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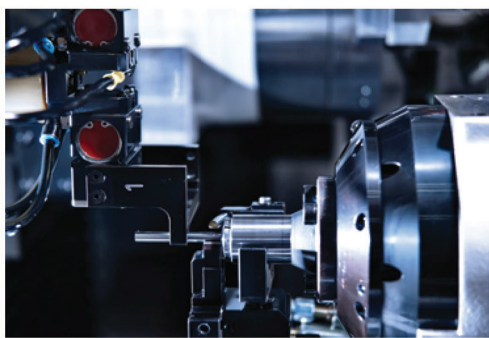


HPMT Industries Sdn Bhd, the leading producer of cutting tools in South-East Asia, with over 40 years of experience in tool design and manufacturing.

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.





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	

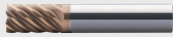
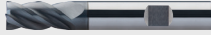
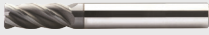
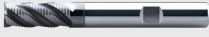
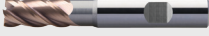
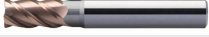
Universal Endmills for General Engineering

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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				P01	P02	P03	M01	M02	K01	K02	N01	N02	N03	S01	S02	S03	H01	H02	O01		O02
				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	
Endmills for General Engineering																					
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 Tipo  Type  Typ  Type				EDP			N ° Z	Helix Angle	Coating	Recess
Endmills for Mould & Die										
DM 70 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 < 35 HRC	J89	DH 2xD Endmills, 5 Flutes				35° / 36° / 37°	G6110			
	J90	DH 2xD with Weldon Endmills, 5 Flutes				35° / 36° / 37°	G6110			
	J92	DH 4xD 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 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	•		

Application				Working Material														Page / Seite / Pagina			
				P			M		K		N			S			H		O		
				P01	P02	P03	M01	M02	K01	K02	N01	N02	N03	S01	S02	S03	H01		H02	O01	O02
				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	
Endmills for Mould & Die																					
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Tipo Type Typ Type	EDP			N° Z	Helix Angle	Coating	Recess
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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	
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Drill (ø3-ø20) for General Engineering

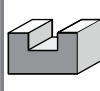
DR-S	W08	DIN 6537K - 3 x Ø, Point Angle 140°, 2 Flutes		30°	T8090	
	W09	DIN 6537L - 5 x Ø, Point Angle 140°, 2 Flutes		30°	T8090	
	W10	DIN 6537K - 3 x Ø, Point Angle 140°, 2 Flutes		30°	T8090	
	W11	DIN 6537L - 5 x Ø, Point Angle 140°, 2 Flutes		30°	T8090	
	W12	DIN 6537L - 8 x Ø, Point Angle 140°, 2 Flutes		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	
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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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Application				Working Material																Page / Seite / Pagina	
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				P01	P02	P03	M01	M02	K01	K02	N01	N02	N03	S01	S02	S03	H01	H02	O01		O02
				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

Endmills for Non-Ferrous Materials

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Drill (ø3-ø20) for General Engineering

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Micro Drills (ø1 - ø3) up to 30 X D

Drilling		•	•	•	•	•	•	•	•	•	•	•	•	•							184-185
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Extra Long-Drill (ø3, 1 - ø10) up to 30 X D

Drilling		•	•	•	•	•	•	•	•	•	•	•	•	•							191-192
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Description of The Icons

1 Tool Material (Tungsten Carbide)																	
		Micro Grain Carbide 90% WC 6% CO 91.5 HRA 0.7 micron Grain Size ISO Grade K10/K30					Micro Grain Carbide 90% WC 10% CO 92.0±0.5 HRA 0.8 micron Grain Size ISO Grade K10/K30					Micro Grain Carbide 93.5% WC 6% CO 93.5 HRA 0.6 micron Grain Size ISO Grade K05/K10					
		Sub-micrograna 86.5% WC 12% CO 93.0±0.5 HRA Grano: 0.5 micron Qualità ISO: K10 / K40					Sub-micrograna 91% WC 9% CO 93.9 HRA Grano: 0.2 micron Qualità ISO: K10 / K30										
2 Corner Form																	
			Sharp corner Edge						Corner Edge Radius Tolerance Of The Radius						Full Radius Tolerance Of The Radius		
			Chamfer														
3 Cutting Geometry																	
			Display Helix Angle Of Flute						No Vibration						No Vibration		
4 Shank design																	
			HA = Plain shank 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
	Uncoated	-/-	-/-	-/-	-/-	-/-	-/-
	AITIN (Monolayer)	(HV 0.05) 3,300	$\geq 900^{\circ}\text{C}$ $\leq 1,000^{\circ}\text{C}$	0.3	3 μm	Suitable for medium and high speed, wet and dry machining and good for machining steel with hardness up to HRC 52.	 Blue-Black
	TiSi Based (Multilayer)	(HV 0.05) 3,600	$\leq 1,200^{\circ}\text{C}$	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
	AlTiSiN Based (Multilayer)	3,800	$>1,100^{\circ}\text{C}$	0.5	2.5 - 3.5 μm	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
	AlCrN (Monolayer)	(HV 0.05) 3,200	$\leq 1,100^{\circ}\text{C}$	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
	Diamond (Monolayer)	(GPA) 40 -90	$\leq 600^{\circ}\text{C}$	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
	Alu	2,600	600°C	0.35	1 - 3 μm	Suitable for aluminium.	 Barley
	TiSi Based (Multilayer)	(HV 0.05) 3,600	$\leq 1,200^{\circ}\text{C}$	0.3	2 - 3 μm	Suitable for high performance drilling in difficult machining material.	 Copper
	TiAlN (Multilayer)	(HV 0.05) 3,300	$\leq 900^{\circ}\text{C}$	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 90% WC 6% CO 91.5 HRA 0.7 micras Tamaño de las partículas ISO Grado K10/K30		Feinkorn 90% WC 6% CO 91.5±0.5 HRA Kerngröße: 0.7 µm ISO Qualität: K10/K30		Micrograin 90% WC 6% CO 91.5±0.5 HRA Grain: 0.7 micron Qualité ISO: K10 / K30	
		Carburo micrograno 90% WC 10% CO 92.0±0.5 HRA 0.8 micras Tamaño de las partículas ISO Grado K10/K30		Feinkorn 90% WC 10% CO 92.0±0.5 HRA Kerngröße: 0.8 µm ISO Qualität: K10/K30		Micrograin 90% WC 10% CO 92.0±0.5 HRA Grain: 0.8 micron Qualité ISO: K10 / K30	
		Carburo micrograno 93.5% WC 6% CO 93.5 HRA 0.6 micras Tamaño de las partículas ISO Grado K05/K10		Feinkorn 93.5% WC 6% CO 93.5 HRA Kerngröße: 0.6 µm ISO Qualität: K05/K10		Micrograin 93.5% WC 6% CO 93.5 HRA Grain: 0.6 micron Qualité ISO: K05 / K10	
		Carburo micrograno 86.5% WC 12% CO 93.0±0.5 HRA 0.5 micras Tamaño de las partículas ISO Grado K10/K40		Feinkorn 86.5% WC 12% CO 93.0±0.5 HRA Kerngröße: 0.5 µm ISO Qualität: K10/K40		Submicrograin 86.5% WC 12% CO 93.0±0.5 HRA Grain: 0.5 micron Qualité ISO: K10 / K40	
		Carburo micrograno 91% WC 9% CO 93.9 HRA 0.2 micras Tamaño de las partículas ISO Grado K05/K10		Feinkorn 91% WC 9% CO 93.9 HRA Kerngröße: 0.2 µm ISO Qualität: K05/K10		Submicrograin 91% WC 9% CO 93.9 HRA Grain: 0.2 micron Qualité ISO: K05 / K10	
2		Geometría de corte		Eckenformen		Formes des angles	
		Borde afilado		Scharfe Schneidecken		Angles vifs	
		Radio del borde de la esquina Tolerancia del radio		Eckenradius - Torusfräser Radius - Toleranz		Angles à rayon - toriques tolérance des rayons	
		Radio completo Tolerancia del radio		Radius - Fräser Radius - Toleranz		Bout hémisphérique tolérance des rayons	
		Chaflán		Chamfer		Chamfer	
3		Geometría de corte		Schneidengeometrien		Géometries de coupe	
		Indicación del ángulo de la hélice de la flauta		Größe des Drallwinkels		Indique la valeur de 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
	Sin recubrimiento	Unbeschichtet	sans revêtement
	Material de revestimiento : AlTiN (Monocapa) Dureza : (HV 0.05) 3,300 Resistencia a la oxidación Temperatura : ≥ 900 °C ≤ 1,000 °C Coeficiente de fricción : 0.3 Espesor estándar : 3 µm	Schichtmaterial: AlTiN (einschichtig) Mikrohärte (HV 0,05): 3,300 Max. Anwendungstemperatur: ≥ 900 °C ≤ 1000 °C Reibungskoeffizient 0.3 Schichtdicke : 3 µm	Revêtement = AlTiN (Monocouche) Dureté (HV 0,05): 3,300 Température max. d'utilisation: ≥ 900 °C ≤ 1000 °C Coefficient de friction: 0,25 Épaisseur du revêtement: 3 microns
	Material de revestimiento : Basado en TiSi (multicapa) Dureza : (HV 0.05) 3,600 Resistencia a la oxidación Temperatura : ≤ 1,200 °C Coeficiente de fricción : 0.3 Espesor estándar : 2.5 - 3.5 µm	Schichtmaterial: TiSi basierend (mehrlagig) Mikrohärte (HV 0,05): 3,600 Max. Anwendungstemperatur: ≥ 1200 °C Reibungskoeffizient 0.3 Schichtdicke : 2.5 - 3.5 µm	Revêtement = à base de TiSi (multi couches) Dureté (HV 0,05): 3,600 Température max. d'utilisation: ≥ 1200 °C Coefficient de friction: 0,3 Épaisseur du revêtement: 2.5 - 3.5 microns
	Material de revestimiento : Basado en TiSi (multicapa) Dureza : 3,800 Resistencia a la oxidación Temperatura : > 1,100 °C Coeficiente de fricción : 0.3 Espesor estándar : 2.5 - 3.5 µm	Schichtmaterial: AlTiSiN basierend (mehrlagig) Mikrohärte (HV 0,05): 3,800 Max. Anwendungstemperatur: > 1,100 °C Reibungskoeffizient 0.5 Schichtdicke : 2.5 - 3.5 µm	Revêtement = à base de AlTiSiN (multi couches) Dureté (HV 0,05): 3,800 Température max. d'utilisation: > 1,100 °C Coefficient de friction: 0,5 Épaisseur du revêtement: 2.5 - 3.5 microns
	Material de revestimiento : AlTiN (Monocapa) Dureza : (HV 0.05) 3,200 Resistencia a la oxidación Temperatura : ≤ 1,100 °C Coeficiente de fricción : 0.35 Espesor estándar : 2.5 - 3.5 µm	Schichtmaterial: AlCrN (einschichtig) Mikrohärte (HV 0,05): 3,200 Max. Anwendungstemperatur: ≤ 1100 °C Reibungskoeffizient 0.35 Schichtdicke : 2.5 - 3.5 µm	Revêtement = AlCrN (monocouche) Dureté (HV 0,05): 3,200 Température max. d'utilisation: ≤ 1100 °C Coefficient de friction: 0,35 Épaisseur du revêtement: 2.5 - 3.5 microns
	Material de revestimiento : Diamante (monocapa) Dureza : (GPA) 40 - 90 Resistencia a la oxidación Temperatura : ≤ 600 °C Coeficiente de fricción : 0.15 - 0.2 Espesor estándar : 1.2 µm	Schichtmaterial: Diamanten (einschichtig) Härte (GPA): 40 - 90 Max. Anwendungstemperatur: 600 °C Reibungskoeffizient 0.15 - 0.20 Schichtdicke : 4 - 6 µm	Revêtement = diamanté (monocouche) Dureté (GPA) : 40 - 90 Température max. d'utilisation: (°C) ≤ 600 Coefficient de friction = 0,15 - 0,20 Épaisseur: 4 - 6 microns
	Material del revestimiento: Alu Dureza : 2,600 Resistencia a la oxidación Temperatura : 600 °C Coeficiente de fricción : 0.35 Espesor estándar : 1 - 3 µm	Schichtmaterial: Alu Härte (GPA): 2,600 Max. Anwendungstemperatur: 600 °C Reibungskoeffizient 0.35 Schichtdicke : 1 - 3 µm	Revêtement = Alu Dureté (GPA): 2,600 Température max. d'utilisation: 600 °C Coefficient de friction: 0,35 Épaisseur du revêtement: 1-3 microns
	Material de revestimiento : Basado en TiSi (multicapa) Dureza : (HV 0.05) 3,600 Resistencia a la oxidación Temperatura : ≤ 1,200 °C Coeficiente de fricción : 0.3 Espesor estándar : 2 - 3 µm	Schichtmaterial: TiSi basierend (mehrlagig) Mikrohärte (HV 0,05): 3,600 Max. Anwendungstemperatur: 1200 °C Reibungskoeffizient 0.3 Schichtdicke : 2-3 µm	Revêtement = à base de TiSi (multi couches) Dureté (HV 0,05): 3,600 Température max. d'utilisation: ≥ 1200 °C Coefficient de friction: 0,3 Épaisseur du revêtement: 2 - 3 microns
	Material de revestimiento : Diamante (monocapa) Dureza : (HV 0.05) 3,300 Resistencia a la oxidación Temperatura : ≤ 900 °C Coeficiente de fricción : 0.3-0.35 Espesor estándar : 3 µm	Schichtmaterial: AlTiN (einschichtig) Mikrohärte (HV 0,05): 3,300 Max. Anwendungstemperatur: ≥ 900 °C Reibungskoeffizient 0.3-0.35 Schichtdicke : 3 µm	Revêtement = AlTiN (Monocouche) Dureté (HV 0,05): 3,300 Température max. d'utilisation: ≥ 900 °C Coefficient de friction: 0.3-0.35 Épaisseur du revêtement: 3 microns
*HSC	Corte de alta velocidad	für Hochgeschwindigkeitsfräsen geeignet	pour UGV
*HPT	Instrumentos de alto rendimiento	Hochleistungswerkzeug	outil à haute performance

 English

 Spanish

 Deutsch

 Français

	Material Groups	Grupo de Materiales	Materialgruppen	Groupes matière
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 inoxidable, Alta maquinabilidad	Rostfreie Stähle <35 HRC	Aciers inoxydables, Usinabilité élevée
M02	Stainless steel, low machinability	Aceros inoxidable, Baja maquinabilidad	Rostfreie Stähle ≥35 HRC	Aciers inoxydables, Faible usinabilité
S01	Titanium alloy	Aleaciones de titanio	Titanlegierungen	Alliages de titane jusqu'à
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
Aluminium 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		
Aluminium cast alloy, Si ≥ 9%	N02	Aluminium alloys	9% < Si < 16%	3.5612	G-MgAl6Zn		G-A6-Z1	AZ61A		
				3.5812	G-MgAl8Zn		(G-A7-Z1)	AZ80A		
				3.2315	AlMgSi1		A-SGM0.7/6082			
Copper alloy	N03	Copper alloys	Si > 16%	3.2381	G-AlSi10Mg		A-S10G	B85		
				3.2382	GD-AlSi12			A413.2		
								B390.0	ADC14	
				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	
Grey cast iron	K01	Grey cast irons (GCI)		2.0470	CuZn28Sn1		CuZn29Sn1			
				2.0321	CuZn37		CuZn37			
				2.0530	CuZn38Sn1					
				2.0401	CuZn39Pb3		CuZn39Pb3			
				2.0402	CuZn40Pb2		CuZn39Pb2			
Ductile cast iron	K02	Ductile Cast Iron		2.0410	CuZn44Pb2					
				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	
Carbon steel	P01	Free-cutting steels	360 < Rm < 880	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	
				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	
				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	
		"Low alloy ferritic steels, C < 0.25%wt Low alloy weldable general structural steels"	320 < Rm < 600	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		
				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	
				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		
		"Ferritic & ferritic/pearlitic steels, C < 0.25%wt Weldable general structural steels Case hardening steels"	430 < Rm < 610	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	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	
				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		
		"Structural steels, 0.25% < C < 0.67%wt Quench & Temper steels"	550 < Rm < 1200	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 spring 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				AMS 4919		Ti
		Titanium, medium alloyed (α+β)						AMS 4943		Ti 3Al-2.5V (grade 9)
				3.7164	TiV10Fe2Al3			AMS 4920, Grade 5 AMS 4986		Ti 6Al-4V 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
Cobalt alloy	S03	Cobalt based superalloys		2.4654						Udimet 500
										Waspalloy
										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	
				1.2344	X 40 CrMoV 5 1	X 40 Crmo 5 1 1 KU	Z 40 CDV 5	H13	SKD 61	
		"Tool steels High Speed Steels"	38 < HRC < 64	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 CrMoV 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									

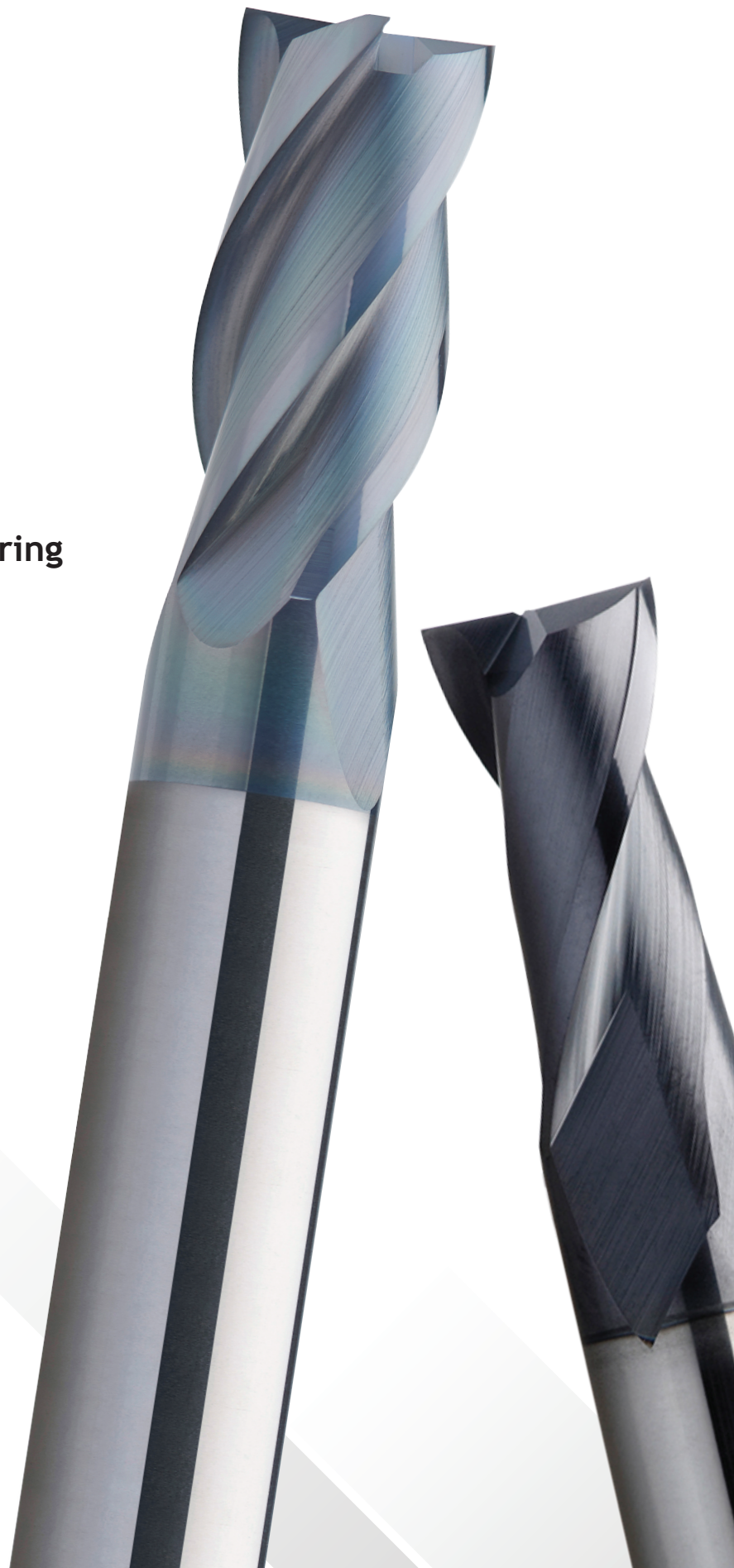
Hardness Conversion Chart



Tensile Strength Rm in N/mm ²	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	300
		59	680	315
		61	720	330
		63	770	345
		64	800	355
		65	830	365
		66	870	375
		67	900	385
		68	940	395
		69	980	405

ENDMILLS

Endmills for General Engineering



FEATURES & BENEFITS

EZ LINE

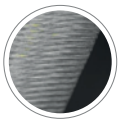


1. Gash Land Design



- 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



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 aufzulösen 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



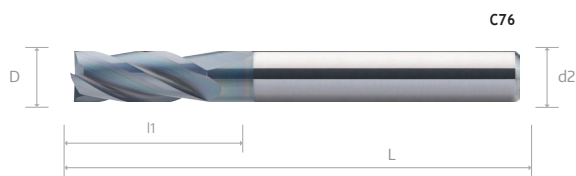
1. Conception de fraise pour l'usinage general
Renforcer la protection des bords du coin de l'outil de coupe
Résistance mécanique plus élevée pour résister à une force de coupe plus importante
Une durée d'usinage plus longue et une plus grande durabilité de l'outil
2. Meulage excentrique
Meulage optimal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

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 Matière

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

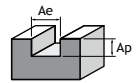
Recommended Cutting Data



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

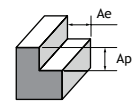


EZ DP/DH Endmills, 4 Flutes - C76



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 x D		0.80 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	
D	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz
1	220	0.005	200	0.004	165	0.003	110	0.002	135	0.002	120	0.002	100	0.001
2		0.008		0.008		0.006		0.006		0.004		0.003		
3		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		0.056		0.053		0.055		0.056		0.053		0.038		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 × D		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		0.25 × D		0.20 × D		0.18 × D	
D	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz
1	275	0.005	240	0.004	200	0.003	140	0.004	165	0.003	130	0.003	110	0.003
2		0.010		0.009		0.007		0.008		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		0.060		0.058		0.057		0.053		0.053		0.047		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

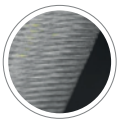


1. Gash Land Design



- 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



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. Stirnchliff 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
Verbessert die Werkzeuglebensdauer
Verbessert die Verschleißfestigkeit und reduziert übermäßige Reibung
4. Ausgezeichnete Beschichtung zur Verringerung der Reibung
Erhöht die Härte und bietet bessere Verschleißfestigkeit
Höhere Temperaturbeständigkeit
Glatte Oberfläche für besseren Spänefluß
5. Geeignet für Materialgruppen P, K, N

CARACTÉRISTIQUES ET AVANTAGES



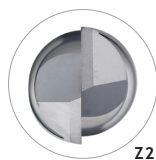
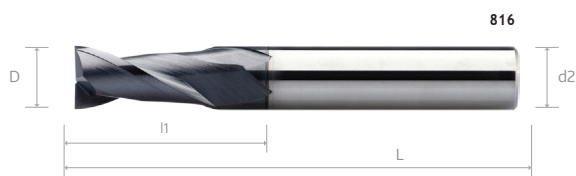
1. Conception de fraise pour l'usinage general
Améliore considérablement la solidité et apporte une excellente résistance à l'ébarbage
2. Meulage excentrique
Meulage optimal diminuant le coefficient de friction tout en maintenant une bonne acuité de l'arête de coupe
3. Préparation des arêtes de coupes
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

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 Matière

N01	N02	N03	K01	K02	P01	P02	P03	M01	M02	S01	S02	S03	H01	H02	O01	O02
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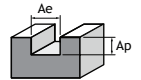
Recommended Cutting Data



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

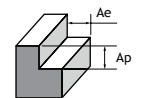


SE 30 Endmills, 2 Flutes - 816



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 x D		1.00 x D		1.00 x D	
D	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz
1	230	0.009	210	0.009	180	0.008	80	0.009	115	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		0.085		0.081		0.077		0.090		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	280	0.011	250	0.010	210	0.010	120	0.011	140	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		0.102		0.097		0.092		0.108		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

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 Matière

N01	N02	N03	K01	K02	P01	P02	P03	M01	M02	S01	S02	S03	H01	H02	O01	O02
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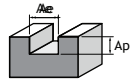
Recommended Cutting Data



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

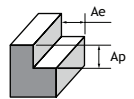


SE 30 Endmills, 3 Flutes - 818



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 x D		1.00 x D		1.00 x D	
D	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz
1	230	0.009	210	0.009	180	0.008	80	0.008	115	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		0.085		0.081		0.077		0.089		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	280	0.011	250	0.010	210	0.010	120	0.011	140	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		0.102		0.097		0.092		0.107		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

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



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

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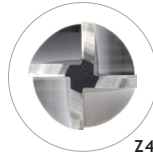
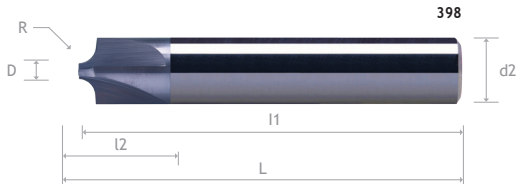
N01	N02	N03	K01	K02	P01	P02	P03	M01	M02	S01	S02	S03	H01	H02	O01	O02
•	•	•	•		•											

Round Corner Milling Cutters, 4 Flutes

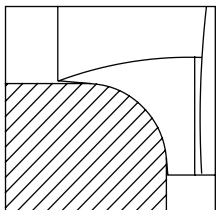
 Fresas de esquinas redondeadas, 4 canales

 Eckfräser rund, 4 Schneiden

 Fraises à coins ronds, 4 goujures



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	2	1	48.78	10	50	4	•
398 0125 020		1.25	48.49	12	50	6	•
398 0150 020		1.5	48.26	12	50	6	•
398 0150 035	2.5	1.75	48.03	12	50	6	•
398 0175 020		2	47.74	14	50	8	•
398 0200 025		2.25	47.51	14	50	8	•
398 0200 030	3.5	2.5	47.28	14	50	8	•
398 0225 025		1.5	68.27	16	70	10	•
398 0250 025		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.

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

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Recommended Cutting Data

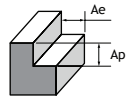


Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition



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

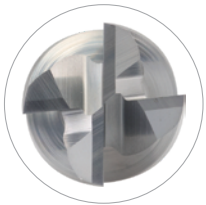
ENDMILLS

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.

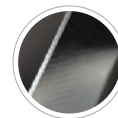
3. Differential Helix (DH)

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



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 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

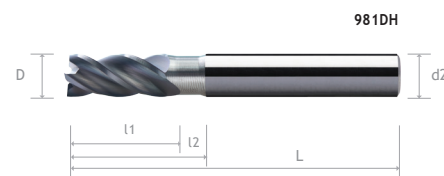
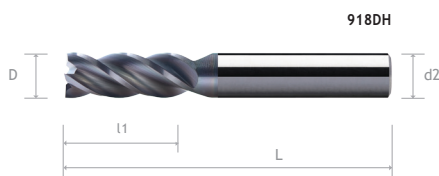


Optimum DP/DH / with Recess/ Weldon Endmills, 4 Flutes

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

Optimum DP/DH Fräser, 4 Zähne

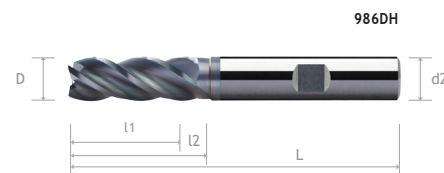
Optimum DP/DH à pas décalés, 4 dents



Order Number	HA	D (mm)	L1 (mm)	L2 (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			100	20	•

Order Number	HA	D (mm)	L1 (mm)	L2 (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	•

* - DIN 6535



Order Number	HB	D (mm)	L1 (mm)	L2 (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 Matière

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

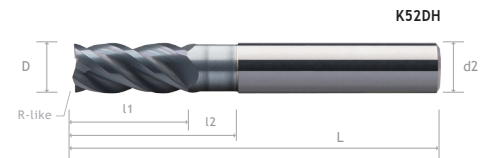
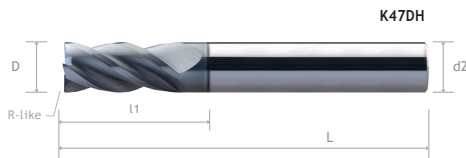
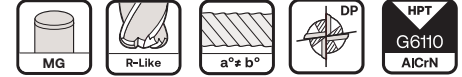
K47DH / K52DH / K53DH NEW ≤ 45 HRC HPMT

Optimum DP/DH R-Like Endmills, 4 Flutes

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

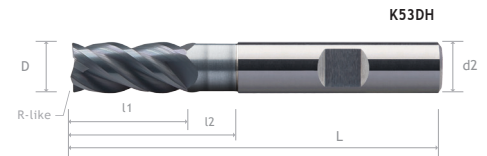
 Optimum DP/DH R-Like Fräser, 4 Zähne

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



Order Number  HA	D (mm)	I 1 (mm)	I 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)	I 1 (mm)	I 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	•



Order Number  HB	D (mm)	I 1 (mm)	I 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	•



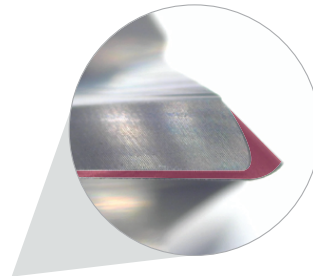
R - Like is an enhanced edge protection.

Material Group | Grupo de materiales | Materialgruppen | Groupe Matière

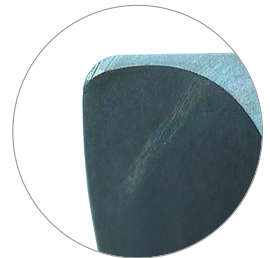
N01	N02	N03	K01	K02	P01	P02	P03	M01	M02	S01	S02	S03	H01	H02	O01	O02
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

FEATURES & BENEFITS

Optimum Torus



Smooth joint at radius



S-Gash

1. Differential Pitch (DP)



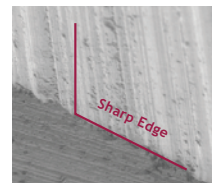
Reduces chatter to provide excellent surface finishing.

2. S-Gash (Unique Radius Design)

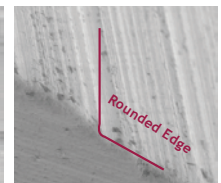
Smooth joining area at the radius to deliver tighter accuracy.

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



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 aufzulösen und Vibrationen zu reduzieren
2. Verbessertes Eckradius-Design
Verbessern Sie die Haltbarkeit im Radiusbereich
3. Schneidkantenbehandlung
Verbessert die Werkzeuglebensdauer
Verbessert die Verschleißfestigkeit und reduziert übermäßige Reibung
4. Geeignet für Materialgruppen P, M, K, N, S

CARACTÉRISTIQUES ET AVANTAGES



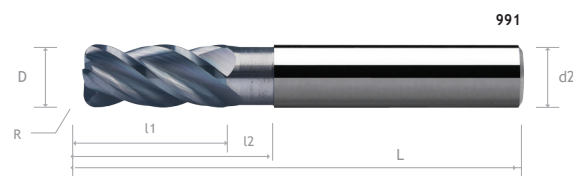
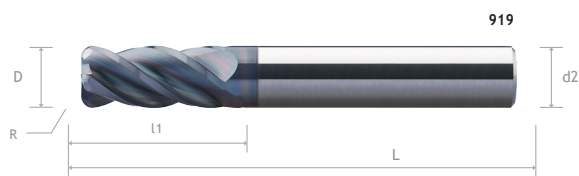
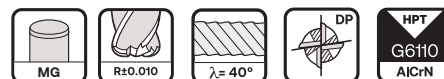
1. Conception à pas différentiel (DP)
Réduire les vibrations pour obtenir une excellente finition de surface
2. Conception améliorée du rayon d'angle
Améliorer la durabilité sur la zone du rayon
3. Préparation des arêtes de coupes
Réduit l'adhérence du matériau sur le tranchant pour surmonter l'usinage 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

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)	L1 (mm)	L2 (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)	L1 (mm)	L2 (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 Matière

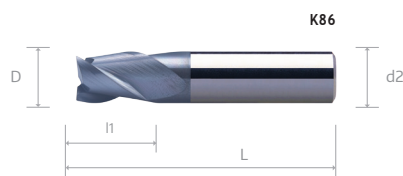
N01	N02	N03	K01	K02	P01	P02	P03	M01	M02	S01	S02	S03	H01	H02	O01	O02
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

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	10		38	6	•
K86 0700 042 08	7			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 Matière

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

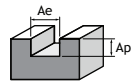
Recommended Cutting Data



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



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 × 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	
D	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz
1	220	0.005	200	0.005	165	0.003	110	0.002	209	0.001	135	0.002	120	0.001	95	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		0.025		0.024		0.024		0.023		0.009		0.022		0.014		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 × D		1.00 × 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
1	100	0.001	44	0.001	66	0.001	110	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		0.013		0.014		0.010		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

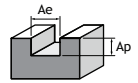
Recommended Cutting Data



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

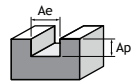


Optimum DP/DH / DP Torus / R-Like - 918DH, 981DH, 986DH, 919, 991, K47DH, K52DH, K53DH



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	330	0.005	300	0.004	280	0.004	170	0.003	110	0.003	60	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		0.037		0.036		0.038		0.026		0.028		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	200	0.003	160	0.003	150	0.003	120	0.003	80	0.003	30	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		0.026		0.026		0.026		0.030		0.034		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

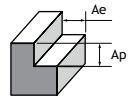
Recommended Cutting Data



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

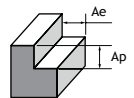


Optimum DP/DH / DP Torus / R-Like - 918DH, 981DH, 986DH, 919, 991, K47DH, K52DH, K53DH



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	400	0.006	380	0.005	360	0.004	250	0.007	140	0.004	70	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		0.046		0.046		0.050		0.049		0.041		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	280	0.005	230	0.006	190	0.005	160	0.004	100	0.005	40	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		0.049		0.043		0.042		0.043		0.049		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

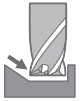
Recommended Cutting Data



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



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	250	0.004	220	0.003	210	0.003	130	0.002	80	0.002	45	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		0.030		0.029		0.030		0.021		0.022		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	150	0.002	120	0.002	110	0.002	90	0.002	60	0.002	20	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		0.021		0.021		0.021		0.024		0.027		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

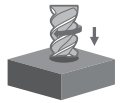
Recommended Cutting Data



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

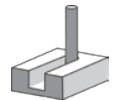


Optimum DP/DH / DP Torus / R-Like - 918DH, 981DH, 986DH, 919, 991, K47DH, K52DH, K53DH



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	150	0.009	140	0.009	130	0.008	120	0.007	120	0.007	110	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		0.078		0.077		0.075		0.080		0.080		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	350	0.017	290	0.013	250	0.012	200	0.010	120	0.008	100	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		0.075		0.073		0.078		0.084		0.091		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

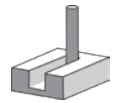
Recommended Cutting Data



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



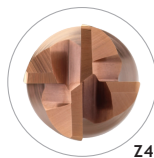
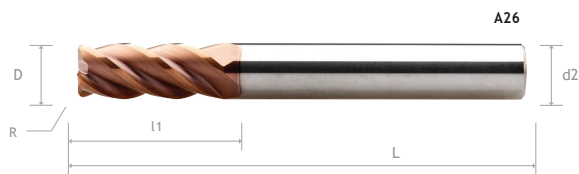
Trochoidal Milling	N						K				S	
Working Material	Wrought Aluminium		Cast Aluminium		Copper Alloy		Grey Cast Iron		Ductile Cast Iron		Nickel Alloy	
Properties	Si < 9%		Si ≥ 9%		-		-		-		-	
Maximum Slot Width	1.25 × D		1.25 × D		1.25 × D		1.25 × D		1.25 × D		1.25 × D	
Cutting depth, ap	1.50 × D		1.50 × 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	450	0.020	420	0.019	380	0.018	320	0.015	170	0.010	45	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		0.070		0.070		0.074		0.073		0.092		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

ENDMILLS

Endmills for Mould & Die



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)	L1 (mm)	L2 (mm)	L (mm)	d2 h6 (mm)	R	Availability	Order Number	D (mm)	L1 (mm)	L2 (mm)	L (mm)	d2 h6 (mm)	R	Availability
A26 0100 050 0400 020	1	3		50	4	0.2	•	A26 1200 075 1200 020				75	12	0.2	•
A26 0200 050 0400 020	2	6.5		50	4	0.2	•	A26 1200 075 1200 030				75	12	0.3	•
A26 0200 050 0400 030				50	4	0.3	•	A26 1200 075 1200 050				75	12	0.5	•
A26 0300 050 0600 020				50	6	0.2	•	A26 1200 075 1200 100	12	25		75	12	1	•
A26 0300 050 0600 030				50	6	0.3	•	A26 1200 075 1200 150				75	12	1.5	•
A26 0300 050 0600 050				50	6	0.5	•	A26 1200 075 1200 200				75	12	2	•
A26 0300 060 0600 020	3	9		60	6	0.2	•	A26 1200 075 1200 300				75	12	3	•
A26 0300 060 0600 030				60	6	0.3	•	A26 1400 090 1400 030				90	14	0.3	•
A26 0300 060 0600 050				60	6	0.5	•	A26 1400 090 1400 050				90	14	0.5	•
A26 0400 050 0600 020				50	6	0.2	•	A26 1400 090 1400 100				90	14	1	•
A26 0400 050 0600 030				50	6	0.3	•	A26 1400 090 1400 150	14			90	14	1.5	•
A26 0400 050 0600 050				50	6	0.5	•	A26 1400 090 1400 200				90	14	2	•
A26 0400 050 0600 100				50	6	1	•	A26 1400 090 1400 300				90	14	3	•
A26 0400 060 0600 020	4	12		60	6	0.2	•	A26 1600 090 1600 030				90	16	0.3	•
A26 0400 060 0600 030				60	6	0.3	•	A26 1600 090 1600 050				90	16	0.5	•
A26 0400 060 0600 050				60	6	0.5	•	A26 1600 090 1600 100	16			90	16	1	•
A26 0400 060 0600 100				60	6	1	•	A26 1600 090 1600 150				90	16	1.5	•
A26 0500 050 0500 020				50	5	0.2	•	A26 1600 090 1600 200				90	16	2	•
A26 0500 050 0600 020				50	6	0.2	•	A26 1600 090 1600 300				90	16	3	•
A26 0500 050 0600 030				50	6	0.3	•	A26 1800 100 1800 030				100	18	0.3	•
A26 0500 050 0600 050				50	6	0.5	•	A26 1800 100 1800 050				100	18	0.5	•
A26 0500 050 0600 100	5	15		50	6	1	•	A26 1800 100 1800 100				100	18	1	•
A26 0500 060 0600 020				60	6	0.2	•	A26 1800 100 1800 150	18			100	18	1.5	•
A26 0500 060 0600 030				60	6	0.3	•	A26 1800 100 1800 200				100	18	2	•
A26 0500 060 0600 050				60	6	0.5	•	A26 1800 100 1800 300				100	18	3	•
A26 0500 060 0600 100				60	6	1	•	A26 2000 100 2000 030				100	20	0.3	•
A26 0600 050 0600 020				50	6	0.2	•	A26 2000 100 2000 050	20			100	20	0.5	•
A26 0600 050 0600 030				50	6	0.3	•	A26 2000 100 2000 100				100	20	1	•
A26 0600 050 0600 050				50	6	0.5	•	A26 2000 100 2000 150				100	20	1.5	•
A26 0600 050 0600 100				50	6	1	•	A26 2000 100 2000 200				100	20	2	•
A26 0600 060 0600 020	6			60	6	0.2	•	A26 2000 100 2000 300				100	20	3	•
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				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	8			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				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	10	22		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	•								

Material Group | Grupo de materiales | Materialgruppen | Groupe Matière

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

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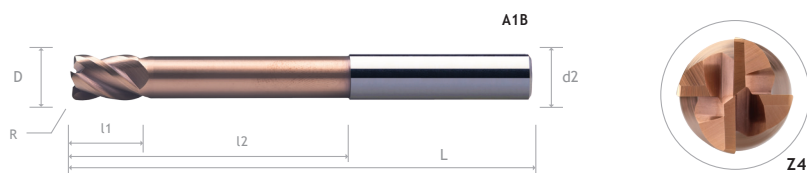
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SE 45R Torus Short Flutes Long Reach with Recess Endmills - Long, 4 Flutes

 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	8	12	40	75	6	1	•
A1B 0800 075 0800 020			40	75	8	0.2	•
A1B 0800 075 0800 030			40	75	8	0.3	•
A1B 0800 075 0800 050	10	14	40	75	8	0.5	•
A1B 0800 075 0800 100			40	75	8	1	•
A1B 1000 075 1000 020			40	75	10	0.2	•
A1B 1000 075 1000 030	12	16	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	16	22	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 *	12	16	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	16	22	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	85	125	60	100	12	1	•
A1B 1200 100 1200 200			60	100	12	2	•
A1B 1600 125 1600 030			85	125	16	0.3	•
A1B 1600 125 1600 050	16	22	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 Matière

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

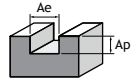
Recommended Cutting Data



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

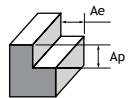


SE 45 Torus Endmills, 4 Flutes - A26 - A1B



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	130	0.003	110	0.002	100	0.003	80	0.002	50	0.002	80	0.003	25	0.004	50	0.002
2		0.006		0.004		0.006		0.003		0.004		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		0.030		0.025		0.030		0.021		0.024		0.030		0.045		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



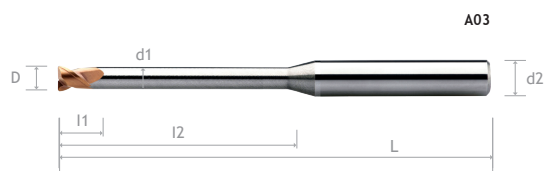
Side Milling	P						M				K	S		H		
Working Material	Carbon Steel		Alloy Steel		Prehardened Steel		Stainless Steel		Stainless Steel		Ductile Cast Iron		Titanium Alloy		Hardened Steel	
Properties	-		520 < Rm < 1200		35 ≤ HRC < 45		High Machinability		Low Machinability		-		-		45 ≤ HRC < 52	
Cutting depth, 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	160	0.004	130	0.005	110	0.004	90	0.004	55	0.005	90	0.004	35	0.004	90	0.003
2		0.009		0.009		0.011		0.013		0.008		0.008				
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		0.064		0.058		0.058		0.069		0.076		0.042		0.045		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

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



Order Number	D (mm)	I 1 (mm)	I 2 (mm)	L (mm)	d1 (mm)	d2 h6 (mm)	Availability	CODICE	D (mm)	I 1 (mm)	I 2 (mm)	L (mm)	d1 (mm)	d2 h6 (mm)	Availability
A03 0020 050 0400	0.2	0.3	-	50	-	4	•	A03 0120 050 0400	1.2	1.8	-	50	-	4	•
A03 0020 050 0400 005			0.5	50	0.17	4	•	A03 0120 050 0400 060			6	50	1.1	4	•
A03 0020 050 0400 010			1	50	0.17	4	•	A03 0120 050 0400 080			8	50	1.1	4	•
A03 0020 050 0400 015	0.3	0.4	1.5	50	0.17	4	•	A03 0120 050 0400 100	1.4	2.1	10	50	1.1	4	•
A03 0030 050 0400			-	50	-	4	•	A03 0120 050 0400 120			12	50	1.1	4	•
A03 0030 050 0400 010			1	50	0.27	4	•	A03 0140 050 0400			-	50	-	4	•
A03 0030 050 0400 020	0.4	0.6	2	50	0.27	4	•	A03 0140 050 0400 060	1.5	2.3	6	50	1.3	4	•
A03 0030 050 0400 030			3	50	0.27	4	•	A03 0140 050 0400 080			8	50	1.3	4	•
A03 0040 050 0400			-	50	-	4	•	A03 0140 050 0400 100			10	50	1.3	4	•
A03 0040 050 0400 020	0.5	0.7	2	50	0.37	4	•	A03 0140 050 0400 120	1.6	2.4	12	50	1.3	4	•
A03 0040 050 0400 030			3	50	0.37	4	•	A03 0140 050 0400 140			14	50	1.3	4	•
A03 0040 050 0400 040			4	50	0.37	4	•	A03 0140 050 0400 160			16	50	1.3	4	•
A03 0040 050 0400 050	0.6	0.9	5	50	0.37	4	•	A03 0150 050 0400	1.8	2.7	-	50	-	4	•
A03 0050 050 0400			-	50	-	4	•	A03 0150 050 0400 060			6	50	1.4	4	•
A03 0050 050 0400 020			2	50	0.45	4	•	A03 0150 050 0400 080			8	50	1.4	4	•
A03 0050 050 0400 040	0.7	1	4	50	0.45	4	•	A03 0150 050 0400 100	1.9	3.0	10	50	1.4	4	•
A03 0050 050 0400 060			6	50	0.45	4	•	A03 0150 050 0400 120			12	50	1.4	4	•
A03 0050 050 0400 080			8	50	0.45	4	•	A03 0150 050 0400 140			14	50	1.4	4	•
A03 0060 050 0400	0.8	1.2	-	50	-	4	•	A03 0150 050 0400 160	2.0	3.3	16	50	1.4	4	•
A03 0060 050 0400 020			2	50	0.55	4	•	A03 0150 060 0400			-	60	-	4	•
A03 0060 050 0400 040			4	50	0.55	4	•	A03 0150 060 0400 180			18	60	1.4	4	•
A03 0060 050 0400 060	0.9	1.5	6	50	0.55	4	•	A03 0150 060 0400 200	2.1	3.6	20	60	1.4	4	•
A03 0060 050 0400 080			8	50	0.55	4	•	A03 0160 050 0400			-	50	-	4	•
A03 0060 050 0400 100			10	50	0.55	4	•	A03 0160 050 0400 060			6	50	1.5	4	•
A03 0070 050 0400	1.0	1.8	-	50	-	4	•	A03 0160 050 0400 080	2.2	3.9	8	50	1.5	4	•
A03 0070 050 0400 020			2	50	0.65	4	•	A03 0160 050 0400 100			10	50	1.5	4	•
A03 0070 050 0400 040			4	50	0.65	4	•	A03 0160 050 0400 120			12	50	1.5	4	•
A03 0070 050 0400 060	1.1	2.1	6	50	0.65	4	•	A03 0160 050 0400 140	2.3	4.2	14	50	1.5	4	•
A03 0070 050 0400 080			8	50	0.65	4	•	A03 0160 050 0400 160			16	50	1.5	4	•
A03 0070 050 0400 100			10	50	0.65	4	•	A03 0160 060 0400			-	60	-	4	•
A03 0080 050 0400	1.2	2.4	-	50	-	4	•	A03 0160 060 0400 180	2.4	4.8	18	60	1.5	4	•
A03 0080 050 0400 040			4	50	0.75	4	•	A03 0160 060 0400 200			20	60	1.5	4	•
A03 0080 050 0400 060			6	50	0.75	4	•	A03 0180 050 0400			-	50	-	4	•
A03 0080 050 0400 080	1.3	2.7	8	50	0.75	4	•	A03 0180 050 0400 060	2.6	6.3	6	50	1.7	4	•
A03 0080 050 0400 100			10	50	0.75	4	•	A03 0180 050 0400 080			8	50	1.7	4	•
A03 0080 050 0400 120			12	50	0.75	4	•	A03 0180 050 0400 100			10	50	1.7	4	•
A03 0090 050 0400	1.4	3.0	-	50	-	4	•	A03 0180 050 0400 120	2.8	7.0	12	50	1.7	4	•
A03 0090 050 0400 060			6	50	0.85	4	•	A03 0180 050 0400 140			14	50	1.7	4	•
A03 0090 050 0400 080			8	50	0.85	4	•	A03 0180 050 0400 160			16	50	1.7	4	•
A03 0090 050 0400 100	1.5	3.6	10	50	0.85	4	•	A03 0180 060 0400	2.9	7.7	-	60	-	4	•
A03 0090 050 0400 150			15	50	0.85	4	•	A03 0180 060 0400 180			18	60	1.7	4	•
A03 0100 050 0400			-	50	-	4	•	A03 0180 060 0400 200			20	60	1.7	4	•
A03 0100 050 0400 060	1.6	4.2	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	1.7	4.8	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	•								

Material Group | Grupo de materiales | Materialgruppen | Groupe Matière

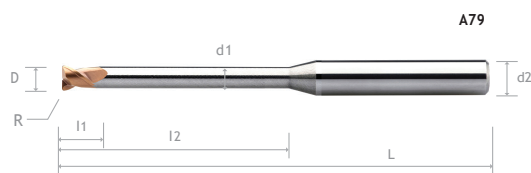
N01 N02 N03 K01 K02 P01 P02 P03 M01 M02 S01 S02 S03 H01 H02 O01 O02

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



Order Number	D (mm)	I 1 (mm)	I 2 (mm)	L (mm)	d1 (mm)	R	d2 h6 (mm)	Availability	Order Number	D (mm)	I 1 (mm)	I 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 0300 050 0600 080 R020	3		8	50	2.8	0.2	6	◦		
A79 0160 060 0400 200 R010			20	60	1.5	0.1	4	◦	A79 0300 050 0600 100 R020			10	50	2.8	0.2	6	◦		
A79 0180 050 0400 060 R020			6	50	1.7	0.2	4	◦	A79 0300 050 0600 120 R020			12	50	2.8	0.2	6	◦		
A79 0180 050 0400 080 R020	1.8	2.7	8	50	1.7	0.2	4	◦	A79 0300 050 0600 140 R020	4.5		14	50	2.8	0.2	6	◦		
A79 0180 050 0400 100 R020			10	50	1.7	0.2	4	◦	A79 0300 060 0600 160 R020			16	60	2.8	0.2	6	•		
A79 0180 050 0400 120 R020			12	50	1.7	0.2	4	•	A79 0300 060 0600 180 R020			18	60	2.8	0.2	6	◦		
A79 0180 050 0400 140 R020			14	50	1.7	0.2	4	◦	A79 0300 060 0600 200 R020			20	60	2.8	0.2	6	•		
A79 0180 050 0400 160 R020			16	50	1.7	0.2	4	•	A79 0300 075 0600 250 R020			25	75	2.8	0.2	6	◦		
A79 0180 060 0400 180 R020			18	60	1.7	0.2	4	◦	A79 0300 050 0600 080 R030			8	50	2.8	0.3	6	•		
A79 0180 060 0400 200 R020			20	60	1.7	0.2	4	◦	A79 0300 050 0600 100 R030			10	50	2.8	0.3	6	•		
A79 0200 050 0400 060 R020			2	3	6	50	1.9	0.2	4			◦	A79 0300 050 0600 120 R030	12	50	2.8	0.3	6	•
A79 0200 050 0400 080 R020					8	50	1.9	0.2	4			◦	A79 0300 050 0600 140 R030	14	50	2.8	0.3	6	•
A79 0200 050 0400 100 R020					10	50	1.9	0.2	4			•	A79 0300 060 0600 160 R030	16	60	2.8	0.3	6	◦
A79 0200 050 0400 120 R020					12	50	1.9	0.2	4			•	A79 0300 060 0600 180 R030	18	60	2.8	0.3	6	◦
A79 0200 050 0400 140 R020					14	50	1.9	0.2	4			◦	A79 0300 060 0600 200 R030	20	60	2.8	0.3	6	◦
A79 0200 050 0400 160 R020	16	50			1.9	0.2	4	•	A79 0300 075 0600 250 R030	25	75	2.8	0.3	6	◦				
A79 0200 060 0400 180 R020	18	60			1.9	0.2	4	◦	A79 0300 050 0600 080 R050	8	50	2.8	0.5	6	•				
A79 0200 060 0400 200 R020	20	60			1.9	0.2	4	◦	A79 0300 050 0600 100 R050	10	50	2.8	0.5	6	•				
A79 0200 075 0400 250 R020	25	75			1.9	0.2	4	◦	A79 0300 050 0600 120 R050	12	50	2.8	0.5	6	•				
A79 0200 075 0400 300 R020	30	75			1.9	0.2	4	◦	A79 0300 060 0600 140 R050	14	50	2.8	0.5	6	•				
A79 0200 050 0400 080 R030	2.5	3.7			8	50	1.9	0.3	4	•	A79 0300 060 0600 160 R050	16	60	2.8	0.5	6	•		
A79 0200 050 0400 160 R030					16	50	1.9	0.3	4	•	A79 0300 060 0600 180 R050	18	60	2.8	0.5	6	•		
A79 0200 060 0400 200 R030			20	60	1.9	0.3	4	◦	A79 0300 060 0600 200 R050	20	60	2.8	0.5	6	•				
A79 0200 050 0400 060 R050			6	50	1.9	0.5	4	•	A79 0300 075 0600 250 R050	25	75	2.8	0.5	6	•				
A79 0200 050 0400 080 R050			8	50	1.9	0.5	4	•	A79 0400 060 0600 100 R030	10	60	3.7	0.3	6	◦				
A79 0200 050 0400 120 R050			12	50	1.9	0.5	4	•	A79 0400 060 0600 150 R030	15	60	3.7	0.3	6	•				
A79 0200 050 0400 160 R050			16	50	1.9	0.5	4	•	A79 0400 060 0600 200 R030	20	60	3.7	0.3	6	◦				
A79 0200 060 0400 200 R050			20	60	1.9	0.5	4	•	A79 0400 075 0600 250 R030	25	75	3.7	0.3	6	◦				
A79 0200 075 0400 250 R050			25	75	1.9	0.5	4	•	A79 0400 075 0600 300 R030	30	75	3.7	0.3	6	◦				
A79 0200 075 0400 300 R050			30	75	1.9	0.5	4	•	A79 0400 075 0600 400 R030	40	75	3.7	0.3	6	◦				
A79 0250 050 0400 080 R030			2.5	3.7	8	50	2.4	0.3	4	◦	A79 0400 060 0600 100 R050	10	60	3.7	0.5	6	•		
A79 0250 050 0400 100 R030					10	50	2.4	0.3	4	◦	A79 0400 060 0600 150 R050	15	60	3.7	0.5	6	•		
A79 0250 050 0400 120 R030	12	50			2.4	0.3	4	◦	A79 0400 060 0600 200 R050	20	60	3.7	0.5	6	•				
A79 0250 050 0400 140 R030	14	50			2.4	0.3	4	◦	A79 0400 075 0600 250 R050	25	75	3.7	0.5	6	•				
A79 0250 050 0400 160 R030	16	50			2.4	0.3	4	◦	A79 0400 075 0600 300 R050	30	75	3.7	0.5	6	•				
A79 0250 060 0400 180 R030	18	60			2.4	0.3	4	◦	A79 0400 075 0600 400 R050	40	75	3.7	0.5	6	•				
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	2.5	3.7			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	◦											

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

Material Group | Grupo de materiales | Materialgruppen | Groupe Matière

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

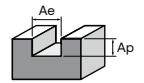
Recommended Cutting Data



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



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
	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
0.9	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

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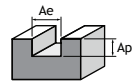
Recommended Cutting Data



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



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

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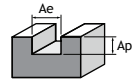
Recommended Cutting Data



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



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



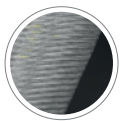
Slotting		K			P			M			S			H		
Working Material		Ductile Cast Iron			Prehardened Steel			Stainless Steel			Nickel Alloy			Hardened Steel		
Properties		-			-			Low Machinability			-			45 ≤ HRC < 52		
D	Effective Length	Ap	N	Fz	Ap	N	Fz	Ap	N	Fz	Ap	N	Fz	Ap	N	Fz
2.5	8.0	0.130	11520	0.031	0.145	12800	0.028	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
3.0	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
	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
4.0	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
	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



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
Verbessert 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 Materialgruppen P, M, K, S, H

CARACTÉRISTIQUES ET AVANTAGES



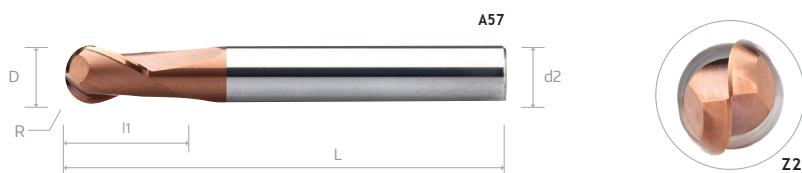
1. Meulage excentrique
Meulage optimal diminuant le coefficient de friction tout en maintenant une bonne acuité de l'arête de coupe
2. Préparation des arêtes de coupes
Réduit l'adhérence du matériau sur le tranchant pour surmonter l'usinage stable
Améliore la résistance à l'usure et réduit le frottement 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

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	3		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	4		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 Matière

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

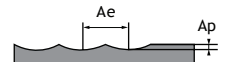
Recommended Cutting Data



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

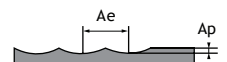


BN 45 Ballnose Cutters, 2 Flutes - A57



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	160	0.008	185	0.013	70	0.006	40	0.006	140	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		0.135		0.146		0.065		0.074		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	170	0.006	195	0.011	80	0.004	50	0.004	150	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		0.105		0.124		0.046		0.052		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

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	3		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	4		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 Matière

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

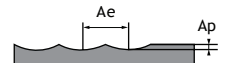
Recommended Cutting Data



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

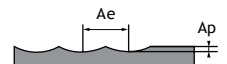


BN 45 Long Ballnose Cutters, 2 Flutes - A59



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	125	0.007	165	0.011	65	0.006	35	0.007	120	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		0.101		0.107		0.050		0.061		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	135	0.005	175	0.009	75	0.003	45	0.003	140	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		0.076		0.087		0.032		0.039		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

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	3		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	4		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	32		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	38		150	20	•
A61 2000 200					200	20	•

Material Group | Grupo de materiales | Materialgruppen | Groupe Matière

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

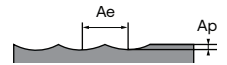
Recommended Cutting Data



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

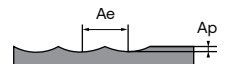


BN 45 Extra-Long Ballnose Cutters, 2 Flutes - A61



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	105	0.004	145	0.009	60	0.005	30	0.007	100	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		0.070		0.104		0.048		0.058		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



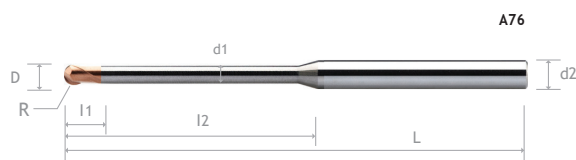
Finishing	K		P		M		S		H	
Working Material	Ductile Cast Iron		Prehardened Steel		Stainless Steel		Nickel Alloy		Hardened Steel	
Properties	-		-		Low Machinability		-		45 ≤ HRC < 52	
Cutting depth, ap	0.05 × D		0.05 × D		0.05 × D		0.05 × D		0.05 × D	
Cutting Width, ae	0.02 × D		0.02 × D		0.02 × D		0.02 × D		0.02 × D	
D	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz
1	115	0.003	155	0.007	70	0.003	40	0.002	120	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		0.054		0.082		0.029		0.020		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

BN 45 Miniature Ballnose Cutters with Long Neck, 2 Flutes

Mini fresas esféricas BN 45 con cuello largo, 2 canales

BN 45 Kleinradiusfräser mit langem Hals, 2 Zähne

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



Order Number	D (mm)	R	I 1 (mm)	I 2 (mm)	L (mm)	d1 (mm)	d2 h6 (mm)	Availability	Order Number	D (mm)	R	I 1 (mm)	I 2 (mm)	L (mm)	d1 (mm)	d2 h6 (mm)	Availability
A76 0020 050 0400	0.2	0.10	0.2	-	50	-	4	•	A76 0150 050 0400	1.5	0.75	1.2	-	50	-	4	•
A76 0020 050 0400 005				0.5	50	0.17	4	•	A76 0150 050 0400 080				8	50	1.4	4	•
A76 0020 050 0400 010				1	50	0.17	4	•	A76 0150 050 0400 120				12	50	1.4	4	•
A76 0020 050 0400 015				1.5	50	0.17	4	•	A76 0150 050 0400 160				16	50	1.4	4	•
A76 0030 050 0400	0.3	0.15	0.3	-	50	-	4	•	A76 0150 060 0400	1.6	0.80	1.3	-	60	-	4	•
A76 0030 050 0400 010				1	50	0.27	4	•	A76 0150 060 0400 180				18	60	1.4	4	•
A76 0030 050 0400 020				2	50	0.27	4	•	A76 0160 050 0400				-	50	-	4	•
A76 0030 050 0400 030				3	50	0.27	4	•	A76 0160 050 0400 080				8	50	1.5	4	•
A76 0040 050 0400	0.4	0.20	0.4	-	50	-	4	•	A76 0160 050 0400 120	1.8	0.90	1.4	12	50	1.5	4	•
A76 0040 050 0400 010				1	50	0.37	4	•	A76 0160 050 0400 160				16	50	1.5	4	•
A76 0040 050 0400 020				2	50	0.37	4	•	A76 0160 060 0400				-	60	-	4	•
A76 0040 050 0400 030				3	50	0.37	4	•	A76 0160 060 0400 200				20	60	1.5	4	•
A76 0040 050 0400 040	0.5	0.25	0.4	4	50	0.37	4	•	A76 0180 050 0400	2	1	1.6	-	50	-	4	•
A76 0040 050 0400 050				5	50	0.37	4	•	A76 0180 050 0400 080				8	50	1.7	4	•
A76 0050 050 0400				-	50	-	4	•	A76 0180 050 0400 120				12	50	1.7	4	•
A76 0050 050 0400 020				2	50	0.45	4	•	A76 0180 050 0400 160				16	50	1.7	4	•
A76 0050 050 0400 030	0.6	0.30	0.5	3	50	0.45	4	•	A76 0180 060 0400	3.0	1.5	2.4	-	60	-	4	•
A76 0050 050 0400 040				4	50	0.45	4	•	A76 0180 060 0400 200				20	60	1.7	4	•
A76 0050 050 0400 050				5	50	0.45	4	•	A76 0200 050 0400				-	50	-	4	•
A76 0050 050 0400 060				6	50	0.45	4	•	A76 0200 050 0400 040				4	50	1.9	4	•
A76 0050 050 0400 080	0.8	0.40	0.6	8	50	0.45	4	•	A76 0200 050 0400 060	4	2	3.2	6	50	1.9	4	•
A76 0060 050 0400				-	50	-	4	•	A76 0200 050 0400 080				8	50	1.9	4	•
A76 0060 050 0400 020				2	50	0.55	4	•	A76 0200 050 0400 100				10	50	1.9	4	•
A76 0060 050 0400 030				3	50	0.55	4	•	A76 0200 050 0400 120				12	50	1.9	4	•
A76 0060 050 0400 040	1.0	0.50	0.8	4	50	0.55	4	•	A76 0200 050 0400 140	4	2	3.2	14	50	1.9	4	•
A76 0060 050 0400 050				5	50	0.55	4	•	A76 0200 050 0400 160				16	50	1.9	4	•
A76 0060 050 0400 060				6	50	0.55	4	•	A76 0200 060 0400				-	60	-	4	•
A76 0060 050 0400 080				8	50	0.55	4	•	A76 0200 060 0400 180				18	60	1.9	4	•
A76 0080 050 0400	1.2	0.60	1.0	-	50	-	4	•	A76 0200 060 0400 200	4	2	3.2	20	60	1.9	4	•
A76 0080 050 0400 020				2	50	0.75	4	•	A76 0200 060 0400 220				22	60	1.9	4	•
A76 0080 050 0400 040				4	50	0.75	4	•	A76 0200 075 0400				-	75	-	4	•
A76 0080 050 0400 050				5	50	0.75	4	•	A76 0200 075 0400 250				25	75	1.9	4	•
A76 0080 050 0400 060	1.4	0.70	1.1	6	50	0.75	4	•	A76 0200 075 0400 300	4	2	3.2	30	75	1.9	4	•
A76 0080 050 0400 070				7	50	0.75	4	•	A76 0300 050 0600				-	50	-	6	•
A76 0080 050 0400 080				8	50	0.75	4	•	A76 0300 050 0600 080				8	50	2.8	6	•
A76 0080 050 0400 100				10	50	0.75	4	•	A76 0300 050 0600 100				10	50	2.8	6	•
A76 0100 050 0400	1.6	0.80	1.2	-	50	-	4	•	A76 0300 060 0600	4	2	3.2	-	60	-	6	•
A76 0100 050 0400 030				3	50	0.9	4	•	A76 0300 060 0600 160				16	60	2.8	6	•
A76 0100 050 0400 040				4	50	0.9	4	•	A76 0300 060 0600 200				20	60	2.8	6	•
A76 0100 050 0400 050				5	50	0.9	4	•	A76 0300 075 0600				-	75	-	6	•
A76 0100 050 0400 060	1.8	0.90	1.4	6	50	0.9	4	•	A76 0300 075 0600 250	4	2	3.2	25	75	2.8	6	•
A76 0100 050 0400 070				7	50	0.9	4	•	A76 0300 075 0600 300				30	75	2.8	6	•
A76 0100 050 0400 080				8	50	0.9	4	•	A76 0300 075 0600 350				35	75	2.8	6	•
A76 0100 050 0400 090				9	50	0.9	4	•	A76 0400 050 0600				-	50	-	6	•
A76 0100 050 0400 100	2.0	1.00	1.6	10	50	0.9	4	•	A76 0400 050 0600 100	4	2	3.2	10	50	3.7	6	•
A76 0100 050 0400 120				12	50	0.9	4	•	A76 0400 060 0600				-	60	-	6	•
A76 0100 050 0400 140				14	50	0.9	4	•	A76 0400 060 0600 160				16	60	3.7	6	•
A76 0100 050 0400 160				16	50	0.9	4	•	A76 0400 060 0600 200				20	60	3.7	6	•
A76 0100 060 0400	2.2	1.10	1.8	-	60	-	4	•	A76 0400 075 0600	4	2	3.2	-	75	-	6	•
A76 0100 060 0400 200				20	60	0.9	4	•	A76 0400 075 0600 250				25	75	3.7	6	•
A76 0120 050 0400				-	50	-	4	•	A76 0400 075 0600 300				30	75	3.7	6	•
A76 0120 050 0400 060				6	50	1.1	4	•	A76 0400 075 0600 350				35	75	3.7	6	•
A76 0120 050 0400 080	2.4	1.20	2.0	8	50	1.1	4	•	A76 0400 100 0600	4	2	3.2	-	100	-	6	•
A76 0120 050 0400 100				10	50	1.1	4	•	A76 0400 100 0600 400				40	100	3.7	6	•
A76 0120 050 0400 120				12	50	1.1	4	•	A76 0400 100 0600 450				45	100	3.7	6	•
A76 0140 050 0400				-	50	-	4	•	A76 0400 100 0600 500				50	100	3.7	6	•
A76 0140 050 0400 080	2.6	1.30	2.2	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	•									

Material Group | Grupo de materiales | Materialgruppen | Groupe Matière

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

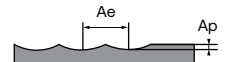
Recommended Cutting Data



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



BN 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
	3	0.050	27720	0.018	0.056	30800	0.018	0.052	20250	0.021
1.0	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
	6	0.050	23400	0.021	0.056	26000	0.021	0.026	16200	0.024
1.2	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

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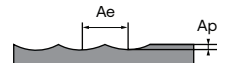
Recommended Cutting Data



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



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

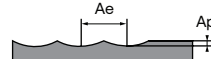
Recommended Cutting Data



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



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
1.2	6	0.006	10800	0.014	0.010	21600	0.016
	20	0.004	8100	0.014	0.007	16200	0.016
	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
1.4	12	0.012	10500	0.018	0.020	21000	0.020
	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

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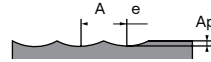
Recommended Cutting Data



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



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



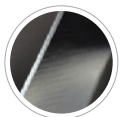
- Reinforce edge protection of the cutting tool corner.
- Higher mechanical strength to withstand greater cutting force.
- Longer machining time consistency and greater tool durability.

2 Differential Pitch (DP)



Reduces chatter to provide excellent surface finishing.

3 Ideal Cutting Edge

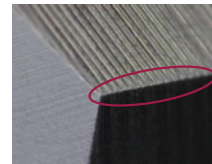


Provides edge protection to prolong tool life.

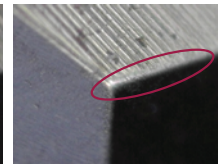


4 Cutting Edge Preparation

- 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)



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. Bruído 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. Stirnchliff 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 aufzulösen und Vibrationen zu reduzieren
3. Perfekte Schneide
Bietet Schneidkantenschutz, um die Lebensdauer des Werkzeugs zu verlängern
4. Schneidkantenbehandlung
Verbessert die Werkzeuglebensdauer
Verbessert die Verschleißfestigkeit und reduziert übermäßige Reibung
5. Ausgezeichnete Beschichtung zur Verringerung der Reibung
Erhöht die Härte 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)

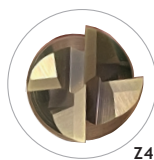
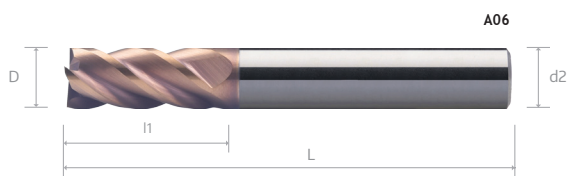
CARACTÉRISTIQUES ET AVANTAGES



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 les arêtes 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)

SE 45X DP Endmills, 4 Flutes

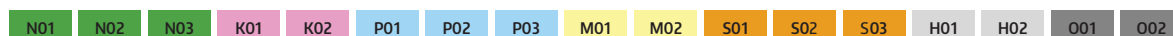
-  SE 45X DP, 4 flautas
-  SE 45X DP Fräser, 4 Zähne
-  SE 45X DP - 4 dents



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 Matière



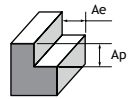
Recommended Cutting Data



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

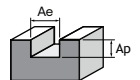


SE 45X DP Endmills, 4 Flutes - A06



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



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



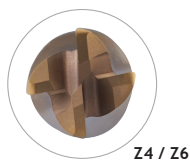
1. 4/6 goujures
Débit 2 à 3 fois plus élevé que les dispositifs de coupe
conventionnels à 2 goujures
2. Revêtement à base de silicium sous forme de dépôt
en phase vapeur résistant
prolonge la durée de vie de l'outil
permet des vitesses de coupe supérieures
augmente la résistance à la chaleur, donc parfaitement
adapté à l'usinage à sec
3. Adapté au matériaux P, H

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



Order Number	D (mm)	L1 (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 Matière

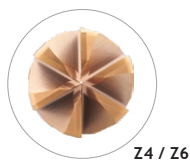
N01 N02 N03 K01 K02 P01 P02 P03 M01 M02 S01 S02 S03 H01 H02 O01 O02

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



Order Number	D (mm)	I 1 (mm)	I 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	1.5	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 standard
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 Matière

N01	N02	N03	K01	K02	P01	P02	P03	M01	M02	S01	S02	S03	H01	H02	O01	O02
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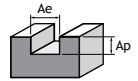
Recommended Cutting Data



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

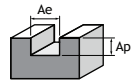


SE 60X Fin-Mill Torus Endmills, 4 Flutes - G78



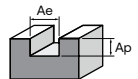
Face Milling	P		H			
Working Material	Prehardened Steel		Hardened Steel		Hardened Steel	
Properties	-		45 ≤ HRC < 52		52 ≤ HRC < 68	
Cutting depth, ap	0.05 × D		0.05 × D		0.05 × D	
Cutting Width, ae	0.40 × D		0.35 × D		0.15 × D	
D	Vc	Fz	Vc	Fz	Vc	Fz
2	150	0.021	130	0.019	110	0.018
3		0.037		0.033		0.031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

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



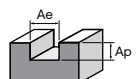
Face Milling	P		H			
Working Material	Prehardened Steel		Hardened Steel		Hardened Steel	
Properties	-		45 ≤ HRC < 52		52 ≤ HRC < 68	
Cutting depth, ap	0.05 × D		0.05 × D		0.05 × D	
Cutting Width, ae	0.40 × D		0.35 × D		0.30 × D	
D	Vc	Fz	Vc	Fz	Vc	Fz
8	150	0.096	130	0.088	110	0.085
10		0.125		0.114		0.110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



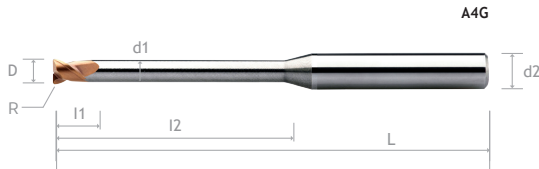
Face Milling	P		H			
Working Material	Prehardened Steel		Hardened Steel		Hardened Steel	
Properties	-		45 ≤ HRC < 52		52 ≤ HRC < 68	
Cutting depth, ap	0.05 × D		0.04 × D		0.03 × D	
Cutting Width, ae	0.40 × D		0.35 × D		0.30 × D	
D	Vc	Fz	Vc	Fz	Vc	Fz
8	160	0.144	140	0.142	120	0.140
10		0.184		0.182		0.180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

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



Order Number	D (mm)	l1 (mm)	l2 (mm)	L (mm)	d1 (mm)	R	d2 h6 (mm)	Availability	Order Number	D (mm)	l1 (mm)	l2 (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 0400 060 0600 R030	4	4	-	60	-	0.3	6	•
A4G 0250 075 0400 R030			-	75	-	0.3	4	•	A4G 0400 060 0600 100 R030			10	60	3.7	0.3	6	•
A4G 0250 075 0400 300 R030			30	75	2.4	0.3	4	•	A4G 0400 060 0600 150 R030			15	60	3.7	0.3	6	•
A4G 0250 050 0400 R050			-	50	-	0.5	4	•	A4G 0400 060 0600 200 R030			20	60	3.7	0.3	6	•
A4G 0250 050 0400 080 R050			8	50	2.4	0.5	4	•	A4G 0400 075 0600 R030			-	75	-	0.3	6	•
A4G 0250 050 0400 120 R050			12	50	2.4	0.5	4	•	A4G 0400 075 0600 250 R030			25	75	3.7	0.3	6	•
A4G 0250 050 0400 160 R050			16	50	2.4	0.5	4	•	A4G 0400 075 0600 320 R030			32	75	3.7	0.3	6	•
A4G 0250 060 0400 R050			-	60	-	0.5	4	•	A4G 0400 075 0600 400 R030			40	75	3.7	0.3	6	•
A4G 0250 060 0400 200 R050			20	60	2.4	0.5	4	•	A4G 0400 060 0600 R050			-	60	-	0.5	6	•
A4G 0250 060 0400 250 R050			25	60	2.4	0.5	4	•	A4G 0400 060 0600 100 R050			10	60	3.7	0.5	6	•
A4G 0250 075 0400 R050			-	75	-	0.5	4	•	A4G 0400 060 0600 150 R050			15	60	3.7	0.5	6	•
A4G 0250 075 0400 300 R050			30	75	2.4	0.5	4	•	A4G 0400 060 0600 200 R050			20	60	3.7	0.5	6	•
A4G 0300 050 0600 R020			-	50	-	0.2	6	•	A4G 0400 075 0600 R050			-	75	-	0.5	6	•
A4G 0300 050 0600 080 R020			8	50	2.8	0.2	6	•	A4G 0400 075 0600 250 R050			25	75	3.7	0.5	6	•
A4G 0300 050 0600 100 R020			10	50	2.8	0.2	6	•	A4G 0400 075 0600 320 R050			32	75	3.7	0.5	6	•
A4G 0300 050 0600 120 R020			12	50	2.8	0.2	6	•	A4G 0400 075 0600 400 R050			40	75	3.7	0.5	6	•
A4G 0300 050 0600 140 R020	3	3	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	•									

Material Group | Grupo de materiales | Materialgruppen | Groupe Matière

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

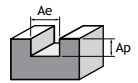
Recommended Cutting Data



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



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
1.8	16	0.01	0.75	11000	0.033	0.007	0.75	9000	0.033
	-	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
2.0	18	0.02	0.9	10120	0.041	0.01	0.9	8500	0.044
	-	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 ►

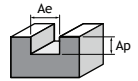
Recommended Cutting Data



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



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
4.0	30	0.03	1.5	7700	0.078	0.02	1.5	6500	0.077
	-	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
5.0	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
	-	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
6.0	50	0.03	2.5	3080	0.101	0.02	2.5	2500	0.100
	-	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

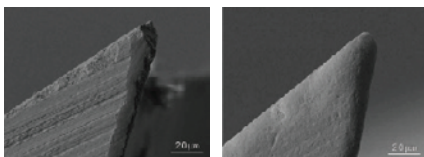
Diameter	Radius Tolerance
$\varnothing \leq 6$	+0.000 -0.012
$\varnothing > 6$	+0.000 -0.020

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

- Profiling application.
- Semi finishing application.
- Finishing application.

5 Suitable for Materials



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. VVerbesserte 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 Materialgruppen 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

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

DIN 6535

HA

HB

UF+

$\lambda = 30^\circ$

HSC

B0909

TiSiN



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
$R \leq 2.5$	± 0.005
$2.5 \leq R \leq 6$	± 0.010
$6 < R$	± 0.015

Material Group | Grupo de materiales | Materialgruppen | Groupe Matière

N01

N02

N03

K01

K02

P01

P02

P03

M01

M02

S01

S02

S03

H01

H02

O01

O02

○

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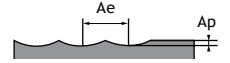
Recommended Cutting Data



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

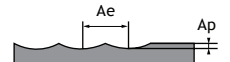


BN 60X Ballnose Cutters, 2 Flutes - A4Q



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



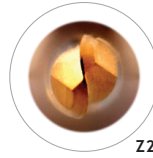
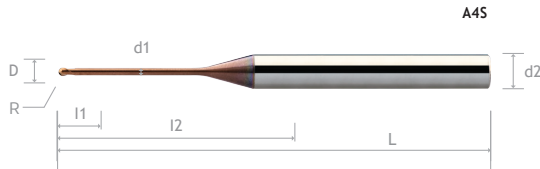
Finishing	P		H			
Working Material	Prehardened Steel		Hardened Steel		Hardened Steel	
Properties	-		45 ≤ HRC < 52		52 ≤ HRC < 68	
Cutting depth, ap	0.05 × D		0.05 × D		0.04 × D	
Cutting Width, ae	0.02 × D		0.02 × D		0.02 × D	
D	Vc	Fz	Vc	Fz	Vc	Fz
1	260	0.017	230	0.014	190	0.011
2		0.021		0.020		0.019
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

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



Order Number	D (mm)	R	I 1 (mm)	I 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	0.3	0.15	0.23	1.5	50	0.17	4	•
A4S 0030 050 0400				-	50	-	4	•
A4S 0030 050 0400 010				1	50	0.27	4	•
A4S 0030 050 0400 020	0.4	0.20	0.30	2	50	0.27	4	•
A4S 0030 050 0400 030				3	50	0.27	4	•
A4S 0040 050 0400				-	50	-	4	•
A4S 0040 050 0400 010	0.5	0.25	0.35	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	0.6	0.30	0.42	4	50	0.37	4	•
A4S 0040 050 0400 050				5	50	0.37	4	•
A4S 0050 050 0400				-	50	-	4	•
A4S 0050 050 0400 020	0.8	0.40	0.48	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	1.0	0.50	0.80	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	1.2	0.60	1.08	-	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	1.4	0.70	1.26	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	1.6	0.80	1.44	8	50	0.55	4	•
A4S 0080 050 0400				-	50	-	4	•
A4S 0080 050 0400 020				2	50	0.75	4	•
A4S 0080 050 0400 040	1.8	0.90	1.62	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	2.0	1.0	1.70	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	3.0	1.5	2.40	-	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	4.0	2.0	3.00	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	5.0	2.5	3.75	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	6.0	3.0	4.50	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	7.0	3.5	5.25	-	60	-	4	•
A4S 0100 060 0400 200				20	60	0.9	4	•
A4S 0120 050 0400				-	50	-	4	•
A4S 0120 050 0400 060	8.0	4.0	6.00	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	9.0	4.5	6.75	12	50	1.1	4	•
A4S 0140 050 0400				-	50	-	4	•
A4S 0140 050 0400 080				8	50	1.3	4	•
A4S 0140 050 0400 120	10.0	5.0	7.50	12	50	1.3	4	•
A4S 0140 050 0400 160				16	50	1.3	4	•

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

Material Group | Grupo de materiales | Materialgruppen | Groupe Matière

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



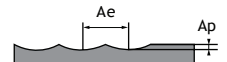
Recommended Cutting Data



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



BN 60X 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
0.6	8.0	0.006	27200	0.008	0.005	24000	0.007	0.005	22400	0.007
	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
0.8	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
	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
1.0	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
	3.0	0.160	45900	0.033	0.130	43200	0.032	0.120	37800	0.030
1.2	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
1.4	20.0	0.008	18360	0.018	0.007	16200	0.016	0.006	15120	0.016
	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
1.5	12.0	0.036	29376	0.022	0.029	25920	0.020	0.027	24192	0.018
	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

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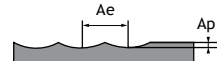
Recommended Cutting Data



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



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



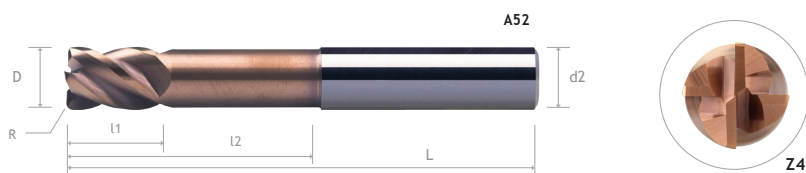
Profiling		P			H					
Working Material		Prehardened Steel			Hardened Steel			Hardened Steel		
Properties		-			45 ≤ HRC < 52			52 ≤ HRC < 68		
D	Effective Length	Ap	N	Fz	Ap	N	Fz	Ap	N	Fz
1.6	8.0	0.176	30940	0.040	0.143	27300	0.039	0.132	23660	0.034
	12.0	0.078	27846	0.039	0.064	24570	0.038	0.059	21294	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
4.0	35.0	0.064	10880	0.057	0.052	9600	0.053	0.048	10752	0.050
	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

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



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			30	75	6	0.2	•
A52 0300 075 0600 030	3	5	30	75	6	0.3	•
A52 0300 075 0600 050			30	75	6	0.5	•
A52 0400 075 0600 020			32	75	6	0.2	•
A52 0400 075 0600 030	4	8	32	75	6	0.3	•
A52 0400 075 0600 050			32	75	6	0.5	•
A52 0500 075 0600 020			32	75	6	0.2	•
A52 0500 075 0600 030	5	9	32	75	6	0.3	•
A52 0500 075 0600 050			32	75	6	0.5	•
A52 0600 075 0600 020			40	75	6	0.2	•
A52 0600 075 0600 030	6	10	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	10	14	40	75	8	1	•
A52 1000 075 1000 020			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 *	12	16	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			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	16	22	60	100	12	1	•
A52 1200 100 1200 200			60	100	12	2	•
A52 1600 125 1600 030			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

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

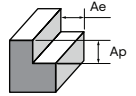
Recommended Cutting Data



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



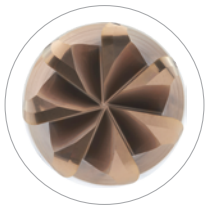
SE 60R Long Reach Torus Endmills, Short Flutes - Long with Recess, 4 Flutes - A52



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

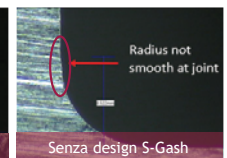
- Higher stability to reduce vibration and chattering.
- Shaper radius rake angle to reduce spindle load.
- Increases tool life and productivity performance.



4 S-Gash Radius Design



- Perfect joining between corner radius and outer diameter to achieve higher accuracy radius contour.
- More reliability 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



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
zuverlässiger 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



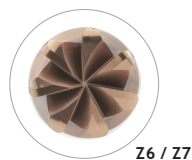
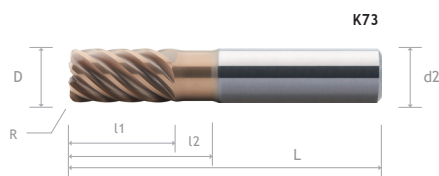
1. Multi-Flûte (MF)
Grand nombre d'arêtes de coupe jusqu'à 7 goujures
Vitesses d'avance et productivité significativement plus élevées
(Augmenter la vitesse d'avance de 75% par rapport à 4 goujures)
Plus grande résistance du noyau et déviation de l'outil minimisée
Meilleure qualité de finition de surface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

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 Multidentés 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

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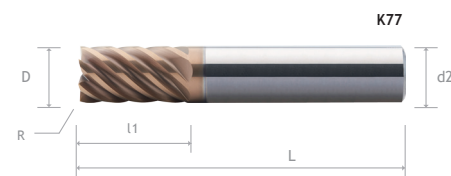
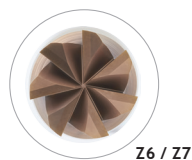
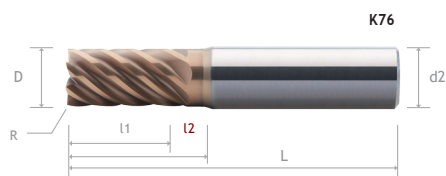
N01 N02 N03 K01 K02 P01 P02 P03 M01 M02 S01 S02 S03 H01 H02 O01 O02

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 Multident SE 70 DH, 6/7 dents



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 Matière

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

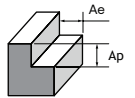
Recommended Cutting Data



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

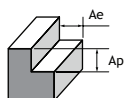


SE 70 Torus DH Multiflute / with Recess Endmills, 6 Flutes - K73, K76, K77



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

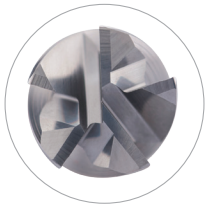
ENDMILLS

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



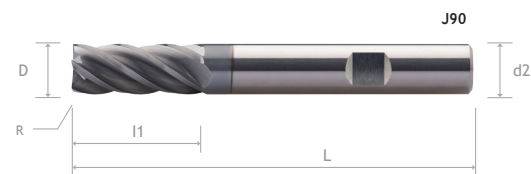
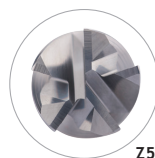
1. Conception de 5 flûtes
La conception à 5 dents offre des vitesses d'avance accrues
jusqu'à 25 % par rapport aux outils à 4 dents et peut être
utilisée dans
2. Conception à hélice variable (DH)
Réduit la force de coupe
Permet l'usinage à grande vitesse, augmentant la productivité
Améliore la finition 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

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



Order Number	HA	D (mm)	L1 (mm)	L2 (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)	L1 (mm)	L2 (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 Matière

N01	N02	N03	K01	K02	P01	P02	P03	M01	M02	S01	S02	S03	H01	H02	O01	O02
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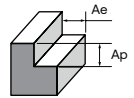
Recommended Cutting Data



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

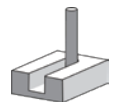


NiTiCo 30 DH / with Weldon Endmills, 5 Flutes - J89, J90



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

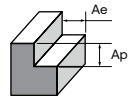
Recommended Cutting Data



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

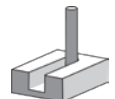


NiTiCo 30 DH Long / with Weldon Endmills, 5 Flutes - J92, J93



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)

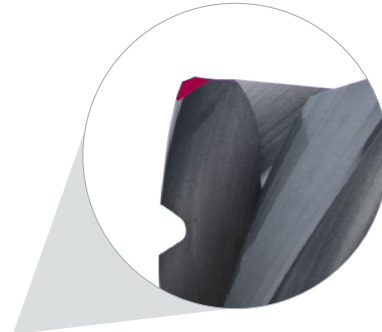


Reduces the cutting force:

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

3. Optimized Geometry with Chipbreakers

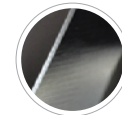
Efficiently shears work materials and shortens chips for improved chips removal.



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



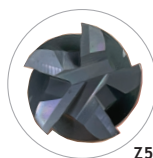
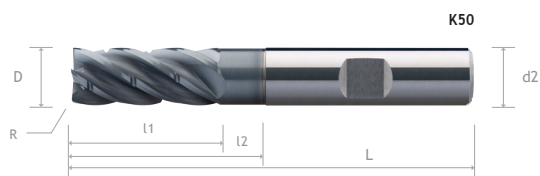
1. Conception de 5 flûtes
La conception à 5 dents offre des vitesses d'avance accrues jusqu'à 25 % par rapport aux outils à 4 dents et peut être utilisée dans
2. Conception à hélice variable (DH)
Réduit la force de coupe
Permet l'usinage à grande vitesse, augmentant la productivité
Améliore la finition 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

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 Matière

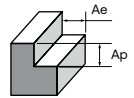
N01	N02	N03	K01	K02	P01	P02	P03	M01	M02	S01	S02	S03	H01	H02	O01	O02
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Recommended Cutting Data

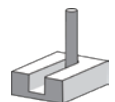


Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition



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

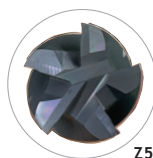
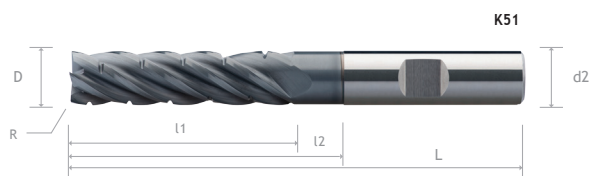
Trochoidal Milling	K		P		M		S							
Working Material	Grey Cast Iron		Carbon Steel		Alloy Steel		Stainless Steel		Titanium Alloy		Nickel Alloy		Cobalt Alloy	
Proprietà	-		-		520 < Rm < 1200		High Machinability		-		-		-	
Maximum Slot Width	1.25 × D		1.25 × D		1.25 × D		1.25 × D		1.25 × D		1.25 × D		1.25 × 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

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 Matière

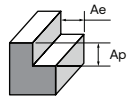
N01	N02	N03	K01	K02	P01	P02	P03	M01	M02	S01	S02	S03	H01	H02	O01	O02
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Recommended Cutting Data



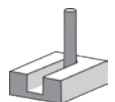
Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition



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

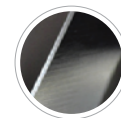


- Improves welding resistance.
- Enables a wide range of machining processes.
- Especially beneficial for difficult to cut materials, offering stable machining.

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. Spanbrechergeometrie
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.

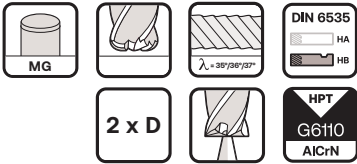
NiTiCo 30 DH 2xD Standard Internal Oil Hole, Weldon, Recess, 5 Flutes

- 

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)	I 1 (mm)	I 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 Matière

N01

N02

N03

K01

K02

P01

P02

P03

M01

M02

S01

S02

S03

H01

H02

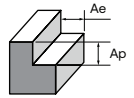
O01

O02

Recommended Cutting Data

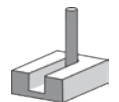


Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition



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	$1.00 \times D$		$1.00 \times D$		$1.00 \times D$		$1.00 \times D$		$1.00 \times D$		$1.00 \times D$		$1.00 \times D$	
Cutting Width, ae	$0.25 \times D$		$0.25 \times D$		$0.20 \times D$		$0.18 \times D$		$0.15 \times D$		$0.15 \times D$		$0.15 \times D$	
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

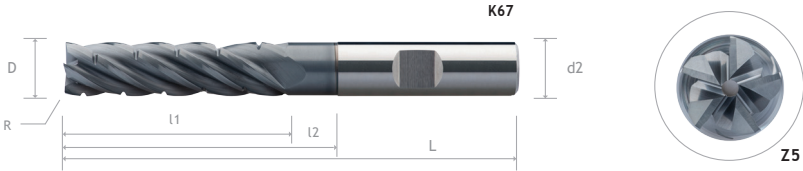
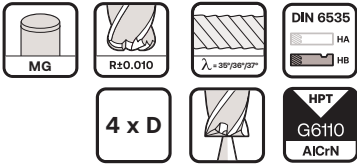


NiTiCo 30 DH 2xD Standard Internal Oil Hole, Weldon, Recess, 5 Flutes - K65

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	$1.25 \times D$		$1.25 \times D$		$1.25 \times D$		$1.25 \times D$		$1.25 \times D$		$1.25 \times D$		$1.25 \times D$	
Cutting depth, ap	$1.50 \times D$		$1.50 \times D$		$1.50 \times D$		$1.50 \times D$		$1.50 \times D$		$1.50 \times D$		$1.50 \times D$	
Cutting Width, ae	$0.15 \times D$		$0.15 \times D$		$0.12 \times D$		$0.10 \times D$		$0.10 \times D$		$0.10 \times D$		$0.10 \times D$	
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

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)	I 1 (mm)	I 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

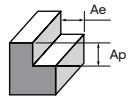
Material Group | Grupo de materiales | Materialgruppen | Groupe Matiere



Recommended Cutting Data

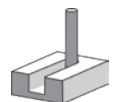


Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition



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

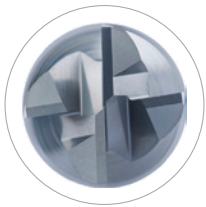


NiTiCo 30 DH 4xD Long Internal Oil Hole, Weldon, Recess, 5 Flutes - K67

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

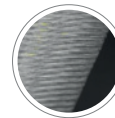
Allows for high speeds and feed rates greatly improving productivity.

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



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 perfecto
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 aufzulösen und Vibrationen zu reduzieren
3. Stabile Schneide
Ermöglicht hohe Geschwindigkeiten und Vorschubgeschwindigkeiten, wodurch die Produktivität 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 Produktivität.
Ermöglicht hohe CNC-Wiederholbarkeit innerhalb 0.01mm
6. Geeignet für die Materialgruppen P, M, K, S

CARACTÉRISTIQUES ET AVANTAGES



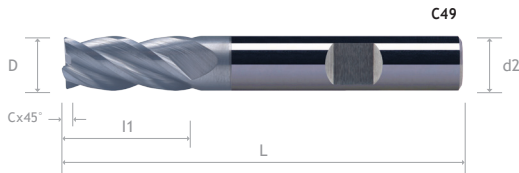
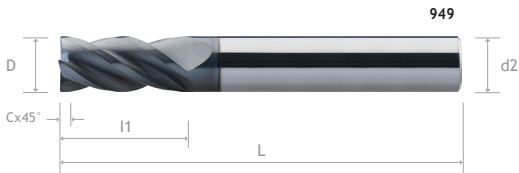
1. Conception à hélice variable (DH)
Réduit la force de coupe
Permet l'usinage à grande vitesse, augmentant la productivité
Améliore la finition de surface
2. Marge de craquelure
Fournit un tranchant stable avec beaucoup possibilité réduite d'écaillage en prolongeant la durée de vie de l'outil
Très bonne 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

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

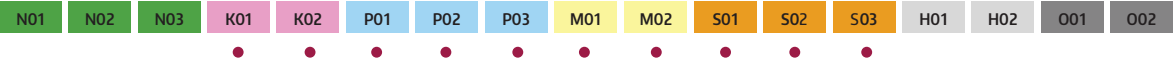


Order Number	 HA	D (mm)	l 1 (mm)	l 2 (mm)	L (mm)	d2 h6 (mm)	C	Availability
949 0400		4	11		57	6	0.1	•
949 0500		5	13		57	6	0.1	•
949 0600		6			57	6	0.1	•
949 0800		8	20		64	8	0.2	•
949 1000		10	22		72	10	0.2	•
949 1200		12	26		83	12	0.2	•
949 1400		14			83	14	0.3	•
949 1600		16	32		92	16	0.3	•
949 1800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



Cutting Parameter

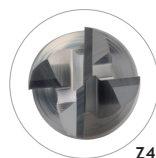
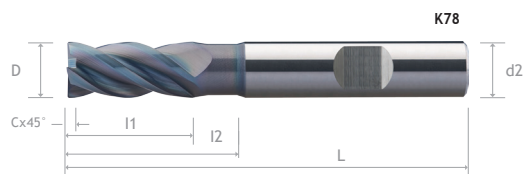
143

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

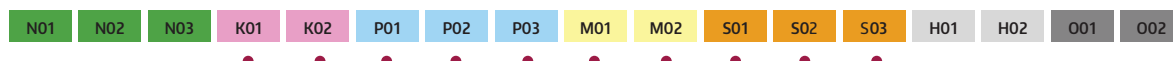


Order Number	D (mm)	I 1 (mm)	I 2 (mm)	L (mm)	d2 h6 (mm)	C	Availability
K78 0400	4	11	15	57	6	0.1	•
K78 0500	5	13	18	57	6	0.1	•
K78 0600	6		19	57	6	0.1	•
K78 0800	8	20	26	64	8	0.2	•
K78 1000	10	22	30	72	10	0.2	•
K78 1200	12	26	36	83	12	0.2	•
K78 1400	14		36	83	14	0.3	•
K78 1600	16	32	42	92	16	0.3	•
K78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



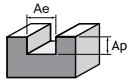
Recommended Cutting Data



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

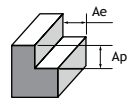


NiTiCo 30 DP/DH / with Weldon Endmills, 4 Flutes - 949, C49, K78



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

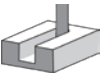


NiTiCo 30 DP/DH / with Weldon Endmills, 4 Flutes - 949, C49, K78



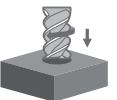
Ramp/Helical	K				P				M				S			
Working Material	Grey Cast Iron		Ductile Cast Iron		Carbon Steel		Alloy Steel		Prehardened Steel		Stainless Steel		Stainless Steel		Titanium Alloy	
Properties	-		-		-		520 < Rm < 1200		-		High Machinability		Low Machinability		-	
Cutting depth, ap	1.00 × D		1.00 × D	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

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	
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	
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	
D	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz
3		0.025		0.025		0.026		0.024		0.024		0.027		0.030		0.024
4		0.034		0.037		0.035		0.033		0.033		0.037		0.043		0.034
5		0.043		0.046		0.044		0.043		0.043		0.048		0.054		0.045
6		0.053		0.059		0.054		0.053		0.053		0.060		0.068		0.057
8		0.073		0.079		0.075		0.073		0.073		0.084		0.096		0.084
10		0.095		0.101		0.098		0.096		0.093		0.112		0.130		0.116
12		0.118		0.124		0.121		0.120		0.120		0.142		0.163		0.151
14		0.133		0.139		0.138		0.136		0.136		0.158		0.182		0.165
16		0.147		0.150		0.153		0.149		0.152		0.173		0.195		0.176
18		0.160		0.163		0.167		0.162		0.168		0.186		0.211		0.184
20		0.172		0.175		0.180		0.174		0.179		0.197		0.221		0.189

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	
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	
Cutting Width, ae																
D	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
4		0.035		0.038		0.038		0.033		0.033		0.035		0.039		0.024
5		0.044		0.047		0.048		0.042		0.042		0.044		0.049		0.031
6		0.054		0.060		0.058		0.051		0.051		0.054		0.061		0.038
8		0.074		0.079		0.080		0.070		0.070		0.074		0.084		0.052
10		0.095		0.100		0.102		0.091		0.088		0.095		0.110		0.067
12		0.116		0.122		0.126		0.113		0.113		0.118		0.135		0.083
14		0.134		0.140		0.144		0.129		0.129		0.136		0.156		0.095
16		0.150		0.153		0.162		0.144		0.147		0.154		0.174		0.107
18		0.167		0.170		0.180		0.159		0.164		0.172		0.195		0.120
20		0.182		0.185		0.196		0.171		0.177		0.189		0.212		0.131

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)	I 1 (mm)	I 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				64	8	0.3	•
C46 0800 064 0800 050	8			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 Matière

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

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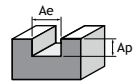
Recommended Cutting Data



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

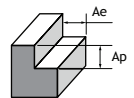


NiTiCo 30 DP Torus Endmills, 4 Flutes - C46



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

Recommended Cutting Data



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



NiTiCo 30 DP Torus Endmills, 4 Flutes - C46

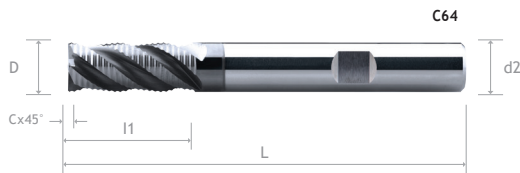
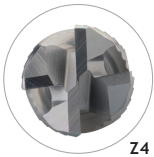
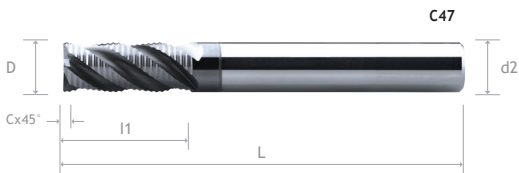
Ramp/Helical	K		P		M		S							
Working Material	Grey Cast Iron		Carbon Steel		Alloy steel		Stainless Steel		Titanium Alloy		Nickel Alloy		Cobalt Alloy	
Properties	-		-		520 < Rm < 1200		High Machinability		-		-		-	
Cutting depth, ap	1.00 × D		1.00 × D		1.00 × D		1.00 × D		1.00 × D		1.00 × D		1.00 × D	
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

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	38		92	18	0.3	•
C47 1800 100					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	38		92	18	0.3	●	
C64 1800 100					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
			•		•	•		•		•	•	•				

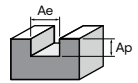
Recommended Cutting Data



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

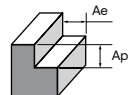


NiTiCo 30 DP/DH with Weldon Endmills, 4 Flutes - C47, C64



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		0.035		0.037		0.034		0.036		0.043		0.002		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

3. Ideal Cutting Edge



Provides edge protection to prolong tool life



2. Differential Helix (DH)



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

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



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 Spannten, um Eigenresonanz aufzulösen 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

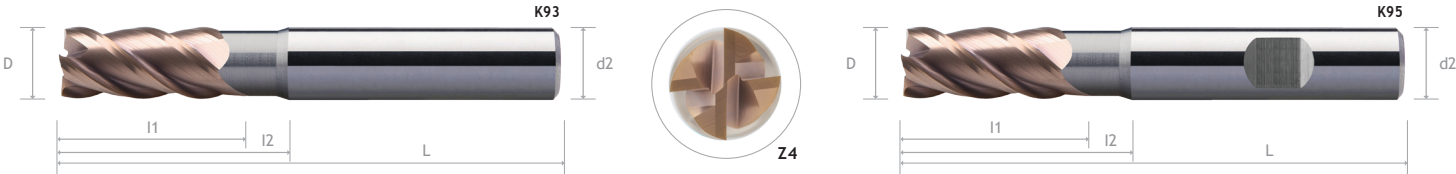
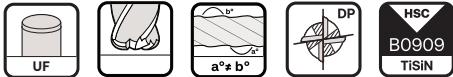
CARACTÉRISTIQUES ET AVANTAGES



1. Conception à pas différentiel (DP)
Réduire les vibrations pour obtenir une excellente finition de surface
2. Conception à hélice variable (DH)
Réduit la force de 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

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 surfer / à surfer et à souder, 4 goujures



Order Number	HA	D (mm)	L1 (mm)	L2 (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	HB	D (mm)	L1 (mm)	L2 (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

N01N02N03K01K02P01P02P03M01M02S01S02S03H01H02O01O02

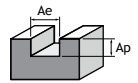
Recommended Cutting Data



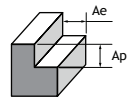
Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition



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 × D		0.30 × 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

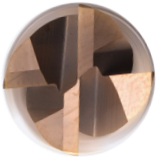


NiTiCo 45 DP/DH Endmills with Recess / with Recess and Weldon, 4 Flutes - K93, K95

Side Milling	M		S	
Working Material	Stainless Steel		Nickel Alloy	
Properties	Low Machinability		-	
Cutting depth, ap	1.00 × D		1.00 × 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.

3. Ideal Cutting Edge



Provides edge protection to prolong tool life

5. Corner Radius



Reduces chipping and providing longer tool life



2. Differential Helix (DH)



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

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

6. Suitable for Material Groups



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



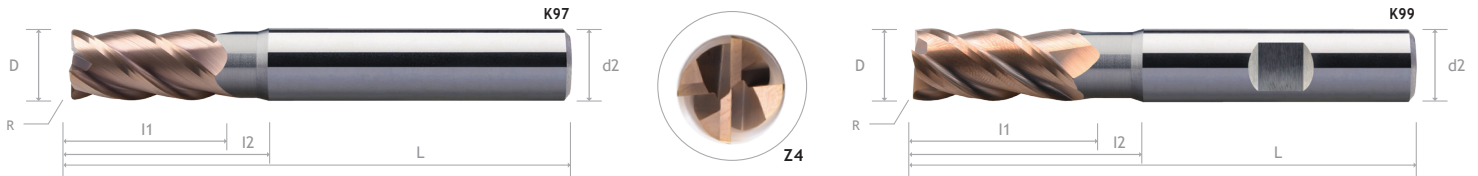
1. Ungleiche Teilung (DP)
Ungleiche Anordnung der Spannuten, um Eigenresonanz aufzulösen und Vibrationen zu reduzieren
2. Ungleiche Drallsteigung (DH)
Minimierung von Vibrationen und Resonanzen während der Bearbeitung
Erhöht die Werkzeugstandzeit und Produktivität
Ausgezeichnete Oberflächengüte
3. Perfekte 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
Eckenradius hervorragender 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)
Réduit la force de 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

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

Order Number	HA	D (mm)	I 1 (mm)	I 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				18	57	6	0.3	•
K97 0400 057 0600 050		4	11	18	57	6	0.5	•
K97 0400 057 0600 100				18	57	6	1	•
K97 0500 057 0600 030				18	57	6	0.3	•
K97 0500 057 0600 050		5	13	18	57	6	0.5	•
K97 0600 057 0600 030				20	57	6	0.3	•
K97 0600 057 0600 050				20	57	6	0.5	•
K97 0600 057 0600 100		6	13	20	57	6	1	•
K97 0800 064 0800 030				26	63	8	0.3	•
K97 0800 064 0800 050				26	63	8	0.5	•
K97 0800 064 0800 100		8	19	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		10	22	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		12	26	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	26	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		14	26	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		16	32	42	92	16	2	•
K97 1600 092 1600 250				42	92	16	2.5	•
K97 1600 092 1600 300				42	92	16	3	•
K97 1800 092 1800 030		18	38	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		18	38	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		20	38	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		20	38	52	104	20	4	•

Order Number	HB	D (mm)	I 1 (mm)	I 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				18	57	6	0.3	•
K99 0400 057 0600 050		4	11	18	57	6	0.5	•
K99 0400 057 0600 100				18	57	6	1	•
K99 0500 057 0600 030				18	57	6	0.3	•
K99 0500 057 0600 050		5	13	18	57	6	0.5	•
K99 0600 057 0600 030				20	57	6	0.3	•
K99 0600 057 0600 050				20	57	6	0.5	•
K99 0600 057 0600 100		6	13	20	57	6	1	•
K99 0800 064 0800 030				26	63	8	0.3	•
K99 0800 064 0800 050				26	63	8	0.5	•
K99 0800 064 0800 100		8	19	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		10	22	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		12	26	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	26	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		14	26	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		16	32	42	92	16	2	•
K99 1600 092 1600 250				42	92	16	2.5	•
K99 1600 092 1600 300				42	92	16	3	•
K99 1800 092 1800 030		18	38	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		18	38	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		20	38	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		20	38	52	104	20	4	•

Material Group | Grupo de materiales | Materialgruppen | Groupe Matière

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



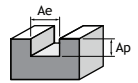
Recommended Cutting Data



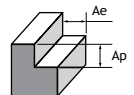
Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition



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 × D		0.30 × 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

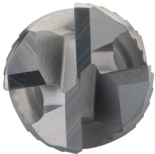


NiTiCo 45 DP/DH Torus Endmills with Recess / with Recess and Weldon, 4 Flutes - K97, K99

Side Milling	M		S	
Working Material	Stainless Steel		Nickel Alloy	
Properties	Low Machinability		-	
Cutting depth, ap	1.00 × D		1.00 × 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



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 aufzulösen 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

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 Schrappfräser mit Schweissnaht und Einstich, 4 Schneiden

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



Order Number	D (mm)	I 1 (mm)	I 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 Matière

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

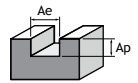
Recommended Cutting Data



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

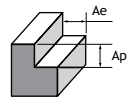


NiTiCo 45 DP Roughing Endmills with Weldon and Recess, 4 Flutes - G47



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 × D		0.80 × D		0.45 × D		0.30 × 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 × D		1.00 × D		1.00 × D		1.00 × 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

ALU LINE

Endmills for Non-Ferrous Materials

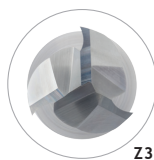
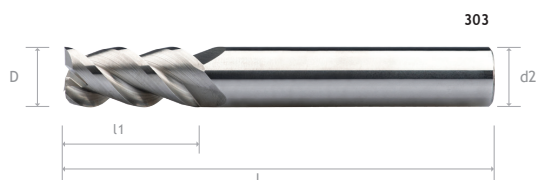


AL SE Endmills, 3 Flutes

 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 Matière

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

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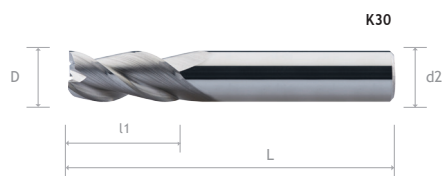
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AL SE DP Endmills, 3 Flutes

AL SE DP Fresas de mango, 3 hélices

AL SE DP Schaftfräser, 3 Schneiden

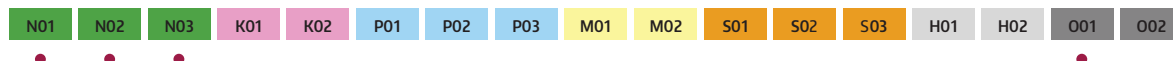
Fraises en bout AL SE DP, 3 goujures



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 Matière



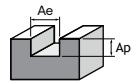
Recommended Cutting Data



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

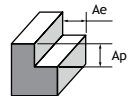


AL SE DP Endmills, 3 Flutes - 303, K30



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	330	0.008	290	0.006	200	0.003	310	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		0.056		0.049		0.040		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	380	0.011	340	0.009	250	0.006	360	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		0.064		0.058		0.050		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.

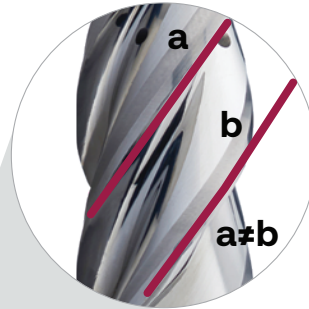
2. Polished Flutes



Ensures fast and effective chips evacuation and 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.



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 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 aufzulösen und Vibrationen zu reduzieren
2. Polierte Schneiden
Sorgt für schnellen effizienten Spänefluß und reduziert die Bildung von Aufbauschneiden
3. Ungleiche Spannuttentiefe (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

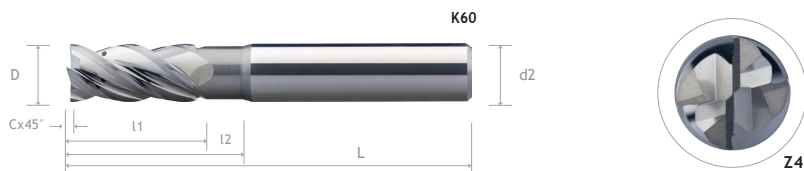
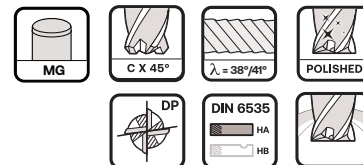
CARACTÉRISTIQUES ET AVANTAGES



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

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



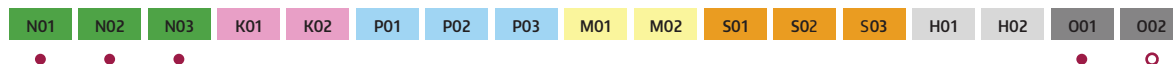
Order Number	D (mm)	l 1 (mm)	l 2 (mm)	L (mm)	d2 h6 (mm)	C	Availability
K60 0600 *	6	13	20	57	6	0.1	•
K60 0800 *	8	20	26	64	8	0.1	•
K60 1000 *	10	22	30	72	10	0.2	•
K60 1200 *	12	26	36	83	12	0.2	•
K60 1400 *	14		38	83	14	0.2	•
K60 1600 *	16	32	42	92	16	0.2	•
K60 1800 *	18		42	92	18	0.3	•
K60 2000 *	20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

* - DIN 6535

CNC Repeatability

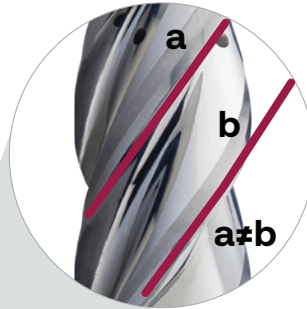
Ø1 - Ø3 within 10µm
Ø4 - Ø8 within 15µm
≥ Ø10 within 20µm

Material Group | Grupo de materiales | Materialgruppen | Groupe Matière



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 aufzulösen und Vibrationen zu reduzieren
2. Polierte Schneiden
Sorgt für schnellen effizienten Spänefluß und reduziert die Bildung von Aufbauschneiden
3. Ungleiche Spannuttentiefe (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 langspannenden Werkstoffen und verhindert somit Spanstau im Prozess und bei der Spanabfuhr

CARACTÉRISTIQUES ET AVANTAGES



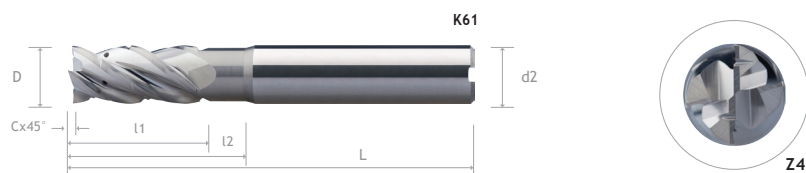
1. Conception à pas différentiel (DP)
Réduire les vibrations pour obtenir une excellente finition de surface
2. Flûtes polies
Assure une évacuation rapide et efficace des copeaux et réduit considérablement les bords accumulés
3. Cannelures différentielles (DF)
Avec un diamètre de noyau optimisé, contrecarre 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

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 Matière

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

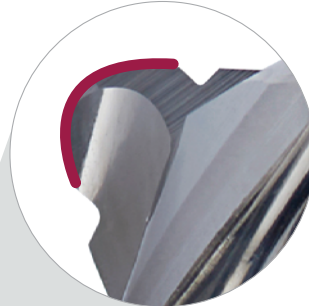
3. Polished Flutes



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 aufzulösen 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 Spannuttentiefe (DF)
Optimierter Kerndurchmesser wirkt den erzeugten Kräften entgegen und ermöglicht einen stabileren Fräsprozess
5. Eckenradius
Eckenradius hervorragender 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

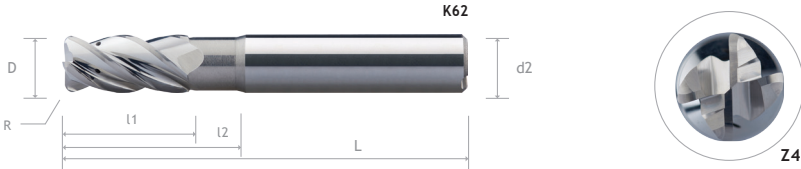
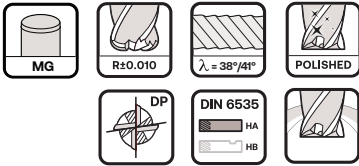
CARACTÉRISTIQUES ET AVANTAGES



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

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

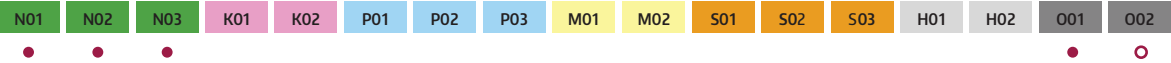


Order Number DIN 6535	D (mm)	l 1 (mm)	l 2 (mm)	L (mm)	d2 h6 (mm)	R	Availability
K62 1000 072 1000 200 *	10	22	30	72	10	2	•
K62 1200 083 1200 200 *	12	26	36	83	12	2	•
K62 1600 092 1600 200 *	16	32	42	92	16	2	•
K62 2000 104 2000 200 *	20	38	52	104	20	2	•

* - DIN 6535

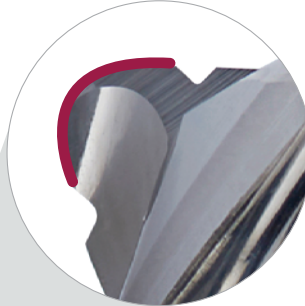
CNC Repeatability
Ø1 - Ø3 within 10µm
Ø4 - Ø8 within 15µm
≥ Ø10 within 20µm

Material Group | Grupo de materiales | Materialgruppen | Groupe Matiere



FEATURES & BENEFITS

XQ Alu Cutters



1. Differential Pitch (DP)



Reduces chatter to provide excellent surface finishing.

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- Enables a wide range of machining processes.
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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 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

MERKMALE UND VORTEILE



1. Ungleiche Teilung (DP)
Ungleiche Anordnung der Spannuten, um Eigenresonanz aufzulösen und Vibrationen zu reduzieren
2. Große Kühlkanalbohrungen für Hochleistungsfräsen
Verbessert die Spanabfuhr
Ermöglicht umfangreiche Applikationen
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3. Polierte Schneiden
Sorgt für schnellen effizienten Spänefluß und reduziert die Bildung von Aufbauschneiden
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Optimierter Kerndurchmesser wirkt den erzeugten Kräften entgegen und ermöglicht einen stabileren Fräsprozess
5. Eckenradius
Eckenradius hervorragender 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

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

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



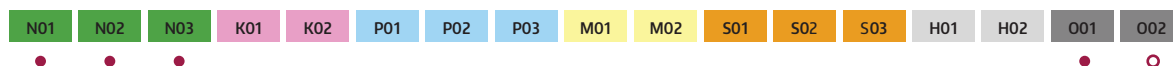
Order Number DIN 6535	D (mm)	L 1 (mm)	L 2 (mm)	L (mm)	d2 h6 (mm)	R	Availability
K63 1000 072 1000 200 *	10	22	30	72	10	2	•
K63 1000 072 1000 250 *			30	72	10	2.5	•
K63 1000 072 1000 300 *			30	72	10	3	•
K63 1000 072 1000 400 *			30	72	12	4	•
K63 1200 083 1200 200 *	12	26	36	83	12	2	•
K63 1200 083 1200 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 Matière



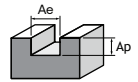
Recommended Cutting Data



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

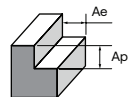


XQ Alu Cutters DP/DH/DF Endmills, 4 Flutes - K60, K61, K62, K63



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 × 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



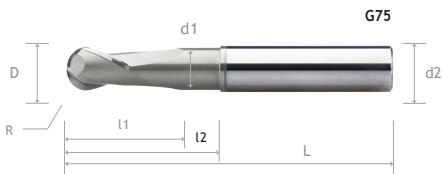
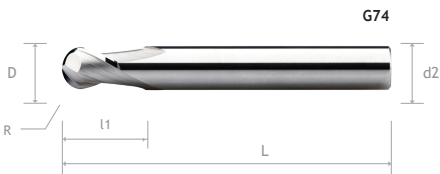
Side Milling	N						O	
Working Material	Wrought Aluminium		Cast Aluminium		Copper alloy		Thermoplastic	
Properties	Si < 9%		Si ≥ 9%		-		-	
Cutting depth, ap	1.00 × D		1.00 × D		1.00 × D		1.00 × D	
Cutting Width, ae	0.30 × D		0.30 × D		0.30 × D		0.30 × D	
D	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz
6	750	0.039	700	0.030	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

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

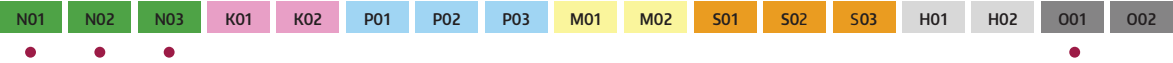


Order Number	D (mm)	R	l1 (mm)	l2 (mm)	d1 (mm)	L (mm)	d2 h6 (mm)	Availability
G74 0300	3	1.5	5			57	6	•
G74 0400	4	2	6			57	6	•
G74 0600	6	3	8			57	6	•
G74 0800	8	4	10			57	8	•
G74 1000	10	5	12			72	10	•
G74 1200	12	6	14			83	12	•
G74 1600	16	8	18			92	16	•
G74 2000	20	10	22			104	20	•

Order Number	D (mm)	R	l1 (mm)	l2 (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 Matière



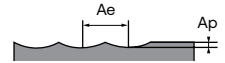
Recommended Cutting Data



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

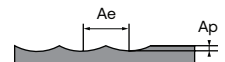


AL BN Ballnose Cutters, 2 Flutes - G74, G75



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 × D		0.35 × D	
D	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz
3	450	0.027	400	0.023	350	0.019	380	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		0.080		0.069		0.057		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

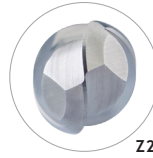
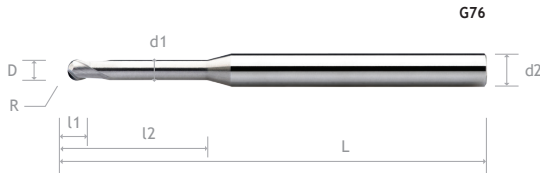
AL BN Ballnose Cutters, 2 Flutes - G74, G75



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	470	0.021	420	0.018	370	0.014	400	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		0.061		0.052		0.043		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

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	l1 (mm)	l2 (mm)	d1 (mm)	L (mm)	d2 h6 (mm)	Availability	Order Number	D (mm)	R	l1 (mm)	l2 (mm)	d1 (mm)	L (mm)	d2 h6 (mm)	Availability
G76 0020 050 0400	0.2	0.10	0.15	-	-	50	4	•	G76 0150 050 0400	1.5	0.75	1.35	-	-	50	4	•
G76 0020 050 0400 005				0.5	0.17	50	4	•	G76 0150 050 0400 080				8	1.4	50	4	•
G76 0020 050 0400 010				1	0.17	50	4	•	G76 0150 050 0400 120				12	1.4	50	4	•
G76 0020 050 0400 015	0.3	0.15	0.23	1.5	0.17	50	4	•	G76 0150 050 0400 160	1.6	0.80	1.44	16	1.4	50	4	•
G76 0030 050 0400				-	-	50	4	•	G76 0150 060 0400				-	-	60	4	•
G76 0030 050 0400 010				1	0.27	50	4	•	G76 0150 060 0400 180				18	1.4	60	4	•
G76 0030 050 0400 020	0.4	0.20	0.30	2	0.27	50	4	•	G76 0160 050 0400	1.8	0.90	1.62	-	-	50	4	•
G76 0030 050 0400 030				3	0.27	50	4	•	G76 0160 050 0400 080				8	1.5	50	4	•
G76 0040 050 0400				-	-	50	4	•	G76 0160 050 0400 120				12	1.5	50	4	•
G76 0040 050 0400 010	0.5	0.25	0.35	1	0.37	50	4	•	G76 0160 050 0400 160	2	1	1.70	16	1.5	50	4	•
G76 0040 050 0400 020				2	0.37	50	4	•	G76 0160 060 0400				-	-	60	4	•
G76 0040 050 0400 030				3	0.37	50	4	•	G76 0160 060 0400 200				20	1.5	60	4	•
G76 0040 050 0400 040	0.6	0.30	0.42	4	0.37	50	4	•	G76 0180 050 0400	3.0	1.5	2.40	-	-	50	4	•
G76 0040 050 0400 050				5	0.37	50	4	•	G76 0180 050 0400 080 ▲				8	1.7	50	4	•
G76 0050 050 0400				-	-	50	4	•	G76 0180 050 0400 120 ▲				12	1.7	50	4	•
G76 0050 050 0400 020 ▲	0.8	0.40	0.48	2	0.45	50	4	•	G76 0180 050 0400 160 ▲	4	2	3.00	16	1.7	50	4	•
G76 0050 050 0400 030				3	0.45	50	4	•	G76 0180 060 0400				-	-	60	4	•
G76 0050 050 0400 040				4	0.45	50	4	•	G76 0180 060 0400 200				20	1.7	60	4	•
G76 0050 050 0400 050	1.0	0.50	0.80	5	0.45	50	4	•	G76 0200 050 0400	3.0	1.5	2.40	-	-	50	4	•
G76 0050 050 0400 060				6	0.45	50	4	•	G76 0200 050 0400 040				4	1.9	50	4	•
G76 0050 050 0400 080 ▲				8	0.45	50	4	•	G76 0200 050 0400 060				6	1.9	50	4	•
G76 0060 050 0400 ▲	1.2	0.60	1.08	-	-	50	4	•	G76 0200 050 0400 080	4	2	3.00	8	1.9	50	4	•
G76 0060 050 0400 020				2	0.55	50	4	•	G76 0200 050 0400 100				10	1.9	50	4	•
G76 0060 050 0400 030				3	0.55	50	4	•	G76 0200 050 0400 120				12	1.9	50	4	•
G76 0060 050 0400 040	1.4	0.70	1.26	4	0.55	50	4	•	G76 0200 050 0400 140	4	2	3.00	14	1.9	50	4	•
G76 0060 050 0400 050 ▲				5	0.55	50	4	•	G76 0200 050 0400 160				16	1.9	50	4	•
G76 0060 050 0400 060				6	0.55	50	4	•	G76 0200 060 0400				-	-	60	4	•
G76 0060 050 0400 080 ▲	1.2	0.60	1.08	8	0.55	50	4	•	G76 0200 060 0400 180	4	2	3.00	18	1.9	60	4	•
G76 0080 050 0400				-	-	50	4	•	G76 0200 060 0400 200				20	1.9	60	4	•
G76 0080 050 0400 020				2	0.75	50	4	•	G76 0200 060 0400 220				22	1.9	60	4	•
G76 0080 050 0400 040	1.0	0.50	0.80	4	0.75	50	4	•	G76 0200 075 0400 ▲	4	2	3.00	-	-	75	4	•
G76 0080 050 0400 050				5	0.75	50	4	•	G76 0200 075 0400 250				25	1.9	75	4	•
G76 0080 050 0400 060 ▲				6	0.75	50	4	•	G76 0200 075 0400 300				30	1.9	75	4	•
G76 0080 050 0400 070	1.2	0.60	1.08	7	0.75	50	4	•	G76 0300 050 0600	4	2	3.00	-	-	50	6	•
G76 0080 050 0400 080				8	0.75	50	4	•	G76 0300 050 0600 080				8	2.8	50	6	•
G76 0080 050 0400 100 ▲				10	0.75	50	4	•	G76 0300 050 0600 100				10	2.8	50	6	•
G76 0100 050 0400	1.4	0.70	1.26	-	-	50	4	•	G76 0300 060 0600	4	2	3.00	-	-	60	6	•
G76 0100 050 0400 030				3	0.9	50	4	•	G76 0300 060 0600 160				16	2.8	60	6	•
G76 0100 050 0400 040				4	0.9	50	4	•	G76 0300 060 0600 200				20	2.8	60	6	•
G76 0100 050 0400 050	1.2	0.60	1.08	5	0.9	50	4	•	G76 0300 075 0600	4	2	3.00	-	-	75	6	•
G76 0100 050 0400 060				6	0.9	50	4	•	G76 0300 075 0600 250				25	2.8	75	6	•
G76 0100 050 0400 070 ▲				7	0.9	50	4	•	G76 0300 075 0600 300				30	2.8	75	6	•
G76 0100 050 0400 080	1.0	0.50	0.80	8	0.9	50	4	•	G76 0300 075 0600 350	4	2	3.00	35	2.8	75	6	•
G76 0100 050 0400 090				9	0.9	50	4	•	G76 0400 050 0600				-	-	50	6	•
G76 0100 050 0400 100				10	0.9	50	4	•	G76 0400 050 0600 100				10	3.7	50	6	•
G76 0100 050 0400 120	1.2	0.60	1.08	12	0.9	50	4	•	G76 0400 060 0600	4	2	3.00	-	-	60	6	•
G76 0100 050 0400 140				14	0.9	50	4	•	G76 0400 060 0600 160				16	3.7	60	6	•
G76 0100 050 0400 160				16	0.9	50	4	•	G76 0400 060 0600 200				20	3.7	60	6	•
G76 0100 060 0400	1.4	0.70	1.26	-	-	60	4	•	G76 0400 075 0600	4	2	3.00	-	-	75	6	•
G76 0100 060 0400 200				20	0.9	60	4	•	G76 0400 075 0600 250				25	3.7	75	6	•
G76 0120 050 0400				-	-	50	4	•	G76 0400 075 0600 300				30	3.7	75	6	•
G76 0120 050 0400 060	1.2	0.60	1.08	6	1.1	50	4	•	G76 0400 075 0600 350	4	2	3.00	35	3.7	75	6	•
G76 0120 050 0400 080				8	1.1	50	4	•	G76 0400 100 0600				-	-	100	6	•
G76 0120 050 0400 100				10	1.1	50	4	•	G76 0400 100 0600 400				40	3.7	100	6	•
G76 0120 050 0400 120	1.4	0.70	1.26	12	1.1	50	4	•	G76 0400 100 0600 450	4	2	3.00	45	3.7	100	6	•
G76 0140 050 0400				-	-	50	4	•	G76 0400 100 0600 500				50	3.7	100	6	•
G76 0140 050 0400 080				8	1.3	50	4	•									
G76 0140 050 0400 120 ▲	1.2	0.60	1.08	12	1.3	50	4	•		4	2	3.00					
G76 0140 050 0400 160 ▲				16	1.3	50	4	•									

“o” Prodotto su richiesta (Minimo d'ordine 2 pcs.) | Make to order | auf Anfrage | Faire sur commande

Material Group | Grupo de materiales | Materialgruppen | Groupe Matière

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



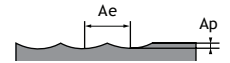
Recommended Cutting Data



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



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
	3.0	0.288	50000	0.032	0.264	50000	0.030	0.240	50000	0.027	0.259	50000	0.029
1.0	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

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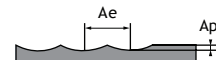
Recommended Cutting Data



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



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

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



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



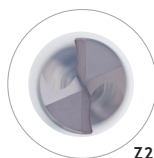
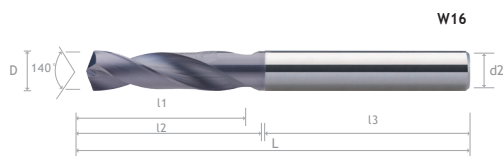
1. Kreuzanschliff
Bietet Selbstzentrierung und reduzierten Axialdruck
2. C-förmige Nuten
Erzeugt kleine Späne
verbessert den Spänefluß
3. Effektiver Abstand und Schnitt
Niedrigere Schnittkräfte
Verbessert die Spanbildung und Kontrolle
4. Schneideckenverstärkung
sorgt für mehr Schutz beim Bohren
5. Schneideckenfase
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, efforts 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 perçage
5. Arête chanfrein de coin
Idéal pour la fonte et meilleure finition de surface
6. Adapté aux matériaux P, K, N, O

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)	l1 (mm)	l2 (mm)	l3 (mm)	L (mm)	d2 h6 (mm)	Availability	Order Number	D (mm)	l1 (mm)	l2 (mm)	l3 (mm)	L (mm)	d2 h6 (mm)	Availability
W16 0100	1	4	7	33	45	3	•	W16 0620	6.2	31	34	36	79	8	•
W16 0110	1.1		7	33	45	3	•	W16 0630	6.3		34	36	79	8	•
W16 0120	1.2		7	33	45	3	•	W16 0640	6.4		34	36	79	8	•
W16 0130	1.3		7	33	45	3	•	W16 0650	6.5		34	36	79	8	•
W16 0140	1.4	10	7	33	45	3	•	W16 0660	6.6		34	36	79	8	•
W16 0150	1.5		14	35	50	3	•	W16 0670	6.7		34	36	79	8	•
W16 0160	1.6		14	35	50	3	•	W16 0680	6.8		34	36	79	8	•
W16 0170	1.7		14	35	50	3	•	W16 0690	6.9		34	36	79	8	•
W16 0180	1.8	14	14	35	50	3	•	W16 0700	7	35	34	36	79	8	•
W16 0190	1.9		14	35	50	3	•	W16 0710	7.1		41	36	79	8	•
W16 0200	2		20	36	55	4	•	W16 0720	7.2		41	36	79	8	•
W16 0210	2.1		20	36	55	4	•	W16 0730	7.3		41	36	79	8	•
W16 0220	2.2	17	20	36	55	4	•	W16 0740	7.4		41	36	79	8	•
W16 0230	2.3		20	36	55	4	•	W16 0750	7.5		41	36	79	8	•
W16 0240	2.4		20	36	55	4	•	W16 0760	7.6		41	36	79	8	•
W16 0250	2.5		20	36	55	4	•	W16 0770	7.7	41	41	36	79	8	•
W16 0260	2.6	21	20	36	55	4	•	W16 0780	7.8		41	36	79	8	•
W16 0270	2.7		20	36	55	4	•	W16 0790	7.9		41	36	79	8	•
W16 0280	2.8		20	36	55	4	•	W16 0800	8		41	36	79	8	•
W16 0290	2.9	25	20	36	55	4	•	W16 0810	8.1		47	40	89	10	•
W16 0300	3		20	36	62	6	•	W16 0820	8.2		47	40	89	10	•
W16 0310	3.1		20	36	62	6	•	W16 0830	8.3		47	40	89	10	•
W16 0320	3.2		20	36	62	6	•	W16 0840	8.4	55	47	40	89	10	•
W16 0330	3.3	29	20	36	62	6	•	W16 0850	8.5		47	40	89	10	•
W16 0340	3.4		20	36	62	6	•	W16 0860	8.6		47	40	89	10	•
W16 0350	3.5		20	36	62	6	•	W16 0870	8.7		47	40	89	10	•
W16 0360	3.6		20	36	62	6	•	W16 0880	8.8		47	40	89	10	•
W16 0370	3.7	33	20	36	62	6	•	W16 0890	8.9		47	40	89	10	•
W16 0380	3.8		24	36	66	6	•	W16 0900	9		47	40	89	10	•
W16 0390	3.9		24	36	66	6	•	W16 0910	9.1		47	40	89	10	•
W16 0400	4		24	36	66	6	•	W16 0920	9.2	55	47	40	89	10	•
W16 0410	4.1	37	24	36	66	6	•	W16 0930	9.3		47	40	89	10	•
W16 0420	4.2		24	36	66	6	•	W16 0940	9.4		47	40	89	10	•
W16 0430	4.3		24	36	66	6	•	W16 0950	9.5		47	40	89	10	•
W16 0440	4.4		24	36	66	6	•	W16 0960	9.6		47	40	89	10	•
W16 0450	4.5	41	24	36	66	6	•	W16 0970	9.7		47	40	89	10	•
W16 0460	4.6		24	36	66	6	•	W16 0980	9.8		47	40	89	10	•
W16 0470	4.7		24	36	66	6	•	W16 0990	9.9		47	40	89	10	•
W16 0480	4.8		28	36	66	6	•	W16 1000	10		47	40	89	10	•
W16 0490	4.9	45	28	36	66	6	•	W16 1010	10.1	55	55	45	102	12	•
W16 0500	5		28	36	66	6	•	W16 1020	10.2		55	45	102	12	•
W16 0510	5.1		28	36	66	6	•	W16 1030	10.3		55	45	102	12	•
W16 0520	5.2		28	36	66	6	•	W16 1040	10.4		55	45	102	12	•
W16 0530	5.3	49	28	36	66	6	•	W16 1050	10.5		55	45	102	12	•
W16 0540	5.4		28	36	66	6	•	W16 1060	10.6		55	45	102	12	•
W16 0550	5.5		28	36	66	6	•	W16 1070	10.7		55	45	102	12	•
W16 0560	5.6		28	36	66	6	•	W16 1080	10.8		55	45	102	12	•
W16 0570	5.7	53	28	36	66	6	•	W16 1090	10.9		55	45	102	12	•
W16 0580	5.8		28	36	66	6	•	W16 1100	11		55	45	102	12	•
W16 0590	5.9		28	36	66	6	•	W16 1110	11.1		55	45	102	12	•
W16 0600	6		28	36	66	6	•	W16 1120	11.2		55	45	102	12	•
W16 0610	6.1	31	34	36	79	8	•	W16 1130	11.3		55	45	102	12	•

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Material Group | Grupo de materiales | Materialgruppen | Groupe Matière

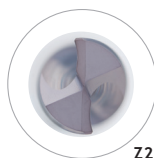
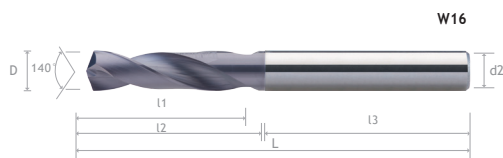
N01	N02	N03	K01	K02	P01	P02	P03	M01	M02	S01	S02	S03	H01	H02	O01	O02
•	•	•	○	○	○	○	○	○								

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	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	50	55	45	102	12	•								
W16 1220	12.2		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	65	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	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	•								

Material Group | Grupo de materiales | Materialgruppen | Groupe Matière

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

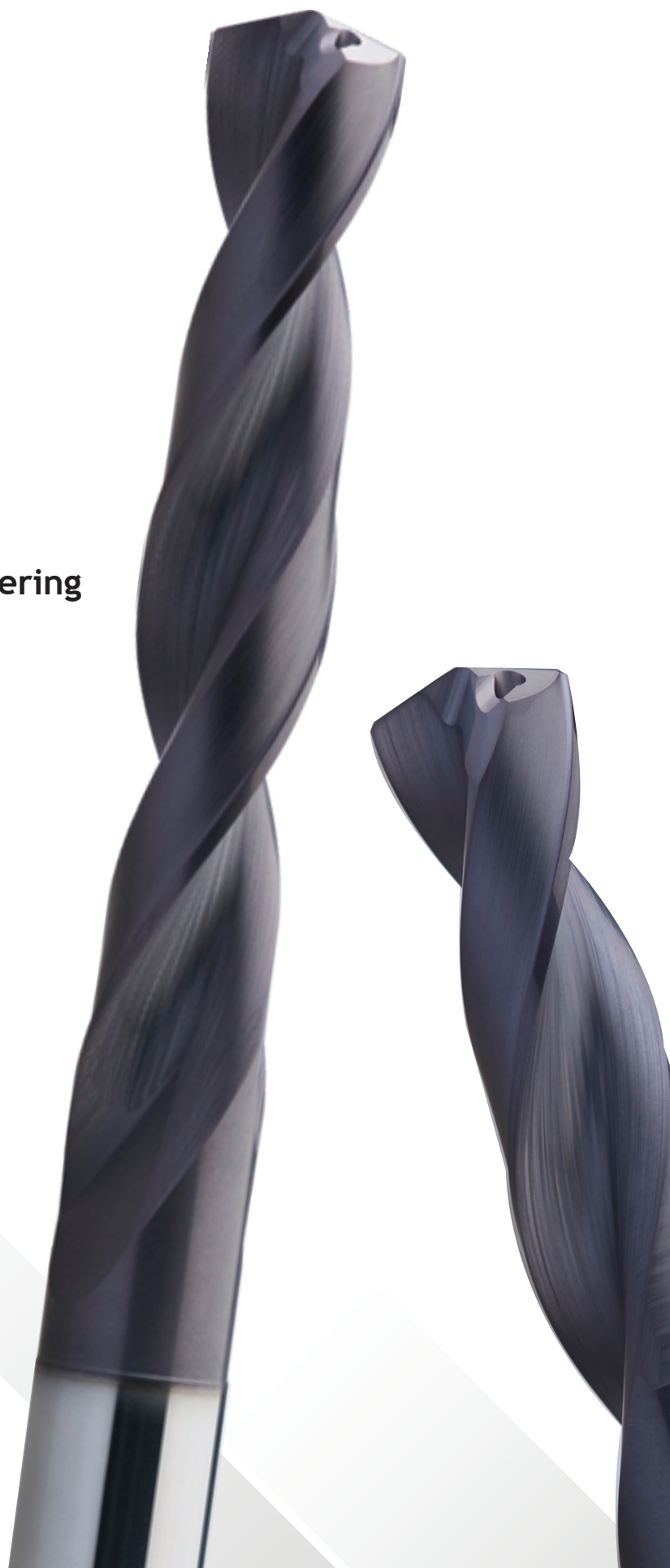


EZ Twist Drills DIN 6537K - 3 x Ø, Point Angle 140°, 2 Flutes - W16

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	150	0.019	130	0.018	100	0.018	75	0.020	60	0.012	80	0.021	65	0.015	35	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		0.195		0.190		0.190		0.200		0.142		0.216		0.154		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

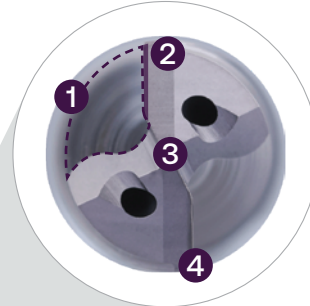
DRILL

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



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



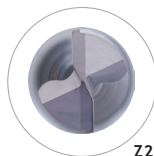
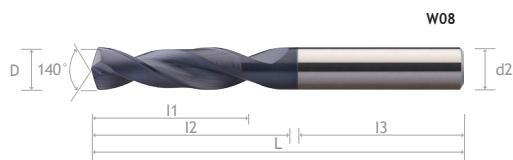
1. Récupérateur de copeaux plus large
Évacuation des copeaux plus facile et plus fluide
2. Profil d'arête droite
Copeaux plus courts et arête tranchante renforcée
3. Coefficient K supérieur
Adapté pour un débit plus élevé et améliore la durabilité de l'outil
4. Arête chanfrein de coin
Idéal pour la fonte et meilleure finition de surface
5. Polyvalent
Adapté au 5 groupes de matériaux

DR-S Twist Drills DIN 6537K - 3 x Ø, Point Angle 140°, 2 Flutes

DR-S Brocas espirales DIN 6537K - 3 x Ø, Ângulo de ponta 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	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 0850 *		8.5	35	47	40	89	10	•
W08 0310 *		3.1		20	36	62	6	•	W08 0860 *		8.6		47	40	89	10	•
W08 0320 *		3.2		20	36	62	6	•	W08 0870 *		8.7		47	40	89	10	•
W08 0330 *		3.3		20	36	62	6	•	W08 0880 *		8.8		47	40	89	10	•
W08 0340 *		3.4		20	36	62	6	•	W08 0890 *		8.9		47	40	89	10	•
W08 0350 *		3.5		20	36	62	6	•	W08 0900 *		9		47	40	89	10	•
W08 0360 *		3.6		20	36	62	6	•	W08 0910 *		9.1		47	40	89	10	•
W08 0370 *		3.7		20	36	62	6	•	W08 0920 *		9.2		47	40	89	10	•
W08 0380 *		3.8		24	36	66	6	•	W08 0930 *		9.3		47	40	89	10	•
W08 0390 *		3.9		24	36	66	6	•	W08 0940 *		9.4		47	40	89	10	•
W08 0400 *		4	17	24	36	66	6	•	W08 0950 *		9.5	47	40	89	10	•	
W08 0410 *		4.1		24	36	66	6	•	W08 0960 *		9.6	47	40	89	10	•	
W08 0420 *		4.2		24	36	66	6	•	W08 0970 *		9.7	47	40	89	10	•	
W08 0430 *		4.3		24	36	66	6	•	W08 0980 *		9.8	47	40	89	10	•	
W08 0440 *		4.4		24	36	66	6	•	W08 0990 *		9.9	47	40	89	10	•	
W08 0450 *		4.5		24	36	66	6	•	W08 1000 *		10	47	40	89	10	•	
W08 0460 *		4.6		24	36	66	6	•	W08 1010 *		10.1	55	45	102	12	•	
W08 0470 *		4.7		24	36	66	6	•	W08 1020 *		10.2	55	45	102	12	•	
W08 0480 *		4.8		28	36	66	6	•	W08 1030 *		10.3	55	45	102	12	•	
W08 0490 *		4.9		28	36	66	6	•	W08 1040 *		10.4	55	45	102	12	•	
W08 0500 *		5	20	28	36	66	6	•	W08 1050 *		10.5	55	45	102	12	•	
W08 0510 *		5.1		28	36	66	6	•	W08 1060 *		10.6	55	45	102	12	•	
W08 0520 *		5.2		28	36	66	6	•	W08 1070 *		10.7	55	45	102	12	•	
W08 0530 *		5.3		28	36	66	6	•	W08 1080 *		10.8	55	45	102	12	•	
W08 0540 *		5.4		28	36	66	6	•	W08 1090 *		10.9	55	45	102	12	•	
W08 0550 *		5.5		28	36	66	6	•	W08 1100 *		11	55	45	102	12	•	
W08 0560 *		5.6		28	36	66	6	•	W08 1110 *		11.1	55	45	102	12	•	
W08 0570 *		5.7		28	36	66	6	•	W08 1120 *		11.2	55	45	102	12	•	
W08 0580 *		5.8		28	36	66	6	•	W08 1130 *		11.3	55	45	102	12	•	
W08 0590 *		5.9		28	36	66	6	•	W08 1140 *		11.4	55	45	102	12	•	
W08 0600 *		6	24	28	36	66	6	•	W08 1150 *		11.5	55	45	102	12	•	
W08 0610 *		6.1		34	36	79	8	•	W08 1160 *		11.6	55	45	102	12	•	
W08 0620 *		6.2		34	36	79	8	•	W08 1170 *		11.7	55	45	102	12	•	
W08 0630 *		6.3		34	36	79	8	•	W08 1180 *		11.8	55	45	102	12	•	
W08 0640 *		6.4		34	36	79	8	•	W08 1190 *		11.9	55	45	102	12	•	
W08 0650 *		6.5		34	36	79	8	•	W08 1200 *		12	55	45	102	12	•	
W08 0660 *		6.6		34	36	79	8	•	W08 1250 *		12.5	60	45	107	14	•	
W08 0670 *		6.7		34	36	79	8	•	W08 1270 *		12.7	60	45	107	14	•	
W08 0680 *		6.8		34	36	79	8	•	W08 1300 *		13	60	45	107	14	•	
W08 0690 *		6.9		34	36	79	8	•	W08 1350 *		13.5	60	45	107	14	•	
W08 0700 *		7	29	34	36	79	8	•	W08 1370 *		13.7	60	45	107	14	•	
W08 0710 *		7.1		41	36	79	8	•	W08 1400 *		14	60	45	107	14	•	
W08 0720 *		7.2		41	36	79	8	•	W08 1450 *		14.5	65	48	115	16	•	
W08 0730 *		7.3		41	36	79	8	•	W08 1500 *		15	65	48	115	16	•	
W08 0740 *		7.4		41	36	79	8	•	W08 1550 *		15.5	65	48	115	16	•	
W08 0750 *		7.5		41	36	79	8	•	W08 1600 *		16	65	48	115	16	•	
W08 0760 *		7.6		41	36	79	8	•	W08 1650 *		16.5	73	48	123	18	•	
W08 0770 *		7.7		41	36	79	8	•	W08 1700 *		17	73	48	123	18	•	
W08 0780 *		7.8		41	36	79	8	•	W08 1750 *		17.5	73	48	123	18	•	
W08 0790 *		7.9		41	36	79	8	•	W08 1800 *		18	73	48	123	18	•	
W08 0800 *		8	35	41	36	79	8	•	W08 1850 *		18.5	79	50	131	20	•	
W08 0810 *		8.1		47	40	89	10	•	W08 1900 *		19	79	50	131	20	•	
W08 0820 *		8.2		47	40	89	10	•	W08 1950 *		19.5	79	50	131	20	•	
W08 0830 *		8.3		47	40	89	10	•	W08 2000 *		20	79	50	131	20	•	
W08 0840 *		8.4		47	40	89	10	•									

* - DIN 6535

Material Group | Grupo de materiales | Materialgruppen | Groupe Matière

N01	N02	N03	K01	K02	P01	P02	P03	M01	M02	S01	S02	S03	H01	H02	O01	O02
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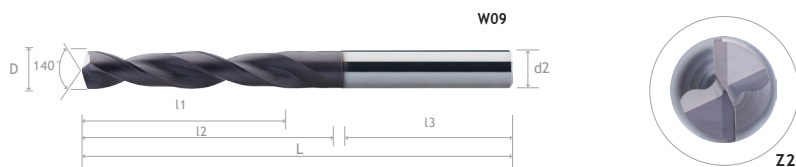
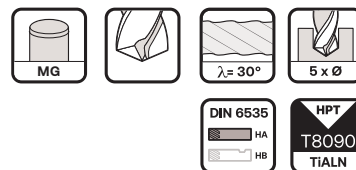
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DR-S Twist Drills DIN 6537L - 5 x Ø, Point Angle 140°, 2 Flutes

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)	l1 (mm)	l2 (mm)	l3 (mm)	L (mm)	d2 h6 (mm)	Availability	Order Number	DIN 6535	D (mm)	l1 (mm)	l2 (mm)	l3 (mm)	L (mm)	d2 h6 (mm)	Availability
W09 0300 *		3	23	28	36	66	6	•	W09 0850 *		8.5	49	61	40	103	10	•
W09 0310 *		3.1		28	36	66	6	•	W09 0860 *		8.6		61	40	103	10	•
W09 0320 *		3.2		28	36	66	6	•	W09 0870 *		8.7		61	40	103	10	•
W09 0330 *		3.3		28	36	66	6	•	W09 0880 *		8.8		61	40	103	10	•
W09 0340 *		3.4		28	36	66	6	•	W09 0890 *		8.9		61	40	103	10	•
W09 0350 *		3.5		28	36	66	6	•	W09 0900 *		9		61	40	103	10	•
W09 0360 *		3.6		28	36	66	6	•	W09 0910 *		9.1		61	40	103	10	•
W09 0370 *		3.7		28	36	66	6	•	W09 0920 *		9.2		61	40	103	10	•
W09 0380 *		3.8		36	36	74	6	•	W09 0930 *		9.3		61	40	103	10	•
W09 0390 *		3.9		36	36	74	6	•	W09 0940 *		9.4		61	40	103	10	•
W09 0400 *		4	29	36	36	74	6	•	W09 0950 *		9.5	56	61	40	103	10	•
W09 0410 *		4.1		36	36	74	6	•	W09 0960 *		9.6		61	40	103	10	•
W09 0420 *		4.2		36	36	74	6	•	W09 0970 *		9.7		61	40	103	10	•
W09 0430 *		4.3		36	36	74	6	•	W09 0980 *		9.8		61	40	103	10	•
W09 0440 *		4.4		36	36	74	6	•	W09 0990 *		9.9		61	40	103	10	•
W09 0450 *		4.5		36	36	74	6	•	W09 1000 *		10		61	40	103	10	•
W09 0460 *		4.6		36	36	74	6	•	W09 1020 *		10.2		71	45	118	12	•
W09 0470 *		4.7		36	36	74	6	•	W09 1050 *		10.5		71	45	118	12	•
W09 0480 *		4.8		44	36	82	6	•	W09 1080 *		10.8		71	45	118	12	•
W09 0490 *		4.9		44	36	82	6	•	W09 1100 *		11		71	45	118	12	•
W09 0500 *		5	35	44	36	82	6	•	W09 1120 *		11.2	60	71	45	118	12	•
W09 0510 *		5.1		44	36	82	6	•	W09 1130 *		11.3		71	45	118	12	•
W09 0520 *		5.2		44	36	82	6	•	W09 1150 *		11.5		71	45	118	12	•
W09 0530 *		5.3		44	36	82	6	•	W09 1180 *		11.8		71	45	118	12	•
W09 0540 *		5.4		44	36	82	6	•	W09 1200 *		12		71	45	118	12	•
W09 0550 *		5.5		44	36	82	6	•	W09 1220 *		12.2		77	45	124	14	•
W09 0560 *		5.6		44	36	82	6	•	W09 1250 *		12.5		77	45	124	14	•
W09 0570 *		5.7		44	36	82	6	•	W09 1270 *		12.7		77	45	124	14	•
W09 0580 *		5.8		44	36	82	6	•	W09 1280 *		12.8		77	45	124	14	•
W09 0590 *		5.9		44	36	82	6	•	W09 1300 *		13		77	45	124	14	•
W09 0600 *		6	43	44	36	82	6	•	W09 1330 *		13.3	63	77	45	124	14	•
W09 0610 *		6.1		53	36	91	8	•	W09 1350 *		13.5		77	45	124	14	•
W09 0620 *		6.2		53	36	91	8	•	W09 1370 *		13.7		77	45	124	14	•
W09 0630 *		6.3		53	36	91	8	•	W09 1380 *		13.8		77	45	124	14	•
W09 0640 *		6.4		53	36	91	8	•	W09 1400 *		14		77	45	124	14	•
W09 0650 *		6.5		53	36	91	8	•	W09 1450 *		14.5		83	48	133	16	•
W09 0660 *		6.6		53	36	91	8	•	W09 1500 *		15		83	48	133	16	•
W09 0670 *		6.7		53	36	91	8	•	W09 1530 *		15.3		83	48	133	16	•
W09 0680 *		6.8		53	36	91	8	•	W09 1550 *		15.5		83	48	133	16	•
W09 0690 *		6.9		53	36	91	8	•	W09 1580 *		15.8		83	48	133	16	•
W09 0700 *		7	49	53	36	91	8	•	W09 1600 *		16	71	83	48	133	16	•
W09 0710 *		7.1		53	36	91	8	•	W09 1650 *		16.5		93	48	143	18	•
W09 0720 *		7.2		53	36	91	8	•	W09 1700 *		17		93	48	143	18	•
W09 0730 *		7.3		53	36	91	8	•	W09 1750 *		17.5		93	48	143	18	•
W09 0740 *		7.4		53	36	91	8	•	W09 1800 *		18		93	48	143	18	•
W09 0750 *		7.5		53	36	91	8	•	W09 1850 *		18.5		101	50	153	20	•
W09 0760 *		7.6		53	36	91	8	•	W09 1900 *		19		101	50	153	20	•
W09 0770 *		7.7		53	36	91	8	•	W09 1950 *		19.5		101	50	153	20	•
W09 0780 *		7.8		53	36	91	8	•	W09 2000 *		20		101	50	153	20	•
W09 0790 *		7.9		53	36	91	8	•									
W09 0800 *		8	49	53	36	91	8	•									
W09 0810 *		8.1		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	•									

* - DIN 6535

Material Group | Grupo de materiales | Materialgruppen | Groupe Matière

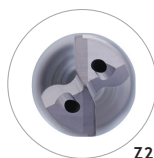
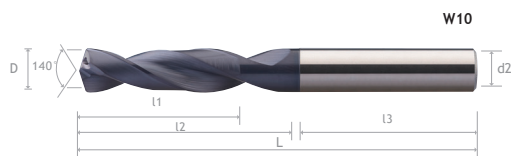
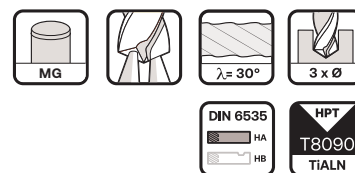


DR-S Oil Feed Twist Drills DIN 6537K - 3 x Ø, Point Angle 140°, 2 Flutes

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)	l1 (mm)	l2 (mm)	l3 (mm)	L (mm)	d2 h6 (mm)	Availability	Order Number	DIN 6535	D (mm)	l1 (mm)	l2 (mm)	l3 (mm)	L (mm)	d2 h6 (mm)	Availability
W10 0300 *		3	14	20	36	62	6	•	W10 0850 *		8.5	35	47	40	89	10	•
W10 0310 *		3.1		20	36	62	6	•	W10 0860 *		8.6		47	40	89	10	•
W10 0320 *		3.2		20	36	62	6	•	W10 0870 *		8.7		47	40	89	10	•
W10 0330 *		3.3		20	36	62	6	•	W10 0880 *		8.8		47	40	89	10	•
W10 0340 *		3.4		20	36	62	6	•	W10 0890 *		8.9		47	40	89	10	•
W10 0350 *		3.5		20	36	62	6	•	W10 0900 *		9		47	40	89	10	•
W10 0360 *		3.6		20	36	62	6	•	W10 0910 *		9.1		47	40	89	10	•
W10 0370 *		3.7		20	36	62	6	•	W10 0920 *		9.2		47	40	89	10	•
W10 0380 *		3.8		24	36	66	6	•	W10 0930 *		9.3		47	40	89	10	•
W10 0390 *		3.9		24	36	66	6	•	W10 0940 *		9.4		47	40	89	10	•
W10 0400 *		4	17	24	36	66	6	•	W10 0950 *		9.5	40	47	40	89	10	•
W10 0410 *		4.1		24	36	66	6	•	W10 0960 *		9.6		47	40	89	10	•
W10 0420 *		4.2		24	36	66	6	•	W10 0970 *		9.7		47	40	89	10	•
W10 0430 *		4.3		24	36	66	6	•	W10 0980 *		9.8		47	40	89	10	•
W10 0440 *		4.4		24	36	66	6	•	W10 0990 *		9.9		47	40	89	10	•
W10 0450 *		4.5		24	36	66	6	•	W10 1000 *		10		47	40	89	10	•
W10 0460 *		4.6		24	36	66	6	•	W10 1020 *		10.2		55	45	102	12	•
W10 0470 *		4.7		24	36	66	6	•	W10 1050 *		10.5		55	45	102	12	•
W10 0480 *		4.8		28	36	66	6	•	W10 1080 *		10.8		55	45	102	12	•
W10 0490 *		4.9		28	36	66	6	•	W10 1100 *		11		55	45	102	12	•
W10 0500 *		5	20	28	36	66	6	•	W10 1120 *		11.2	43	55	45	102	12	•
W10 0510 *		5.1		28	36	66	6	•	W10 1130 *		11.3		55	45	102	12	•
W10 0520 *		5.2		28	36	66	6	•	W10 1150 *		11.5		55	45	102	12	•
W10 0530 *		5.3		28	36	66	6	•	W10 1180 *		11.8		55	45	102	12	•
W10 0540 *		5.4		28	36	66	6	•	W10 1200 *		12		55	45	102	12	•
W10 0550 *		5.5		28	36	66	6	•	W10 1220 *		12.2		60	45	107	12	•
W10 0560 *		5.6		28	36	66	6	•	W10 1250 *		12.5		60	45	107	12	•
W10 0570 *		5.7		28	36	66	6	•	W10 1270 *		12.7		60	45	107	12	•
W10 0580 *		5.8		28	36	66	6	•	W10 1280 *		12.8		60	45	107	12	•
W10 0590 *		5.9		28	36	66	6	•	W10 1300 *		13		60	45	107	14	•
W10 0600 *		6	24	28	36	66	6	•	W10 1330 *		13.3	45	60	45	107	14	•
W10 0610 *		6.1		34	36	79	8	•	W10 1350 *		13.5		60	45	107	14	•
W10 0620 *		6.2		34	36	79	8	•	W10 1370 *		13.7		60	45	107	14	•
W10 0630 *		6.3		34	36	79	8	•	W10 1380 *		13.8		60	45	107	14	•
W10 0640 *		6.4		34	36	79	8	•	W10 1400 *		14		60	45	107	14	•
W10 0650 *		6.5		34	36	79	8	•	W10 1450 *		14.5		65	48	115	16	•
W10 0660 *		6.6		34	36	79	8	•	W10 1500 *		15		65	48	115	16	•
W10 0670 *		6.7		34	36	79	8	•	W10 1530 *		15.3		65	48	115	16	•
W10 0680 *		6.8		34	36	79	8	•	W10 1550 *		15.5		65	48	115	16	•
W10 0690 *		6.9		34	36	79	8	•	W10 1580 *		15.8		65	48	115	16	•
W10 0700 *		7	29	34	36	79	8	•	W10 1600 *		16	51	65	48	115	16	•
W10 0710 *		7.1		41	36	79	8	•	W10 1650 *		16.5		73	48	123	18	•
W10 0720 *		7.2		41	36	79	8	•	W10 1700 *		17		73	48	123	18	•
W10 0730 *		7.3		41	36	79	8	•	W10 1750 *		17.5		73	48	123	18	•
W10 0740 *		7.4		41	36	79	8	•	W10 1800 *		18		73	48	123	18	•
W10 0750 *		7.5		41	36	79	8	•	W10 1850 *		18.5		79	50	131	20	•
W10 0760 *		7.6		41	36	79	8	•	W10 1900 *		19		79	50	131	20	•
W10 0770 *		7.7		41	36	79	8	•	W10 1950 *		19.5		79	50	131	20	•
W10 0780 *		7.8		41	36	79	8	•	W10 2000 *		20		79	50	131	20	•
W10 0790 *		7.9		41	36	79	8	•									
W10 0800 *		8	35	41	36	79	8	•									
W10 0810 *		8.1		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	•									

* - DIN 6535

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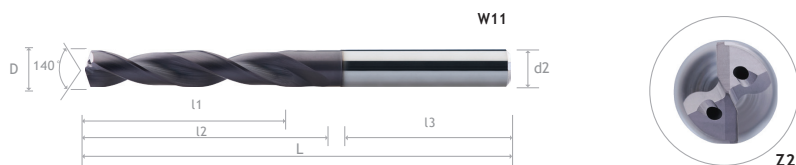
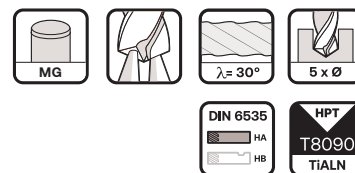
N01	N02	N03	K01	K02	P01	P02	P03	M01	M02	S01	S02	S03	H01	H02	O01	O02
•	•	•	•	•	•	•	•	•	•	•	•	•				

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)	l1 (mm)	l2 (mm)	l3 (mm)	L (mm)	d2 h6 (mm)	Availability	Order Number	DIN 6535	D (mm)	l1 (mm)	l2 (mm)	l3 (mm)	L (mm)	d2 h6 (mm)	Availability
W11 0300 *		3	23	28	36	66	6	•	W11 0850 *		8.5	49	61	40	103	10	•
W11 0310 *		3.1		28	36	66	6	•	W11 0860 *		8.6		61	40	103	10	•
W11 0320 *		3.2		28	36	66	6	•	W11 0870 *		8.7		61	40	103	10	•
W11 0330 *		3.3		28	36	66	6	•	W11 0880 *		8.8		61	40	103	10	•
W11 0340 *		3.4		28	36	66	6	•	W11 0890 *		8.9		61	40	103	10	•
W11 0350 *		3.5		28	36	66	6	•	W11 0900 *		9		61	40	103	10	•
W11 0360 *		3.6		28	36	66	6	•	W11 0910 *		9.1		61	40	103	10	•
W11 0370 *		3.7		28	36	66	6	•	W11 0920 *		9.2		61	40	103	10	•
W11 0380 *		3.8		36	36	74	6	•	W11 0930 *		9.3		61	40	103	10	•
W11 0390 *		3.9		36	36	74	6	•	W11 0940 *		9.4		61	40	103	10	•
W11 0400 *		4	29	36	36	74	6	•	W11 0950 *		9.5	56	61	40	103	10	•
W11 0410 *		4.1		36	36	74	6	•	W11 0960 *		9.6		61	40	103	10	•
W11 0420 *		4.2		36	36	74	6	•	W11 0970 *		9.7		61	40	103	10	•
W11 0430 *		4.3		36	36	74	6	•	W11 0980 *		9.8		61	40	103	10	•
W11 0440 *		4.4		36	36	74	6	•	W11 0990 *		9.9		61	40	103	10	•
W11 0450 *		4.5		36	36	74	6	•	W11 1000 *		10		61	40	103	10	•
W11 0460 *		4.6		36	36	74	6	•	W11 1010 *		10.1		71	45	118	12	•
W11 0470 *		4.7		36	36	74	6	•	W11 1020 *		10.2		71	45	118	12	•
W11 0480 *		4.8		44	36	82	6	•	W11 1040 *		10.4		71	45	118	12	•
W11 0490 *		4.9		44	36	82	6	•	W11 1050 *		10.5		71	45	118	12	•
W11 0500 *		5	35	44	36	82	6	•	W11 1060 *		10.6	60	71	45	118	12	•
W11 0510 *		5.1		44	36	82	6	•	W11 1070 *		10.7		71	45	118	12	•
W11 0520 *		5.2		44	36	82	6	•	W11 1080 *		10.8		71	45	118	12	•
W11 0530 *		5.3		44	36	82	6	•	W11 1090 *		10.9		71	45	118	12	•
W11 0540 *		5.4		44	36	82	6	•	W11 1100 *		11		71	45	118	12	•
W11 0550 *		5.5		44	36	82	6	•	W11 1110 *		11.1		71	45	118	12	•
W11 0560 *		5.6		44	36	82	6	•	W11 1120 *		11.2		71	45	118	12	•
W11 0570 *		5.7		44	36	82	6	•	W11 1130 *		11.3		71	45	118	12	•
W11 0580 *		5.8		44	36	82	6	•	W11 1140 *		11.4		71	45	118	12	•
W11 0590 *		5.9		44	36	82	6	•	W11 1150 *		11.5		71	45	118	12	•
W11 0600 *		6	43	44	36	82	6	•	W11 1160 *		11.6	63	71	45	118	12	•
W11 0610 *		6.1		53	36	91	8	•	W11 1170 *		11.7		71	45	118	12	•
W11 0620 *		6.2		53	36	91	8	•	W11 1180 *		11.8		71	45	118	12	•
W11 0630 *		6.3		53	36	91	8	•	W11 1190 *		11.9		71	45	118	12	•
W11 0640 *		6.4		53	36	91	8	•	W11 1200 *		12		71	45	118	12	•
W11 0650 *		6.5		53	36	91	8	•	W11 1210 *		12.1		77	45	124	14	•
W11 0660 *		6.6		53	36	91	8	•	W11 1220 *		12.2		77	45	124	14	•
W11 0670 *		6.7		53	36	91	8	•	W11 1230 *		12.3		77	45	124	14	•
W11 0680 *		6.8		53	36	91	8	•	W11 1240 *		12.4		77	45	124	14	•
W11 0690 *		6.9		53	36	91	8	•	W11 1250 *		12.5		77	45	124	14	•
W11 0700 *		7	49	53	36	91	8	•	W11 1260 *		12.6	63	77	45	124	14	•
W11 0710 *		7.1		53	36	91	8	•	W11 1270 *		12.7		77	45	124	14	•
W11 0720 *		7.2		53	36	91	8	•	W11 1280 *		12.8		77	45	124	14	•
W11 0730 *		7.3		53	36	91	8	•	W11 1290 *		12.9		77	45	124	14	•
W11 0740 *		7.4		53	36	91	8	•	W11 1300 *		13		77	45	124	14	•
W11 0750 *		7.5		53	36	91	8	•	W11 1320 *		13.2		77	45	124	14	•
W11 0760 *		7.6		53	36	91	8	•	W11 1330 *		13.3		77	45	124	14	•
W11 0770 *		7.7		53	36	91	8	•	W11 1350 *		13.5		77	45	124	14	•
W11 0780 *		7.8		53	36	91	8	•	W11 1360 *		13.6		77	45	124	14	•
W11 0790 *		7.9		53	36	91	8	•	W11 1370 *		13.7		77	45	124	14	•
W11 0800 *		8	49	53	36	91	8	•	W11 1380 *		13.8		77	45	124	14	•
W11 0810 *		8.1		61	40	103	10	•	W11 1390 *		13.9		77	45	124	14	•
W11 0820 *		8.2		61	40	103	10	•	W11 1400 *		14		77	45	124	14	•
W11 0830 *		8.3		61	40	103	10	•	W11 1410 *		14.1		83	48	133	16	•
W11 0840 *		8.4		61	40	103	10	•	W11 1420 *		14.2		83	48	133	16	•

* - DIN 6535

cont'd ▶

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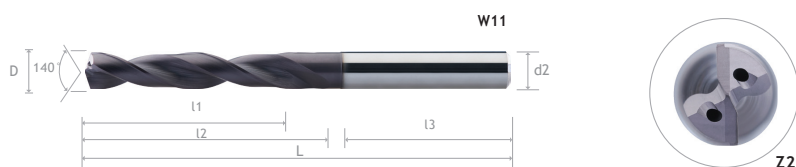


DR-S Oil Feed Twist Drills DIN 6537L - 5 x Ø, Point Angle 140°, 2 Flute

 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	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	•									

* - DIN 6535

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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)	l1 (mm)	l2 (mm)	l3 (mm)	L (mm)	d2 h6 (mm)	Availability	Order Number	DIN 6535	D (mm)	l1 (mm)	l2 (mm)	l3 (mm)	L (mm)	d2 h6 (mm)	Availability
W12 0300 *		3	32	40	36	85	6	•	W12 0850 *		8.5	80	95	40	142	10	•
W12 0310 *		3.1		40	36	85	6	•	W12 0860 *		8.6		95	40	142	10	•
W12 0320 *		3.2		40	36	85	6	•	W12 0870 *		8.7		95	40	142	10	•
W12 0330 *		3.3		40	36	85	6	•	W12 0880 *		8.8		95	40	142	10	•
W12 0340 *		3.4		40	36	85	6	•	W12 0890 *		8.9		95	40	142	10	•
W12 0350 *		3.5	36	40	36	85	6	•	W12 0900 *		9		95	40	142	10	•
W12 0360 *		3.6		40	36	85	6	•	W12 0910 *		9.1		95	40	142	10	•
W12 0370 *		3.7		40	36	85	6	•	W12 0920 *		9.2		95	40	142	10	•
W12 0380 *		3.8		40	36	85	6	•	W12 0930 *		9.3		95	40	142	10	•
W12 0390 *		3.9		40	36	85	6	•	W12 0940 *		9.4		95	40	142	10	•
W12 0400 *		4	38	46	36	85	6	•	W12 0950 *		9.5	96	95	40	142	10	•
W12 0410 *		4.1		46	36	85	6	•	W12 0960 *		9.6		95	40	142	10	•
W12 0420 *		4.2		46	36	85	6	•	W12 0970 *		9.7		95	40	142	10	•
W12 0430 *		4.3		46	36	97	6	•	W12 0980 *		9.8		95	40	142	10	•
W12 0440 *		4.4		46	36	97	6	•	W12 0990 *		9.9		95	40	142	10	•
W12 0450 *		4.5	40	46	36	97	6	•	W12 1000 *		10		95	40	142	10	•
W12 0460 *		4.6		46	36	97	6	•	W12 1020 *		10.2		114	45	163	12	•
W12 0470 *		4.7		46	36	97	6	•	W12 1030 *		10.3		114	45	163	12	•
W12 0480 *		4.8		46	36	97	6	•	W12 1050 *		10.5		114	45	163	12	•
W12 0490 *		4.9		46	36	97	6	•	W12 1080 *		10.8		114	45	163	12	•
W12 0500 *		5	44	57	36	97	6	•	W12 1100 *		11		114	45	163	12	•
W12 0510 *		5.1		57	36	97	6	•	W12 1120 *		11.2	112	114	45	163	12	•
W12 0520 *		5.2		57	36	97	6	•	W12 1130 *		11.3		114	45	163	12	•
W12 0530 *		5.3		57	36	97	6	•	W12 1150 *		11.5		114	45	163	12	•
W12 0540 *		5.4		57	36	97	6	•	W12 1180 *		11.8		114	45	163	12	•
W12 0550 *		5.5		57	36	97	6	•	W12 1200 *		12		114	45	163	12	•
W12 0560 *		5.6		57	36	97	6	•	W12 1220 *		12.2		133	45	182	12	•
W12 0570 *		5.7		57	36	97	6	•	W12 1250 *		12.5		133	45	182	12	•
W12 0580 *		5.8		57	36	97	6	•	W12 1270 *		12.7		133	45	182	12	•
W12 0590 *		5.9		57	36	97	6	•	W12 1280 *		12.8		133	45	182	12	•
W12 0600 *		6	48	57	36	97	6	•	W12 1300 *		13		133	45	182	14	•
W12 0610 *		6.1		76	36	116	8	•	W12 1330 *		13.3	128	133	45	182	14	•
W12 0620 *		6.2		76	36	116	8	•	W12 1350 *		13.5		133	45	182	14	•
W12 0630 *		6.3		76	36	116	8	•	W12 1370 *		13.7		133	45	182	14	•
W12 0640 *		6.4		76	36	116	8	•	W12 1380 *		13.8		133	45	182	14	•
W12 0650 *		6.5		76	36	116	8	•	W12 1400 *		14		133	45	182	14	•
W12 0660 *		6.6		76	36	116	8	•	W12 1450 *		14.5		152	48	204	16	•
W12 0670 *		6.7		76	36	116	8	•	W12 1500 *		15		152	48	204	16	•
W12 0680 *		6.8		76	36	116	8	•	W12 1530 *		15.3		152	48	204	16	•
W12 0690 *		6.9		76	36	116	8	•	W12 1550 *		15.5		152	48	204	16	•
W12 0700 *		7	64	76	36	116	8	•	W12 1580 *		15.8		152	48	204	16	•
W12 0710 *		7.1		76	36	116	8	•	W12 1600 *		16	144	152	48	204	16	•
W12 0720 *		7.2		76	36	116	8	•	W12 1650 *		16.5		171	48	222	18	•
W12 0730 *		7.3		76	36	116	8	•	W12 1700 *		17		171	48	222	18	•
W12 0740 *		7.4		76	36	116	8	•	W12 1750 *		17.5		171	48	222	18	•
W12 0750 *		7.5		76	36	116	8	•	W12 1800 *		18		171	48	222	18	•
W12 0760 *		7.6		76	36	116	8	•	W12 1850 *		18.5		190	50	243	20	•
W12 0770 *		7.7		76	36	116	8	•	W12 1900 *		19		190	50	243	20	•
W12 0780 *		7.8		76	36	116	8	•	W12 1950 *		19.5		190	50	243	20	•
W12 0790 *		7.9		76	36	116	8	•	W12 2000 *		20		190	50	243	20	•
W12 0800 *		8	80	76	36	116	8	•									
W12 0810 *		8.1		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	•									

* - DIN 6535

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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



DR-S Twist Drills, 3xD & 5xD External Coolant, 2 Flutes - W08, W09



Aggressive	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		0.272		0.287		0.290		0.282		0.263		0.175
12	200	0.300	165	0.321	140	0.318	95	0.308	70	0.296	25	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



Aggressive	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		0.319		0.300		0.272		0.233		0.182		0.167
12	105	0.361	80	0.338	50	0.303	40	0.255	35	0.200	20	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

Recommended Cutting Data



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



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		0.055		0.062		0.060		0.061		0.039		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	150	0.300	130	0.314	100	0.306	75	0.268	70	0.221	20	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		0.060		0.055		0.040		0.044		0.041		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	80	0.318	60	0.303	40	0.203	30	0.225	25	0.214	12	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

Recommended Cutting Data



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



Aggressive	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		0.397		0.377		0.369		0.394		0.351		0.233
12	310	0.446	220	0.424	190	0.408	140	0.447	105	0.395	40	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



Aggressive	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		0.349		0.427		0.382		0.217		0.220		0.118
12	175	0.396	120	0.491	65	0.429	60	0.250	50	0.236	35	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

Recommended Cutting Data



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



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	240	0.069	200	0.065	160	0.050	85	0.058	65	0.046	22	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		0.359		0.334		0.306		0.276		0.211		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	110	0.069	80	0.065	40	0.073	35	0.039	30	0.044	15	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		0.384		0.414		0.348		0.182		0.211		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

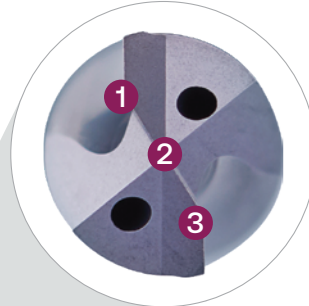
MICRO DRILLS

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



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



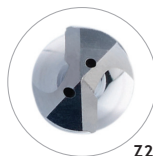
1. Conception à affûtage croisé
Permet une capacité de centrage automatique et une poussée réduite
2. Amincissement en X
Meilleur auto-centrage à l'attaque du perçage
3. Profil d'arête droite
Copeaux plus courts et arête de coupe renforcée
4. Goujures hautement polies
Évacuation des copeaux plus fluide
Moins d'accumulation sur les arêtes
5. Adapté aux matériaux P, K, N, M, S

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



H03



Z2

Order Number	Hole Depth l2/D	D h7 (mm)	l1 (mm)	l2 (mm)	L (mm)	d2 h6 (mm)	Availability	Order Number	Hole Depth l2/D	D h7 (mm)	l1 (mm)	l2 (mm)	L (mm)	d2 h6 (mm)	Availability
H03 0100 5	5xD	1.0	6.5	8	50	3	•	H03 0190 5	5xD	1.9	12.4	13.9	55	3	•
H03 0100 8	8xD		9.5	11	50	3	•	H03 0190 8	8xD		18.1	19.6	60	3	•
H03 0100 12	12xD		13.5	15	55	3	•	H03 0190 12	12xD		25.7	27.2	65	3	•
H03 0100 20	20xD		21.5	23	65	3	•	H03 0190 20	20xD		40.9	42.4	75	3	•
H03 0100 25	25xD		26.5	28	70	3	•	H03 0190 25	25xD		50.35	51.85	90	3	•
H03 0100 30	30xD	1.1	31.5	33	75	3	•	H03 0190 30	30xD	2.0	59.85	61.35	100	3	•
H03 0110 5	5xD		7.2	8.7	50	3	•	H03 0200 5	5xD		13	16	55	3	•
H03 0110 8	8xD		10.5	12	50	3	•	H03 0200 8	8xD		19	22	60	3	•
H03 0110 12	12xD		14.9	16.4	55	3	•	H03 0200 12	12xD		27	30	65	3	•
H03 0110 20	20xD		23.7	25.2	65	3	•	H03 0200 20	20xD		43	46	82	3	•
H03 0110 25	25xD	1.2	29.15	30.65	70	3	•	H03 0200 25	25xD	2.1	53	56	90	3	•
H03 0110 30	30xD		34.65	36.15	75	3	•	H03 0200 30	30xD		63	66	100	3	•
H03 0120 5	5xD		7.8	9.3	50	3	•	H03 0210 5	5xD		13.7	16.85	55	3	•
H03 0120 8	8xD		11.4	12.9	50	3	•	H03 0210 8	8xD		20	23.15	60	3	•
H03 0120 12	12xD		16.2	17.7	55	3	•	H03 0210 12	12xD		28.4	31.55	65	3	•
H03 0120 20	20xD	1.3	25.8	27.3	65	3	•	H03 0210 20 *	20xD	2.2	45.2	48.35	82	3	•
H03 0120 25	25xD		31.8	33.3	75	3	•	H03 0210 25	25xD		55.65	58.8	100	3	•
H03 0120 30	30xD		37.8	39.3	75	3	•	H03 0210 30	30xD		66.15	69.3	110	3	•
H03 0130 5	5xD		8.5	10	50	3	•	H03 0220 5	5xD		14.3	17.6	55	3	•
H03 0130 8	8xD		12.4	13.9	50	3	•	H03 0220 8	8xD	2.3	20.9	24.2	60	3	•
H03 0130 12	12xD	1.4	17.6	19.1	55	3	•	H03 0220 12	12xD		29.7	33	65	3	•
H03 0130 20	20xD		28	29.5	65	3	•	H03 0220 20	20xD		47.3	50.6	82	3	•
H03 0130 25	25xD		34.45	35.95	75	3	•	H03 0220 25	25xD		58.3	61.6	100	3	•
H03 0130 30	30xD		40.95	42.45	85	3	•	H03 0220 30	30xD		69.3	72.6	110	3	•
H03 0140 5	5xD	1.5	9.1	10.6	50	3	•	H03 0230 5	5xD	2.4	15	18.45	55	3	•
H03 0140 8	8xD		13.3	14.8	50	3	•	H03 0230 8	8xD		21.9	25.35	60	3	•
H03 0140 12	12xD		18.9	20.4	55	3	•	H03 0230 12	12xD		31.1	34.55	65	3	•
H03 0140 20	20xD		30.1	31.6	65	3	•	H03 0230 20	20xD		49.5	52.95	100	3	•
H03 0140 25	25xD		37.1	38.6	75	3	•	H03 0230 25	25xD	2.5	60.95	64.4	100	3	•
H03 0140 30	30xD	1.6	44.1	45.6	85	3	•	H03 0230 30	30xD		72.45	75.9	110	3	•
H03 0150 5	5xD		9.8	11.3	50	3	•	H03 0240 5	5xD		15.6	19.2	55	3	•
H03 0150 8	8xD		14.3	15.8	50	3	•	H03 0240 8	8xD		22.8	26.4	60	3	•
H03 0150 12	12xD		20.3	21.8	55	3	•	H03 0240 12	12xD	2.6	32.4	36	75	3	•
H03 0150 20	20xD		32.3	33.8	75	3	•	H03 0240 20	20xD		51.6	55.2	100	3	•
H03 0150 25	25xD	1.7	39.75	41.25	80	3	•	H03 0240 25	25xD		63.6	67.2	100	3	•
H03 0150 30	30xD		47.25	48.75	85	3	•	H03 0240 30 *	30xD		75.6	79.2	120	3	•
H03 0160 5	5xD		10.4	11.9	50	3	•	H03 0250 5	5xD	2.7	16.3	20.05	55	3	•
H03 0160 8	8xD		15.2	16.7	50	3	•	H03 0250 8	8xD		23.8	27.55	60	3	•
H03 0160 12	12xD		21.6	23.1	65	3	•	H03 0250 12	12xD		33.8	37.55	75	3	•
H03 0160 20	20xD		34.4	35.9	75	3	•	H03 0250 20	20xD		53.8	57.55	100	3	•
H03 0160 25	25xD	1.8	42.4	43.9	80	3	•	H03 0250 25 *	25xD		66.25	70	110	3	•
H03 0160 30	30xD		50.4	51.9	90	3	•	H03 0260 5	5xD	2.8	17.6	21.65	55	3	•
H03 0170 5	5xD		11.1	12.6	55	3	•	H03 0260 8	8xD		25.7	29.75	60	3	•
H03 0170 8	8xD		16.2	17.7	60	3	•	H03 0260 12	12xD		36.5	40.55	75	3	•
H03 0170 12	12xD		23	24.5	65	3	•	H03 0260 20	20xD		58.1	62.15	100	3	•
H03 0170 20	20xD	1.9	36.6	38.1	75	3	•	H03 0260 25	25xD		71.55	75.6	110	3	•
H03 0170 25	25xD		45.05	46.55	80	3	•	H03 0270 5	5xD	2.9	17.6	21.65	55	3	•
H03 0170 30	30xD		53.55	55.05	90	3	•	H03 0270 8	8xD		25.7	29.75	60	3	•
H03 0180 5	5xD		11.7	13.2	55	3	•	H03 0270 12	12xD		36.5	40.55	75	3	•
H03 0180 8	8xD		17.1	18.6	60	3	•	H03 0270 20	20xD		58.1	62.15	100	3	•
H03 0180 12	12xD		24.3	25.8	65	3	•	H03 0270 25	25xD		71.55	75.6	110	3	•
H03 0180 20	20xD	2.0	38.7	40.2	75	3	•	H03 0270 30	30xD		85.05	89.1	130	3	•
H03 0180 25	25xD		47.7	49.2	90	3	•								
H03 0180 30	30xD		56.7	58.2	100	3	•								

* - DIN 6535

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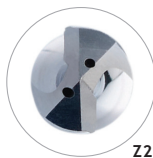
Material Group | Grupo de materiales | Materialgruppen | Groupe Matière

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

 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

[illegible]

Material Group | Grupo de materiales | Materialgruppen | Groupe Matière

Recommended Cutting Data



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



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	145	0.017	125	0.018	115	0.016	85	0.018	65	0.016	30	0.013
1.5		0.026		0.026		0.024		0.027		0.024		0.019
2.0		0.035		0.035		0.032		0.035		0.032		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	90	0.017	80	0.016	65	0.014	60	0.015	40	0.014	20	0.009	35	0.022
1.5		0.026		0.024		0.022		0.022		0.021		0.016		0.036
2.0		0.035		0.031		0.029		0.029		0.028		0.025		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	130	0.016	115	0.016	105	0.015	80	0.014	55	0.014	30	0.010
1.5		0.025		0.024		0.022		0.021		0.021		0.016
2.0		0.033		0.032		0.029		0.028		0.028		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	85	0.014	65	0.014	55	0.010	50	0.010	40	0.009	15	0.010	35	0.012
1.5		0.021		0.020		0.015		0.015		0.014		0.016		0.021
2.0		0.028		0.027		0.020		0.020		0.019		0.025		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

Recommended Cutting Data



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



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	125	0.014	105	0.014	95	0.012	75	0.010	50	0.013	30	0.006
1.5		0.021		0.021		0.018		0.015		0.019		0.009
2.0		0.028		0.027		0.024		0.020		0.025		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	80	0.010	60	0.011	50	0.008	45	0.007	35	0.007	15	0.008	30	0.008
1.5		0.015		0.016		0.011		0.010		0.011		0.013		0.014
2.0		0.020		0.022		0.015		0.014		0.014		0.021		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

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



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

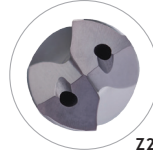
6. Adapté aux matériaux P, K, N, M, S

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



W05



Z2

Order Number		*L2/D	D h7 (mm)	L1 (mm)	*L 2 (mm)	L3 (mm)	L4 (mm)	L (mm)	d2 h6 (mm)	Availability
DIN 6535										
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	3.10	15.5	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			45	50	32	85	4	•
W05 0310 15		15 x D	3.10	15.5	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	3.20	16.0	94	99	32	135	4	•
W05 0320 12		12 x D			45	50	32	85	4	•
W05 0320 15		15 x D			50	55	32	90	4	•
W05 0330 12		12 x D	3.30	16.5	64	69	32	105	4	•
W05 0330 15		15 x D			78.5	83	32	120	4	•
W05 0330 20		20 x D			94	99	32	135	4	•
W05 0340 12		12 x D	3.40	17.0	45	50	32	85	4	•
W05 0340 15		15 x D			48	54	32	90	4	•
W05 0340 20		20 x D			48	54	32	90	4	•
W05 0350 12		12 x D	3.50	17.5	55	60	32	95	4	•
W05 0350 15		15 x D			72	77	32	110	4	•
W05 0350 20		20 x D			89	94	32	130	4	•
W05 0350 25		25 x D	3.60	18.0	106	111	32	145	4	•
W05 0350 30		30 x D			48	54	32	90	4	•
W05 0360 12		12 x D			48	54	32	90	4	•
W05 0360 15		15 x D	3.70	18.5	57	64	32	100	4	•
W05 0360 20		20 x D			60	65	32	100	4	•
W05 0360 25		25 x D			78	84	32	120	4	•
W05 0380 12	NEW	12 x D	3.80	19.0	96	102	32	135	4	•
W05 0380 15	NEW	15 x D			115	121	32	155	4	•
W05 0380 20	NEW	20 x D			57	64	32	100	4	•
W05 0380 25		25 x D	3.90	19.5	57	64	32	100	4	•
W05 0380 30		30 x D			57	64	32	100	4	•
W05 0390 12		12 x D			62	68	32	105	4	•
W05 0400 12		12 x D	4.00	20.0	82	88	32	125	4	•
W05 0400 15		15 x D			101	107	32	140	4	•
W05 0400 20		20 x D			121	127	32	160	4	•
W05 0400 25		25 x D	4.10	20.5	57	64	34	100	5	•
W05 0400 30		30 x D			64	70	34	105	5	•
W05 0410 12		12 x D			57	64	34	100	5	•
W05 0410 15		15 x D	4.20	21.0	65	71	34	110	5	•
W05 0410 20		20 x D			86	92	34	130	5	•
W05 0410 25		25 x D			106	112	34	150	5	•
W05 0420 12		12 x D	4.30	21.5	127	133	34	170	5	•
W05 0420 15	NEW	15 x D			57	64	34	100	5	•
W05 0420 20	NEW	20 x D			57	64	34	100	5	•
W05 0420 25		25 x D	4.40	22.0	57	64	34	100	5	•
W05 0420 30		30 x D			57	64	34	100	5	•
W05 0430 12		12 x D			70	76	34	115	5	•
W05 0430 15		15 x D	4.50	22.5	92	99	34	135	5	•
W05 0430 20		20 x D			114	120	34	155	5	•
W05 0430 25		25 x D			136	143	34	180	5	•
W05 0430 30		30 x D	4.60	23.0	57	64	34	100	5	•
W05 0440 12		12 x D			57	64	34	100	5	•
W05 0440 15		15 x D			64	70	34	105	5	•
W05 0450 12		12 x D	4.70	23.5	67	74	34	110	5	•
W05 0450 15		15 x D			72	81	34	120	5	•
W05 0450 20		20 x D			72	81	34	120	5	•
W05 0450 25		25 x D	4.80	24.0	77	85	34	120	5	•
W05 0450 30		30 x D			102	110	34	145	5	•
W05 0460 12		12 x D			126	134	34	170	5	•
W05 0460 15		15 x D	4.90	24.5	151	159	34	195	5	•
W05 0460 20		20 x D			57	64	34	100	5	•
W05 0460 25		25 x D			57	64	34	100	5	•
W05 0460 30		30 x D	5.00	25.0	67	74	34	110	5	•
W05 0470 12		12 x D			72	81	34	120	5	•
W05 0470 15		15 x D			77	85	34	120	5	•
W05 0470 20		20 x D	5.10	25.5	102	110	34	145	5	•
W05 0470 25		25 x D			126	134	34	170	5	•
W05 0470 30		30 x D			151	159	34	195	5	•
W05 0480 12		12 x D	5.20	26.0	57	64	34	100	5	•
W05 0480 15		15 x D			57	64	34	100	5	•
W05 0480 20		20 x D			64	70	34	105	5	•
W05 0480 25		25 x D	5.30	26.5	70	76	34	115	5	•
W05 0480 30		30 x D			92	99	34	135	5	•
W05 0490 12		12 x D			114	120	34	155	5	•
W05 0490 15		15 x D	5.40	27.0	136	143	34	180	5	•
W05 0490 20		20 x D			57	64	34	100	5	•
W05 0490 25		25 x D			57	64	34	100	5	•
W05 0490 30		30 x D	5.60	28.0	64	70	34	105	5	•
W05 0500 12		12 x D			70	76	34	115	5	•
W05 0500 15		15 x D			92	99	34	135	5	•
W05 0500 20		20 x D	5.70	28.5	114	120	34	155	5	•
W05 0500 25		25 x D			136	143	34	180	5	•
W05 0500 30		30 x D			57	64	34	100	5	•
W05 0510 12		12 x D	5.80	29.0	57	64	34	100	5	•
W05 0510 15		15 x D			64	70	34	105	5	•
W05 0510 20		20 x D			70	76	34	115	5	•
W05 0510 25		25 x D	5.90	29.5	92	99	34	135	5	•
W05 0510 30		30 x D			114	120	34	155	5	•
W05 0520 12		12 x D			136	143	34	180	5	•
W05 0520 15		15 x D	6.00	30.0	57	64	34	100	5	•
W05 0520 20		20 x D			57	64	34	100	5	•
W05 0520 25		25 x D			64	70	34	105	5	•
W05 0520 30		30 x D	6.10	30.5	70	76	34	115	5	•
W05 0530 12		12 x D			92	99	34	135	5	•
W05 0530 15		15 x D			114	120	34	155	5	•
W05 0530 20		20 x D	6.20	31.0	136	143	34	180	5	•
W05 0530 25		25 x D			57	64	34	100	5	•
W05 0530 30		30 x D			57	64	34	100	5	•
W05 0540 12		12 x D	6.30	31.5	64	70	34	105	5	•
W05 0540 15		15 x D			70	76	34	115	5	•
W05 0540 20		20 x D			92	99	34	135	5	•
W05 0540 25		25 x D	6.40	32.0	114	120	34	155	5	•
W05 0540 30		30 x D			136	143	34	180	5	•
W05 0550 12		12 x D			57	64	34	100	5	•
W05 0550 15		15 x D	6.50	32.5	57	64	34	100	5	•
W05 0550 20		20 x D			64	70	34	105	5	•
W05 0550 25		25 x D			70	76	34	115	5	•
W05 0550 30		30 x D	6.60	33.0	92	99	34	135	5	•
W05 0560 12		12 x D			114	120	34	155	5	•
W05 0560 15		15 x D			136	143	34	180	5	•
W05 0560 20		20 x D	6.70	33.5	57	64	34	100	5	•
W05 0560 25		25 x D			57	64	34	100	5	•
W05 0560 30		30 x D			64	70	34	105	5	•
W05 0570 12		12 x D	6.80	34.0	70	76	34	115	5	•
W05 0570 15		15 x D			92	99	34	135	5	•
W05 0570 20		20 x D			114	120	34	155	5	•
W05 0570 25		25 x D	6.90	34.5	136	143	34	180	5	•
W05 0570 30		30 x D			57	64	34	100	5	•
W05 0580 12		12 x D			57	64	34	100	5	•
W05 0580 15		15 x D	7.00	35.0	57	64	34	100	5	•
W05 0580 20		20 x D			64	70	34	105	5	•
W05 0580 25		25 x D			70	76	34	115	5	•
W05 0580 30		30 x D	7.10	35.5	92	99	34	135	5	•
W05 0590 12		12 x D			114	120	34	155	5	•
W05 0590 15		15 x D			136	143	34	180	5	•
W05 0590 20		20 x D	7.20	36.0	57	64	34	100	5	•
W05 0590 25		25 x D			57	64	34	100	5	•
W05 0590 30		30 x D			64	70	34	105	5	•
W05 0600 12		12 x D	7.30	36.5	70	76	34	115	5	•
W05 0600 15		15 x D			92	99	34	135	5	•
W05 0600 20		20 x D			114	120	34	155	5	•
W05 0600 25		25 x D	7.40	37.0	136	143	34	180	5	•
W05 0600 30		30 x D			57	64	34	100	5	•
W05 0610 12		12 x D			57	64	34	100	5	•
W05 0610 15		15 x D	7.50	37.5	64	70	34	105	5	•
W05 0610 20		20 x D			70	76	34	115	5	•
W05 0610 25		25 x D			92	99	34	135	5	•
W05 0610 30		30 x D	7.60	38.0	114	120	34	155	5	•
W05 0620 12		12 x D			136	143	34	180	5	•
W05 0620 15		15 x D			57	64	34	100	5	•
W05 0620 20		20 x D	7.70	38.5	57	64	34	100	5	•
W05 0620 25		25 x D			64	70	34	105	5	•
W05 0620 30		30 x D			70	76	34	115	5	•
W05 0630 12		12 x D	7.80	39.0	92	99	34	135	5	•
W05 0630 15		15 x D			114	120	34	155	5	•
W05 0630 20		20 x D			136	143	34	180	5	•
W05 0630 25		25 x D	7.90	39.5	57	64	34	100	5</	

	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	*I2/D	D h7 (mm)	I 1 (mm)	*I 2 (mm)	I 3 (mm)	I 4 (mm)	L (mm)	d2 h6 (mm)	Availability
DIN 6535									
W05 0770 12 *	12 x D	7.70	38.5	96	108	36	145	8	•
W05 0780 12 *		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	8.00	40.0	96	108	36	145	8	•
W05 0800 15	15 x D			122	134	40	175	8	•
W05 0800 20	20 x D			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 *	12 x D	8.10	40.5	115	127	40	170	10	◦
W05 0820 12 *		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	8.50	42.5	120	135	40	180	10	•
W05 0850 15 *	15 x D			130	142	40	185	10	•
W05 0850 20 *	20 x D			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	8.80	44.0	120	135	40	180	10	•
W05 0880 15 NEW	15 x D			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	9.00	45.0	120	135	40	180	10	•
W05 0900 15 *	15 x D			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 *	12 x D	9.10	45.5	120	135	40	180	10	◦
W05 0920 12 *		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	9.50	47.5	120	135	40	180	10	•
W05 0950 15 *	15 x D			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	10.00	50.0	120	135	40	180	10	•
W05 1000 15 *	15 x D			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	•

(Remark: l2 is just a guideline for maximum drilling depth, make adjustments accordingly to your machine or workpiece conditions)

*I2 - Massimo Perforazione Profondità | Max. Drilling Depth | max.Bohren Tiefe | Max. Forage Profondeur

Recommended Cutting Data



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

Recommended Cutting Data



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

Recommended Cutting Data



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	65 - 100	0.081	50 - 70	0.081	45 - 65	0.073	30 - 45	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		0.204		0.204		0.189		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	20 - 30	0.078	15 - 25	0.049	25	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		0.190		0.116		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	100 - 130	0.110	85 - 115	0.107	70 - 100	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		0.309		0.301		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

Recommended Cutting Data



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

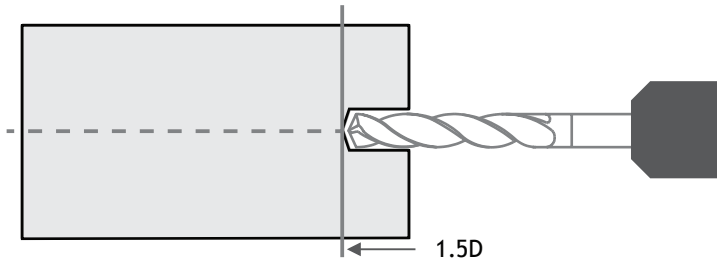
Working Material	K				M			
	Grey Cast Iron		Ductile Cast Iron		Stainless Steel		Stainless Steel	
Properties	-		-		Elevata lavorabilità		Bassa lavorabilità	
D	Vc	fn	Vc	fn	Vc	fn	Vc	fn
3.0	50 - 75	0.088	35 - 45	0.088	30 - 40	0.082	20 - 30	0.073
4.0		0.120		0.118		0.113		0.101
5.0		0.168		0.165		0.155		0.137
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

Drilling on Standard Through Hole

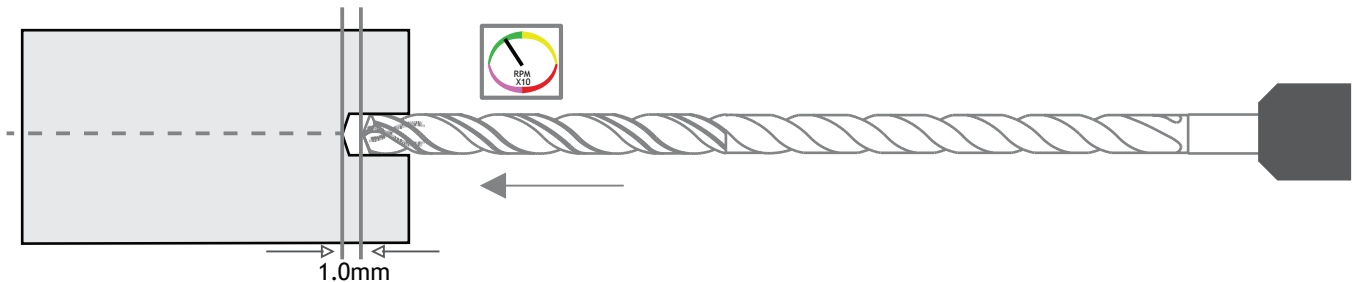
1



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

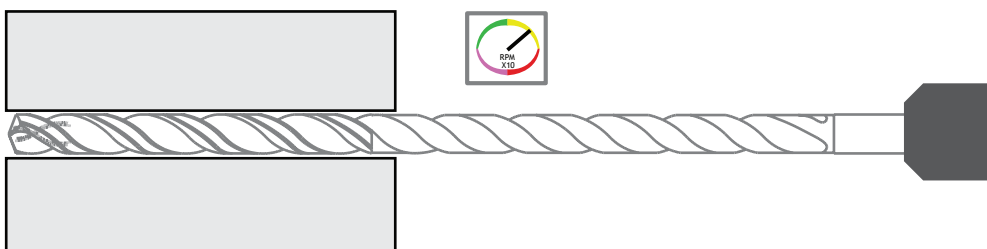
2



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

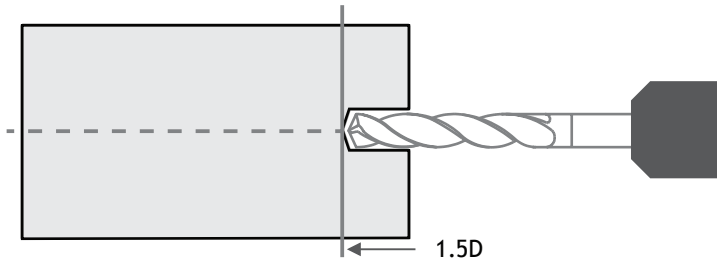


Deep drilling process

- 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

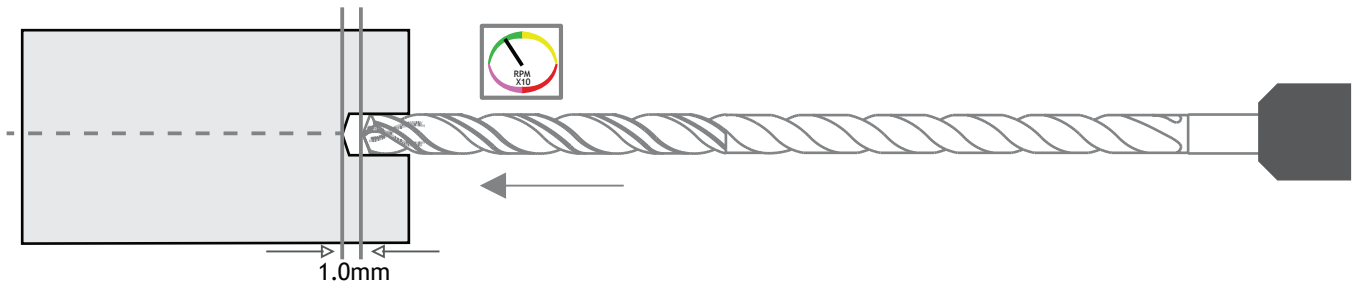
1



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

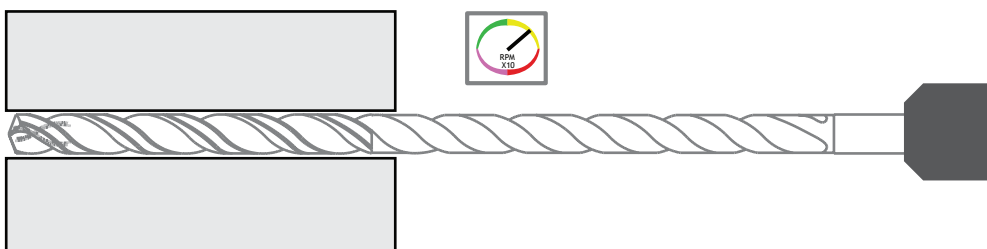
2



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

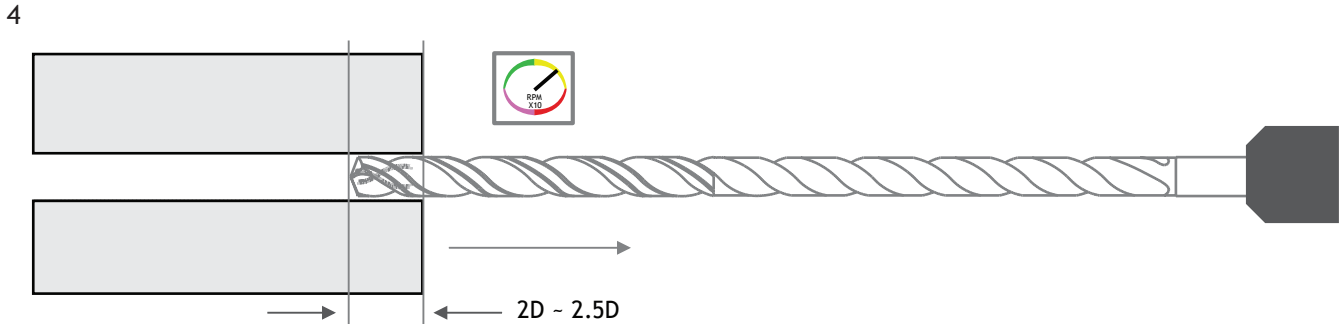
3



Deep drilling process

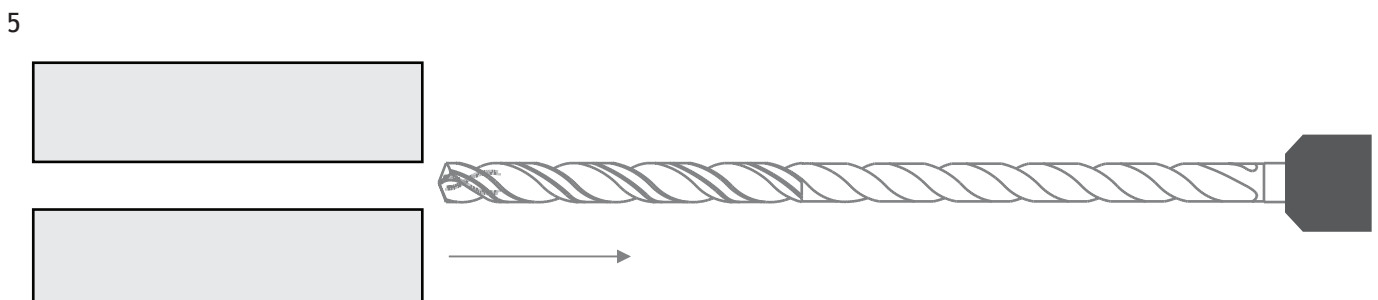
- Load higher spindle speed (Vc) and feedrate (f) as per recommended
- Continuous drilling upon complete hole depth without chip removal cycles/peck drilling cycles
- For through holes, reduce 30% of feedrate approximate 1mm before complete the hole depth

Drilling on Standard Through Hole



Withdrawal

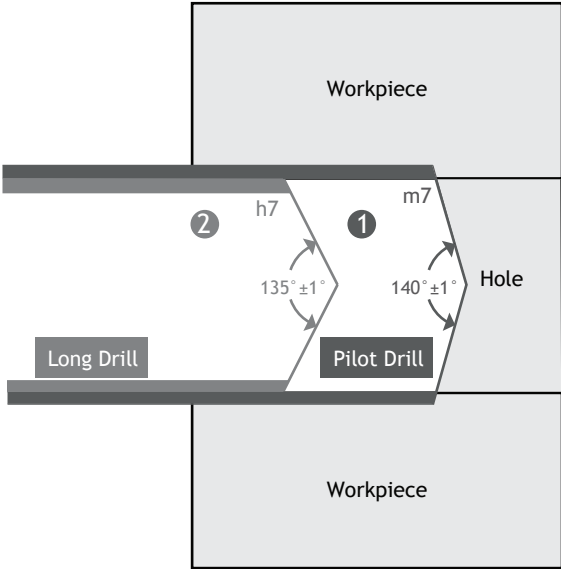
- Switch of coolant supply
- Withdraw the long drills after completed drilling the hole depth
- Existing spindle speed (V_c) and double up the feedrate (f)
- Withdraw towards approximate 2 to 2.5D of the beginning part of pilot bore



Discharge from the bore

- Discharge with lower and stationary speed from the remaining part

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 I DR S (140° I 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)

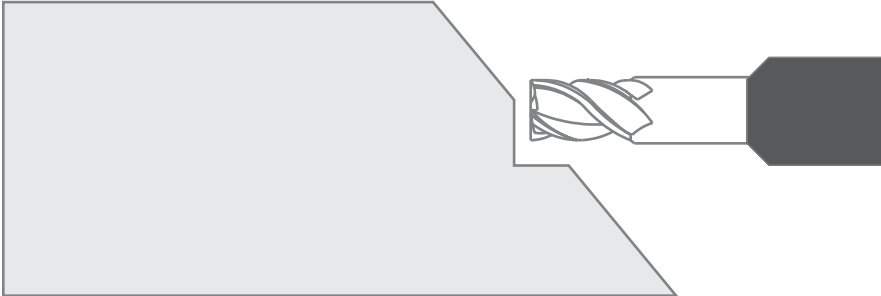
Please use the corresponding drill with internal coolant supply and the same nominal diameter for the deep hole bore.
Long Drill Series I DR-L (135° I D(h7))

Tolerance consideration for h7 in µm

Diameter	Tolerance, µm
≤ Ø3	0 ~ -10
Ø4 - Ø6	0 ~ -12
Ø7 - Ø10	0 ~ -15

Drilling On Irregular Faces or Angles

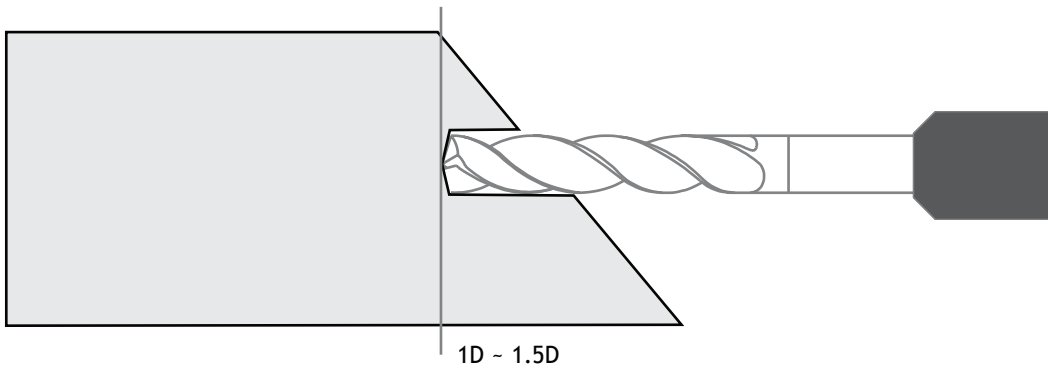
1



Spot Facing

- Make a flat surface 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)

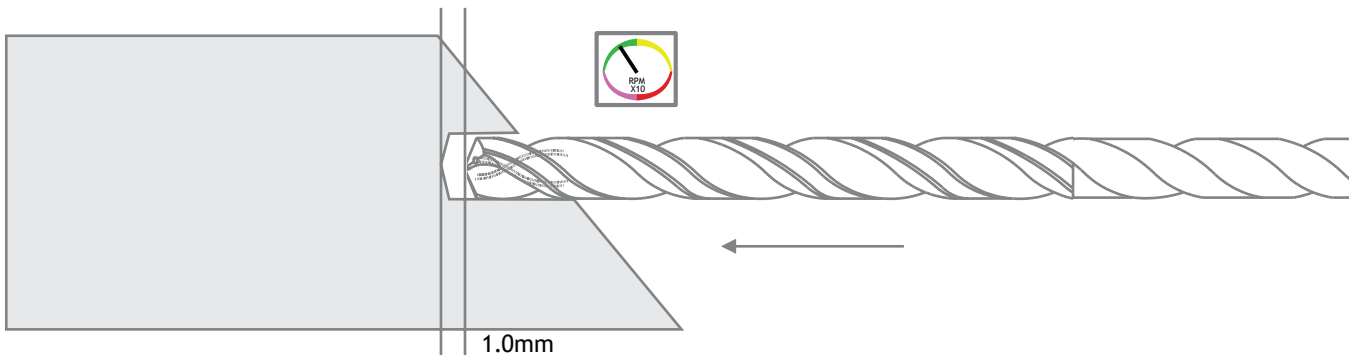
2



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

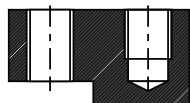
SPECIALS TOOLS

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.



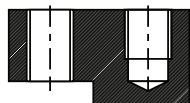
Tab Size Table



Tab size holes

Ø	M	Former M	MF	Former MF	UNC	Former UNC	UNF	Former UNF	BSW - W	DIN 5156	DIN 5156	NPT, NPTF	DIN 40432	TR
										DIN 5157			DIN 40433	
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										

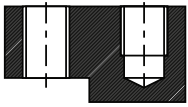
Tab Size Table



Tab size holes

Ø	M	Former M	MF	Former MF	UNC	Former UNC	UNF	Former UNF	BSW - W	DIN 5156	DIN 5156	NPT, NPTF	DIN 40432	TR
										DIN 5157			DIN 40433	
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

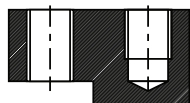
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Tab size holes

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										DIN 5157			DIN 40433	
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

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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



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