 | | 0.185 | | 0.281 | | 0.200 | | 0.183 |
| 11 | | 0.293 | | 0.284 | | 0.290 | | 0.295 | | 0.217 | | 0.313 | | 0.226 | | 0.200 |
| 12 | | 0.333 | | 0.320 | | 0.322 | | 0.330 | | 0.250 | | 0.355 | | 0.250 | | 0.230 |
| 13 | | 0.349 | | 0.341 | | 0.336 | | 0.342 | | 0.260 | | 0.380 | | 0.275 | | 0.244 |
| 14 | | 0.360 | | 0.353 | | 0.357 | | 0.350 | | 0.271 | | 0.395 | | 0.287 | | 0.275 |
| 15 | | 0.384 | | 0.371 | | 0.364 | | 0.381 | | 0.285 | | 0.435 | | 0.307 | | 0.285 |
| 16 | | 0.400 | | 0.388 | | 0.385 | | 0.393 | | 0.300 | | 0.450 | | 0.323 | | 0.300 |

HPMT

# DRILL

## Drill (ø3-ø20) for General Engineering

FEATURES & BENEFITS

# DR-S


## 1 Wider Chip Pocket

Enhances and smoother chip evacuation.

## 2 Straight Edge Profile

Shorter chip and reinforced cutting edge.

## 3 Bigger K-Value

Suitable for higher feed rate and enhances tool durability.

## 4 Corner Chamfer Edge

Ideal for cast iron and better surface finishing.

## 5 Suitable for Material

P K N M S

## CARATTERISTICHE TECNICHE

1. Ranuras más profundas
   Mejora y simplifica la evacuación de las virutas.
2. Perfil recto
   Virutas más cortas y ángulo de corte reforzado.
3. Mayor valor K
   Adecuado para mayores velocidades de avance y mejora la vida útil de la herramienta.
4. Chaflán protector
   Ideal para fundición y mejora el acabado superficial.
5. Versátil
   Adecuado para grupos de 5 materiales.

## MERKMALE UND VORTEILE

1. Größere Spantasche
   Verbesserter problemloser Spänefluß
2. Gerades Schneidkantenprofil
   Kürzere Späne und verstärkte Schneidkanten
3. Größere K-Ausprägung
   für höhere Vorschubgeschwindigkeit und verbesserte die Haltbarkeit des Werkzeugs
4. Schneideckenfase
   Ideal für Gussbearbeitung und bessere Oberflächengüte
5. Vielseitig
   Geeignet für 5 Materialgruppen

## CARACTÉRISTIQUES ET AVANTAGES

1. Récupérateur de copeaux plus large
   Évacuation des copeaux plus facile et plus fluide
2. Profil d'arête droite
   Copeaux plus courts et arête tranchante renforcée
3. Coefficient K supérieur
   Adapté pour un débit plus élevé et améliore la durabilité de l'outil
4. Arête chanfrein de coin
   Idéal pour la fonte et meilleure finition de surface
5. Polyvalent
   Adapté au 5 groupes de matériaux

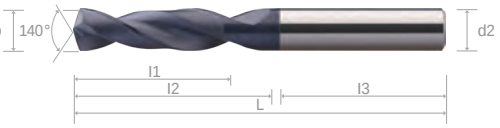
# W08

## DR-S Twist Drills DIN 6537K - 3 x Ø, Point Angle 140°, 2 Flutes

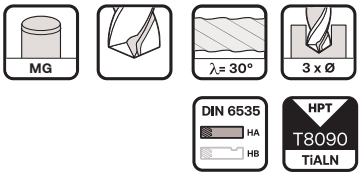
DR-S Brocas espirales DIN 6537K - 3 x Ø, Ángulo de punta 140°, 2 filos

DR-S Spiralbohrer DIN 6537K - 3 x Ø, Spitzenwinkel 140°, 2 Schneiden

DR-S Forets hélicoïdaux DIN 6537K - 3 x Ø, Angle de pointe 140°, 2 goujures








| Order Number DIN 6535 | D (mm) | l 1 (mm) | l 2 (mm) | l 3 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| W08 0300 * | 3 | 14 | 20 | 36 | 62 | 6 | • |
| W08 0310 * | 3.1 | | 20 | 36 | 62 | 6 | • |
| W08 0320 * | 3.2 | | 20 | 36 | 62 | 6 | • |
| W08 0330 * | 3.3 | | 20 | 36 | 62 | 6 | • |
| W08 0340 * | 3.4 | | 20 | 36 | 62 | 6 | • |
| W08 0350 * | 3.5 | | 20 | 36 | 62 | 6 | • |
| W08 0360 * | 3.6 | | 20 | 36 | 62 | 6 | • |
| W08 0370 * | 3.7 | | 20 | 36 | 62 | 6 | • |
| W08 0380 * | 3.8 | 17 | 24 | 36 | 66 | 6 | • |
| W08 0390 * | 3.9 | | 24 | 36 | 66 | 6 | • |
| W08 0400 * | 4 | | 24 | 36 | 66 | 6 | • |
| W08 0410 * | 4.1 | | 24 | 36 | 66 | 6 | • |
| W08 0420 * | 4.2 | | 24 | 36 | 66 | 6 | • |
| W08 0430 * | 4.3 | | 24 | 36 | 66 | 6 | • |
| W08 0440 * | 4.4 | | 24 | 36 | 66 | 6 | • |
| W08 0450 * | 4.5 | | 24 | 36 | 66 | 6 | • |
| W08 0460 * | 4.6 | | 24 | 36 | 66 | 6 | • |
| W08 0470 * | 4.7 | | 24 | 36 | 66 | 6 | • |
| W08 0480 * | 4.8 | 20 | 28 | 36 | 66 | 6 | • |
| W08 0490 * | 4.9 | | 28 | 36 | 66 | 6 | • |
| W08 0500 * | 5 | | 28 | 36 | 66 | 6 | • |
| W08 0510 * | 5.1 | | 28 | 36 | 66 | 6 | • |
| W08 0520 * | 5.2 | | 28 | 36 | 66 | 6 | • |
| W08 0530 * | 5.3 | | 28 | 36 | 66 | 6 | • |
| W08 0540 * | 5.4 | | 28 | 36 | 66 | 6 | • |
| W08 0550 * | 5.5 | | 28 | 36 | 66 | 6 | • |
| W08 0560 * | 5.6 | | 28 | 36 | 66 | 6 | • |
| W08 0570 * | 5.7 | | 28 | 36 | 66 | 6 | • |
| W08 0580 * | 5.8 | | 28 | 36 | 66 | 6 | • |
| W08 0590 * | 5.9 | | 28 | 36 | 66 | 6 | • |
| W08 0600 * | 6 | | 28 | 36 | 66 | 6 | • |
| W08 0610 * | 6.1 | 24 | 34 | 36 | 79 | 8 | • |
| W08 0620 * | 6.2 | | 34 | 36 | 79 | 8 | • |
| W08 0630 * | 6.3 | | 34 | 36 | 79 | 8 | • |
| W08 0640 * | 6.4 | | 34 | 36 | 79 | 8 | • |
| W08 0650 * | 6.5 | | 34 | 36 | 79 | 8 | • |
| W08 0660 * | 6.6 | | 34 | 36 | 79 | 8 | • |
| W08 0670 * | 6.7 | | 34 | 36 | 79 | 8 | • |
| W08 0680 * | 6.8 | | 34 | 36 | 79 | 8 | • |
| W08 0690 * | 6.9 | | 34 | 36 | 79 | 8 | • |
| W08 0700 * | 7 | | 34 | 36 | 79 | 8 | • |
| W08 0710 * | 7.1 | 29 | 41 | 36 | 79 | 8 | • |
| W08 0720 * | 7.2 | | 41 | 36 | 79 | 8 | • |
| W08 0730 * | 7.3 | | 41 | 36 | 79 | 8 | • |
| W08 0740 * | 7.4 | | 41 | 36 | 79 | 8 | • |
| W08 0750 * | 7.5 | | 41 | 36 | 79 | 8 | • |
| W08 0760 * | 7.6 | | 41 | 36 | 79 | 8 | • |
| W08 0770 * | 7.7 | | 41 | 36 | 79 | 8 | • |
| W08 0780 * | 7.8 | | 41 | 36 | 79 | 8 | • |
| W08 0790 * | 7.9 | | 41 | 36 | 79 | 8 | • |
| W08 0800 * | 8 | | 41 | 36 | 79 | 8 | • |
| W08 0810 * | 8.1 | 35 | 47 | 40 | 89 | 10 | • |
| W08 0820 * | 8.2 | | 47 | 40 | 89 | 10 | • |
| W08 0830 * | 8.3 | | 47 | 40 | 89 | 10 | • |
| W08 0840 * | 8.4 | | 47 | 40 | 89 | 10 | • |

| Order Number DIN 6535 | D (mm) | l 1 (mm) | l 2 (mm) | l 3 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| W08 0850 * | 8.5 | 35 | 47 | 40 | 89 | 10 | • |
| W08 0860 * | 8.6 | | 47 | 40 | 89 | 10 | • |
| W08 0870 * | 8.7 | | 47 | 40 | 89 | 10 | • |
| W08 0880 * | 8.8 | | 47 | 40 | 89 | 10 | • |
| W08 0890 * | 8.9 | | 47 | 40 | 89 | 10 | • |
| W08 0900 * | 9 | | 47 | 40 | 89 | 10 | • |
| W08 0910 * | 9.1 | | 47 | 40 | 89 | 10 | • |
| W08 0920 * | 9.2 | | 47 | 40 | 89 | 10 | • |
| W08 0930 * | 9.3 | | 47 | 40 | 89 | 10 | • |
| W08 0940 * | 9.4 | | 47 | 40 | 89 | 10 | • |
| W08 0950 * | 9.5 | | 47 | 40 | 89 | 10 | • |
| W08 0960 * | 9.6 | | 47 | 40 | 89 | 10 | • |
| W08 0970 * | 9.7 | | 47 | 40 | 89 | 10 | • |
| W08 0980 * | 9.8 | | 47 | 40 | 89 | 10 | • |
| W08 0990 * | 9.9 | | 47 | 40 | 89 | 10 | • |
| W08 1000 * | 10 | | 47 | 40 | 89 | 10 | • |
| W08 1010 * | 10.1 | 40 | 55 | 45 | 102 | 12 | • |
| W08 1020 * | 10.2 | | 55 | 45 | 102 | 12 | • |
| W08 1030 * | 10.3 | | 55 | 45 | 102 | 12 | • |
| W08 1040 * | 10.4 | | 55 | 45 | 102 | 12 | • |
| W08 1050 * | 10.5 | | 55 | 45 | 102 | 12 | • |
| W08 1060 * | 10.6 | | 55 | 45 | 102 | 12 | • |
| W08 1070 * | 10.7 | | 55 | 45 | 102 | 12 | • |
| W08 1080 * | 10.8 | | 55 | 45 | 102 | 12 | • |
| W08 1090 * | 10.9 | | 55 | 45 | 102 | 12 | • |
| W08 1100 * | 11 | | 55 | 45 | 102 | 12 | • |
| W08 1110 * | 11.1 | | 55 | 45 | 102 | 12 | • |
| W08 1120 * | 11.2 | | 55 | 45 | 102 | 12 | • |
| W08 1130 * | 11.3 | | 55 | 45 | 102 | 12 | • |
| W08 1140 * | 11.4 | | 55 | 45 | 102 | 12 | • |
| W08 1150 * | 11.5 | | 55 | 45 | 102 | 12 | • |
| W08 1160 * | 11.6 | | 55 | 45 | 102 | 12 | • |
| W08 1170 * | 11.7 | | 55 | 45 | 102 | 12 | • |
| W08 1180 * | 11.8 | | 55 | 45 | 102 | 12 | • |
| W08 1190 * | 11.9 | | 55 | 45 | 102 | 12 | • |
| W08 1200 * | 12 | | 55 | 45 | 102 | 12 | • |
| W08 1250 * | 12.5 | 43 | 60 | 45 | 107 | 14 | • |
| W08 1270 * | 12.7 | | 60 | 45 | 107 | 14 | • |
| W08 1300 * | 13 | | 60 | 45 | 107 | 14 | • |
| W08 1350 * | 13.5 | | 60 | 45 | 107 | 14 | • |
| W08 1370 * | 13.7 | | 60 | 45 | 107 | 14 | • |
| W08 1400 * | 14 | | 60 | 45 | 107 | 14 | • |
| W08 1450 * | 14.5 | 45 | 65 | 48 | 115 | 16 | • |
| W08 1500 * | 15 | | 65 | 48 | 115 | 16 | • |
| W08 1550 * | 15.5 | | 65 | 48 | 115 | 16 | • |
| W08 1600 * | 16 | | 65 | 48 | 115 | 16 | • |
| W08 1650 * | 16.5 | 51 | 73 | 48 | 123 | 18 | • |
| W08 1700 * | 17 | | 73 | 48 | 123 | 18 | • |
| W08 1750 * | 17.5 | | 73 | 48 | 123 | 18 | • |
| W08 1800 * | 18 | | 73 | 48 | 123 | 18 | • |
| W08 1850 * | 18.5 | 55 | 79 | 50 | 131 | 20 | • |
| W08 1900 * | 19 | | 79 | 50 | 131 | 20 | • |
| W08 1950 * | 19.5 | | 79 | 50 | 131 | 20 | • |
| W08 2000 * | 20 | | 79 | 50 | 131 | 20 | • |

* - DIN 6535

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| • | • | • | • | • | • | • | • | • | • | | | | | | | |

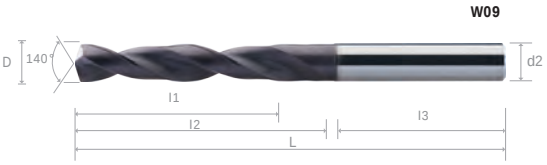
# W09

## DR-S Twist Drills DIN 6537L - 5 x Ø, Point Angle 140°, 2 Flutes

DR-S Brocas espirales DIN 6537L - 5 x Ø, ángulo de punta 140°, 2 aristas de corte

DR-S Spiralbohrer DIN 6537L - 5 x Ø, Spitzenwinkel 140°, 2 Schneiden

DR-S Forets hélicoïdaux DIN 6537L - 5 x Ø, angle de pointe 140°, 2 tranchants



| Order Number DIN 6535 | D (mm) | l 1 (mm) | l 2 (mm) | l 3 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| W09 0300 * | 3 | 23 | 28 | 36 | 66 | 6 | • |
| W09 0310 * | 3.1 | | 28 | 36 | 66 | 6 | • |
| W09 0320 * | 3.2 | | 28 | 36 | 66 | 6 | • |
| W09 0330 * | 3.3 | | 28 | 36 | 66 | 6 | • |
| W09 0340 * | 3.4 | | 28 | 36 | 66 | 6 | • |
| W09 0350 * | 3.5 | | 28 | 36 | 66 | 6 | • |
| W09 0360 * | 3.6 | | 28 | 36 | 66 | 6 | • |
| W09 0370 * | 3.7 | | 28 | 36 | 66 | 6 | • |
| W09 0380 * | 3.8 | 29 | 36 | 36 | 74 | 6 | • |
| W09 0390 * | 3.9 | | 36 | 36 | 74 | 6 | • |
| W09 0400 * | 4 | | 36 | 36 | 74 | 6 | • |
| W09 0410 * | 4.1 | | 36 | 36 | 74 | 6 | • |
| W09 0420 * | 4.2 | | 36 | 36 | 74 | 6 | • |
| W09 0430 * | 4.3 | | 36 | 36 | 74 | 6 | • |
| W09 0440 * | 4.4 | | 36 | 36 | 74 | 6 | • |
| W09 0450 * | 4.5 | | 36 | 36 | 74 | 6 | • |
| W09 0460 * | 4.6 | | 36 | 36 | 74 | 6 | • |
| W09 0470 * | 4.7 | | 36 | 36 | 74 | 6 | • |
| W09 0480 * | 4.8 | 35 | 44 | 36 | 82 | 6 | • |
| W09 0490 * | 4.9 | | 44 | 36 | 82 | 6 | • |
| W09 0500 * | 5 | | 44 | 36 | 82 | 6 | • |
| W09 0510 * | 5.1 | | 44 | 36 | 82 | 6 | • |
| W09 0520 * | 5.2 | | 44 | 36 | 82 | 6 | • |
| W09 0530 * | 5.3 | | 44 | 36 | 82 | 6 | • |
| W09 0540 * | 5.4 | | 44 | 36 | 82 | 6 | • |
| W09 0550 * | 5.5 | | 44 | 36 | 82 | 6 | • |
| W09 0560 * | 5.6 | | 44 | 36 | 82 | 6 | • |
| W09 0570 * | 5.7 | | 44 | 36 | 82 | 6 | • |
| W09 0580 * | 5.8 | | 44 | 36 | 82 | 6 | • |
| W09 0590 * | 5.9 | | 44 | 36 | 82 | 6 | • |
| W09 0600 * | 6 | | 44 | 36 | 82 | 6 | • |
| W09 0610 * | 6.1 | 43 | 53 | 36 | 91 | 8 | • |
| W09 0620 * | 6.2 | | 53 | 36 | 91 | 8 | • |
| W09 0630 * | 6.3 | | 53 | 36 | 91 | 8 | • |
| W09 0640 * | 6.4 | | 53 | 36 | 91 | 8 | • |
| W09 0650 * | 6.5 | | 53 | 36 | 91 | 8 | • |
| W09 0660 * | 6.6 | | 53 | 36 | 91 | 8 | • |
| W09 0670 * | 6.7 | | 53 | 36 | 91 | 8 | • |
| W09 0680 * | 6.8 | | 53 | 36 | 91 | 8 | • |
| W09 0690 * | 6.9 | | 53 | 36 | 91 | 8 | • |
| W09 0700 * | 7 | | 53 | 36 | 91 | 8 | • |
| W09 0710 * | 7.1 | | 53 | 36 | 91 | 8 | • |
| W09 0720 * | 7.2 | | 53 | 36 | 91 | 8 | • |
| W09 0730 * | 7.3 | | 53 | 36 | 91 | 8 | • |
| W09 0740 * | 7.4 | | 53 | 36 | 91 | 8 | • |
| W09 0750 * | 7.5 | | 53 | 36 | 91 | 8 | • |
| W09 0760 * | 7.6 | | 53 | 36 | 91 | 8 | • |
| W09 0770 * | 7.7 | | 53 | 36 | 91 | 8 | • |
| W09 0780 * | 7.8 | | 53 | 36 | 91 | 8 | • |
| W09 0790 * | 7.9 | | 53 | 36 | 91 | 8 | • |
| W09 0800 * | 8 | | 53 | 36 | 91 | 8 | • |
| W09 0810 * | 8.1 | 49 | 61 | 40 | 103 | 10 | • |
| W09 0820 * | 8.2 | | 61 | 40 | 103 | 10 | • |
| W09 0830 * | 8.3 | | 61 | 40 | 103 | 10 | • |
| W09 0840 * | 8.4 | | 61 | 40 | 103 | 10 | • |

| Order Number DIN 6535 | D (mm) | l 1 (mm) | l 2 (mm) | l 3 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| W09 0850 * | 8.5 | 49 | 61 | 40 | 103 | 10 | • |
| W09 0860 * | 8.6 | | 61 | 40 | 103 | 10 | • |
| W09 0870 * | 8.7 | | 61 | 40 | 103 | 10 | • |
| W09 0880 * | 8.8 | | 61 | 40 | 103 | 10 | • |
| W09 0890 * | 8.9 | | 61 | 40 | 103 | 10 | • |
| W09 0900 * | 9 | | 61 | 40 | 103 | 10 | • |
| W09 0910 * | 9.1 | | 61 | 40 | 103 | 10 | • |
| W09 0920 * | 9.2 | | 61 | 40 | 103 | 10 | • |
| W09 0930 * | 9.3 | | 61 | 40 | 103 | 10 | • |
| W09 0940 * | 9.4 | | 61 | 40 | 103 | 10 | • |
| W09 0950 * | 9.5 | | 61 | 40 | 103 | 10 | • |
| W09 0960 * | 9.6 | | 61 | 40 | 103 | 10 | • |
| W09 0970 * | 9.7 | | 61 | 40 | 103 | 10 | • |
| W09 0980 * | 9.8 | | 61 | 40 | 103 | 10 | • |
| W09 0990 * | 9.9 | | 61 | 40 | 103 | 10 | • |
| W09 1000 * | 10 | | 61 | 40 | 103 | 10 | • |
| W09 1020 * | 10.2 | 56 | 71 | 45 | 118 | 12 | • |
| W09 1050 * | 10.5 | | 71 | 45 | 118 | 12 | • |
| W09 1080 * | 10.8 | | 71 | 45 | 118 | 12 | • |
| W09 1100 * | 11 | | 71 | 45 | 118 | 12 | • |
| W09 1120 * | 11.2 | | 71 | 45 | 118 | 12 | • |
| W09 1130 * | 11.3 | | 71 | 45 | 118 | 12 | • |
| W09 1150 * | 11.5 | | 71 | 45 | 118 | 12 | • |
| W09 1180 * | 11.8 | | 71 | 45 | 118 | 12 | • |
| W09 1200 * | 12 | | 71 | 45 | 118 | 12 | • |
| W09 1220 * | 12.2 | 60 | 77 | 45 | 124 | 14 | • |
| W09 1250 * | 12.5 | | 77 | 45 | 124 | 14 | • |
| W09 1270 * | 12.7 | | 77 | 45 | 124 | 14 | • |
| W09 1280 * | 12.8 | | 77 | 45 | 124 | 14 | • |
| W09 1300 * | 13 | | 77 | 45 | 124 | 14 | • |
| W09 1330 * | 13.3 | | 77 | 45 | 124 | 14 | • |
| W09 1350 * | 13.5 | | 77 | 45 | 124 | 14 | • |
| W09 1370 * | 13.7 | | 77 | 45 | 124 | 14 | • |
| W09 1380 * | 13.8 | | 77 | 45 | 124 | 14 | • |
| W09 1400 * | 14 | | 77 | 45 | 124 | 14 | • |
| W09 1450 * | 14.5 | 63 | 83 | 48 | 133 | 16 | • |
| W09 1500 * | 15 | | 83 | 48 | 133 | 16 | • |
| W09 1530 * | 15.3 | | 83 | 48 | 133 | 16 | • |
| W09 1550 * | 15.5 | | 83 | 48 | 133 | 16 | • |
| W09 1580 * | 15.8 | | 83 | 48 | 133 | 16 | • |
| W09 1600 * | 16 | | 83 | 48 | 133 | 16 | • |
| W09 1650 * | 16.5 | 71 | 93 | 48 | 143 | 18 | • |
| W09 1700 * | 17 | | 93 | 48 | 143 | 18 | • |
| W09 1750 * | 17.5 | | 93 | 48 | 143 | 18 | • |
| W09 1800 * | 18 | | 93 | 48 | 143 | 18 | • |
| W09 1850 * | 18.5 | 77 | 101 | 50 | 153 | 20 | • |
| W09 1900 * | 19 | | 101 | 50 | 153 | 20 | • |
| W09 1950 * | 19.5 | | 101 | 50 | 153 | 20 | • |
| W09 2000 * | 20 | | 101 | 50 | 153 | 20 | • |

* - DIN 6535

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| • | • | • | • | • | • | • | • | • | • | | | | | | | |

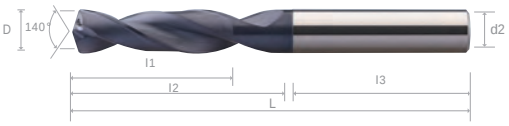
HPMT

# DR-S Oil Feed Twist Drills DIN 6537K - 3 x Ø, Point Angle 140°, 2 Flutes

DR-S Brocas espirales con avance por aceite DIN 6537K - 3 x Ø, Ángulo de punta 140°, 2 canales

DR-S Ölvorschub-Spiralbohrer DIN 6537K - 3 x Ø, Spitzenwinkel 140°, 2 Schneiden

DR-S Oil Feed Twist Drills DIN 6537K - 3 x Ø, Angle de pointe 140°, 2 goujures





| Order Number DIN 6535 | D (mm) | l 1 (mm) | l 2 (mm) | l 3 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| W10 0300 * | 3 | 14 | 20 | 36 | 62 | 6 | • |
| W10 0310 * | 3.1 | | 20 | 36 | 62 | 6 | • |
| W10 0320 * | 3.2 | | 20 | 36 | 62 | 6 | • |
| W10 0330 * | 3.3 | | 20 | 36 | 62 | 6 | • |
| W10 0340 * | 3.4 | | 20 | 36 | 62 | 6 | • |
| W10 0350 * | 3.5 | | 20 | 36 | 62 | 6 | • |
| W10 0360 * | 3.6 | | 20 | 36 | 62 | 6 | • |
| W10 0370 * | 3.7 | | 20 | 36 | 62 | 6 | • |
| W10 0380 * | 3.8 | 17 | 24 | 36 | 66 | 6 | • |
| W10 0390 * | 3.9 | | 24 | 36 | 66 | 6 | • |
| W10 0400 * | 4 | | 24 | 36 | 66 | 6 | • |
| W10 0410 * | 4.1 | | 24 | 36 | 66 | 6 | • |
| W10 0420 * | 4.2 | | 24 | 36 | 66 | 6 | • |
| W10 0430 * | 4.3 | | 24 | 36 | 66 | 6 | • |
| W10 0440 * | 4.4 | | 24 | 36 | 66 | 6 | • |
| W10 0450 * | 4.5 | | 24 | 36 | 66 | 6 | • |
| W10 0460 * | 4.6 | | 24 | 36 | 66 | 6 | • |
| W10 0470 * | 4.7 | | 24 | 36 | 66 | 6 | • |
| W10 0480 * | 4.8 | 20 | 28 | 36 | 66 | 6 | • |
| W10 0490 * | 4.9 | | 28 | 36 | 66 | 6 | • |
| W10 0500 * | 5 | | 28 | 36 | 66 | 6 | • |
| W10 0510 * | 5.1 | | 28 | 36 | 66 | 6 | • |
| W10 0520 * | 5.2 | | 28 | 36 | 66 | 6 | • |
| W10 0530 * | 5.3 | | 28 | 36 | 66 | 6 | • |
| W10 0540 * | 5.4 | | 28 | 36 | 66 | 6 | • |
| W10 0550 * | 5.5 | | 28 | 36 | 66 | 6 | • |
| W10 0560 * | 5.6 | | 28 | 36 | 66 | 6 | • |
| W10 0570 * | 5.7 | | 28 | 36 | 66 | 6 | • |
| W10 0580 * | 5.8 | | 28 | 36 | 66 | 6 | • |
| W10 0590 * | 5.9 | | 28 | 36 | 66 | 6 | • |
| W10 0600 * | 6 | | 28 | 36 | 66 | 6 | • |
| W10 0610 * | 6.1 | 24 | 34 | 36 | 79 | 8 | • |
| W10 0620 * | 6.2 | | 34 | 36 | 79 | 8 | • |
| W10 0630 * | 6.3 | | 34 | 36 | 79 | 8 | • |
| W10 0640 * | 6.4 | | 34 | 36 | 79 | 8 | • |
| W10 0650 * | 6.5 | | 34 | 36 | 79 | 8 | • |
| W10 0660 * | 6.6 | | 34 | 36 | 79 | 8 | • |
| W10 0670 * | 6.7 | | 34 | 36 | 79 | 8 | • |
| W10 0680 * | 6.8 | | 34 | 36 | 79 | 8 | • |
| W10 0690 * | 6.9 | | 34 | 36 | 79 | 8 | • |
| W10 0700 * | 7 | | 34 | 36 | 79 | 8 | • |
| W10 0710 * | 7.1 | 29 | 41 | 36 | 79 | 8 | • |
| W10 0720 * | 7.2 | | 41 | 36 | 79 | 8 | • |
| W10 0730 * | 7.3 | | 41 | 36 | 79 | 8 | • |
| W10 0740 * | 7.4 | | 41 | 36 | 79 | 8 | • |
| W10 0750 * | 7.5 | | 41 | 36 | 79 | 8 | • |
| W10 0760 * | 7.6 | | 41 | 36 | 79 | 8 | • |
| W10 0770 * | 7.7 | | 41 | 36 | 79 | 8 | • |
| W10 0780 * | 7.8 | | 41 | 36 | 79 | 8 | • |
| W10 0790 * | 7.9 | | 41 | 36 | 79 | 8 | • |
| W10 0800 * | 8 | | 41 | 36 | 79 | 8 | • |
| W10 0810 * | 8.1 | 35 | 47 | 40 | 89 | 10 | • |
| W10 0820 * | 8.2 | | 47 | 40 | 89 | 10 | • |
| W10 0830 * | 8.3 | | 47 | 40 | 89 | 10 | • |
| W10 0840 * | 8.4 | | 47 | 40 | 89 | 10 | • |

| Order Number DIN 6535 | D (mm) | l 1 (mm) | l 2 (mm) | l 3 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| W10 0850 * | 8.5 | 35 | 47 | 40 | 89 | 10 | • |
| W10 0860 * | 8.6 | | 47 | 40 | 89 | 10 | • |
| W10 0870 * | 8.7 | | 47 | 40 | 89 | 10 | • |
| W10 0880 * | 8.8 | | 47 | 40 | 89 | 10 | • |
| W10 0890 * | 8.9 | | 47 | 40 | 89 | 10 | • |
| W10 0900 * | 9 | | 47 | 40 | 89 | 10 | • |
| W10 0910 * | 9.1 | | 47 | 40 | 89 | 10 | • |
| W10 0920 * | 9.2 | | 47 | 40 | 89 | 10 | • |
| W10 0930 * | 9.3 | | 47 | 40 | 89 | 10 | • |
| W10 0940 * | 9.4 | | 47 | 40 | 89 | 10 | • |
| W10 0950 * | 9.5 | | 47 | 40 | 89 | 10 | • |
| W10 0960 * | 9.6 | | 47 | 40 | 89 | 10 | • |
| W10 0970 * | 9.7 | | 47 | 40 | 89 | 10 | • |
| W10 0980 * | 9.8 | | 47 | 40 | 89 | 10 | • |
| W10 0990 * | 9.9 | | 47 | 40 | 89 | 10 | • |
| W10 1000 * | 10 | | 47 | 40 | 89 | 10 | • |
| W10 1020 * | 10.2 | 40 | 55 | 45 | 102 | 12 | • |
| W10 1050 * | 10.5 | | 55 | 45 | 102 | 12 | • |
| W10 1080 * | 10.8 | | 55 | 45 | 102 | 12 | • |
| W10 1100 * | 11 | | 55 | 45 | 102 | 12 | • |
| W10 1120 * | 11.2 | | 55 | 45 | 102 | 12 | • |
| W10 1130 * | 11.3 | | 55 | 45 | 102 | 12 | • |
| W10 1150 * | 11.5 | | 55 | 45 | 102 | 12 | • |
| W10 1180 * | 11.8 | | 55 | 45 | 102 | 12 | • |
| W10 1200 * | 12 | | 55 | 45 | 102 | 12 | • |
| W10 1220 * | 12.2 | 43 | 60 | 45 | 107 | 12 | • |
| W10 1250 * | 12.5 | | 60 | 45 | 107 | 12 | • |
| W10 1270 * | 12.7 | | 60 | 45 | 107 | 12 | • |
| W10 1280 * | 12.8 | | 60 | 45 | 107 | 12 | • |
| W10 1300 * | 13 | | 60 | 45 | 107 | 14 | • |
| W10 1330 * | 13.3 | | 60 | 45 | 107 | 14 | • |
| W10 1350 * | 13.5 | | 60 | 45 | 107 | 14 | • |
| W10 1370 * | 13.7 | | 60 | 45 | 107 | 14 | • |
| W10 1380 * | 13.8 | | 60 | 45 | 107 | 14 | • |
| W10 1400 * | 14 | | 60 | 45 | 107 | 14 | • |
| W10 1450 * | 14.5 | 45 | 65 | 48 | 115 | 16 | • |
| W10 1500 * | 15 | | 65 | 48 | 115 | 16 | • |
| W10 1530 * | 15.3 | | 65 | 48 | 115 | 16 | • |
| W10 1550 * | 15.5 | | 65 | 48 | 115 | 16 | • |
| W10 1580 * | 15.8 | | 65 | 48 | 115 | 16 | • |
| W10 1600 * | 16 | | 65 | 48 | 115 | 16 | • |
| W10 1650 * | 16.5 | 51 | 73 | 48 | 123 | 18 | • |
| W10 1700 * | 17 | | 73 | 48 | 123 | 18 | • |
| W10 1750 * | 17.5 | | 73 | 48 | 123 | 18 | • |
| W10 1800 * | 18 | | 73 | 48 | 123 | 18 | • |
| W10 1850 * | 18.5 | 55 | 79 | 50 | 131 | 20 | • |
| W10 1900 * | 19 | | 79 | 50 | 131 | 20 | • |
| W10 1950 * | 19.5 | | 79 | 50 | 131 | 20 | • |
| W10 2000 * | 20 | | 79 | 50 | 131 | 20 | • |

* - DIN 6535

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| • | • | • | • | • | • | • | • | • | • | • | • | • | | | | |

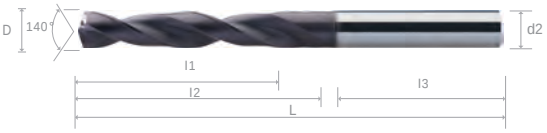
HPMT

# DR-S Oil Feed Twist Drills DIN 6537L - 5 x Ø, Point Angle 140°, 2 Flute

DR-S Brocas espirales con avance por aceite DIN 6537L - 5 x Ø, ángulo de punta 140°, 2 aristas de corte

DR-S Ölvorschub-Spiralbohrer DIN 6537L - 5 x Ø, Spitzenwinkel 140°, 2 Schneiden

DR-S Forets hélicoïdaux à huile DIN 6537L - 5 x Ø, angle de pointe 140°, 2 tranchants








| Order Number DIN 6535 | D (mm) | l 1 (mm) | l 2 (mm) | l 3 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| W11 0300 * | 3 | 23 | 28 | 36 | 66 | 6 | • |
| W11 0310 * | 3.1 | | 28 | 36 | 66 | 6 | • |
| W11 0320 * | 3.2 | | 28 | 36 | 66 | 6 | • |
| W11 0330 * | 3.3 | | 28 | 36 | 66 | 6 | • |
| W11 0340 * | 3.4 | | 28 | 36 | 66 | 6 | • |
| W11 0350 * | 3.5 | | 28 | 36 | 66 | 6 | • |
| W11 0360 * | 3.6 | | 28 | 36 | 66 | 6 | • |
| W11 0370 * | 3.7 | | 28 | 36 | 66 | 6 | • |
| W11 0380 * | 3.8 | 29 | 36 | 36 | 74 | 6 | • |
| W11 0390 * | 3.9 | | 36 | 36 | 74 | 6 | • |
| W11 0400 * | 4 | | 36 | 36 | 74 | 6 | • |
| W11 0410 * | 4.1 | | 36 | 36 | 74 | 6 | • |
| W11 0420 * | 4.2 | | 36 | 36 | 74 | 6 | • |
| W11 0430 * | 4.3 | | 36 | 36 | 74 | 6 | • |
| W11 0440 * | 4.4 | | 36 | 36 | 74 | 6 | • |
| W11 0450 * | 4.5 | | 36 | 36 | 74 | 6 | • |
| W11 0460 * | 4.6 | | 36 | 36 | 74 | 6 | • |
| W11 0470 * | 4.7 | | 36 | 36 | 74 | 6 | • |
| W11 0480 * | 4.8 | 35 | 44 | 36 | 82 | 6 | • |
| W11 0490 * | 4.9 | | 44 | 36 | 82 | 6 | • |
| W11 0500 * | 5 | | 44 | 36 | 82 | 6 | • |
| W11 0510 * | 5.1 | | 44 | 36 | 82 | 6 | • |
| W11 0520 * | 5.2 | | 44 | 36 | 82 | 6 | • |
| W11 0530 * | 5.3 | | 44 | 36 | 82 | 6 | • |
| W11 0540 * | 5.4 | | 44 | 36 | 82 | 6 | • |
| W11 0550 * | 5.5 | | 44 | 36 | 82 | 6 | • |
| W11 0560 * | 5.6 | | 44 | 36 | 82 | 6 | • |
| W11 0570 * | 5.7 | | 44 | 36 | 82 | 6 | • |
| W11 0580 * | 5.8 | | 44 | 36 | 82 | 6 | • |
| W11 0590 * | 5.9 | | 44 | 36 | 82 | 6 | • |
| W11 0600 * | 6 | | 44 | 36 | 82 | 6 | • |
| W11 0610 * | 6.1 | 43 | 53 | 36 | 91 | 8 | • |
| W11 0620 * | 6.2 | | 53 | 36 | 91 | 8 | • |
| W11 0630 * | 6.3 | | 53 | 36 | 91 | 8 | • |
| W11 0640 * | 6.4 | | 53 | 36 | 91 | 8 | • |
| W11 0650 * | 6.5 | | 53 | 36 | 91 | 8 | • |
| W11 0660 * | 6.6 | | 53 | 36 | 91 | 8 | • |
| W11 0670 * | 6.7 | | 53 | 36 | 91 | 8 | • |
| W11 0680 * | 6.8 | | 53 | 36 | 91 | 8 | • |
| W11 0690 * | 6.9 | | 53 | 36 | 91 | 8 | • |
| W11 0700 * | 7 | | 53 | 36 | 91 | 8 | • |
| W11 0710 * | 7.1 | | 53 | 36 | 91 | 8 | • |
| W11 0720 * | 7.2 | | 53 | 36 | 91 | 8 | • |
| W11 0730 * | 7.3 | | 53 | 36 | 91 | 8 | • |
| W11 0740 * | 7.4 | | 53 | 36 | 91 | 8 | • |
| W11 0750 * | 7.5 | | 53 | 36 | 91 | 8 | • |
| W11 0760 * | 7.6 | | 53 | 36 | 91 | 8 | • |
| W11 0770 * | 7.7 | | 53 | 36 | 91 | 8 | • |
| W11 0780 * | 7.8 | | 53 | 36 | 91 | 8 | • |
| W11 0790 * | 7.9 | | 53 | 36 | 91 | 8 | • |
| W11 0800 * | 8 | | 53 | 36 | 91 | 8 | • |
| W11 0810 * | 8.1 | 49 | 61 | 40 | 103 | 10 | • |
| W11 0820 * | 8.2 | | 61 | 40 | 103 | 10 | • |
| W11 0830 * | 8.3 | | 61 | 40 | 103 | 10 | • |
| W11 0840 * | 8.4 | | 61 | 40 | 103 | 10 | • |

| Order Number DIN 6535 | D (mm) | l 1 (mm) | l 2 (mm) | l 3 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| W11 0850 * | 8.5 | 49 | 61 | 40 | 103 | 10 | • |
| W11 0860 * | 8.6 | | 61 | 40 | 103 | 10 | • |
| W11 0870 * | 8.7 | | 61 | 40 | 103 | 10 | • |
| W11 0880 * | 8.8 | | 61 | 40 | 103 | 10 | • |
| W11 0890 * | 8.9 | | 61 | 40 | 103 | 10 | • |
| W11 0900 * | 9 | | 61 | 40 | 103 | 10 | • |
| W11 0910 * | 9.1 | | 61 | 40 | 103 | 10 | • |
| W11 0920 * | 9.2 | | 61 | 40 | 103 | 10 | • |
| W11 0930 * | 9.3 | | 61 | 40 | 103 | 10 | • |
| W11 0940 * | 9.4 | | 61 | 40 | 103 | 10 | • |
| W11 0950 * | 9.5 | | 61 | 40 | 103 | 10 | • |
| W11 0960 * | 9.6 | | 61 | 40 | 103 | 10 | • |
| W11 0970 * | 9.7 | | 61 | 40 | 103 | 10 | • |
| W11 0980 * | 9.8 | | 61 | 40 | 103 | 10 | • |
| W11 0990 * | 9.9 | | 61 | 40 | 103 | 10 | • |
| W11 1000 * | 10 | | 61 | 40 | 103 | 10 | • |
| W11 1010 * | 10.1 | 56 | 71 | 45 | 118 | 12 | • |
| W11 1020 * | 10.2 | | 71 | 45 | 118 | 12 | • |
| W11 1040 * | 10.4 | | 71 | 45 | 118 | 12 | • |
| W11 1050 * | 10.5 | | 71 | 45 | 118 | 12 | • |
| W11 1060 * | 10.6 | | 71 | 45 | 118 | 12 | • |
| W11 1070 * | 10.7 | | 71 | 45 | 118 | 12 | • |
| W11 1080 * | 10.8 | | 71 | 45 | 118 | 12 | • |
| W11 1090 * | 10.9 | | 71 | 45 | 118 | 12 | • |
| W11 1100 * | 11 | | 71 | 45 | 118 | 12 | • |
| W11 1110 * | 11.1 | | 71 | 45 | 118 | 12 | • |
| W11 1120 * | 11.2 | | 71 | 45 | 118 | 12 | • |
| W11 1130 * | 11.3 | | 71 | 45 | 118 | 12 | • |
| W11 1140 * | 11.4 | | 71 | 45 | 118 | 12 | • |
| W11 1150 * | 11.5 | | 71 | 45 | 118 | 12 | • |
| W11 1160 * | 11.6 | | 71 | 45 | 118 | 12 | • |
| W11 1170 * | 11.7 | | 71 | 45 | 118 | 12 | • |
| W11 1180 * | 11.8 | | 71 | 45 | 118 | 12 | • |
| W11 1190 * | 11.9 | | 71 | 45 | 118 | 12 | • |
| W11 1200 * | 12 | | 71 | 45 | 118 | 12 | • |
| W11 1210 * | 12.1 | 60 | 77 | 45 | 124 | 14 | • |
| W11 1220 * | 12.2 | | 77 | 45 | 124 | 14 | • |
| W11 1230 * | 12.3 | | 77 | 45 | 124 | 14 | • |
| W11 1240 * | 12.4 | | 77 | 45 | 124 | 14 | • |
| W11 1250 * | 12.5 | | 77 | 45 | 124 | 14 | • |
| W11 1260 * | 12.6 | | 77 | 45 | 124 | 14 | • |
| W11 1270 * | 12.7 | | 77 | 45 | 124 | 14 | • |
| W11 1280 * | 12.8 | | 77 | 45 | 124 | 14 | • |
| W11 1290 * | 12.9 | | 77 | 45 | 124 | 14 | • |
| W11 1300 * | 13 | | 77 | 45 | 124 | 14 | • |
| W11 1320 * | 13.2 | | 77 | 45 | 124 | 14 | • |
| W11 1330 * | 13.3 | | 77 | 45 | 124 | 14 | • |
| W11 1350 * | 13.5 | | 77 | 45 | 124 | 14 | • |
| W11 1360 * | 13.6 | | 77 | 45 | 124 | 14 | • |
| W11 1370 * | 13.7 | | 77 | 45 | 124 | 14 | • |
| W11 1380 * | 13.8 | | 77 | 45 | 124 | 14 | • |
| W11 1390 * | 13.9 | | 77 | 45 | 124 | 14 | • |
| W11 1400 * | 14 | | 77 | 45 | 124 | 14 | • |
| W11 1410 * | 14.1 | 63 | 83 | 48 | 133 | 16 | • |
| W11 1420 * | 14.2 | | 83 | 48 | 133 | 16 | • |

* - DIN 6535

cont'd ▸

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

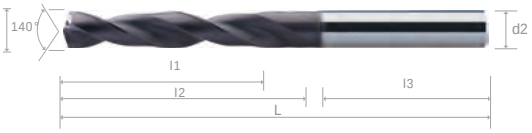
| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | | |

# DR-S Oil Feed Twist Drills DIN 6537L - 5 x Ø, Point Angle 140°, 2 Flute

DR-S Brocas espirales con avance por aceite DIN 6537L - 5 x Ø, ángulo de punta 140°, 2 aristas de corte

DR-S Ölvorschub-Spiralbohrer DIN 6537L - 5 x Ø, Spitzenwinkel 140°, 2 Schneiden

DR-S Forets hélicoïdaux à huile DIN 6537L - 5 x Ø, angle de pointe 140°, 2 tranchants








| Order Number DIN 6535 | D (mm) | l 1 (mm) | l 2 (mm) | l 3 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| W11 1450 * | 14.5 | 63 | 83 | 48 | 133 | 16 | • |
| W11 1470 * | 14.7 | | 83 | 48 | 133 | 16 | • |
| W11 1500 * | 15 | | 83 | 48 | 133 | 16 | • |
| W11 1520 * | 15.2 | | 83 | 48 | 133 | 16 | • |
| W11 1530 * | 15.3 | | 83 | 48 | 133 | 16 | • |
| W11 1550 * | 15.5 | | 83 | 48 | 133 | 16 | • |
| W11 1560 * | 15.6 | | 83 | 48 | 133 | 16 | • |
| W11 1570 * | 15.7 | | 83 | 48 | 133 | 16 | • |
| W11 1580 * | 15.8 | | 83 | 48 | 133 | 16 | • |
| W11 1590 * | 15.9 | | 83 | 48 | 133 | 16 | • |
| W11 1600 * | 16 | 71 | 83 | 48 | 133 | 16 | • |
| W11 1650 * | 16.5 | | 93 | 48 | 143 | 18 | • |
| W11 1670 * | 16.7 | | 93 | 48 | 143 | 18 | • |
| W11 1700 * | 17 | | 93 | 48 | 143 | 18 | • |
| W11 1750 * | 17.5 | | 93 | 48 | 143 | 18 | • |
| W11 1770 * | 17.7 | | 93 | 48 | 143 | 18 | • |
| W11 1800 * | 18 | 77 | 93 | 48 | 143 | 18 | • |
| W11 1850 * | 18.5 | | 101 | 50 | 153 | 20 | • |
| W11 1870 * | 18.7 | | 101 | 50 | 153 | 20 | • |
| W11 1900 * | 19 | | 101 | 50 | 153 | 20 | • |
| W11 1950 * | 19.5 | | 101 | 50 | 153 | 20 | • |
| W11 1970 * | 19.7 | | 101 | 50 | 153 | 20 | • |
| W11 2000 * | 20 | | 101 | 50 | 153 | 20 | • |

| Order Number DIN 6535 | D (mm) | l 1 (mm) | l 2 (mm) | l 3 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

* - DIN 6535

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | | |

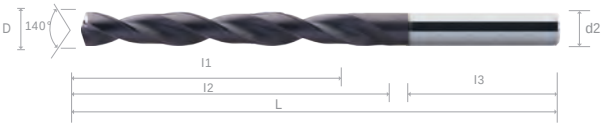
HPMT

# DR-S Oil Feed Twist Drills DIN 6537L - 8 x Ø, Point Angle 140°, 2 Flutes

DR-S Brocas espirales con avance por aceite DIN 6537L - 8 x Ø, ángulo de punta 140°, 2 aristas de corte

DR-S Ölvorschub-Spiralbohrer DIN 6537L - 8 x Ø, Spitzenwinkel 140°, 2 Schneiden

DR-S Forets hélicoïdaux à huile DIN 6537L - 8 x Ø, angle de pointe 140°, 2 goujures








| Order Number | DIN 6535 | D (mm) | l 1 (mm) | l 2 (mm) | l 3 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|---|
| W12 0300 | * | 3 | 32 | 40 | 36 | 85 | 6 | • |
| W12 0310 | * | 3.1 | | 40 | 36 | 85 | 6 | • |
| W12 0320 | * | 3.2 | | 40 | 36 | 85 | 6 | • |
| W12 0330 | * | 3.3 | | 40 | 36 | 85 | 6 | • |
| W12 0340 | * | 3.4 | | 40 | 36 | 85 | 6 | • |
| W12 0350 | * | 3.5 | | 40 | 36 | 85 | 6 | • |
| W12 0360 | * | 3.6 | 36 | 40 | 36 | 85 | 6 | • |
| W12 0370 | * | 3.7 | | 40 | 36 | 85 | 6 | • |
| W12 0380 | * | 3.8 | | 40 | 36 | 85 | 6 | • |
| W12 0390 | * | 3.9 | | 40 | 36 | 85 | 6 | • |
| W12 0400 | * | 4 | | 46 | 36 | 85 | 6 | • |
| W12 0410 | * | 4.1 | 38 | 46 | 36 | 85 | 6 | • |
| W12 0420 | * | 4.2 | | 46 | 36 | 85 | 6 | • |
| W12 0430 | * | 4.3 | 40 | 46 | 36 | 97 | 6 | • |
| W12 0440 | * | 4.4 | | 46 | 36 | 97 | 6 | • |
| W12 0450 | * | 4.5 | 44 | 46 | 36 | 97 | 6 | • |
| W12 0460 | * | 4.6 | | 46 | 36 | 97 | 6 | • |
| W12 0470 | * | 4.7 | | 46 | 36 | 97 | 6 | • |
| W12 0480 | * | 4.8 | | 46 | 36 | 97 | 6 | • |
| W12 0490 | * | 4.9 | | 46 | 36 | 97 | 6 | • |
| W12 0500 | * | 5 | 48 | 57 | 36 | 97 | 6 | • |
| W12 0510 | * | 5.1 | | 57 | 36 | 97 | 6 | • |
| W12 0520 | * | 5.2 | | 57 | 36 | 97 | 6 | • |
| W12 0530 | * | 5.3 | | 57 | 36 | 97 | 6 | • |
| W12 0540 | * | 5.4 | | 57 | 36 | 97 | 6 | • |
| W12 0550 | * | 5.5 | | 57 | 36 | 97 | 6 | • |
| W12 0560 | * | 5.6 | | 57 | 36 | 97 | 6 | • |
| W12 0570 | * | 5.7 | | 57 | 36 | 97 | 6 | • |
| W12 0580 | * | 5.8 | | 57 | 36 | 97 | 6 | • |
| W12 0590 | * | 5.9 | | 57 | 36 | 97 | 6 | • |
| W12 0600 | * | 6 | | 57 | 36 | 97 | 6 | • |
| W12 0610 | * | 6.1 | 64 | 76 | 36 | 116 | 8 | • |
| W12 0620 | * | 6.2 | | 76 | 36 | 116 | 8 | • |
| W12 0630 | * | 6.3 | | 76 | 36 | 116 | 8 | • |
| W12 0640 | * | 6.4 | | 76 | 36 | 116 | 8 | • |
| W12 0650 | * | 6.5 | | 76 | 36 | 116 | 8 | • |
| W12 0660 | * | 6.6 | | 76 | 36 | 116 | 8 | • |
| W12 0670 | * | 6.7 | | 76 | 36 | 116 | 8 | • |
| W12 0680 | * | 6.8 | | 76 | 36 | 116 | 8 | • |
| W12 0690 | * | 6.9 | | 76 | 36 | 116 | 8 | • |
| W12 0700 | * | 7 | | 76 | 36 | 116 | 8 | • |
| W12 0710 | * | 7.1 | | 76 | 36 | 116 | 8 | • |
| W12 0720 | * | 7.2 | | 76 | 36 | 116 | 8 | • |
| W12 0730 | * | 7.3 | | 76 | 36 | 116 | 8 | • |
| W12 0740 | * | 7.4 | | 76 | 36 | 116 | 8 | • |
| W12 0750 | * | 7.5 | | 76 | 36 | 116 | 8 | • |
| W12 0760 | * | 7.6 | | 76 | 36 | 116 | 8 | • |
| W12 0770 | * | 7.7 | | 76 | 36 | 116 | 8 | • |
| W12 0780 | * | 7.8 | | 76 | 36 | 116 | 8 | • |
| W12 0790 | * | 7.9 | | 76 | 36 | 116 | 8 | • |
| W12 0800 | * | 8 | | 76 | 36 | 116 | 8 | • |
| W12 0810 | * | 8.1 | 80 | 95 | 40 | 142 | 10 | • |
| W12 0820 | * | 8.2 | | 95 | 40 | 142 | 10 | • |
| W12 0830 | * | 8.3 | | 95 | 40 | 142 | 10 | • |
| W12 0840 | * | 8.4 | | 95 | 40 | 142 | 10 | • |

| Order Number | DIN 6535 | D (mm) | l 1 (mm) | l 2 (mm) | l 3 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|---|
| W12 0850 | * | 8.5 | 80 | 95 | 40 | 142 | 10 | • |
| W12 0860 | * | 8.6 | | 95 | 40 | 142 | 10 | • |
| W12 0870 | * | 8.7 | | 95 | 40 | 142 | 10 | • |
| W12 0880 | * | 8.8 | | 95 | 40 | 142 | 10 | • |
| W12 0890 | * | 8.9 | | 95 | 40 | 142 | 10 | • |
| W12 0900 | * | 9 | | 95 | 40 | 142 | 10 | • |
| W12 0910 | * | 9.1 | | 95 | 40 | 142 | 10 | • |
| W12 0920 | * | 9.2 | | 95 | 40 | 142 | 10 | • |
| W12 0930 | * | 9.3 | | 95 | 40 | 142 | 10 | • |
| W12 0940 | * | 9.4 | | 95 | 40 | 142 | 10 | • |
| W12 0950 | * | 9.5 | | 95 | 40 | 142 | 10 | • |
| W12 0960 | * | 9.6 | | 95 | 40 | 142 | 10 | • |
| W12 0970 | * | 9.7 | | 95 | 40 | 142 | 10 | • |
| W12 0980 | * | 9.8 | | 95 | 40 | 142 | 10 | • |
| W12 0990 | * | 9.9 | | 95 | 40 | 142 | 10 | • |
| W12 1000 | * | 10 | | 95 | 40 | 142 | 10 | • |
| W12 1020 | * | 10.2 | 96 | 114 | 45 | 163 | 12 | • |
| W12 1030 | * | 10.3 | | 114 | 45 | 163 | 12 | • |
| W12 1050 | * | 10.5 | | 114 | 45 | 163 | 12 | • |
| W12 1080 | * | 10.8 | | 114 | 45 | 163 | 12 | • |
| W12 1100 | * | 11 | | 114 | 45 | 163 | 12 | • |
| W12 1120 | * | 11.2 | | 114 | 45 | 163 | 12 | • |
| W12 1130 | * | 11.3 | | 114 | 45 | 163 | 12 | • |
| W12 1150 | * | 11.5 | | 114 | 45 | 163 | 12 | • |
| W12 1180 | * | 11.8 | | 114 | 45 | 163 | 12 | • |
| W12 1200 | * | 12 | | 114 | 45 | 163 | 12 | • |
| W12 1220 | * | 12.2 | 112 | 133 | 45 | 182 | 12 | • |
| W12 1250 | * | 12.5 | | 133 | 45 | 182 | 12 | • |
| W12 1270 | * | 12.7 | | 133 | 45 | 182 | 12 | • |
| W12 1280 | * | 12.8 | | 133 | 45 | 182 | 12 | • |
| W12 1300 | * | 13 | | 133 | 45 | 182 | 14 | • |
| W12 1330 | * | 13.3 | | 133 | 45 | 182 | 14 | • |
| W12 1350 | * | 13.5 | | 133 | 45 | 182 | 14 | • |
| W12 1370 | * | 13.7 | | 133 | 45 | 182 | 14 | • |
| W12 1380 | * | 13.8 | | 133 | 45 | 182 | 14 | • |
| W12 1400 | * | 14 | | 133 | 45 | 182 | 14 | • |
| W12 1450 | * | 14.5 | 128 | 152 | 48 | 204 | 16 | • |
| W12 1500 | * | 15 | | 152 | 48 | 204 | 16 | • |
| W12 1530 | * | 15.3 | | 152 | 48 | 204 | 16 | • |
| W12 1550 | * | 15.5 | | 152 | 48 | 204 | 16 | • |
| W12 1580 | * | 15.8 | | 152 | 48 | 204 | 16 | • |
| W12 1600 | * | 16 | | 152 | 48 | 204 | 16 | • |
| W12 1650 | * | 16.5 | 144 | 171 | 48 | 222 | 18 | • |
| W12 1700 | * | 17 | | 171 | 48 | 222 | 18 | • |
| W12 1750 | * | 17.5 | | 171 | 48 | 222 | 18 | • |
| W12 1800 | * | 18 | | 171 | 48 | 222 | 18 | • |
| W12 1850 | * | 18.5 | 160 | 190 | 50 | 243 | 20 | • |
| W12 1900 | * | 19 | | 190 | 50 | 243 | 20 | • |
| W12 1950 | * | 19.5 | | 190 | 50 | 243 | 20 | • |
| W12 2000 | * | 20 | | 190 | 50 | 243 | 20 | • |

* - DIN 6535

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ● | ● | ● | ● | ● | ○ | ○ | ● | ● | | | | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition


## DR-S Twist Drills, 3xD & 5xD External Coolant, 2 Flutes - W08, W09

| Aggresive | N | | | | | | K | | | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper Alloy | | Grey Cast Iron | | Ductile Cast Iron | | Titanium Alloy | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | | - | | - | |
| D | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn |
| 3 | | 0.058 | | 0.063 | | 0.062 | | 0.070 | | 0.052 | | 0.037 |
| 4 | | 0.081 | | 0.087 | | 0.085 | | 0.095 | | 0.073 | | 0.055 |
| 5 | | 0.104 | | 0.111 | | 0.110 | | 0.120 | | 0.096 | | 0.069 |
| 6 | | 0.128 | | 0.138 | | 0.136 | | 0.145 | | 0.119 | | 0.086 |
| 7 | | 0.155 | | 0.164 | | 0.165 | | 0.170 | | 0.144 | | 0.100 |
| 8 | | 0.183 | | 0.194 | | 0.194 | | 0.200 | | 0.171 | | 0.130 |
| 9 | | 0.211 | | 0.222 | | 0.224 | | 0.226 | | 0.200 | | 0.144 |
| 10 | | 0.241 | | 0.254 | | 0.257 | | 0.252 | | 0.230 | | 0.175 |
| 11 | 200 | 0.272 | 165 | 0.287 | 140 | 0.290 | 95 | 0.282 | 70 | 0.263 | 25 | 0.175 |
| 12 | | 0.300 | | 0.321 | | 0.318 | | 0.308 | | 0.296 | | 0.200 |
| 13 | | 0.322 | | 0.339 | | 0.339 | | 0.333 | | 0.314 | | 0.200 |
| 14 | | 0.335 | | 0.357 | | 0.361 | | 0.359 | | 0.332 | | 0.233 |
| 15 | | 0.349 | | 0.368 | | 0.378 | | 0.371 | | 0.348 | | 0.233 |
| 16 | | 0.365 | | 0.391 | | 0.393 | | 0.405 | | 0.365 | | 0.260 |
| 17 | | 0.374 | | 0.409 | | 0.399 | | 0.428 | | 0.379 | | 0.260 |
| 18 | | 0.383 | | 0.412 | | 0.418 | | 0.447 | | 0.393 | | 0.260 |
| 19 | | 0.394 | | 0.429 | | 0.426 | | 0.469 | | 0.406 | | 0.260 |
| 20 | | 0.406 | | 0.432 | | 0.430 | | 0.463 | | 0.417 | | 0.300 |

## DR-S Twist Drills, 3xD & 5xD External Coolant, 2 Flutes - W08, W09

| Aggresive | P | | | | | | M | | | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Carbon Steel | | Alloy Steel | | Prehardened Steel | | Stainless Steel | | Stainless Steel | | Nickel Alloy | |
| Properties | - | | 520 < Rm < 1200 | | - | | High Machinability | | Low Machinability | | - | |
| D | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn |
| 3 | | 0.072 | | 0.061 | | 0.060 | | 0.049 | | 0.042 | | 0.036 |
| 4 | | 0.100 | | 0.085 | | 0.083 | | 0.069 | | 0.061 | | 0.056 |
| 5 | | 0.128 | | 0.111 | | 0.107 | | 0.088 | | 0.074 | | 0.069 |
| 6 | | 0.157 | | 0.138 | | 0.132 | | 0.109 | | 0.095 | | 0.082 |
| 7 | | 0.188 | | 0.166 | | 0.157 | | 0.132 | | 0.113 | | 0.090 |
| 8 | | 0.221 | | 0.197 | | 0.184 | | 0.156 | | 0.136 | | 0.125 |
| 9 | | 0.250 | | 0.230 | | 0.212 | | 0.173 | | 0.146 | | 0.125 |
| 10 | | 0.285 | | 0.264 | | 0.241 | | 0.208 | | 0.167 | | 0.143 |
| 11 | 105 | 0.319 | 80 | 0.300 | 50 | 0.272 | 40 | 0.233 | 35 | 0.182 | 20 | 0.167 |
| 12 | | 0.361 | | 0.338 | | 0.303 | | 0.255 | | 0.200 | | 0.167 |
| 13 | | 0.385 | | 0.357 | | 0.323 | | 0.280 | | 0.222 | | 0.200 |
| 14 | | 0.413 | | 0.375 | | 0.342 | | 0.270 | | 0.250 | | 0.200 |
| 15 | | 0.422 | | 0.391 | | 0.360 | | 0.300 | | 0.238 | | 0.200 |
| 16 | | 0.457 | | 0.406 | | 0.377 | | 0.325 | | 0.271 | | 0.250 |
| 17 | | 0.475 | | 0.419 | | 0.394 | | 0.313 | | 0.271 | | 0.250 |
| 18 | | 0.489 | | 0.431 | | 0.409 | | 0.313 | | 0.257 | | 0.250 |
| 19 | | 0.511 | | 0.442 | | 0.423 | | 0.343 | | 0.300 | | 0.250 |
| 20 | | 0.529 | | 0.452 | | 0.437 | | 0.329 | | 0.283 | | 0.225 |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P K N M S P K

## DR-S Twist Drills, 3xD & 5xD External Coolant, 2 Flutes - W08, W09

| Conventional | N | | | | | | K | | | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper Alloy | | Grey Cast Iron | | Ductile Cast Iron | | Titanium Alloy | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | | - | | - | |
| D | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn |
| 3 | 150 | 0.055 | 130 | 0.062 | 100 | 0.060 | 75 | 0.061 | 70 | 0.039 | 20 | 0.032 |
| 4 | | 0.077 | | 0.085 | | 0.082 | | 0.083 | | 0.055 | | 0.050 |
| 5 | | 0.100 | | 0.109 | | 0.106 | | 0.104 | | 0.072 | | 0.062 |
| 6 | | 0.124 | | 0.135 | | 0.131 | | 0.126 | | 0.089 | | 0.073 |
| 7 | | 0.149 | | 0.161 | | 0.158 | | 0.149 | | 0.108 | | 0.090 |
| 8 | | 0.177 | | 0.190 | | 0.187 | | 0.174 | | 0.128 | | 0.113 |
| 9 | | 0.204 | | 0.218 | | 0.215 | | 0.197 | | 0.150 | | 0.113 |
| 10 | | 0.235 | | 0.249 | | 0.246 | | 0.219 | | 0.172 | | 0.143 |
| 11 | | 0.266 | | 0.281 | | 0.278 | | 0.246 | | 0.196 | | 0.167 |
| 12 | | 0.300 | | 0.314 | | 0.306 | | 0.268 | | 0.221 | | 0.167 |
| 13 | | 0.319 | | 0.332 | | 0.326 | | 0.290 | | 0.235 | | 0.200 |
| 14 | | 0.329 | | 0.350 | | 0.347 | | 0.313 | | 0.248 | | 0.200 |
| 15 | | 0.350 | | 0.360 | | 0.363 | | 0.324 | | 0.261 | | 0.200 |
| 16 | | 0.363 | | 0.383 | | 0.377 | | 0.353 | | 0.273 | | 0.250 |
| 17 | | 0.369 | | 0.401 | | 0.383 | | 0.373 | | 0.284 | | 0.250 |
| 18 | | 0.385 | | 0.403 | | 0.401 | | 0.389 | | 0.294 | | 0.250 |
| 19 | | 0.388 | | 0.421 | | 0.409 | | 0.408 | | 0.304 | | 0.250 |
| 20 | | 0.408 | | 0.423 | | 0.413 | | 0.403 | | 0.313 | | 0.225 |

## DR-S Twist Drills, 3xD & 5xD External Coolant, 2 Flutes - W08, W09

| Conventional | P | | | | | | M | | | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Carbon Steel | | Alloy Steel | | Prehardened Steel | | Stainless Steel | | Stainless Steel | | Nickel Alloy | |
| Properties | - | | 520 < Rm < 1200 | | - | | High Machinability | | Low Machinability | | - | |
| D | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn |
| 3 | 80 | 0.060 | 60 | 0.055 | 40 | 0.040 | 30 | 0.044 | 25 | 0.041 | 12 | 0.023 |
| 4 | | 0.084 | | 0.076 | | 0.055 | | 0.063 | | 0.060 | | 0.040 |
| 5 | | 0.110 | | 0.099 | | 0.071 | | 0.075 | | 0.075 | | 0.050 |
| 6 | | 0.135 | | 0.124 | | 0.088 | | 0.100 | | 0.093 | | 0.057 |
| 7 | | 0.162 | | 0.149 | | 0.105 | | 0.114 | | 0.108 | | 0.083 |
| 8 | | 0.194 | | 0.177 | | 0.123 | | 0.142 | | 0.140 | | 0.100 |
| 9 | | 0.221 | | 0.206 | | 0.142 | | 0.155 | | 0.156 | | 0.100 |
| 10 | | 0.254 | | 0.237 | | 0.161 | | 0.180 | | 0.188 | | 0.150 |
| 11 | | 0.283 | | 0.269 | | 0.182 | | 0.200 | | 0.188 | | 0.150 |
| 12 | | 0.318 | | 0.303 | | 0.203 | | 0.225 | | 0.214 | | 0.150 |
| 13 | | 0.345 | | 0.320 | | 0.216 | | 0.225 | | 0.214 | | 0.200 |
| 14 | | 0.358 | | 0.336 | | 0.229 | | 0.257 | | 0.250 | | 0.200 |
| 15 | | 0.394 | | 0.351 | | 0.240 | | 0.243 | | 0.233 | | 0.200 |
| 16 | | 0.406 | | 0.364 | | 0.252 | | 0.283 | | 0.280 | | 0.167 |
| 17 | | 0.427 | | 0.376 | | 0.263 | | 0.283 | | 0.280 | | 0.167 |
| 18 | | 0.420 | | 0.387 | | 0.274 | | 0.267 | | 0.260 | | 0.167 |
| 19 | | 0.443 | | 0.397 | | 0.283 | | 0.267 | | 0.260 | | 0.167 |
| 20 | | 0.462 | | 0.406 | | 0.292 | | 0.300 | | 0.300 | | 0.200 |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition


## DR-S Twist Drills, 3xD & 5xD Internal Coolant, 2 Flutes - W10, W11, W12

| Aggresive | N | | | | | | K | | | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper Alloy | | Grey Cast Iron | | Ductile Cast Iron | | Titanium Alloy | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | | - | | - | |
| D | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn |
| 3 | | 0.076 | | 0.073 | | 0.077 | | 0.073 | | 0.071 | | 0.047 |
| 4 | | 0.107 | | 0.102 | | 0.107 | | 0.104 | | 0.099 | | 0.066 |
| 5 | | 0.140 | | 0.134 | | 0.139 | | 0.136 | | 0.128 | | 0.085 |
| 6 | | 0.176 | | 0.169 | | 0.172 | | 0.172 | | 0.160 | | 0.105 |
| 7 | | 0.216 | | 0.204 | | 0.206 | | 0.211 | | 0.194 | | 0.126 |
| 8 | | 0.256 | | 0.244 | | 0.245 | | 0.252 | | 0.230 | | 0.156 |
| 9 | | 0.301 | | 0.287 | | 0.281 | | 0.297 | | 0.268 | | 0.173 |
| 10 | | 0.347 | | 0.327 | | 0.324 | | 0.344 | | 0.308 | | 0.208 |
| 11 | 310 | 0.397 | 220 | 0.377 | 190 | 0.369 | 140 | 0.394 | 105 | 0.351 | 40 | 0.233 |
| 12 | | 0.446 | | 0.424 | | 0.408 | | 0.447 | | 0.395 | | 0.255 |
| 13 | | 0.471 | | 0.450 | | 0.434 | | 0.472 | | 0.415 | | 0.280 |
| 14 | | 0.486 | | 0.461 | | 0.452 | | 0.495 | | 0.433 | | 0.270 |
| 15 | | 0.505 | | 0.483 | | 0.472 | | 0.517 | | 0.449 | | 0.289 |
| 16 | | 0.516 | | 0.500 | | 0.499 | | 0.537 | | 0.463 | | 0.313 |
| 17 | | 0.522 | | 0.505 | | 0.513 | | 0.554 | | 0.475 | | 0.313 |
| 18 | | 0.536 | | 0.526 | | 0.531 | | 0.570 | | 0.485 | | 0.300 |
| 19 | | 0.544 | | 0.532 | | 0.548 | | 0.585 | | 0.494 | | 0.329 |
| 20 | | 0.540 | | 0.525 | | 0.549 | | 0.597 | | 0.500 | | 0.314 |

## DR-S Twist Drills, 3xD & 5xD Internal Coolant, 2 Flutes - W10, W11, W12

| Aggresive | P | | | | | | M | | | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Carbon Steel | | Alloy Steel | | Prehardened Steel | | Stainless Steel | | Stainless Steel | | Nickel Alloy | |
| Properties | - | | 520 < Rm < 1200 | | - | | High Machinability | | Low Machinability | | - | |
| D | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn |
| 3 | | 0.063 | | 0.068 | | 0.080 | | 0.048 | | 0.054 | | 0.026 |
| 4 | | 0.090 | | 0.098 | | 0.110 | | 0.067 | | 0.075 | | 0.039 |
| 5 | | 0.119 | | 0.132 | | 0.143 | | 0.085 | | 0.094 | | 0.048 |
| 6 | | 0.151 | | 0.171 | | 0.178 | | 0.106 | | 0.115 | | 0.058 |
| 7 | | 0.185 | | 0.214 | | 0.215 | | 0.125 | | 0.135 | | 0.075 |
| 8 | | 0.222 | | 0.261 | | 0.253 | | 0.150 | | 0.160 | | 0.086 |
| 9 | | 0.262 | | 0.312 | | 0.294 | | 0.168 | | 0.178 | | 0.092 |
| 10 | | 0.304 | | 0.368 | | 0.337 | | 0.190 | | 0.206 | | 0.108 |
| 11 | 175 | 0.349 | 120 | 0.427 | 65 | 0.382 | 60 | 0.217 | 50 | 0.220 | 35 | 0.118 |
| 12 | | 0.396 | | 0.491 | | 0.429 | | 0.250 | | 0.236 | | 0.130 |
| 13 | | 0.417 | | 0.503 | | 0.457 | | 0.267 | | 0.254 | | 0.133 |
| 14 | | 0.437 | | 0.511 | | 0.484 | | 0.279 | | 0.275 | | 0.150 |
| 15 | | 0.454 | | 0.515 | | 0.509 | | 0.292 | | 0.291 | | 0.150 |
| 16 | | 0.470 | | 0.514 | | 0.534 | | 0.317 | | 0.320 | | 0.157 |
| 17 | | 0.484 | | 0.509 | | 0.557 | | 0.308 | | 0.320 | | 0.157 |
| 18 | | 0.496 | | 0.499 | | 0.578 | | 0.336 | | 0.344 | | 0.157 |
| 19 | | 0.506 | | 0.485 | | 0.599 | | 0.327 | | 0.344 | | 0.183 |
| 20 | | 0.514 | | 0.466 | | 0.618 | | 0.350 | | 0.375 | | 0.183 |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P K N M S P K

## DR-S Twist Drills, 3xD & 5xD Internal Coolant, 2 Flutes - **W10, W11, W12**

| Conventional | N | | | | | | K | | | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Wrought Aluminium | | Cast Aluminium | | Copper Alloy | | Grey Cast Iron | | Ductile Cast Iron | | Titanium Alloy | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | | - | | - | |
| D | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn |
| 3 | | 0.069 | | 0.065 | | 0.050 | | 0.058 | | 0.046 | | 0.046 |
| 4 | | 0.097 | | 0.091 | | 0.073 | | 0.081 | | 0.063 | | 0.067 |
| 5 | | 0.127 | | 0.120 | | 0.098 | | 0.104 | | 0.081 | | 0.080 |
| 6 | | 0.159 | | 0.150 | | 0.126 | | 0.128 | | 0.100 | | 0.108 |
| 7 | | 0.195 | | 0.184 | | 0.158 | | 0.156 | | 0.120 | | 0.118 |
| 8 | | 0.232 | | 0.216 | | 0.191 | | 0.185 | | 0.142 | | 0.156 |
| 9 | | 0.273 | | 0.254 | | 0.226 | | 0.210 | | 0.165 | | 0.175 |
| 10 | | 0.314 | | 0.292 | | 0.269 | | 0.239 | | 0.186 | | 0.188 |
| 11 | 240 | 0.359 | 200 | 0.334 | 160 | 0.306 | 85 | 0.276 | 65 | 0.211 | 22 | 0.214 |
| 12 | | 0.406 | | 0.370 | | 0.351 | | 0.309 | | 0.222 | | 0.250 |
| 13 | | 0.431 | | 0.400 | | 0.365 | | 0.333 | | 0.250 | | 0.250 |
| 14 | | 0.451 | | 0.417 | | 0.381 | | 0.345 | | 0.267 | | 0.250 |
| 15 | | 0.475 | | 0.437 | | 0.400 | | 0.353 | | 0.279 | | 0.300 |
| 16 | | 0.492 | | 0.460 | | 0.406 | | 0.388 | | 0.300 | | 0.280 |
| 17 | | 0.511 | | 0.474 | | 0.417 | | 0.406 | | 0.300 | | 0.280 |
| 18 | | 0.521 | | 0.489 | | 0.414 | | 0.394 | | 0.317 | | 0.350 |
| 19 | | 0.532 | | 0.506 | | 0.426 | | 0.413 | | 0.345 | | 0.350 |
| 20 | | 0.541 | | 0.522 | | 0.419 | | 0.429 | | 0.336 | | 0.325 |

## DR-S Twist Drills, 3xD & 5xD Internal Coolant, 2 Flutes - **W10, W11, W12**

| Conventional | P | | | | | | M | | | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working Material | Carbon Steel | | Alloy Steel | | Prehardened Steel | | Stainless Steel | | Stainless Steel | | Nickel Alloy | |
| Properties | - | | 520 < Rm < 1200 | | - | | High Machinability | | Low Machinability | | - | |
| D | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn |
| 3 | | 0.069 | | 0.065 | | 0.073 | | 0.039 | | 0.044 | | 0.038 |
| 4 | | 0.099 | | 0.095 | | 0.100 | | 0.057 | | 0.067 | | 0.058 |
| 5 | | 0.131 | | 0.128 | | 0.130 | | 0.074 | | 0.080 | | 0.070 |
| 6 | | 0.166 | | 0.166 | | 0.162 | | 0.089 | | 0.100 | | 0.088 |
| 7 | | 0.204 | | 0.208 | | 0.196 | | 0.113 | | 0.121 | | 0.100 |
| 8 | | 0.244 | | 0.253 | | 0.230 | | 0.129 | | 0.142 | | 0.133 |
| 9 | | 0.288 | | 0.303 | | 0.268 | | 0.146 | | 0.164 | | 0.133 |
| 10 | | 0.334 | | 0.357 | | 0.307 | | 0.158 | | 0.180 | | 0.160 |
| 11 | 110 | 0.384 | 80 | 0.414 | 40 | 0.348 | 35 | 0.182 | 30 | 0.211 | 15 | 0.160 |
| 12 | | 0.436 | | 0.476 | | 0.390 | | 0.200 | | 0.225 | | 0.200 |
| 13 | | 0.459 | | 0.488 | | 0.416 | | 0.222 | | 0.225 | | 0.200 |
| 14 | | 0.481 | | 0.496 | | 0.440 | | 0.250 | | 0.257 | | 0.200 |
| 15 | | 0.499 | | 0.499 | | 0.463 | | 0.238 | | 0.243 | | 0.200 |
| 16 | | 0.517 | | 0.498 | | 0.486 | | 0.271 | | 0.283 | | 0.267 |
| 17 | | 0.532 | | 0.493 | | 0.507 | | 0.271 | | 0.283 | | 0.267 |
| 18 | | 0.546 | | 0.484 | | 0.526 | | 0.257 | | 0.267 | | 0.267 |
| 19 | | 0.557 | | 0.471 | | 0.545 | | 0.300 | | 0.267 | | 0.267 |
| 20 | | 0.565 | | 0.452 | | 0.562 | | 0.283 | | 0.300 | | 0.233 |

HPMT

# MICRO DRILLS

## Micro Drills (ø1 - ø3) up to 30 X D

FEATURES & BENEFITS

# DR Mini Micro Drills


## 1 Split Point Design

Provides self centering ability and reduced thrust.

## 2 X-Thinning

Better self-centering on initial cutting.

## 3 Straight Edge Profile

Shorter chip and reinforced cutting edge.

## 4 Polished Flute

-Smoother chips evacuation.
-Less build up edge.

## 5 Suitable for Material

P K N M S

## CARATTERISTICHE TECNICHE

1. Estructura de punto de ruptura
   Ofrece capacidades de autocentrado y empuje reducido.
2. Adelgazamiento en X
   Autocentrado mejorado en el corte inicial.
3. Perfil recto
   Virutas más cortas y ángulo de corte reforzado.
4. Ranuras muy pulidas
   Evacuación más fácil de la viruta.
   Menor formación de material de arrastre.
5. Adecuado para materiales P, K, N, M, S

## MERKMALE UND VORTEILE

1. Kreuzanschliff
   Bietet Selbstzentrierung und reduzierten Axialdruck
2. X-Ausspitzung
   Bessere Selbstzentrierung beim Anschnitt
3. Gerades Kantenprofil
   Kürzerer Span und verstärkte Schneidkante
4. Polierte Schneiden
   Verbesserter problemloser Spänefluß
   Weniger Aufbauschneiden
5. Geeignet für die Materialgruppen P, K, N, M, S

## CARACTÉRISTIQUES ET AVANTAGES

1. Conception à affûtage croisé
   Permet une capacité de centrage automatique et une poussée réduite
2. Amincissement en X
   Meilleur auto-centrage à l'attaque du percage
3. Profil d'arête droite
   Copeaux plus courts et arête de coupe renforcée
4. Goujures hautement polies
   Évacuation des copeaux plus fluide
   Moins d'accumulation sur les arêtes
5. Adapté aux matériaux P, K, N, M, S

# H03

HPMT

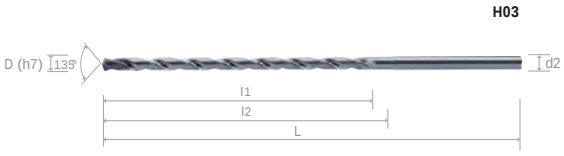
## DR MINI Oil Feed Twist Drills Point Angle 135° - 5 x Ø, 8x Ø, Ø12 x Ø, 15x Ø, 20x Ø, 25x Ø, 30x Ø

DR MINI Brocas helicoidales con avance por aceite ángulo de punta 135° - 5 x Ø, 8x Ø, Ø12 x Ø, 15x Ø, 20x Ø, 25x Ø, 30x Ø

DR MINI Ölvorschub-Spiralbohrer Spitzenwinkel 135° - 5 x Ø, 8x Ø, Ø12 x Ø, 15x Ø, 20x Ø, 25x Ø, 30x Ø

DR MINI Oil Feed Twist Drills angle de pointe 135° - 5 x Ø, 8x Ø, Ø12 x Ø, 15x Ø, 20x Ø, 25x Ø, 30x Ø

MG | HPT T8090 TiALN | λ= 30°





| Order Number | Hole Depth l2/D | D h7 (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| H03 0100 5 | 5xD | 1.0 | 6.5 | 8 | 50 | 3 | • |
| H03 0100 8 | 8xD | | 9.5 | 11 | 50 | 3 | • |
| H03 0100 12 | 12xD | | 13.5 | 15 | 55 | 3 | • |
| H03 0100 20 | 20xD | | 21.5 | 23 | 65 | 3 | • |
| H03 0100 25 | 25xD | | 26.5 | 28 | 70 | 3 | • |
| H03 0100 30 | 30xD | | 31.5 | 33 | 75 | 3 | • |
| H03 0110 5 | 5xD | 1.1 | 7.2 | 8.7 | 50 | 3 | • |
| H03 0110 8 | 8xD | | 10.5 | 12 | 50 | 3 | • |
| H03 0110 12 | 12xD | | 14.9 | 16.4 | 55 | 3 | • |
| H03 0110 20 | 20xD | | 23.7 | 25.2 | 65 | 3 | • |
| H03 0110 25 | 25xD | | 29.15 | 30.65 | 70 | 3 | • |
| H03 0110 30 | 30xD | | 34.65 | 36.15 | 75 | 3 | • |
| H03 0120 5 | 5xD | 1.2 | 7.8 | 9.3 | 50 | 3 | • |
| H03 0120 8 | 8xD | | 11.4 | 12.9 | 50 | 3 | • |
| H03 0120 12 | 12xD | | 16.2 | 17.7 | 55 | 3 | • |
| H03 0120 20 | 20xD | | 25.8 | 27.3 | 65 | 3 | • |
| H03 0120 25 | 25xD | | 31.8 | 33.3 | 75 | 3 | • |
| H03 0120 30 | 30xD | | 37.8 | 39.3 | 75 | 3 | • |
| H03 0130 5 | 5xD | 1.3 | 8.5 | 10 | 50 | 3 | • |
| H03 0130 8 | 8xD | | 12.4 | 13.9 | 50 | 3 | • |
| H03 0130 12 | 12xD | | 17.6 | 19.1 | 55 | 3 | • |
| H03 0130 20 | 20xD | | 28 | 29.5 | 65 | 3 | • |
| H03 0130 25 | 25xD | | 34.45 | 35.95 | 75 | 3 | • |
| H03 0130 30 | 30xD | | 40.95 | 42.45 | 85 | 3 | • |
| H03 0140 5 | 5xD | 1.4 | 9.1 | 10.6 | 50 | 3 | • |
| H03 0140 8 | 8xD | | 13.3 | 14.8 | 50 | 3 | • |
| H03 0140 12 | 12xD | | 18.9 | 20.4 | 55 | 3 | • |
| H03 0140 20 | 20xD | | 30.1 | 31.6 | 65 | 3 | • |
| H03 0140 25 | 25xD | | 37.1 | 38.6 | 75 | 3 | • |
| H03 0140 30 | 30xD | | 44.1 | 45.6 | 85 | 3 | • |
| H03 0150 5 | 5xD | 1.5 | 9.8 | 11.3 | 50 | 3 | • |
| H03 0150 8 | 8xD | | 14.3 | 15.8 | 50 | 3 | • |
| H03 0150 12 | 12xD | | 20.3 | 21.8 | 55 | 3 | • |
| H03 0150 20 | 20xD | | 32.3 | 33.8 | 75 | 3 | • |
| H03 0150 25 | 25xD | | 39.75 | 41.25 | 80 | 3 | • |
| H03 0150 30 | 30xD | | 47.25 | 48.75 | 85 | 3 | • |
| H03 0160 5 | 5xD | 1.6 | 10.4 | 11.9 | 50 | 3 | • |
| H03 0160 8 | 8xD | | 15.2 | 16.7 | 50 | 3 | • |
| H03 0160 12 | 12xD | | 21.6 | 23.1 | 65 | 3 | • |
| H03 0160 20 | 20xD | | 34.4 | 35.9 | 75 | 3 | • |
| H03 0160 25 | 25xD | | 42.4 | 43.9 | 80 | 3 | • |
| H03 0160 30 | 30xD | | 50.4 | 51.9 | 90 | 3 | • |
| H03 0170 5 | 5xD | 1.7 | 11.1 | 12.6 | 55 | 3 | • |
| H03 0170 8 | 8xD | | 16.2 | 17.7 | 60 | 3 | • |
| H03 0170 12 | 12xD | | 23 | 24.5 | 65 | 3 | • |
| H03 0170 20 | 20xD | | 36.6 | 38.1 | 75 | 3 | • |
| H03 0170 25 | 25xD | | 45.05 | 46.55 | 80 | 3 | • |
| H03 0170 30 | 30xD | | 53.55 | 55.05 | 90 | 3 | • |
| H03 0180 5 | 5xD | 1.8 | 11.7 | 13.2 | 55 | 3 | • |
| H03 0180 8 | 8xD | | 17.1 | 18.6 | 60 | 3 | • |
| H03 0180 12 | 12xD | | 24.3 | 25.8 | 65 | 3 | • |
| H03 0180 20 | 20xD | | 38.7 | 40.2 | 75 | 3 | • |
| H03 0180 25 | 25xD | | 47.7 | 49.2 | 90 | 3 | • |
| H03 0180 30 | 30xD | | 56.7 | 58.2 | 100 | 3 | • |

| Order Number | Hole Depth l2/D | D h7 (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| H03 0190 5 | 5xD | 1.9 | 12.4 | 13.9 | 55 | 3 | • |
| H03 0190 8 | 8xD | | 18.1 | 19.6 | 60 | 3 | • |
| H03 0190 12 | 12xD | | 25.7 | 27.2 | 65 | 3 | • |
| H03 0190 20 | 20xD | | 40.9 | 42.4 | 75 | 3 | • |
| H03 0190 25 | 25xD | | 50.35 | 51.85 | 90 | 3 | • |
| H03 0190 30 | 30xD | | 59.85 | 61.35 | 100 | 3 | • |
| H03 0200 5 | 5xD | 2.0 | 13 | 16 | 55 | 3 | • |
| H03 0200 8 | 8xD | | 19 | 22 | 60 | 3 | • |
| H03 0200 12 | 12xD | | 27 | 30 | 65 | 3 | • |
| H03 0200 20 | 20xD | | 43 | 46 | 82 | 3 | • |
| H03 0200 25 | 25xD | | 53 | 56 | 90 | 3 | • |
| H03 0200 30 | 30xD | | 63 | 66 | 100 | 3 | • |
| H03 0210 5 | 5xD | 2.1 | 13.7 | 16.85 | 55 | 3 | • |
| H03 0210 8 | 8xD | | 20 | 23.15 | 60 | 3 | • |
| H03 0210 12 | 12xD | | 28.4 | 31.55 | 65 | 3 | • |
| H03 0210 20 * | 20xD | | 45.2 | 48.35 | 82 | 3 | • |
| H03 0210 25 | 25xD | | 55.65 | 58.8 | 100 | 3 | • |
| H03 0210 30 | 30xD | | 66.15 | 69.3 | 110 | 3 | • |
| H03 0220 5 | 5xD | 2.2 | 14.3 | 17.6 | 55 | 3 | • |
| H03 0220 8 | 8xD | | 20.9 | 24.2 | 60 | 3 | • |
| H03 0220 12 | 12xD | | 29.7 | 33 | 65 | 3 | • |
| H03 0220 20 | 20xD | | 47.3 | 50.6 | 82 | 3 | • |
| H03 0220 25 | 25xD | | 58.3 | 61.6 | 100 | 3 | • |
| H03 0220 30 | 30xD | | 69.3 | 72.6 | 110 | 3 | • |
| H03 0230 5 | 5xD | 2.3 | 15 | 18.45 | 55 | 3 | • |
| H03 0230 8 | 8xD | | 21.9 | 25.35 | 60 | 3 | • |
| H03 0230 12 | 12xD | | 31.1 | 34.55 | 65 | 3 | • |
| H03 0230 20 | 20xD | | 49.5 | 52.95 | 100 | 3 | • |
| H03 0230 25 | 25xD | | 60.95 | 64.4 | 100 | 3 | • |
| H03 0230 30 | 30xD | | 72.45 | 75.9 | 110 | 3 | • |
| H03 0240 5 | 5xD | 2.4 | 15.6 | 19.2 | 55 | 3 | • |
| H03 0240 8 | 8xD | | 22.8 | 26.4 | 60 | 3 | • |
| H03 0240 12 | 12xD | | 32.4 | 36 | 75 | 3 | • |
| H03 0240 20 | 20xD | | 51.6 | 55.2 | 100 | 3 | • |
| H03 0240 25 | 25xD | | 63.6 | 67.2 | 100 | 3 | • |
| H03 0240 30 * | 30xD | | 75.6 | 79.2 | 120 | 3 | • |
| H03 0250 5 | 5xD | 2.5 | 16.3 | 20.05 | 55 | 3 | • |
| H03 0250 8 | 8xD | | 23.8 | 27.55 | 60 | 3 | • |
| H03 0250 12 | 12xD | | 33.8 | 37.55 | 75 | 3 | • |
| H03 0250 20 | 20xD | | 53.8 | 57.55 | 100 | 3 | • |
| H03 0250 25 * | 25xD | | 66.25 | 70 | 110 | 3 | • |
| H03 0250 30 | 30xD | | 78.75 | 82.5 | 120 | 3 | • |
| H03 0260 5 | 5xD | 2.6 | 16.9 | 20.8 | 55 | 3 | • |
| H03 0260 8 | 8xD | | 24.7 | 28.6 | 60 | 3 | • |
| H03 0260 12 | 12xD | | 35.1 | 39 | 75 | 3 | • |
| H03 0260 20 | 20xD | | 55.9 | 59.8 | 100 | 3 | • |
| H03 0260 25 | 25xD | | 68.9 | 72.8 | 110 | 3 | • |
| H03 0260 30 | 30xD | | 81.9 | 85.8 | 120 | 3 | • |
| H03 0270 5 | 5xD | 2.7 | 17.6 | 21.65 | 55 | 3 | • |
| H03 0270 8 | 8xD | | 25.7 | 29.75 | 60 | 3 | • |
| H03 0270 12 | 12xD | | 36.5 | 40.55 | 75 | 3 | • |
| H03 0270 20 | 20xD | | 58.1 | 62.15 | 100 | 3 | • |
| H03 0270 25 | 25xD | | 71.55 | 75.6 | 110 | 3 | • |
| H03 0270 30 | 30xD | | 85.05 | 89.1 | 130 | 3 | • |

* - DIN 6535

cont'd ▸

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| • | • | • | • | • | • | • | • | • | • | • | • | • | | | | |

# H03

## DR MINI Oil Feed Twist Drills Point Angle 135° - 5 x Ø, 8x Ø, Ø12 x Ø, 15x Ø, 20x Ø, 25x Ø, 30x Ø

DR MINI Brocas helicoidales con avance por aceite ángulo de punta 135° - 5 x Ø, 8x Ø, Ø12 x Ø, 15x Ø, 20x Ø, 25x Ø, 30x Ø

DR MINI Ölvorschub-Spiralbohrer Spitzenwinkel 135° - 5 x Ø, 8x Ø, Ø12 x Ø, 15x Ø, 20x Ø, 25x Ø, 30x Ø

DR MINI Oil Feed Twist Drills angle de pointe 135° - 5 x Ø, 8x Ø, Ø12 x Ø, 15x Ø, 20x Ø, 25x Ø, 30x Ø

MG | HPT T8090 TiALN | λ= 30°

H03


Z2

| Order Number | Hole Depth l2/D | D h7 (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|
| H03 0280 5 | 5xD | 2.8 | 18.2 | 22.4 | 55 | 3 | • |
| H03 0280 8 | 8xD | | 26.6 | 30.8 | 60 | 3 | • |
| H03 0280 12 | 12xD | | 37.8 | 42 | 75 | 3 | • |
| H03 0280 20 | 20xD | | 60.2 | 64.4 | 100 | 3 | • |
| H03 0280 25 | 25xD | | 74.2 | 78.4 | 110 | 3 | • |
| H03 0280 30 | 30xD | | 88.2 | 92.4 | 130 | 3 | • |
| H03 0290 5 | 5xD | 2.9 | 18.9 | 23.25 | 55 | 3 | • |
| H03 0290 8 | 8xD | | 27.6 | 31.95 | 60 | 3 | • |
| H03 0290 12 | 12xD | | 39.2 | 43.55 | 75 | 3 | • |
| H03 0290 20 | 20xD | | 61.4 | 65.75 | 100 | 3 | • |
| H03 0290 25 | 25xD | | 76.85 | 81.2 | 120 | 3 | • |
| H03 0290 30 | 30xD | | 91.35 | 95.7 | 130 | 3 | • |
| H03 0300 5 | 5xD | 3.0 | 19.5 | 24 | 55 | 3 | • |
| H03 0300 8 | 8xD | | 28.5 | 33 | 60 | 3 | • |
| H03 0300 12 | 12xD | | 40.5 | 45 | 75 | 3 | • |
| H03 0300 20 | 20xD | | 64.5 | 69 | 100 | 3 | • |
| H03 0300 25 | 25xD | | 79.5 | 84 | 120 | 3 | • |
| H03 0300 30 | 30xD | | 94.5 | 99 | 130 | 3 | • |

| Order Number | Hole Depth l2/D | D h7 (mm) | l 1 (mm) | l 2 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|

* - DIN 6535

**Material Group** | Grupo de materiales | Materialgruppen | Groupe Matiere

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| • | • | • | • | • | • | • | • | • | • | • | • | • | | | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P M K N S P K

## DR Mini Oil Feed Twist Drill - Point Angle 135°, 2 Flutes, 5 x D, 8 x D - H03

| Working Material | N | | | | | | K | | | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wrought Aluminium | | Cast Aluminium | | Copper Alloy | | Grey Cast Iron | | Ductile Cast Iron | | Titanium Alloy | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | | - | | - | |
| D | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn |
| 1.0 | | 0.017 | | 0.018 | | 0.016 | | 0.018 | | 0.016 | | 0.013 |
| 1.5 | | 0.026 | | 0.026 | | 0.024 | | 0.027 | | 0.024 | | 0.019 |
| 2.0 | 145 | 0.035 | 125 | 0.035 | 115 | 0.032 | 85 | 0.035 | 65 | 0.032 | 30 | 0.025 |
| 2.5 | | 0.043 | | 0.044 | | 0.040 | | 0.044 | | 0.040 | | 0.031 |
| 3.0 | | 0.052 | | 0.053 | | 0.049 | | 0.053 | | 0.048 | | 0.038 |

## DR Mini Oil Feed Twist Drill - Point Angle 135°, 2 Flutes, 5 x D, 8 x D - H03

| Working Material | P | | | | | | M | | | | S | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Carbon Steel | | Alloy Steel | | Prehardened Steel | | Stainless Steel | | Stainless Steel | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | 520 < Rm < 1200 | | - | | High Machinability | | Low Machinability | | - | | - | |
| D | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn |
| 1.0 | | 0.017 | | 0.016 | | 0.014 | | 0.015 | | 0.014 | | 0.009 | | 0.022 |
| 1.5 | | 0.026 | | 0.024 | | 0.022 | | 0.022 | | 0.021 | | 0.016 | | 0.036 |
| 2.0 | 90 | 0.035 | 80 | 0.031 | 65 | 0.029 | 60 | 0.029 | 40 | 0.028 | 20 | 0.025 | 35 | 0.052 |
| 2.5 | | 0.043 | | 0.039 | | 0.036 | | 0.036 | | 0.035 | | 0.035 | | 0.070 |
| 3.0 | | 0.052 | | 0.047 | | 0.043 | | 0.044 | | 0.042 | | 0.045 | | 0.090 |

## DR Mini Oil Feed Twist Drill - Point Angle 135°, 2 Flutes, 12 x D, 20 x D - H03

| Working Material | N | | | | | | K | | | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wrought Aluminium | | Cast Aluminium | | Copper Alloy | | Grey Cast Iron | | Ductile Cast Iron | | Titanium Alloy | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | | - | | - | |
| D | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn |
| 1.0 | | 0.016 | | 0.016 | | 0.015 | | 0.014 | | 0.014 | | 0.010 |
| 1.5 | | 0.025 | | 0.024 | | 0.022 | | 0.021 | | 0.021 | | 0.016 |
| 2.0 | 130 | 0.033 | 115 | 0.032 | 105 | 0.029 | 80 | 0.028 | 55 | 0.028 | 30 | 0.021 |
| 2.5 | | 0.041 | | 0.039 | | 0.037 | | 0.035 | | 0.035 | | 0.026 |
| 3.0 | | 0.049 | | 0.047 | | 0.044 | | 0.042 | | 0.042 | | 0.031 |

## DR Mini Oil Feed Twist Drill - Point Angle 135°, 2 Flutes, 12 x D, 20 x D - H03

| Working Material | P | | | | | | M | | | | S | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Carbon Steel | | Alloy Steel | | Prehardened Steel | | Stainless Steel | | Stainless Steel | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | 520 < Rm < 1200 | | - | | High Machinability | | Low Machinability | | - | | - | |
| D | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn |
| 1.0 | | 0.014 | | 0.014 | | 0.010 | | 0.010 | | 0.009 | | 0.010 | | 0.012 |
| 1.5 | | 0.021 | | 0.020 | | 0.015 | | 0.015 | | 0.014 | | 0.016 | | 0.021 |
| 2.0 | 85 | 0.028 | 65 | 0.027 | 55 | 0.020 | 50 | 0.020 | 40 | 0.019 | 15 | 0.025 | 35 | 0.045 |
| 2.5 | | 0.035 | | 0.034 | | 0.025 | | 0.025 | | 0.024 | | 0.035 | | 0.070 |
| 3.0 | | 0.042 | | 0.041 | | 0.031 | | 0.030 | | 0.028 | | 0.044 | | 0.060 |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

P M K N S P K

## DR Mini Oil Feed Twist Drill - Point Angle 135°, 2 Flutes, 25 x D, 30 x D - H03

| Working Material | N | | | | | | K | | | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wrought Aluminium | | Cast Aluminium | | Copper Alloy | | Grey Cast Iron | | Ductile Cast Iron | | Titanium Alloy | |
| Properties | Si < 9% | | Si ≥ 9% | | - | | - | | - | | - | |
| D | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn |
| 1.0 | | 0.014 | | 0.014 | | 0.012 | | 0.010 | | 0.013 | | 0.006 |
| 1.5 | | 0.021 | | 0.021 | | 0.018 | | 0.015 | | 0.019 | | 0.009 |
| 2.0 | 125 | 0.028 | 105 | 0.027 | 95 | 0.024 | 75 | 0.020 | 50 | 0.025 | 30 | 0.013 |
| 2.5 | | 0.035 | | 0.034 | | 0.030 | | 0.025 | | 0.031 | | 0.015 |
| 3.0 | | 0.042 | | 0.041 | | 0.036 | | 0.030 | | 0.037 | | 0.019 |

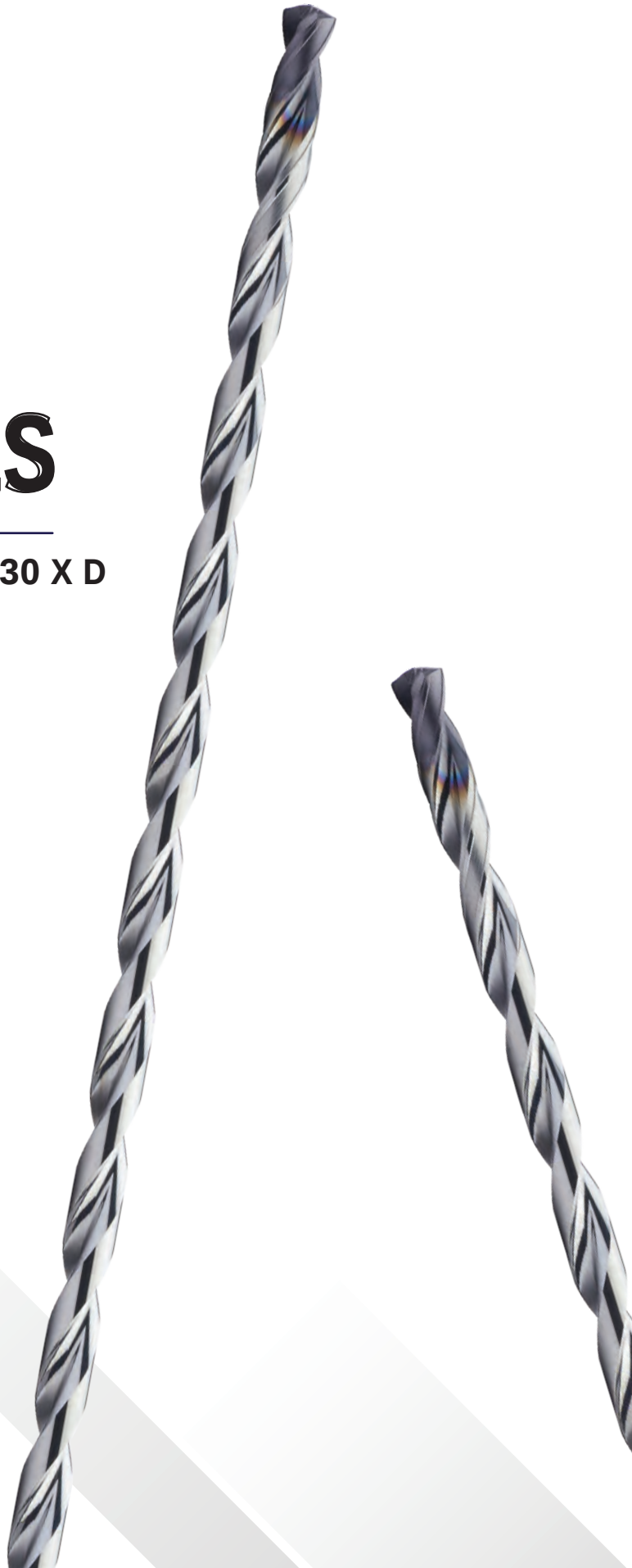
## DR Mini Oil Feed Twist Drill - Point Angle 135°, 2 Flutes, 25 x D, 30 x D - H03

| Working Material | P | | | | | | M | | | | S | | S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Carbon Steel | | Alloy Steel | | Prehardened Steel | | Stainless Steel | | Stainless Steel | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | 520 < Rm < 1200 | | - | | High Machinability | | Low Machinability | | - | | - | |
| D | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn | Vc | fn |
| 1.0 | | 0.010 | | 0.011 | | 0.008 | | 0.007 | | 0.007 | | 0.008 | | 0.008 |
| 1.5 | | 0.015 | | 0.016 | | 0.011 | | 0.010 | | 0.011 | | 0.013 | | 0.014 |
| 2.0 | 80 | 0.020 | 60 | 0.022 | 50 | 0.015 | 45 | 0.014 | 35 | 0.014 | 15 | 0.021 | 30 | 0.022 |
| 2.5 | | 0.025 | | 0.027 | | 0.019 | | 0.017 | | 0.018 | | 0.030 | | 0.031 |
| 3.0 | | 0.031 | | 0.033 | | 0.022 | | 0.021 | | 0.021 | | 0.038 | | 0.060 |

HPMT

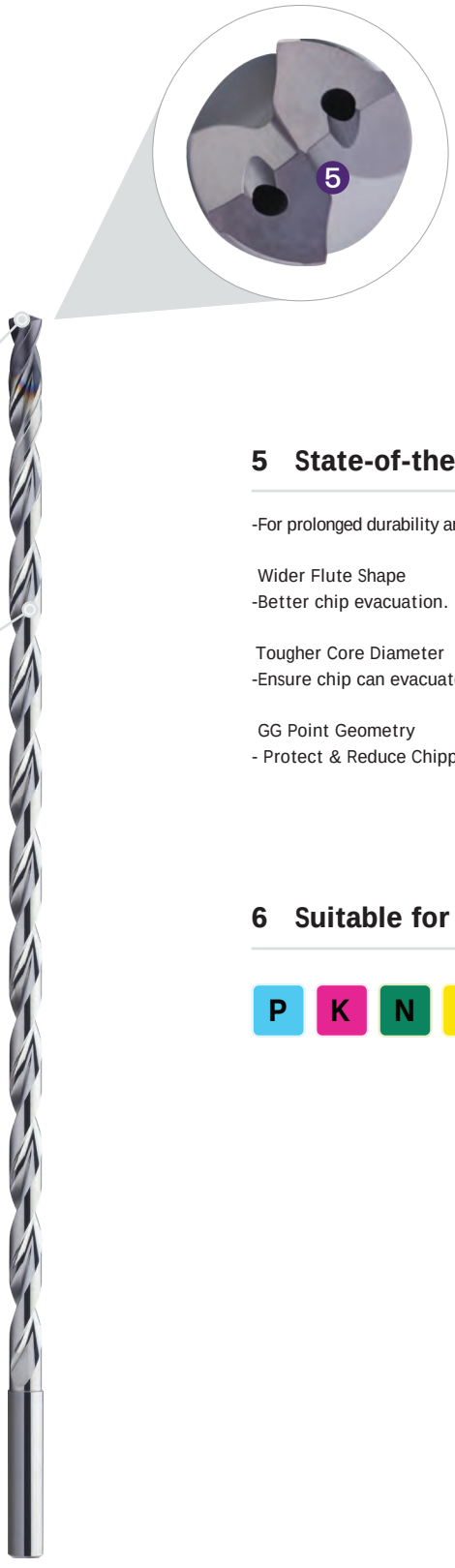
# EXTRA LONG DRILLS

**Extra Long-Drill (ø3, 1 - ø10) up to 30 X D**



FEATURES & BENEFITS

# DR-LX




## 1 Polished Flutes

Smoother chips evacuation and less build-up edge.

## 2 Versatile Machining Condition

Able to drill reliably with various coolant pressure and cutting data.

## 3 Flexible Drilling

Able to drill reliably in continuous and peck drilling.

## 4 T8090 Tip Coating

Low friction, high wear resistance.

## 5 State-of-the-Art-Geometry

-For prolonged durability and excellent quality.

Wider Flute Shape
-Better chip evacuation.

Tougher Core Diameter
-Ensure chip can evacuate smooth yet rigid.

GG Point Geometry
- Protect & Reduce Chipping.

## 6 Suitable for Material

P K N M S

## CARATTERISTICHE TECNICHE

1. Canto pulido
   Evacuación de virutas más suave y menor acumulación de filo.

2. Condiciones de mecanizado versátiles
   Capaz de taladrar de forma fiable con diferentes presiones de refrigerante y datos de corte.

3. Taladrado flexible
   Capaz de taladrar de forma fiable en taladrado continuo y de pico.

4. Recubrimiento de la punta T8090
   Baja fricción, alta resistencia al desgaste.

5. Geometría de vanguardia
   Para una durabilidad prolongada y una calidad excelente.

   Forma más ancha
   Mejor evacuación de la viruta.

   Diámetro del núcleo más duro
   Asegura que la viruta pueda evacuar de forma suave pero rígida.

   Geometría del Punto GG
   Protege y reduce el astillado.

6. Adecuado para materiales P, K, N, M, S

## MERKMALE UND VORTEILE

1. Polierte Schneide
   Verbesserter problemloser Spänefluß
   Weniger Aufbauschneiden

2. Vielseitige Bearbeitungsbedingungen
   Kann mit verschiedenen Kühlmitteldruck- und Schnittdaten zuverlässig bohren

3. Flexibles Bohren
   Zuverlässiges Bohren im Dauer- und Hackbohren

4. T8090 Beschichtung
   Mehrlagen AlTiN-Beschichtung verbessert die Lebensdauer des Werkzeugs

5. Modernste Geometrie
   Für längere Haltbarkeit und hervorragende Qualität

   Breitere Flötenform
   Bessere Spanabfuhr

   Zäherer Kerndurchmesser
   Stellen Sie sicher, dass der Chip glatt und dennoch starr evakuiert werden kann

   GG-Punktgeometrie
   Absplittern schützen und reduzieren

6. Geeignet für die Materialien P, K, N, M, S

## CARACTÉRISTIQUES ET AVANTAGES

1. Goujure polie
   Évacuation des copeaux plus fluide
   Moins d'accumulation sur les arêtes

2. Condition d'usinage polyvalente
   Capable de percer de manière fiable avec diverses pressions d'arrosage et données de coupe

3. Forage flexible
   Capable de percer de manière fiable en forage continu et en perçage

4. T8090 Rivestimento della punta
   Revêtement AlTiN multicouche pour une meilleure durée de vie de l'outil

5. Géométrie de pointe
   Pour une durabilité prolongée et une excellente qualité

   Forme de flûte plus large
   Meilleure évacuation des copeaux

   Diamètre de noyau plus dur
   Assurez-vous que la puce peut évacuer en douceur mais rigide

   Géométrie du point GG
   Protéger et réduire l'écaillage

6. Adapté aux matériaux P, K, N, M, S

# W05

HPMT

## DR-LX SB Oil Feed Twist Drills Point Angle 135° - 12 x Ø, 15x Ø, 20x Ø, 25x Ø, 30x Ø

DR-LX SB Brocas helicoidales con avance por aceite ángulo de punta 135° - 12x Ø, 15x Ø, 20x Ø, 25x Ø, 30x Ø

DR-LX SB Ölvorschub-Spiralbohrer Spitzenwinkel 135° - 12 x Ø, 15x Ø, 20x Ø, 25x Ø, 30x Ø

DR-LX SB Oil Feed Twist Drills angle de pointe 135° - 12 x Ø, 15x Ø, 20x Ø, 25x Ø, 30x Ø






| Order Number DIN 6535 | *l2/D | D h7 (mm) | l 1 (mm) | *l 2 (mm) | l 3 (mm) | l 4 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|---|---|
| W05 0300 12 NEW | 12 x D | 3 | 15.5 | 45 | 50 | 32 | 85 | 3 | • |
| W05 0300 15 NEW | 15 x D | | | 50 | 55 | 32 | 90 | 3 | • |
| W05 0300 20 NEW | 20 x D | | | 64 | 69 | 32 | 105 | 3 | • |
| W05 0300 25 NEW | 25 x D | | | 78.5 | 83 | 32 | 120 | 3 | • |
| W05 0300 30 NEW | 30 x D | | | 94 | 99 | 32 | 135 | 3 | • |
| W05 0310 12 NEW | 12 x D | 3.10 | 15.5 | 45 | 50 | 32 | 85 | 4 | • |
| W05 0310 15 | 15 x D | | | 50 | 55 | 32 | 90 | 4 | • |
| W05 0310 20 | 20 x D | | | 64 | 69 | 32 | 105 | 4 | • |
| W05 0310 25 | 25 x D | | | 78.5 | 83 | 32 | 120 | 4 | • |
| W05 0310 30 | 30 x D | | | 94 | 99 | 32 | 135 | 4 | ○ |
| W05 0320 12 | 12 x D | 3.20 | 16.0 | 45 | 50 | 32 | 85 | 4 | • |
| W05 0330 12 | | 3.30 | 16.5 | 45 | 50 | 32 | 85 | 4 | • |
| W05 0340 12 | | 3.40 | 17.0 | 48 | 54 | 32 | 90 | 4 | ○ |
| W05 0350 12 | | 3.50 | 17.5 | 48 | 54 | 32 | 90 | 4 | • |
| W05 0350 15 | 15 x D | | | 55 | 60 | 32 | 95 | 4 | • |
| W05 0350 20 | 20 x D | | | 72 | 77 | 32 | 110 | 4 | • |
| W05 0350 25 | 25 x D | | | 89 | 94 | 32 | 130 | 4 | • |
| W05 0350 30 | 30 x D | | | 106 | 111 | 32 | 145 | 4 | • |
| W05 0360 12 | 12 x D | 3.60 | 18.0 | 48 | 54 | 32 | 90 | 4 | ○ |
| W05 0370 12 | | 3.70 | 18.5 | 48 | 64 | 32 | 90 | 4 | • |
| W05 0380 12 | 12 x D | 3.80 | 19.0 | 57 | 64 | 32 | 100 | 4 | • |
| W05 0380 15 NEW | 15 x D | | | 60 | 65 | 32 | 100 | 4 | ○ |
| W05 0380 20 NEW | 20 x D | | | 78 | 84 | 32 | 120 | 4 | ○ |
| W05 0380 25 | 25 x D | | | 96 | 102 | 32 | 135 | 4 | ○ |
| W05 0380 30 | 30 x D | | | 115 | 121 | 32 | 155 | 4 | ○ |
| W05 0390 12 | 12 x D | 3.90 | 19.5 | 57 | 64 | 32 | 100 | 4 | ○ |
| W05 0400 12 | | 4.00 | 20.0 | 57 | 64 | 32 | 100 | 4 | • |
| W05 0400 15 | 15 x D | | | 62 | 68 | 32 | 105 | 4 | • |
| W05 0400 20 | 20 x D | | | 82 | 88 | 32 | 125 | 4 | • |
| W05 0400 25 | 25 x D | | | 101 | 107 | 32 | 140 | 4 | • |
| W05 0400 30 | 30 x D | | | 121 | 127 | 32 | 160 | 4 | • |
| W05 0410 12 | 12 x D | 4.10 | 20.5 | 57 | 64 | 34 | 100 | 5 | • |
| W05 0410 15 | 15 x D | | | 64 | 70 | 34 | 105 | 5 | ○ |
| W05 0420 12 | 12 x D | 4.20 | 21.0 | 57 | 64 | 34 | 100 | 5 | • |
| W05 0420 15 NEW | 15 x D | | | 65 | 71 | 34 | 110 | 5 | • |
| W05 0420 20 NEW | 20 x D | | | 86 | 92 | 34 | 130 | 5 | • |
| W05 0420 25 | 25 x D | | | 106 | 112 | 34 | 150 | 5 | ○ |
| W05 0420 30 | 30 x D | | | 127 | 133 | 34 | 170 | 5 | ○ |
| W05 0430 12 | 12 x D | 4.30 | 21.5 | 57 | 64 | 34 | 100 | 5 | • |
| W05 0440 12 | | 4.40 | 22.0 | 57 | 64 | 34 | 100 | 5 | ○ |
| W05 0450 12 | 12 x D | 4.50 | 22.5 | 57 | 64 | 34 | 100 | 5 | • |
| W05 0450 15 | 15 x D | | | 70 | 76 | 34 | 115 | 5 | • |
| W05 0450 20 | 20 x D | | | 92 | 99 | 34 | 135 | 5 | • |
| W05 0450 25 | 25 x D | | | 114 | 120 | 34 | 155 | 5 | • |
| W05 0450 30 | 30 x D | | | 136 | 143 | 34 | 180 | 5 | ○ |
| W05 0460 12 | 12 x D | 4.60 | 23.0 | 57 | 64 | 34 | 100 | 5 | ○ |
| W05 0470 12 | | 4.70 | 23.5 | 57 | 64 | 34 | 100 | 5 | ○ |
| W05 0480 12 | | 4.80 | 24.0 | 67 | 74 | 34 | 110 | 5 | • |
| W05 0490 12 | | 4.90 | 24.5 | 72 | 81 | 34 | 120 | 5 | ○ |
| W05 0500 12 | 12 x D | 5.00 | 25.0 | 72 | 81 | 34 | 120 | 5 | • |
| W05 0500 15 | 15 x D | | | 77 | 85 | 34 | 120 | 5 | • |
| W05 0500 20 | 20 x D | | | 102 | 110 | 34 | 145 | 5 | • |
| W05 0500 25 | 25 x D | | | 126 | 134 | 34 | 170 | 5 | • |
| W05 0500 30 | 30 x D | | | 151 | 159 | 34 | 195 | 5 | • |

| Order Number DIN 6535 | *l2/D | D h7 (mm) | l 1 (mm) | *l 2 (mm) | l 3 (mm) | l 4 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|---|---|
| W05 0510 12 * | 12 x D | 5.10 | 25.5 | 72 | 81 | 36 | 120 | 6 | • |
| W05 0510 15 * | 15 x D | | | 79 | 86 | 36 | 125 | 6 | ○ |
| W05 0510 20 NEW | 20 x D | | | 104 | 112 | 36 | 150 | 6 | ○ |
| W05 0510 25 * | 25 x D | | | 129 | 136 | 36 | 175 | 6 | ○ |
| W05 0510 30 * | 30 x D | | | 154 | 162 | 36 | 200 | 6 | ○ |
| W05 0520 12 * | 12 x D | 5.20 | 26.0 | 72 | 81 | 36 | 120 | 6 | • |
| W05 0530 12 * | | 5.30 | 26.5 | 72 | 81 | 36 | 120 | 6 | • |
| W05 0540 12 * | | 5.40 | 27.0 | 72 | 81 | 36 | 120 | 6 | ○ |
| W05 0550 12 * | 12 x D | 5.50 | 27.5 | 72 | 81 | 36 | 120 | 6 | • |
| W05 0550 15 * | 15 x D | | | 85 | 93 | 36 | 130 | 6 | • |
| W05 0550 20 * | 20 x D | | | 112 | 120 | 36 | 160 | 6 | • |
| W05 0550 25 * | 25 x D | | | 139 | 147 | 36 | 185 | 6 | • |
| W05 0550 30 * | 30 x D | | | 166 | 174 | 36 | 215 | 6 | • |
| W05 0560 12 * | 12 x D | 5.60 | 28.0 | 72 | 81 | 36 | 120 | 6 | • |
| W05 0570 12 * | | 5.70 | 28.5 | 72 | 81 | 36 | 120 | 6 | • |
| W05 0580 12 * | | 5.80 | 29.0 | 72 | 81 | 36 | 120 | 6 | • |
| W05 0590 12 * | | 5.90 | 29.5 | 72 | 81 | 36 | 120 | 6 | • |
| W05 0600 12 * | 12 x D | 6.00 | 30.0 | 72 | 81 | 36 | 120 | 6 | • |
| W05 0600 15 * | 15 x D | | | 92 | 101 | 36 | 140 | 6 | • |
| W05 0600 20 * | 20 x D | | | 122 | 131 | 36 | 170 | 6 | • |
| W05 0600 25 * | 25 x D | | | 151 | 160 | 36 | 200 | 6 | • |
| W05 0600 30 * | 30 x D | | | 181 | 190 | 36 | 230 | 6 | • |
| W05 0610 12 * | 12 x D | 6.10 | 30.5 | 88 | 97 | 36 | 135 | 8 | • |
| W05 0620 12 * | 12 x D | 6.20 | 31.0 | 88 | 97 | 36 | 135 | 8 | • |
| W05 0630 12 * | 12 x D | 6.30 | 31.5 | 88 | 97 | 36 | 135 | 8 | • |
| W05 0630 15 NEW | 15 x D | | | 98 | 108 | 36 | 145 | 8 | ○ |
| W05 0630 20 NEW | 20 x D | | | 128 | 137 | 36 | 175 | 8 | ○ |
| W05 0630 25 NEW | 25 x D | | | 159 | 168 | 36 | 205 | 8 | ○ |
| W05 0630 30 NEW | 30 x D | | | 190 | 199 | 36 | 240 | 8 | ○ |
| W05 0640 12 * | 12 x D | 6.40 | 32.0 | 96 | 108 | 36 | 145 | 8 | ○ |
| W05 0650 12 * | 12 x D | 6.50 | 32.5 | 96 | 108 | 36 | 145 | 8 | • |
| W05 0650 15 * | 15 x D | | | 100 | 110 | 36 | 150 | 8 | • |
| W05 0650 20 * | 20 x D | | | 132 | 142 | 36 | 180 | 8 | • |
| W05 0650 25 * | 25 x D | | | 164 | 173 | 36 | 210 | 8 | • |
| W05 0650 30 * | 30 x D | | | 196 | 206 | 36 | 245 | 8 | • |
| W05 0660 12 * | 12 x D | 66.0 | 33.0 | 96 | 108 | 36 | 145 | 8 | ○ |
| W05 0670 12 * | | 67.0 | 33.5 | 96 | 108 | 36 | 145 | 8 | ○ |
| W05 0680 12 * | | 68.0 | 34.0 | 96 | 108 | 36 | 145 | 8 | • |
| W05 0690 12 * | | 69.0 | 34.5 | 96 | 108 | 36 | 145 | 8 | • |
| W05 0700 12 * | 12 x D | 70.0 | 35.0 | 96 | 108 | 36 | 145 | 8 | • |
| W05 0700 15 * | 15 x D | | | 107 | 118 | 38 | 160 | 8 | • |
| W05 0700 20 * | 20 x D | | | 142 | 153 | 38 | 195 | 8 | • |
| W05 0700 25 * | 25 x D | | | 176 | 187 | 38 | 230 | 8 | • |
| W05 0700 30 * | 30 x D | | | 211 | 222 | 38 | 265 | 8 | • |
| W05 0710 12 * | 12 x D | 71.0 | 35.5 | 96 | 108 | 36 | 145 | 8 | ○ |
| W05 0720 12 * | | 72.0 | 36.0 | 96 | 108 | 36 | 145 | 8 | • |
| W05 0730 12 * | | 73.0 | 36.5 | 96 | 108 | 36 | 145 | 8 | • |
| W05 0740 12 * | | 74.0 | 37.0 | 96 | 108 | 36 | 145 | 8 | ○ |
| W05 0750 12 * | 12 x D | 75.0 | 37.5 | 96 | 108 | 36 | 145 | 8 | • |
| W05 0750 15 * | 15 x D | | | 115 | 126 | 38 | 165 | 8 | • |
| W05 0750 20 * | 20 x D | | | 152 | 163 | 38 | 205 | 8 | • |
| W05 0750 25 * | 25 x D | | | 189 | 200 | 38 | 240 | 8 | • |
| W05 0750 30 * | 30 x D | | | 226 | 237 | 38 | 280 | 8 | • |
| W05 0760 12 * | 12 x D | 76.0 | 38.0 | 96 | 108 | 36 | 145 | 8 | ○ |

* - DIN 6535

cont'd ▸

*(Remark: l2 is just a guideline for maximum drilling depth, make adjustments accordingly to your machine or workpiece conditions)*

"o" Prodotto su richiesta (Minimo d'ordine 2 pcs.) | Make to order | auf Anfrage | Faire sur commande

*l2/D - Profondità del foro | Hole Depth | Lochtiefe | Profondeur du trou

*l2 - Massimo Perforazione Profondità | Max. Drilling Depth | max.Bohren Tiefe | Max. Forage Profondeur

**Material Group | Grupo de materiales | Materialgruppen | Groupe Matiere**

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| • | • | • | • | • | • | • | • | • | • | • | • | • | | | | |

# W05

HPMT

## DR-LX SB Oil Feed Twist Drills Point Angle 135° - 12 x Ø, 15x Ø, 20x Ø, 25x Ø, 30x Ø

DR-LX SB Brocas helicoidales con avance por aceite ángulo de punta 135° - 12x Ø, 15x Ø, 20x Ø, 25x Ø, 30x Ø

DR-LX SB Ölvorschub-Spiralbohrer Spitzenwinkel 135° - 12 x Ø, 15x Ø, 20x Ø, 25x Ø, 30x Ø

DR-LX SB Oil Feed Twist Drills angle de pointe 135° - 12 x Ø, 15x Ø, 20x Ø, 25x Ø, 30x Ø






| Order Number DIN 6535 | *l2/D | D h7 (mm) | l 1 (mm) | *l 2 (mm) | l 3 (mm) | l 4 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|---|---|
| W05 0770 12 * | | 7.70 | 38.5 | 96 | 108 | 36 | 145 | 8 | • |
| W05 0780 12 * | 12 x D | 7.80 | 39.0 | 96 | 108 | 36 | 145 | 8 | • |
| W05 0790 12 * | | 7.90 | 39.5 | 96 | 108 | 36 | 145 | 8 | ◦ |
| W05 0800 12 * | 12 x D | | | 96 | 108 | 36 | 145 | 8 | • |
| W05 0800 15 | 15 x D | | | 122 | 134 | 40 | 175 | 8 | • |
| W05 0800 20 | 20 x D | 8.00 | 40.0 | 162 | 174 | 40 | 215 | 8 | • |
| W05 0800 25 | 25 x D | | | 201 | 213 | 40 | 255 | 8 | • |
| W05 0800 30 | 30 x D | | | 241 | 253 | 40 | 295 | 8 | • |
| W05 0810 12 * | | 8.10 | 40.5 | 115 | 127 | 40 | 170 | 10 | ◦ |
| W05 0820 12 * | 12 x D | 8.20 | 41.0 | 120 | 135 | 40 | 180 | 10 | ◦ |
| W05 0830 12 * | | 8.30 | 41.5 | 120 | 135 | 40 | 180 | 10 | ◦ |
| W05 0840 12 * | | 8.40 | 42.0 | 120 | 135 | 40 | 180 | 10 | ◦ |
| W05 0850 12 * | 12 x D | | | 120 | 135 | 40 | 180 | 10 | • |
| W05 0850 15 * | 15 x D | | | 130 | 142 | 40 | 185 | 10 | • |
| W05 0850 20 * | 20 x D | 8.50 | 42.5 | 172 | 185 | 40 | 230 | 10 | • |
| W05 0850 25 * | 25 x D | | | 214 | 226 | 40 | 270 | 10 | • |
| W05 0850 30 * | 30 x D | | | 258 | 272 | 40 | 315 | 10 | ◦ |
| W05 0860 12 * | 12 x D | 8.60 | 43.0 | 120 | 135 | 40 | 180 | 10 | • |
| W05 0870 12 * | 12 x D | 8.70 | 43.5 | 120 | 135 | 40 | 180 | 10 | • |
| W05 0880 12 * | 12 x D | | | 120 | 135 | 40 | 180 | 10 | • |
| W05 0880 15 NEW | 15 x D | 8.80 | 44.0 | 134 | 147 | 40 | 190 | 10 | ◦ |
| W05 0880 20 NEW | 20 x D | | | 178 | 191 | 40 | 235 | 10 | ◦ |
| W05 0880 25 NEW | 25 x D | | | 221 | 234 | 40 | 275 | 10 | ◦ |
| W05 0890 12 * | 12 x D | 8.90 | 44.5 | 120 | 135 | 40 | 180 | 10 | • |
| W05 0900 12 * | 12 x D | | | 120 | 135 | 40 | 180 | 10 | • |
| W05 0900 15 * | 15 x D | 9.00 | 45.0 | 137 | 151 | 40 | 195 | 10 | • |
| W05 0900 20 * | 20 x D | | | 182 | 196 | 40 | 240 | 10 | • |
| W05 0900 25 * | 25 x D | | | 226 | 240 | 40 | 285 | 10 | • |
| W05 0910 12 * | | 9.10 | 45.5 | 120 | 135 | 40 | 180 | 10 | ◦ |
| W05 0920 12 * | 12 x D | 9.20 | 46.0 | 120 | 135 | 40 | 180 | 10 | ◦ |
| W05 0930 12 * | | 9.30 | 46.5 | 120 | 135 | 40 | 180 | 10 | ◦ |
| W05 0940 12 * | 12 x D | 9.40 | 47.0 | 120 | 135 | 40 | 180 | 10 | ◦ |
| W05 0950 12 * | 12 x D | | | 120 | 135 | 40 | 180 | 10 | • |
| W05 0950 15 * | 15 x D | 9.50 | 47.5 | 145 | 159 | 40 | 200 | 10 | • |
| W05 0950 20 * | 20 x D | | | 192 | 206 | 40 | 250 | 10 | • |
| W05 0950 25 NEW | 25 x D | | | 239 | 253 | 40 | 295 | 10 | • |
| W05 0960 12 * | 12 x D | 9.60 | 48.0 | 120 | 135 | 40 | 180 | 10 | ◦ |
| W05 0970 12 * | | 9.70 | 48.5 | 120 | 135 | 40 | 180 | 10 | ◦ |
| W05 0980 12 * | 12 x D | 9.80 | 49.0 | 120 | 135 | 40 | 180 | 10 | • |
| W05 0980 15 * | 15 x D | | | 149 | 164 | 40 | 205 | 10 | ◦ |
| W05 0990 12 * | 12 x D | 9.90 | 49.5 | 120 | 135 | 40 | 180 | 10 | • |
| W05 1000 12 * | 12 x D | | | 120 | 135 | 40 | 180 | 10 | • |
| W05 1000 15 * | 15 x D | 10.00 | 50.0 | 152 | 167 | 40 | 210 | 10 | • |
| W05 1000 20 * | 20 x D | | | 202 | 217 | 40 | 260 | 10 | • |
| W05 1000 25 NEW | 25 x D | | | 252 | 26 | 40 | 310 | 10 | • |

| Order Number DIN 6535 | *l2/D | D h7 (mm) | l 1 (mm) | *l 2 (mm) | l 3 (mm) | l 4 (mm) | L (mm) | d2 h6 (mm) | Availability |
|---|---|---|---|---|---|---|---|---|---|

* - DIN 6535

*(Remark: l2 is just a guideline for maximum drilling depth, make adjustments accordingly to your machine or workpiece conditions)*

"o" Prodotto su richiesta (Minimo d'ordine 2 pcs.) | Make to order | auf Anfrage | Faire sur commande

*l2/D - Profondità del foro | Hole Depth | Lochtiefe | Profondeur du trou

*l2 - Massimo Perforazione Profondità | Max. Drilling Depth | max.Bohren Tiefe | Max. Forage Profondeur

**Material Group | Grupo de materiales | Materialgruppen | Groupe Matiere**

| N01 | N02 | N03 | K01 | K02 | P01 | P02 | P03 | M01 | M02 | S01 | S02 | S03 | H01 | H02 | O01 | O02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| • | • | • | • | • | • | • | • | • | • | • | • | | | | | |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition


## DR-LX SB Oil Feed Twist Drills Point Angle 135°, 2 Flutes, 12 x D - W05

| Working Material | N | | | | | |
|---|---|---|---|---|---|---|
| | Wrought Aluminium | | Cast Aluminium | | Copper Alloy | |
| Properties | Si < 9% | | Si ≥ 9% | | - | |
| D | Vc | fn | Vc | fn | Vc | fn |
| 3.0 | 120 - 170 | 0.084 | 105 - 150 | 0.083 | 90 - 140 | 0.081 |
| 4.0 | | 0.120 | | 0.119 | | 0.116 |
| 5.0 | | 0.161 | | 0.160 | | 0.155 |
| 6.0 | | 0.209 | | 0.203 | | 0.196 |
| 7.0 | | 0.259 | | 0.253 | | 0.245 |
| 8.0 | | 0.311 | | 0.305 | | 0.298 |
| 9.0 | | 0.332 | | 0.323 | | 0.321 |
| 10.0 | | 0.351 | | 0.350 | | 0.340 |
| 12.0 | | 0.381 | | 0.371 | | 0.365 |

## DR-LX SB Oil Feed Twist Drills Point Angle 135°, 2 Flutes, 12 x D - W05

| Working Material | P | | | | | |
|---|---|---|---|---|---|---|
| | Carbon Steel | | Alloy Steel | | Prehardened Steel | |
| Properties | - | | 520 < Rm < 1200 | | - | |
| D | Vc | fn | Vc | fn | Vc | fn |
| 3.0 | 80 - 120 | 0.066 | 65 - 110 | 0.064 | 55 - 80 | 0.063 |
| 4.0 | | 0.095 | | 0.092 | | 0.088 |
| 5.0 | | 0.126 | | 0.123 | | 0.120 |
| 6.0 | | 0.164 | | 0.153 | | 0.153 |
| 7.0 | | 0.202 | | 0.189 | | 0.192 |
| 8.0 | | 0.245 | | 0.232 | | 0.231 |
| 9.0 | | 0.272 | | 0.246 | | 0.249 |
| 10.0 | | 0.294 | | 0.263 | | 0.266 |
| 12.0 | | 0.339 | | 0.287 | | 0.280 |

## DR-LX SB Oil Feed Twist Drills Point Angle 135°, 2 Flutes, 12 x D - W05

| Working Material | K | | | | M | | | |
|---|---|---|---|---|---|---|---|---|
| | Grey Cast Iron | | Ductile Cast Iron | | Stainless Steel | | Stainless Steel | |
| Properties | - | | - | | High Machinability | | Low Machinability | |
| D | Vc | fn | Vc | fn | Vc | fn | Vc | fn |
| 3.0 | 70 - 110 | 0.067 | 55 - 80 | 0.067 | 50 - 75 | 0.066 | 35 - 50 | 0.062 |
| 4.0 | | 0.097 | | 0.094 | | 0.094 | | 0.088 |
| 5.0 | | 0.130 | | 0.126 | | 0.122 | | 0.113 |
| 6.0 | | 0.164 | | 0.160 | | 0.158 | | 0.147 |
| 7.0 | | 0.209 | | 0.200 | | 0.190 | | 0.176 |
| 8.0 | | 0.251 | | 0.242 | | 0.234 | | 0.218 |
| 9.0 | | 0.262 | | 0.262 | | 0.248 | | 0.224 |
| 10.0 | | 0.280 | | 0.273 | | 0.259 | | 0.248 |
| 12.0 | | 0.304 | | 0.288 | | 0.298 | | 0.267 |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition


## DR-LX SB Oil Feed Twist Drills Point Angle 135°, 2 Flutes, 12 x D - W05

| Working Material | S | | | | | |
|---|---|---|---|---|---|---|
| | Titanium Alloy | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | - | | - | |
| D | Vc | fn | Vc | fn | Vc | fn |
| 3.0 | 25 - 35 | 0.062 | 20 - 30 | 0.052 | 20 - 30 | 0.040 |
| 4.0 | | 0.088 | | 0.077 | | 0.050 |
| 5.0 | | 0.112 | | 0.097 | | 0.050 |
| 6.0 | | 0.158 | | 0.120 | | 0.063 |
| 7.0 | | 0.190 | | 0.140 | | 0.063 |
| 8.0 | | 0.234 | | 0.182 | | 0.080 |
| 9.0 | | 0.242 | | 0.202 | | 0.080 |
| 10.0 | | 0.252 | | 0.210 | | 0.100 |
| 12.0 | | 0.280 | | 0.220 | | 0.100 |

## DR-LX SB Oil Feed Twist Drills Point Angle 135°, 2 Flutes, 15 x D, 20 x D - W05

| Working Material | N | | | | | |
|---|---|---|---|---|---|---|
| | Wrought Aluminium | | Cast Aluminium | | Copper Alloy | |
| Properties | Si < 9% | | Si ≥ 9% | | - | |
| D | Vc | fn | Vc | fn | Vc | fn |
| 3.0 | 115 - 160 | 0.102 | 100 - 140 | 0.098 | 85 - 130 | 0.095 |
| 4.0 | | 0.132 | | 0.126 | | 0.123 |
| 5.0 | | 0.193 | | 0.186 | | 0.181 |
| 6.0 | | 0.227 | | 0.218 | | 0.210 |
| 7.0 | | 0.255 | | 0.248 | | 0.248 |
| 8.0 | | 0.311 | | 0.304 | | 0.300 |
| 9.0 | | 0.340 | | 0.325 | | 0.316 |
| 10.0 | | 0.398 | | 0.381 | | 0.370 |
| 12.0 | | 0.454 | | 0.437 | | 0.421 |

## DR-LX SB Oil Feed Twist Drills Point Angle 135°, 2 Flutes, 15 x D, 20 x D - W05

| Working Material | P | | | | | |
|---|---|---|---|---|---|---|
| | Carbon Steel | | Alloy Steel | | Prehardened Steel | |
| Properties | - | | 520 < Rm < 1200 | | - | |
| D | Vc | fn | Vc | fn | Vc | fn |
| 3.0 | 75 - 110 | 0.077 | 60 - 100 | 0.076 | 50 - 70 | 0.076 |
| 4.0 | | 0.101 | | 0.098 | | 0.098 |
| 5.0 | | 0.148 | | 0.144 | | 0.144 |
| 6.0 | | 0.171 | | 0.168 | | 0.168 |
| 7.0 | | 0.193 | | 0.192 | | 0.193 |
| 8.0 | | 0.239 | | 0.237 | | 0.242 |
| 9.0 | | 0.248 | | 0.256 | | 0.252 |
| 10.0 | | 0.295 | | 0.297 | | 0.294 |
| 12.0 | | 0.342 | | 0.336 | | 0.336 |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition


## DR-LX SB Oil Feed Twist Drills Point Angle 135°, 2 Flutes, 15 x D, 20 x D - W05

| Working Material | K | | | | M | | | |
|---|---|---|---|---|---|---|---|---|
| | Grey Cast Iron | | Ductile Cast Iron | | Stainless Steel | | Stainless Steel | |
| Properties | - | | - | | High Machinability | | Low Machinability | |
| D | Vc | fn | Vc | fn | Vc | fn | Vc | fn |
| 3.0 | | 0.081 | | 0.081 | | 0.073 | | 0.060 |
| 4.0 | | 0.105 | | 0.105 | | 0.095 | | 0.078 |
| 5.0 | | 0.154 | | 0.154 | | 0.140 | | 0.115 |
| 6.0 | | 0.179 | | 0.179 | | 0.161 | | 0.133 |
| 7.0 | 65 - 100 | 0.204 | 50 - 70 | 0.204 | 45 - 65 | 0.189 | 30 - 45 | 0.147 |
| 8.0 | | 0.249 | | 0.255 | | 0.231 | | 0.183 |
| 9.0 | | 0.260 | | 0.266 | | 0.249 | | 0.186 |
| 10.0 | | 0.309 | | 0.309 | | 0.286 | | 0.227 |
| 12.0 | | 0.358 | | 0.358 | | 0.322 | | 0.266 |

## DR-LX SB Oil Feed Twist Drills Point Angle 135°, 2 Flutes, 15 x D, 20 x D - W05

| Working Material | S | | | | | |
|---|---|---|---|---|---|---|
| | Titanium alloy | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | - | | - | |
| D | Vc | fn | Vc | fn | Vc | fn |
| 3.0 | | 0.078 | | 0.049 | | 0.032 |
| 4.0 | | 0.102 | | 0.063 | | 0.040 |
| 5.0 | | 0.150 | | 0.091 | | 0.040 |
| 6.0 | | 0.174 | | 0.109 | | 0.050 |
| 7.0 | 20 - 30 | 0.190 | 15 - 25 | 0.116 | 25 | 0.050 |
| 8.0 | | 0.234 | | 0.154 | | 0.063 |
| 9.0 | | 0.242 | | 0.171 | | 0.063 |
| 10.0 | | 0.294 | | 0.196 | | 0.080 |
| 12.0 | | 0.347 | | 0.218 | | 0.080 |

## DR-LX SB Oil Feed Twist Drills Point Angle 135°, 2 Flutes, 25 x D, 30 x D - W05

| Working Material | N | | | | | |
|---|---|---|---|---|---|---|
| | Wrought Aluminium | | Cast Aluminium | | Copper Alloy | |
| Properties | Si < 9% | | Si ≥ 9% | | - | |
| D | Vc | fn | Vc | fn | Vc | fn |
| 3.0 | | 0.110 | | 0.107 | | 0.104 |
| 4.0 | | 0.150 | | 0.146 | | 0.143 |
| 5.0 | | 0.209 | | 0.205 | | 0.199 |
| 6.0 | | 0.259 | | 0.251 | | 0.242 |
| 7.0 | 100 - 130 | 0.309 | 85 - 115 | 0.301 | 70 - 100 | 0.295 |
| 8.0 | | 0.373 | | 0.366 | | 0.359 |
| 9.0 | | 0.402 | | 0.389 | | 0.383 |
| 10.0 | | 0.445 | | 0.435 | | 0.423 |
| 12.0 | | 0.493 | | 0.478 | | 0.466 |

Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition


## DR-LX SB Oil Feed Twist Drills Point Angle 135°, 2 Flutes, 25 x D, 30 x D - W05

| Working Material | P | | | | | |
|---|---|---|---|---|---|---|
| | Carbon Steel | | Alloy Steel | | Prehardened Steel | |
| Properties | - | | 520 < Rm < 1200 | | - | |
| D | Vc | fn | Vc | fn | Vc | fn |
| 3.0 | 60 - 85 | 0.085 | 45 - 70 | 0.083 | 35 - 45 | 0.082 |
| 4.0 | | 0.117 | | 0.114 | | 0.111 |
| 5.0 | | 0.162 | | 0.158 | | 0.156 |
| 6.0 | | 0.200 | | 0.191 | | 0.191 |
| 7.0 | | 0.238 | | 0.228 | | 0.231 |
| 8.0 | | 0.291 | | 0.281 | | 0.283 |
| 9.0 | | 0.314 | | 0.301 | | 0.300 |
| 10.0 | | 0.354 | | 0.333 | | 0.333 |
| 12.0 | | 0.408 | | 0.369 | | 0.364 |

## DR-LX SB Oil Feed Twist Drills Point Angle 135°, 2 Flutes, 25 x D, 30 x D - W05

| Working Material | K | | | | M | | | |
|---|---|---|---|---|---|---|---|---|
| | Grey Cast Iron | | Ductile Cast Iron | | Stainless Steel | | Stainless Steel | |
| Properties | - | | - | | Elevata lavorabilità | | Bassa lavorabilità | |
| D | Vc | fn | Vc | fn | Vc | fn | Vc | fn |
| 3.0 | 50 - 75 | 0.088 | 35 - 45 | 0.088 | 30 - 40 | 0.082 | 20 - 30 | 0.073 |
| 4.0 | | 0.120 | | 0.118 | | 0.113 | | 0.101 |
| 5.0 | | 0.168 | | 0.165 | | 0.155 | | 0.137 |
| 6.0 | | 0.204 | | 0.201 | | 0.191 | | 0.169 |
| 7.0 | | 0.248 | | 0.242 | | 0.228 | | 0.197 |
| 8.0 | | 0.300 | | 0.297 | | 0.279 | | 0.245 |
| 9.0 | | 0.313 | | 0.316 | | 0.298 | | 0.250 |
| 10.0 | | 0.351 | | 0.346 | | 0.324 | | 0.287 |
| 12.0 | | 0.392 | | 0.381 | | 0.370 | | 0.320 |

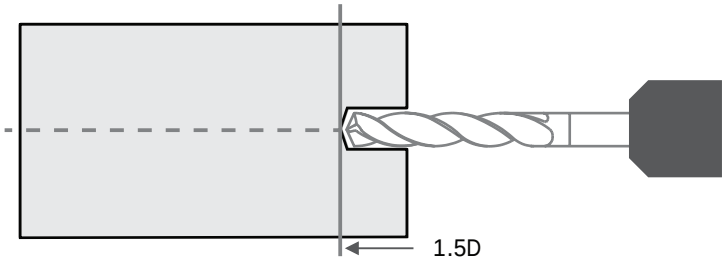
## DR-LX SB Oil Feed Twist Drills Point Angle 135°, 2 Flutes, 25 x D, 30 x D - W05

| Working Material | S | | | | | |
|---|---|---|---|---|---|---|
| | Titanium alloy | | Nickel Alloy | | Cobalt Alloy | |
| Properties | - | | - | | - | |
| D | Vc | fn | Vc | fn | Vc | fn |
| 3.0 | 15 - 25 | 0.082 | 15 - 20 | 0.061 | 25 | 0.026 |
| 4.0 | | 0.113 | | 0.085 | | 0.032 |
| 5.0 | | 0.153 | | 0.113 | | 0.032 |
| 6.0 | | 0.198 | | 0.139 | | 0.040 |
| 7.0 | | 0.228 | | 0.156 | | 0.040 |
| 8.0 | | 0.281 | | 0.204 | | 0.050 |
| 9.0 | | 0.291 | | 0.227 | | 0.050 |
| 10.0 | | 0.323 | | 0.245 | | 0.064 |
| 12.0 | | 0.370 | | 0.263 | | 0.064 |

# DR-LX Long Drill Technical Info (Application)

## Drilling on Standard Through Hole

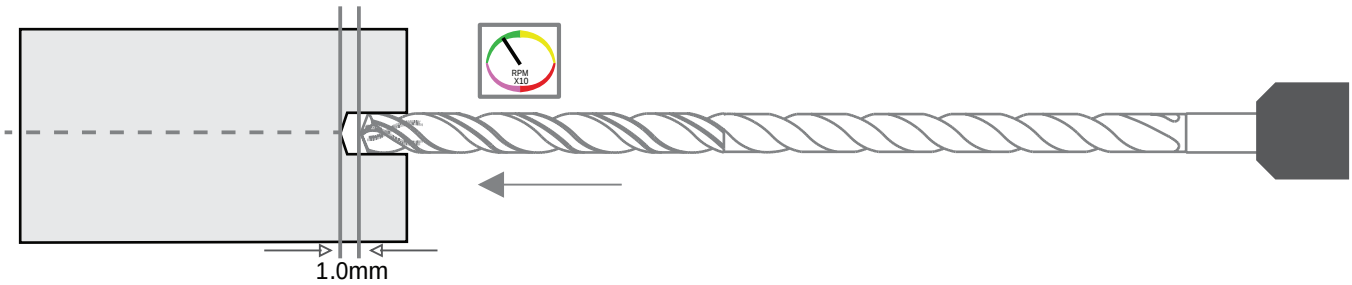
1




### Develop pilot bore

- Using a 3xD pilot drill (DR45/DR-S) with point angle 140° and tolerance m7 ( 4 - 25 micron > Ø deep hole drill)
- Drilling pilot bore depth with minimum of 1 to 1.5D

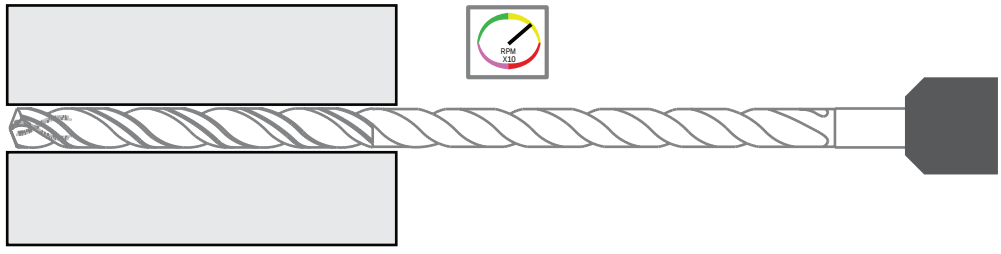
2




### Enter according to pilot bore

- Enter without coolant be upon 1mm before the end of pilot bore
- Approximate 300 rpm and feedrate of 500 mm/min
- Then start high pressure coolant

3



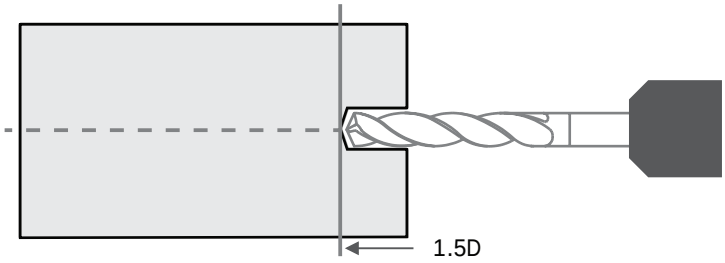

### Deep drilling process

- Load higher spindle speed (Vc) and feedrate (f) as per recommended
- Continuous drilling upon complete hole depth without chip removal cycles/peck drilling cycles
- For through holes, reduce 30% of feedrate approximate 1mm before complete the hole depth

# DR-LX Long Drill Technical Info (Application)

## Drilling on Standard Through Hole

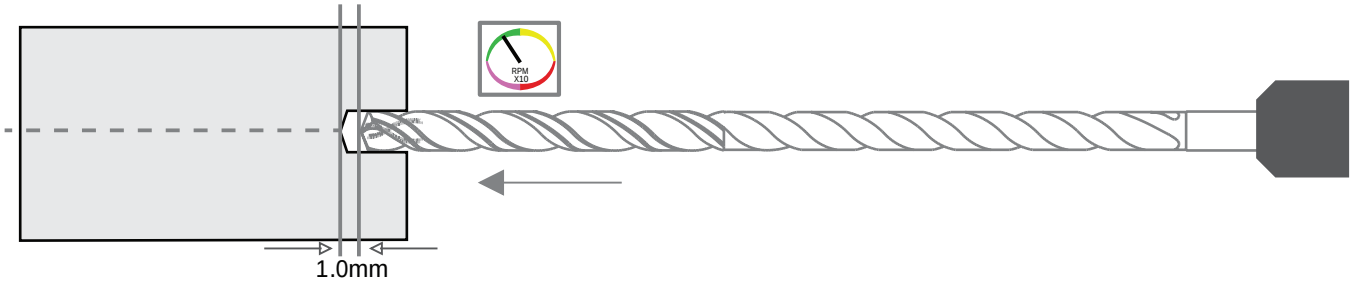
1




### Develop pilot bore

- Using a 3xD pilot drill (DR45/DR-S) with point angle 140° and tolerance m7 ( 4 - 25 micron > Ø deep hole drill)
- Drilling pilot bore depth with minimum of 1 to 1.5D

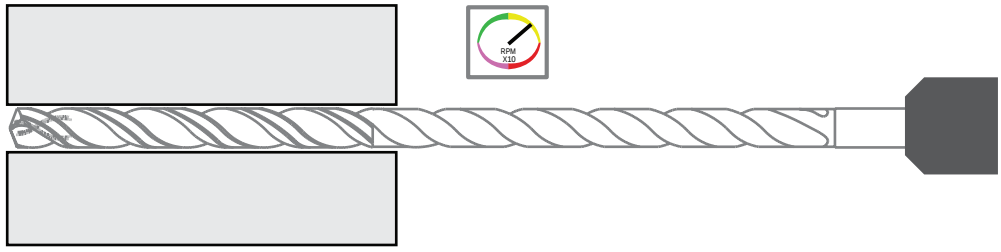
2




### Enter according to pilot bore

- Enter without coolant be upon 1mm before the end of pilot bore
- Approximate 300 rpm and feedrate of 500 mm/min
- Then start high pressure coolant

3

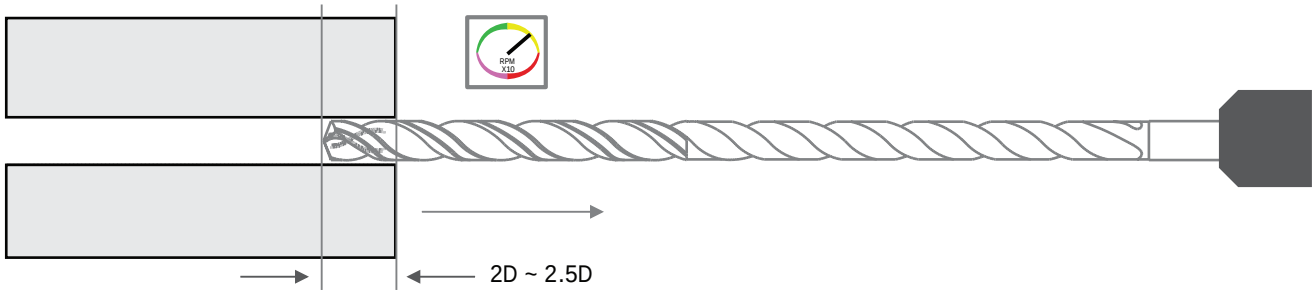



### Deep drilling process

- Load higher spindle speed (Vc) and feedrate (f) as per recommended
- Continuous drilling upon complete hole depth without chip removal cycles/peck drilling cycles
- For through holes, reduce 30% of feedrate approximate 1mm before complete the hole depth

## Drilling on Standard Through Hole

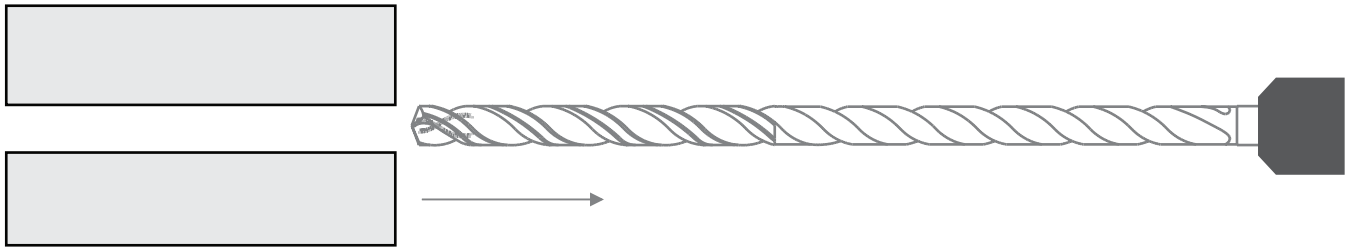
4




### Withdrawal

- Switch of coolant supply
- Withdraw the long drills after completed drilling the hole depth
- Existing spindle speed (Vc) and double up the feedrate (f)
- Withdraw towards approximate 2 to 2.5D of the beginning part of pilot bore

5

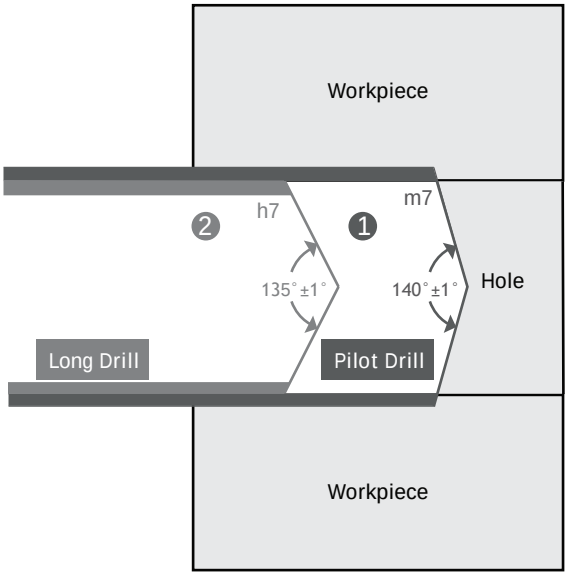


### Discharge from the bore

- Discharge with lower and stationary speed from the remaining part

# DR-LX Long Drill Technical Info (Application)

## Drilling on Standard Through Hole




1

### Pilot Bore

Please use the corresponding drill with internal coolant supply and the same nominal diameter for the pilot bore.
Pilot Drill Series l DR S (140° l D(m7)

Tolerance consideration for m7 in µm

| Diameter | Tolerance, µm |
|---|---|
| ≤ Ø3 | +2 ~ +12 |
| Ø4 - Ø6 | +4 ~ +16 |
| Ø7 - Ø10 | +6 ~ +21 |

2

### Deep Hole Bore (12xD - 30xD)

Please use the corresponding drill with internal coolant supply and the same nominal diameter for the deep hole bore.
Long Drill Series l DR-L (135° l D(h7)

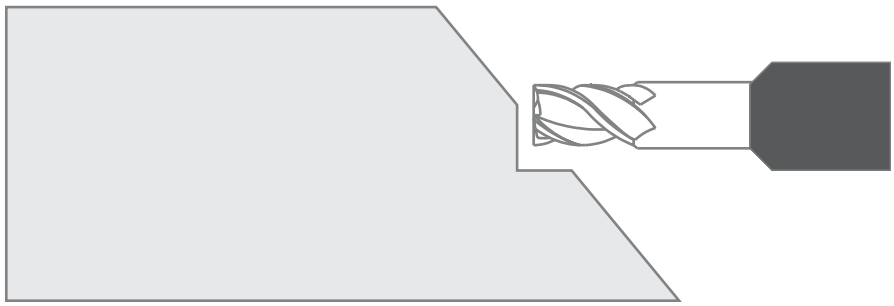
Tolerance consideration for h7 in µm

| Diameter | Tolerance, µm |
|---|---|
| ≤ Ø3 | 0 ~ -10 |
| Ø4 - Ø6 | 0 ~ -12 |
| Ø7 - Ø10 | 0 ~ -15 |

# DR-LX Long Drill Technical Info (Application)

## Drilling On Irregular Faces or Angles

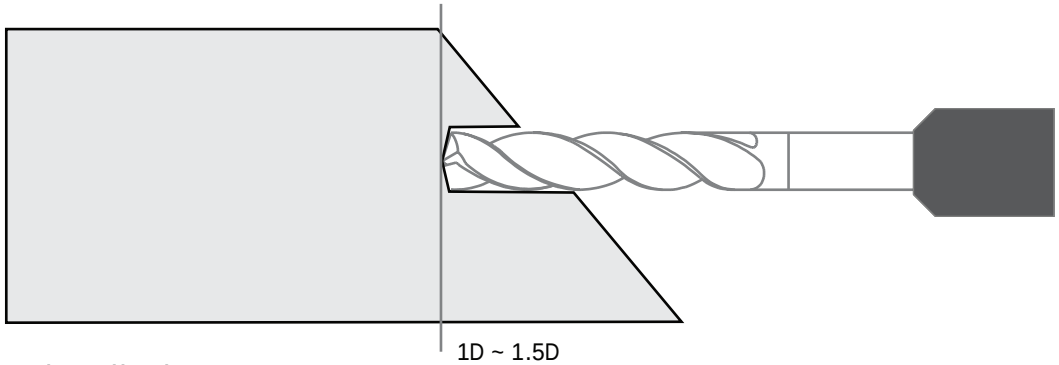
1



### Spot Facing

- Make a flat sur▫ace by using an endmill (HPMT 918) with light slotting on the irregular faces/angles
- Machining the width and depth of spot face same size as the required deep hole diameter
- Endmill used required the capability of spot facing (ramping/plunging)

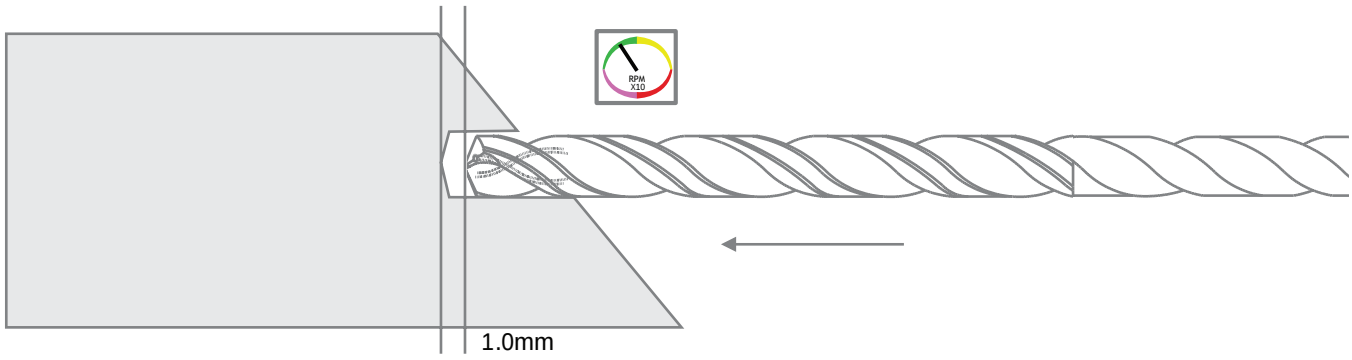
2




### Develop pilot bore

- Using a 3xD pilot drill (DR-S) with point angle 140° & tolerance m7 ( 4 - 25 micron > Ø deep hole drill)
- Drilling pilot bore depth with minimum of 1 to 1.5D

3




### Enter according to pilot bore

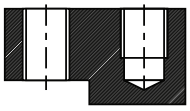
- Enter without coolant be upon 1mm before the end of pilot bore
- Approximate 300 rpm and feedrate of 500 mm/min
- Then start high pressure coolant

# SPECIALS TOOLS

Equipped with state-of-the-art machinery, including a 5-axis universal machining centre, HPMT has the ability to produce a wide range of specialised and specialised and customised products to meet the most diverse application requirements.

The specialised tools range from a diameter of 0.1 mm to a maximum of 32 mm, with a cutting edge length cutting edge lengths of up to 280 mm and with a tolerance of ± 0.001 mm.

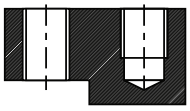
# Tab Size Table



Tab size holes

| | | | | | | | | | | DIN 5156 / DIN 5157 | DIN 5156 | | DIN 40432 / DIN 40433 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ø | M | Former M | MF | Former MF | UNC | Former UNC | UNF | Former UNF | BSW - W | BSP - G | BSPT - RC | NPT, NPTF | PG | TR |
| 0.75 | 1 x 0.25 | | | | | | | | | | | | | |
| 0.85 | 1.1 x 0.25 | | | | | | | | | | | | | |
| 0.95 | 1.2 x 0.25 | | | | | | | | | | | | | |
| 1.10 | 1.4 x 0.3 | | | | | | | | | | | | | |
| 1.20 | | | | | | | | | 1/16 - 60 | | | | | |
| 1.25 | 1.6 x 0.35 | | | | | | 0 - 80 | | | | | | | |
| 1.30 | 1.7 x 0.35 | | | | | | | | | | | | | |
| 1.45 | 1.8 x 0.35 | 1.6 x 0.35 | | | | | | | | | | | | |
| 1.55 | | | | | 1 - 64 | | 1 - 72 | | | | | | | |
| 1.60 | 2 x 0.4 | | | | | | | | | | | | | |
| 1.75 | 2.2 x 0.45 | | 2 x 0.25 | | | | | | | | | | | |
| 1.85 | | | | | 2 - 56 | | | | | | | | | |
| 1.90 | 2.3 x 0.4 | | | | | | 2 - 64 | | 3/32 - 48 | | | | | |
| 1.95 | | | 2.2 x 0.25 | | | 2 - 56 | | | | | | | | |
| 2.05 | 2.5 x 0.45 | | 2.3 x 0.25 | | | | | | | | | | | |
| 2.10 | 2.6 x 0.45 | | | | 3 - 48 | | | | | | | | | |
| 2.15 | | | 2.5 x 0.35 | | | | 3 - 56 | | | | | | | |
| 2.25 | | | 2.6 x 0.35 | | | | | | | | | | | |
| 2.30 | | 2.5 x 0.45 | | | | 3 - 48 | | | | | | | | |
| 2.35 | | | | | 4 - 40 | | | | | | | | | |
| 2.40 | | | | | | | 4 - 48 | | | | | | | |
| 2.50 | 3 x 0.5 | | | | | | | | 1/6 - 40 | | | | | |
| 2.55 | | | | | | 4 - 40 | | | | | | | | |
| 2.60 | | | | | | | | 4 - 48 | | | | | | |
| 2.65 | | | 3 x 0.35 | | 5 - 40 | | | | | | | | | |
| 2.70 | | | | | | | 5 - 44 | | | | | | | |
| 2.75 | | 3 x 0.5 | | | | | | | | | | | | |
| 2.85 | | | | | 6 - 32 | 5 - 40 | | | | | | | | |
| 2.90 | 3.5 x 0.6 | | | | | | | 5 - 44 | | | | | | |
| 2.95 | | | | | | | 6 - 40 | | | | | | | |
| 3.10 | | | | | | 6 - 32 | | | | | | | | |
| 3.15 | | | 3.5 x 0.35 | | | | | | | | | | | |
| 3.20 | | 3.5 x 0.6 | | | | | | 6 - 40 | 5/32 - 32 | | | | | |
| 3.30 | 4 x 0.7 | | | | | | | | | | | | | |
| 3.50 | | | 4 x 0.5 | | 8 - 32 | | 8 - 36 | | | | | | | |
| 3.60 | | | | | | | | | 3/16 - 24 | | | | | |
| 3.65 | | 4 x 0.7 | | | | | | | | | | | | |
| 3.75 | | | | 4 x 0.5 | | | | | | | | | | |
| 3.80 | | | | | | 8 - 32 | | 8 - 36 | | | | | | |
| 3.90 | | | | | 10 - 24 | | | | | | | | | |
| 4.10 | | | | | | | 10 - 32 | | | | | | | |
| 4.20 | 5 x 0.8 | | | | | | | | | | | | | |
| 4.30 | | | | | | 10 - 24 | | | | | | | | |
| 4.45 | | | | | | | | 10 - 32 | | | | | | |
| 4.50 | | | 5 x 0.5 | | 12 - 24 | | | | 7/32 - 24 | | | | | |
| 4.60 | | 5 x 0.8 | | | | | | | | | | | | |
| 4.70 | | | | | | | 12 - 28 | | | | | | | |
| 4.75 | | | | 5 x 0.5 | | | | | | | | | | |

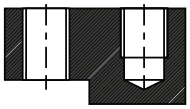
# Tab Size Table



Tab size holes

| Ø | M | Former M | MF | Former MF | UNC | Former UNC | UNF | Former UNF | BSW - W | BSP - G (DIN 5156 / DIN 5157) | BSPT - RC (DIN 5156) | NPT, NPTF | PG (DIN 40432 / DIN 40433) | TR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5.00 | 6 x 1 | | | | | 12 - 24 | | | | | | | | |
| 5.05 | | | | | | | | 12 - 28 | | | | | | |
| 5.10 | | | | | 1/4 - 20 | | | | 1/4 - 20 | | | | | |
| 5.20 | | | 6 x 0.75 | | | | | | | | | | | |
| 5.50 | | 6 x 1 | 6 x 0.5 | | | | 1/4 - 28 | | | | | | | |
| 5.65 | | | | 6 x 0.75 | | | | | | | | | | |
| 5.75 | | | | 6 x 0.5 | | 1/4 - 20 | | | | | | | | |
| 5.90 | | | | | | | | 1/4 - 28 | | | | | | |
| 6.00 | 7 x 1 | | | | | | | | | | | | | |
| 6.20 | | | 7 x 0.75 | | | | | | | | | | | |
| 6.30 | | | | | | | | | | | | 1/16 - 27 | | |
| 6.50 | | 7 x 1 | | | | | | | 5/16 - 18 | | | | | |
| 6.60 | | | | | 5/16 - 18 | | | | | | | | | |
| 6.80 | 8 x 1.25 | | | | | | | | | 1/16 - 28 | | | | |
| 6.90 | | | | | | | 5/16 - 24 | | | | | | | |
| 7.00 | | | 8 x 1 | | | | | | | | | | | |
| 7.20 | | | 8 x 0.75 | | | | | | | | | | | |
| 7.25 | | | | | | 5/16 - 18 | | | | | | | | |
| 7.40 | | 8 x 1.25 | | | | | | 5/16 - 24 | | | | | | |
| 7.50 | | | 8 x 0.5 | 8 x 1 | | | | | | | | | | |
| 7.80 | 9 x 1.25 | | | | | | | | | | | | | |
| 7.90 | | | | | | | | | 3/8 - 16 | | | | | |
| 8.00 | | | 9 x 1 | | 3/8 - 16 | | | | | | | | | |
| 8.20 | | | | | | | | | | | 1/8 - 28 | | | 10 - 2 |
| 8.50 | 10 x 1.5 | | | | | | 3/8 - 24 | | | | | 1/8 - 27 | | |
| 8.70 | | | | | | 3/8 - 16 | | | | | | | | |
| 8.80 | | | 10 x 1.25 | | | | | | | 1/8 - 28 | | | | |
| 9.00 | | | 10 x 1 | | | | | 3/8 - 24 | | | | | | |
| 9.20 | | | 10 x 0.75 | | | | | | | | | | | |
| 9.25 | | | | | | | | | | | | | | 12 - 3 |
| 9.30 | | 10 x 1.5 | | | | | | | 7/16 - 14 | | | | | |
| 9.40 | | | | 10 x 1.25 | 7/16 - 14 | | | | | | | | | |
| 9.50 | | | | 10 x 1 | | | | | | | | | | |
| 9.90 | | | | | | | 7/16 - 20 | | | | | | | |
| 10.00 | | | 10 x 1 | | | | | | | | | | | |
| 10.20 | 12 x 1.75 | | | | | | | | | | | | | 12 - 2 |
| 10.50 | | | 12 x 1.5 | | | | | | 1/2 - 12 | | | | | |
| 10.80 | | | 12 x 1.25 | | 1/2 - 13 | | | | | | | | | |
| 11.00 | | | 12 x 1 | | | | | | | | 1/4 - 19 | | | |
| 11.10 | | | | | | | | | | | 1/4 - 19 | 1/4 - 18 | | |
| 11.20 | | 12 x 1.75 | 12 x 0.75 | | | | | | | | | | | |
| 11.25 | | | | | | | | | | | | | | 14 - 3 |
| 11.30 | | | | 12 x 1.5 | | | | | | | | | | |
| 11.50 | | | | 12 x 1 | | | 1/2 - 20 | | | | | | 7 - 20 | |
| 11.80 | | | | | | 1/2" - 13 | | | | 1/4 - 19 | | | | |
| 12.00 | 14 x 2 | | | | | | | | 9/16 - 12 | | | | | |
| 12.20 | | | | | 8/16 - 12 | | | | | | | | | 14 - 2 |
| 12.25 | | | | | | | | | | | | | | 16 - 4 |

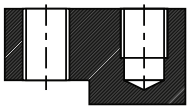
# Tab Size Table



Tab size holes

| | | | | | | | | | | DIN 5156 / DIN 5157 | DIN 5156 | | DIN 40432 / DIN 40433 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ø | M | Former M | MF | Former MF | UNC | Former UNC | UNF | Former UNF | BSW - W | BSP - G | BSPT - RC | NPT, NPTF | PG | TR |
| 12.50 | | | 14 x 1.5 | | | | | | | | | | | |
| 12.80 | | | 14 x 1.25 | | | | | | | | | | | |
| 12.90 | | | | | | | 9/16 - 18 | | | | | | | |
| 13.00 | | 14 x 2 | 14 x 1 | | | | | | | | | | | |
| 13.30 | | | | 14 x 1.5 | | | | | | | | | | |
| 13.50 | | | 15 x 1.5 | | | | | | 5/8 - 11 | | | | | |
| 14.00 | 16 x 2 | | 15 x 1 | | | | | | | | 3/8 - 19 | | 9 - 18 | |
| 14.25 | | | | 14 x 1.25 | | | | | | | | | | 18 - 4 |
| 14.50 | | | 16 x 1.5 | | | | 5/8 - 18 | | | | 3/8 - 19 | 3/8 - 18 | | |
| 15.00 | | 16 x 2 | 16 x 1 | | | | | | | | | | | |
| 15.25 | | | | | | | | | | 3/8 - 19 | | | | |
| 15.30 | | | | 16 x 1.5 | | | | | | | | | | |
| 15.50 | 18 x 2.5 | | | 16 x 1 | | | | | | | | | | |
| 16.00 | | | 18 x 2 | | | | | | | | | | | |
| 16.25 | | | | | | | | | | | | | | 20 - 4 |
| 16.50 | | | 18 x 1.5 | | | | | | 3/4 - 10 | | | | | |
| 17.00 | | | 18 x 1 | | | | | | | | | | | |
| 17.25 | | | | 18 x 1.5 | | | | | | | | | 11 - 18 | 22 - 5 |
| 17.50 | 20 x 2.5 | | | | | | 3/4 - 16 | | | | | | | |
| 17.75 | | | | | | | | | | | | 1/2 - 14 | | |
| 18.00 | | | 20 x 2 | | | | | | | | 1/2 - 14 | | | |
| 18.50 | | | 20 x 1.5 | | 3/4 - 10 | | | | | | | | | |
| 18.60 | | | | | | | | | | | | | | |
| 19.00 | | | 20 x 1 | | | | | | | 1/2 | | | 13.5 - 18 | |
| 19.25 | | | | 20 x 1.5 | | | | | 7/8 - 9 | | | | | 24 - 5 |
| 19.50 | 22 x 2.5 | | | | 7/8 - 9 | | | | | | | | | |
| 20.00 | | | 22 x 2 | | | | | | | | | | | |
| 20.40 | | | 22 x 1.5 | | | | 7/8 - 14 | | | | | | | |
| 21.00 | 24 x 3 | | 22 x 1 | | | | | | | 5/8 - 14 | | | | |

# Tab Size Table



Tab size holes

| | | | | | | | | | | DIN 5156 / DIN 5157 | DIN 5156 | | DIN 40432 / DIN 40433 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ø | M | Former M | MF | Former MF | UNC | Former UNC | UNF | Former UNF | BSW - W | BSP - G | BSPT - RC | NPT, NPTF | PG | TR |
| 0.75 | 1 x 0.25 | | | | | | | | | | | | | |
| 0.85 | 1.1 x 0.25 | | | | | | | | | | | | | |
| 0.95 | 1.2 x 0.25 | | | | | | | | | | | | | |
| 1.10 | 1.4 x 0.3 | | | | | | | | | | | | | |
| 1.20 | | | | | | | | | 1/16 - 60 | | | | | |
| 1.25 | 1.6 x 0.35 | | | | | | 0 - 80 | | | | | | | |
| 1.30 | 1.7 x 0.35 | | | | | | | | | | | | | |
| 1.45 | 1.8 x 0.35 | 1.6 x 0.35 | | | | | | | | | | | | |
| 1.55 | | | | | 1 - 64 | | 1 - 72 | | | | | | | |
| 1.60 | 2 x 0.4 | | | | | | | | | | | | | |
| 1.75 | 2.2 x 0.45 | | 2 x 0.25 | | | | | | | | | | | |
| 1.85 | | | | | 2 - 56 | | | | | | | | | |
| 1.90 | 2.3 x 0.4 | | | | | | 2 - 64 | | 3/32 - 48 | | | | | |
| 1.95 | | | 2.2 x 0.25 | | | 2 - 56 | | | | | | | | |
| 2.05 | 2.5 x 0.45 | | 2.3 x 0.25 | | | | | | | | | | | |
| 2.10 | 2.6 x 0.45 | | | | 3 - 48 | | | | | | | | | |
| 2.15 | | | 2.5 x 0.35 | | | | 3 - 56 | | | | | | | |
| 2.25 | | | 2.6 x 0.35 | | | | | | | | | | | |
| 2.30 | | 2.5 x 0.45 | | | | 3 - 48 | | | | | | | | |
| 2.35 | | | | | 4 - 40 | | | | | | | | | |
| 2.40 | | | | | | | 4 - 48 | | | | | | | |
| 2.50 | 3 x 0.5 | | | | | | | | 1/6 - 40 | | | | | |
| 2.55 | | | | | | 4 - 40 | | | | | | | | |
| 2.60 | | | | | | | | 4 - 48 | | | | | | |
| 2.65 | | | 3 x 0.35 | | 5 - 40 | | | | | | | | | |
| 2.70 | | | | | | | 5 - 44 | | | | | | | |
| 2.75 | | 3 x 0.5 | | | | | | | | | | | | |
| 2.85 | | | | | 6 - 32 | 5 - 40 | | | | | | | | |
| 2.90 | 3.5 x 0.6 | | | | | | | 5 - 44 | | | | | | |
| 2.95 | | | | | | | 6 - 40 | | | | | | | |
| 3.10 | | | | | | 6 - 32 | | | | | | | | |
| 3.15 | | | 3.5 x 0.35 | | | | | | | | | | | |
| 3.20 | | 3.5 x 0.6 | | | | | | 6 - 40 | 5/32 - 32 | | | | | |
| 3.30 | 4 x 0.7 | | | | | | | | | | | | | |
| 3.50 | | | 4 x 0.5 | | 8 - 32 | | 8 - 36 | | | | | | | |
| 3.60 | | | | | | | | | 3/16 - 24 | | | | | |
| 3.65 | | 4 x 0.7 | | | | | | | | | | | | |
| 3.75 | | | | 4 x 0.5 | | | | | | | | | | |
| 3.80 | | | | | | 8 - 32 | | 8 - 36 | | | | | | |
| 3.90 | | | | | 10 - 24 | | | | | | | | | |
| 4.10 | | | | | | | 10 - 32 | | | | | | | |
| 4.20 | 5 x 0.8 | | | | | | | | | | | | | |
| 4.30 | | | | | | 10 - 24 | | | | | | | | |
| 4.45 | | | | | | | | 10 - 32 | | | | | | |
| 4.50 | | | 5 x 0.5 | | 12 - 24 | | | | 7/32 - 24 | | | | | |
| 4.60 | | 5 x 0.8 | | | | | | | | | | | | |
| 4.70 | | | | | | | 12 - 28 | | | | | | | |
| 4.75 | | | | 5 x 0.5 | | | | | | | | | | |

# Certificate

Standard **ISO 9001:2015**

Certificate Registr. No. **01 100 053515**

Certificate Holder:

**HPMT Industries Sdn. Bhd.**
No. 5, Jalan Sungai Kayu Ara 32/39, Taman Berjaya,
Seksyen 32, Shah Alam, Selangor Darul Ehsan, Malaysia

Scope: Design and Manufacturing of Standard and Custom-made Metal Removing Cutting Tools

Proof has been furnished by means of an audit that the requirements of ISO 9001:2015 are met.

Validity: The certificate is valid from 2021-08-15 until 2024-08-14.
First certification 2005

2021-12-13

TÜV Rheinland Cert GmbH
Am Grauen Stein · 51105 Köln

HPMT

High Precision Machining Tools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