



MORSE
CUTTING TOOLS

ABOUT US

MORSE Cutting Tools is a cutting tools engineering and production company. **MORSE** offers a high level of expertise in manufacturing and regrinding special and standard cutting tools, and produces superior endmills and drills. **MORSE** provides you with the right cutter for your specific application, assuring that you, our client, will save time and money.

MORSE Cutting Tools manufactures top quality cutting tools for all milling metal working industries such as aerospace, die and mold, automotive, medical, general engineering, etc.

MORSE Cutting Tools is ISO 9001:2008 certified, as well as a certified supplier of aerospace milling cutter products for key players.



OUR TOOLS

MORSE Cutting Tools superior products contribute to our clients' success over their competitors. **MORSE's** cutters are made of submicron grain size cobalt and are coated with modern high abrasive and temperature resistance finishes.

MORSE provides regrinding for all types of tools with in-house high quality PVD coating.

MORSE Cutting Tools offers a wide range of milling products.

Manufactured in its new facilities, equipment and technologies allow customers to benefit at an even higher level.



***Manufacturing Facilities in the
USA, Italy, Russia, Netherlands and Israel***



RESEARCH & DEVELOPMENT

Research & development is an integral part of **MORSE Cutting Tools**. Our team of engineers work together to examine and select the best solution for the customer's requirements.

Many resources are dedicated to employee training and participation in international professional exhibitions, making certain that the engineering staff stays at the forefront of world technology.

MORSE Cutting Tools

R&D department is always exploring new, more efficient and cost-effective manufacturing procedures and processes. Improvements in computerization, data flow and quality assurance are constantly being implemented.



SPECIAL-TOOLS

MORSE Cutting Tools also designs special tools, step drills, tapered tools and reamers, designing all solid carbide profile types up to 5 micron accuracy with optic protocol measurement according to the customer's specifications. With this information, **MORSE Cutting Tools** engineers can design and produce a product that conforms exactly to the customer's specifications, to give the best solution for their application requirement.

MORSE Cutting Tools manufactures and regrinds top quality cutting tools for all milling metal working industries such as aerospace, die and mold, automotive, medical, general engineering, etc.





MORSE Cutting Tools department for special tools is entirely dedicated to the design and manufacture of special milling solutions for high demanding operations and focused manufacturing.

Unique advantages, such as **PVD** high quality coating facilities (**TiN, TiCN, TiAlN, AlTiN**) on solid carbide tools and capabilities for a wide range of diameters (0.3 to 32 mm), places the company as the preferred solution for high quality and specific application special tools.

MORSE also specializes in other solutions, including:

- Profile tools
- Tapered tools
- Endmills
- Roughers
- Drills
- Step drills
- Router
- Reamers
- Counter bores
- Regrinding
- Coating

MORSE guarantees consistent high accuracy and performance with exceptional tool life.



MANUFACTURING FACILITIES

MORSE Cutting Tools unique state-of-the-art production facility is situated in a new and spotlessly clean factory and includes modern CNC machines, from leading European CNC grinding machineries. **MORSE** invested in a centralized oil filtration system to ensure that grinding takes place under optimum conditions with clean oil and computerized optical measuring equipment, to maintain the high standards for which **MORSE Cutting Tools** is renowned.



TECHNICAL SUPPORT

MORSE's engineers are available for technical support from the design stages to the production line and give full advice for the correct cutting parameters in order to achieve maximum performance from the tools.



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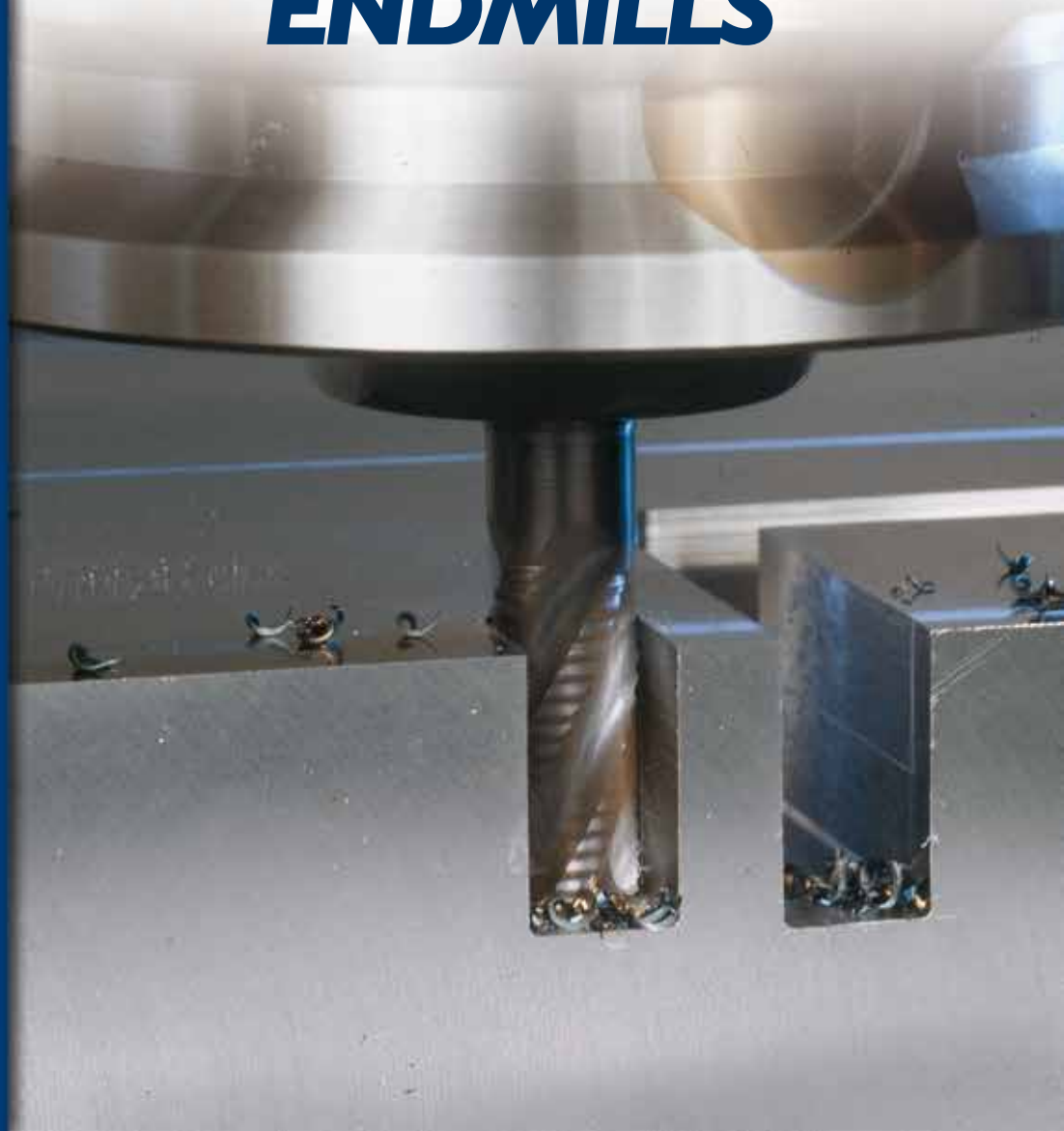
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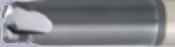


SOLID CARBIDE ENDMILLS



WORKPIECE MATERIAL	ISO
STEEL	P
STAINLESS STEEL	M
CAST IRON	K
ALUMINUM / NON FERROUS MATERIALS	N
SUPPERALLOYS / TITANIUM	S
HARD STEELS	H

Roughing and Semi Finishing Operations

VIBRA FREE		Designation	Ø	Z	a _p	H	P	M	K	S	H	Page
High ↓ Low		MRC-H4S	6-20	4	1xD	-	✓	✓	✓	✓	✓	15
		MRC-H4M/L/XL	1-25	4	2xD	+	✓	✓	✓	✓	✓	16-19
		MRC-E4L	1-25	4	2xD	+	✓	✓	✓	✓	✓	20-21
		MRC-E5L	6-20	5	2xD	-	✓	✓	✓			22
		MRC-E5T	6-20	5	2xD	+		✓		✓		22
		MRCK-H4M	4-20	4	2xD	-				✓	✓	23
		MRCK-H4M	6-16	4	2xD	-				✓	✓	23
		MRC-H5M	4-20	5	2xD	-	✓	✓	✓	✓	✓	24
		MRFS-E44	6-25	4	2xD	-	✓		✓			26
		MRCP-H4L	5-20	3-4	2xD	+	✓	✓				36
		MRFP-E4	6-20	4-5	2xD	-	✓	✓	✓	✓	✓	37
		MRFF-S	1-20	2, 4		+	✓	✓	✓	✓	✓	37
		MRB-E4L/T	3-16	4	2xD	+	✓	✓	✓	✓	✓	79

SOLID ROUGH		Designation	Ø	Z	a _p	H	P	M	K	S	H	Page
High ↓ Low		MRFS-B44	4-25	4	2xD	-	✓	✓	✓	✓	✓	25
		MRFS-B44	6-16	4	2xD	-	✓	✓	✓	✓	✓	26
		MRR-B4, 6 MF	6-25	4, 6	2xD	-	✓			✓	✓	27
		MRR-B..S/M/L/XL	3-20	4-7	2xD	+	✓	✓	✓	✓	✓	28-31
		MRRF	4-25	4, 6	2xD	+	✓		✓			32
		MRR-T4M	6-20	4	2xD	-	✓				✓	33
		MRCP-E3/4L	5-20	3-4	2xD	+	✓	✓				34-35
		MRBRF-T	6-20	3-4	2xD	-	✓	✓	✓	✓	✓	38

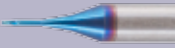
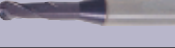
Roughing, Semi Finishing and Finishing Operations

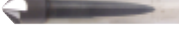
ALLUSPEED		Designation	Ø	Z	a _p	H	N	Page
High ↓ Low		MRCA-H3	1-25	3	1.5xD 2xD	+	✓	39-41
		MRCA-H4	6-25	4	1.5xD 2xD	+	✓	42
		MRCAP-H3	10-20	3	1.5xD 2xD	+	✓	43
		MRCA-H3	6-25	3	2xD	+	✓	43
		MRCA..B/F	4-20	2	2xD	-	✓	44
		MRCA-B-3	4-20	3	2xD	-	✓	45
		MRR-B3	6-20	3	2xD	+	✓	46
		MRR-B3	8-25	3	1.5xD	+	✓	47
		MRRC..E	6-25	3	2xD	+	✓	48

Finishing / H.S.M Operations

SOLID MASTER		Designation	Ø	Z	a _p	H	P	M	K	S	H	Page
High ↓ Low		MRC-E/H7	2-20	7	2xD	-	✓	✓	✓	✓	✓	49
		MRCK-H	6-20	7, 9	2xD	-				✓	✓	50
		MRC-H	6-20	6-20	2xD	-	✓	✓	✓	✓	✓	51
		MRCH..	6-20	6	2xD	-	✓	✓	✓			51
		MRC-B6	6-25	6	2xD	+	✓				✓	53-54
		MRCL/XL	6-20	4, 6	2xD	-	✓	✓	✓			52
		MRC-D6	6-20	6	2xD	-	✓				✓	54

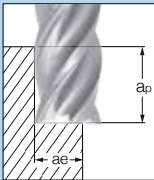
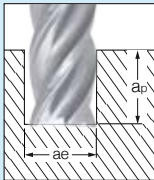
NANOCUT

High ↓ Low		MRC-A2	0.5-12	2	1.5xD	+	✓	✓	✓	✓	✓	55-56
		MRC-A2	0.1-3	2	1.5xD	+	✓	✓		✓	✓	57-59
		MRB-A2	0.1-4	2	0.8xD	+	✓	✓	✓	✓	✓	82-83
		MRB-A2	0.4-6	2	1.5xD	+	✓	✓		✓	✓	80-81
		MRBM..	0.4-2	2	2xD	-	✓	✓				89

SOLID MASTER		Designation	Ø	Z	a _p	H	P	M	K	S	H	Page
High ↓ Low		MRC-A	1-25	2, 4	2xD	-	✓	✓			✓	60-61
		MRC..	2-20	2-4	2xD	-	✓	✓	✓			63-75
		MRC.. (Eco)	1-20	2-4	1.5xD 2xD	-	✓	✓				93-101
		MRB..	1-25	2-4	1.5xD 2xD	+	✓	✓	✓	✓	✓	84-88 90-92
		MRB.. (Eco)	2-20	2, 4	1.5xD	-	✓	✓				102-103
		MRC-B4	10-18	4	1.5xD	+	✓	✓	✓	✓	✓	62
		MRCF	4-12	4	-	-	✓	✓	✓	✓	✓	76
		MRD-S2	3-12	2	-	-	✓	✓	✓	✓	✓	77
		MRN.. (CFRP)	1.6-12	6-12	2xD	-						104-105
		MRX-F (CFRP)	6-12	6, 8	2xD	-						105

For cutting speed, see pages 11-12, 106-114

Recommended Cutting Conditions for **Roughing**

		Side Milling						Slotting					
													
Steel up to 45 Rc		Side Milling			Fz mm/t			Slotting			Fz mm/t		
Description		Vc (m/min)	ap	ae	Ø mm 6-8	Ø mm 10-12	Ø mm 16-20	Vc (m/min)	ae	ap	Ø mm 6-8	Ø mm 10-12	Ø mm 16-20
	MRC-H4/5..VF	150-200	2D	0.4D	0.03-0.06	0.06-0.07	0.07-0.08	150-200	D	2D	0.025-0.035	0.03-0.055	0.04-0.055
	MRC-E4/5..VF	150-200	2D	0.4D	0.025-0.05	0.05-0.065	0.06-0.07	150-200	D	2D	0.02-0.03	0.03-0.045	0.03-0.045
	MRFS-B44..	150-200	2D	0.4D	0.025-0.05	0.05-0.065	0.06-0.07	150-200	D	2D	0.02-0.03	0.03-0.045	0.03-0.045
	MRR-B4..	130-150	2D	0.4D	0.02-0.04	0.04-0.045	0.045-0.065	130-150	D	1D	0.02-0.03	0.03-0.045	0.03-0.045
Stainless Steels		Side Milling			Fz mm/t			Slotting			Fz mm/t		
Description		Vc (m/min)	ap	ae	Ø mm 6-8	Ø mm 10-12	Ø mm 16-20	Vc (m/min)	ae	ap	Ø mm 6-8	Ø mm 10-12	Ø mm 16-20
	MRC-H4/5..VF	70-110	2D	0.4D	0.025-0.045	0.04-0.05	0.05-0.065	70-110	D	2D	0.025-0.035	0.035-0.045	0.045-0.05
	MRFS-B44..	70-110	2D	0.4D	0.025-0.035	0.035-0.04	0.04-0.06	70-110	D	2D	0.02-0.03	0.035-0.04	0.04-0.045
	MRC-E4/5..VF	70-110	2D	0.4D	0.025-0.035	0.035-0.04	0.04-0.06	70-110	D	2D	0.02-0.03	0.035-0.04	0.04-0.045
	MRCP-E3/4....	70-110	2D	0.4D	0.025-0.035	0.035-0.04	0.04-0.06	70-110	D	2D	0.02-0.03	0.035-0.04	0.04-0.045
Titanium		Side Milling			Fz mm/t			Slotting			Fz mm/t		
Description		Vc (m/min)	ap	ae	Ø mm 6-8	Ø mm 10-12	Ø mm 16-20	Vc (m/min)	ae	ap	Ø mm 6-8	Ø mm 10-12	Ø mm 16-20
	MRCK-H4...	50-70	2D	0.4D	0.03-0.045	0.06-0.08	0.065-0.08	50-70	D	2D	0.025-0.03	0.04-0.05	0.04-0.06
	MRFS-B44..	50-70	2D	0.4D	0.02-0.04	0.04-0.05	0.05-0.06	50-70	D	2D	0.01-0.015	0.03-0.05	0.04-0.055
	MRR-B..MF	50-70	2D	0.4D	0.02-0.04	0.04-0.05	0.05-0.06	50-70	D	1.5D	0.01-0.015	0.03-0.045	0.03-0.045
Aluminum		Side Milling			Fz mm/t			Slotting			Fz mm/t		
Description		Vc (m/min)	ap	ae	Ø mm 6-8	Ø mm 10-12	Ø mm 16-20	Vc (m/min)	ap	ae	Ø mm 6-8	Ø mm 10-12	Ø mm 16-20
	MRCA-H3..	Max	2D	0.4D	0.045-0.07	0.07-0.1	0.1-0.15	Max	D	2D	0.04-0.06	0.06-0.08	0.08-0.1
	MRCA-H3.. Coolant	Max	2D	0.4D	0.045-0.07	0.07-0.1	0.1-0.15	Max	D	2D	0.04-0.06	0.06-0.08	0.08-0.1
	MRCAP-H3..Coolant	Max	2D	0.4D	0.045-0.07	0.07-0.1	0.1-0.15	Max	D	2D	0.04-0.06	0.06-0.08	0.08-0.1
	MRR-B3..	Max	2D	0.4D	0.035-0.06	0.06-0.07	0.065-0.08	Max	D	2D	0.03-0.05	0.045-0.055	0.05-0.065
Cast Iron		Side Milling			Fz mm/t			Slotting			Fz mm/t		
Description		Vc (m/min)	ap	ae	Ø mm 6-8	Ø mm 10-12	Ø mm 16-20	Vc (m/min)	ae	ap	Ø mm 6-8	Ø mm 10-12	Ø mm 16-20
	MRC-E4/5..CF	150-200	2D	0.4D	0.035-0.05	0.06-0.065	0.065-0.07	150-200	D	2D	0.03-0.04	0.04-0.045	0.04-0.045
	MRC-H4/5..CF	150-200	2D	0.4D	0.035-0.06	0.06-0.066	0.065-0.08	150-200	D	2D	0.03-0.05	0.04-0.045	0.04-0.045
Hardened Steel 45-55 HRC		Side Milling			Fz mm/t			Slotting			Fz mm/t		
Description		Vc (m/min)	ap	ae	Ø mm 6-8	Ø mm 10-12	Ø mm 16-20	Vc (m/min)	ae	ap	Ø mm 6-8	Ø mm 10-12	Ø mm 16-20
	MRFS-B44..	60-120	2D	0.4D	0.02-0.04	0.03-0.045	0.035-0.065	60-120	D	D	0.01-0.015	0.025-0.045	0.03-0.045
	MRR-B..MF	60-120	2D	0.4D	0.015-0.04	0.04-0.05	0.05-0.06	60-120	D	D	0.01-0.015	0.025-0.045	0.03-0.045
	MRC-E4/5..VF	60-120	2D	0.4D	0.015-0.04	0.04-0.05	0.05-0.06	60-120	D	D	0.01-0.015	0.025-0.045	0.03-0.045

Milling Calculations

Spindle Speed

$$n = \frac{V_c \times 1000}{\pi \times D_c} [rpm]$$

V_c [m/min] Cutting speed

D_c [mm] Tool diameter

Feed Speed

$$V_f = n \times f_z \times Z \left[\frac{mm}{min.} \right]$$

n [RPM]

f_z [mm/t]

Z

Spindle speed

Feed per tooth

Number of teeth

Removal Rate

$$Q = \frac{ae \times ap \times v_f}{1000} \left[\frac{cm^3}{min.} \right]$$

ap Axial depth of cut (mm)

ae Radial depth of cut (mm)

v_f Feed speed (mm/min)

SOLID CARBIDE ENDMILLS

Recommended Cutting Conditions for **Finishing**

	Description	Side Milling		Diameter mm				Cutting Speed Vc (m/min)						
		ap	ae	6-8	10-12	16-20	25	Steel up to 45 HRC	Hardened Steel 45 - 55 HRC	Stainless Steels	Titanium	Inconel	Cast Iron	Aluminum
				Fz mm/t										
	MRC-H... Multi flutes	2D	0.06D	0.02-0.04	0.03-0.05	0.03-0.07	0.03-0.1	150-200	100-150	100-150	80-120	20-40	150-200	
	MRC-H7...	2D	0.1D	0.02-0.04	0.03-0.05	0.03-0.07	0.03-0.1	150-200	100-150	100-150	80-120	20-40	150-200	
	MRCH	2D	0.1D	0.02-0.04	0.03-0.05	0.03-0.07	0.03-0.1	150-200	100-150	100-150	80-120	20-40	150-200	
	MRC-B6	2D	0.1D	0.02-0.04	0.03-0.05	0.03-0.07	0.03-0.1	150-200	100-150	100-150	80-120	20-40	150-200	
	MRC-D6	2D	0.1D	0.02-0.04	0.03-0.05	0.03-0.07	0.03-00.07		100-150					
	MRCK-H7..	2D	0.1D	0.02-0.04	0.03-0.05	0.03-0.07	0.03-0.1				80-120	20-40		
	MRCA-H4	2D	0.3D	0.02-0.04	0.03-0.05	0.03-0.07	0.03-0.1							400-700
	MRCA-H3	2D	0.3D	0.02-0.04	0.03-0.05	0.03-0.07	0.03-0.1							400-700
	MRCA-B-3	2D	0.3D	0.02-0.04	0.03-0.05	0.03-0.07	0.03-0.1							400-700

Recommended Cutting Conditions for **High Speed Machining**

Description		Side Milling		Diameter mm				Cutting Speed Vc (m/min)				
				6-8	10-12	16-20	25	Steel up to 45 HRC	Hardened Steel 45-55 HRC	Stainless Steels	Titanium	Inconel
		ap	ae	Fz mm/t								
	MRC-H7 ...	2D	0.1D	0.08-.15	0.08-0.25	0.1-0.3	0.1-0.3	200-300	100-150	110-150	80-120	20-40
	MRC-H.. Multi Flutes	2D	0.06D	0.08-.15	0.08-0.25	0.1-0.3	0.1-0.3	200-300	100-150	110-150	80-120	20-40
	MRFP-E4/5..	2D	0.1D	0.08-.15	0.08-0.25	0.1-0.3	0.1-0.3	200-300	100-150	110-150	80-120	20-40
	MRCK-H7..	2D	0.1D	0.08-.15	0.08-0.25	0.1-0.3	0.1-0.3				80-120	20-40

Milling Calculations

Spindle Speed

$$n = \frac{V_c \times 1000}{\pi \times D_c} [rpm]$$

Vc [m/min] Cutting speed

Dc [mm] Tool diameter

Feed Speed

$$V_f = n \times f_z \times Z [\frac{mm}{min.}]$$

n [RPM] Spindle speed

fz [mm/t] Feed per tooth

Z Number of teeth

Removal Rate

$$Q = \frac{ae \times ap \times vf}{1000} [\frac{cm^3}{min.}]$$

ap Axial depth of cut (mm)

ae Radial depth of cut (mm)

Vf Feed speed (mm/min)



Solid Carbide Endmills

1 1 2 3 4 5 6 7 8 9 10 11 12 13
M R C - B 4 8 - 20 /30 W 8 R1.0 - 72

1 1 2 3 6 4 7 5 9 10 11 12 13
M R C C 080 B 20 - 3 C 08 R1.0 - 72

1 Solid Carbide Endmill Code	2 Endmill Type C - Square Endmill T - Tapered B - Ball Nose SB - Sphere FR - FINISHROUGH CP - Chip Splitter R/RF/RC/CR - Rougher SM - STORMILL	3 Design (Optional) - = new description A - Aluminum C - Chamfer H - Finish S - Short L - Long XL - Extra Long U - Undersized T - Tapered CS - Chamfer+Short	4 Helix Angle T - 20° A - 30° E - 38° B - 45° D - 50° F - 55° S - Straight H - Different Helix	5 No. of Flutes 2 - 2 Flutes 3 - 3 Flutes 4 - 4 Flutes 5 - 5 Flutes 6 - 6 Flutes 7 - 7 Flutes	6 Cutting Diameter (mm)
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7 Effective Cutting Length 20=20 mm	8 Length of Neck/Angle Neck 30=30 mm 1.5°=1° 30'	9 Shank Type C - Cylindrical W - Weldon	10 Shank Diameter	11 R=Corner Radius VF=Vibra Free S=Sharp Corner	12 Workpiece Material -General * T = High Temp Alloys * S = Stainless Steel L - Steel Low Hardness = <45 HRc M - Steel Medium Hardness = <55 HRc H - Steel High Hardness = >55 HRc A = Aluminum * * For special tools	13 Overall Length 72=72 mm
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Tolerances

Diameter Range	Cutting Diameter øD to e8	Shank ød to h6
<3	-0.014 to 0.028	0 to -0.007
3-6	-0.020 to 0.038	0 to -0.008
6-10	-0.025 to 0.047	0 to -0.009
10-18	-0.032 to 0.059	0 to -0.011
18-30	-0.040 to 0.073	0 to -0.013

MORSE Premium PVD Coated Grades

MORSE has achieved remarkable gains in metal removal rates and tool life with solid carbide endmills with a PVD coating, on a very tough submicron substrate. These new materials provide high toughness and resistance to micro-cracks and chipping.

MC38

- Low surface friction gives excellent chip flow, eliminates built-up edge and micro-cracks, reduces cutting forces, and ensures a quality surface.
- Surface hardness 3000 HV with high toughness adds to wear resistance and higher speeds.
- High productivity, especially on steel, hardened steel and stainless steel and for unfavorable conditions.

MC68

- Hard PVD coating provides substantially improved tool life and reliability.
- High chipping and wear resistance
- Recommended for hardened steel (45-60HRc) at moderate to high cutting speeds.
- Recommended for alloy steels at moderate to high cutting speeds.

MC93

- Excellent for machining hard steel up to 70 HRc and high temperature alloys.
- The small grain size improves cutting edge strength and tends to chip less.

- TiCN on a submicron substrate = MC38
- AlTiN on a submicron substrate = MC98
- AlTiN on ultra-fine grain substrate = MC93

MC98

- High thermal and chemical stability.
- High hardness 3500 HV makes higher speeds, machining of harder materials, and dry machining possible. The AlTiN coating can be applied at 800°C.
- Recommended for hardened steel, high temperature and steel alloys.
- Improves and expedites finishing on dies and molds.
- Longer tool life in high speed machining.

MC2 – Base of MC2 is an ultra-fine grain WC with 9% Co with very high wear and deformation resistance

MC92

- Recommended for hardened steel (45-60HRc) and high temperature alloys at moderate to high cutting speeds.

MC62 / MC72

- Recommended for hardened steel (45-70HRc) and high temperature alloys at moderate to high cutting speeds.
- Hard PVD coating provides substantially improved tool life and reliability.

SOLID CARBIDE ENDMILLS

Solid Carbide Endmills

MRC-H Different Helix and VIBRAFREE Endmills

MORSE is introducing a new evolution of the VIBRAFREE solid carbide endmills with variable pitch and different flute helix angles for roughing and finishing operations.

The new endmills provide improved dampening performance, resulting in 20 to 25% prolonged tool life. They are capable of increased metal removal rate, when compared with the standard VIBRAFREE solid carbide endmills.

The new MRC-H endmills feature a 4 flute, variable pitch and different helix flute angles: two 35° helix flutes and two 37° helix flutes. Two family types are available: cylindrical and relieved shank endmills. All endmills are made from MC98 - a most versatile, PVD coated grade. Each family includes endmills in a diameter range of 6 to

25 mm. All have corner radii and each diameter is available in both Weldon and cylindrical shank options.

The new tools reduce the cutting forces and power consumption of the machine and improve tool life, providing better chip evacuation and good surface quality on stainless and alloyed steel.

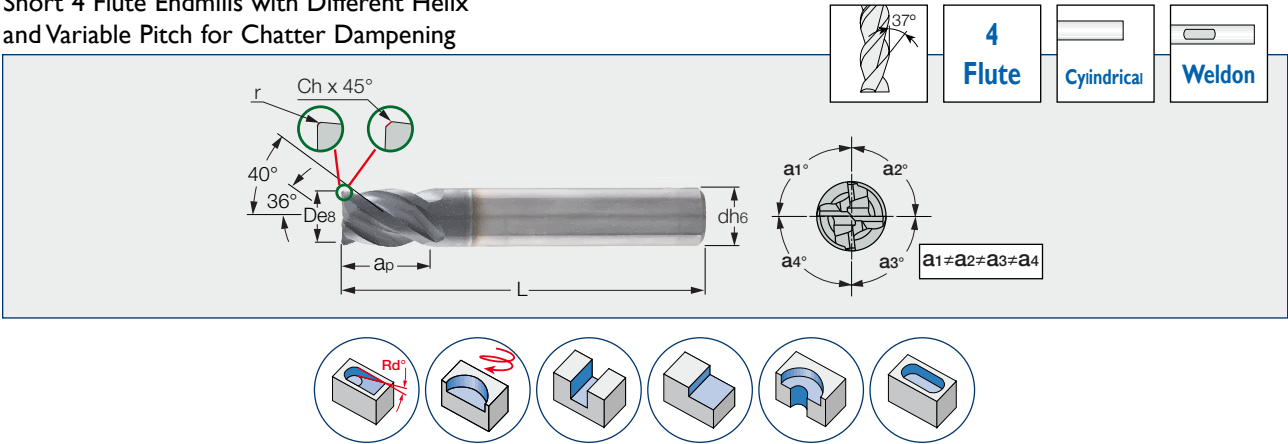
These new endmills are an excellent solution for low power machines with ISO40 or BT40 adaptations, improving their material removal rate and eliminating vibration.

They can be used for full slot machining of up to 2XD.

SOLID CARBIDE ENDMILLS

MRC-H4S-VF...E/R

Short 4 Flute Endmills with Different Helix and Variable Pitch for Chatter Dampening



Designation										Recommended Machining Data	Tough ↔ Hard	
	D	d	ap	L	Flute	Ch	r	Rd°	Shank ⁽¹⁾	fz (mm/t)	MC68	MC68
MRC-H4S 06-06C06VF-E50	6.00	6.00	6.00	50.00	4	0.25	-	5.0	C	0.03-0.08	●	●
MRC-H4S 06-06C06VFR.2E50	6.00	6.00	6.00	50.00	4	-	0.20	5.0	C	0.03-0.08	●	●
MRC-H4S 06-06VV06VF-E50	6.00	6.00	6.00	50.00	4	0.25	-	5.0	W	0.03-0.08	●	●
MRC-H4S 08-08C08VF-E63	8.00	8.00	8.00	63.00	4	0.3	-	5.0	C	0.03-0.08	●	●
MRC-H4S 08-08C08VFR.4E63	8.00	8.00	8.00	63.00	4	-	0.40	5.0	C	0.03-0.08	●	●
MRC-H4S 08-08VV08VF-E63	8.00	8.00	8.00	63.00	4	0.3	-	5.0	W	0.03-0.08	●	●
MRC-H4S 10-10C10VF-E66	10.00	10.00	10.00	66.00	4	0.4	-	5.0	C	0.03-0.10	●	●
MRC-H4S 10-10C10VFR.5E66	10.00	10.00	10.00	66.00	4	-	0.50	5.0	C	0.03-0.10	●	●
MRC-H4S 10-10W10VF-E66	10.00	10.00	10.00	66.00	4	0.4	-	5.0	W	0.03-0.10	●	●
MRC-H4S 12-12C12VF-E73	12.00	12.00	12.00	73.00	4	0.5	-	5.0	C	0.04-0.10	●	●
MRC-H4S 12-12C12VFR.6E73	12.00	12.00	12.00	73.00	4	-	0.60	5.0	C	0.04-0.10	●	●
MRC-H4S 12-12W12VF-E73	12.00	12.00	12.00	73.00	4	0.5	-	5.0	W	0.04-0.10	●	●
MRC-H4S 16-16C16VF-E82	16.00	16.00	16.00	82.00	4	0.6	-	5.0	C	0.05-0.11	●	●
MRC-H4S 16-16W16VF-E82	16.00	16.00	16.00	82.00	4	0.6	-	5.0	W	0.05-0.11	●	●
MRC-H4S 20-20C20VF-E92	20.00	20.00	20.00	92.00	4	0.6	-	5.0	C	0.05-0.11	●	●
MRC-H4S 20-20W20VF-E92	20.00	20.00	20.00	92.00	4	0.6	-	5.0	W	0.05-0.11	●	●

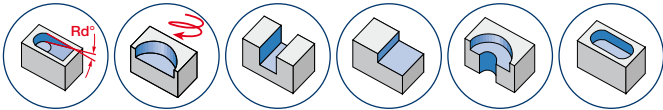
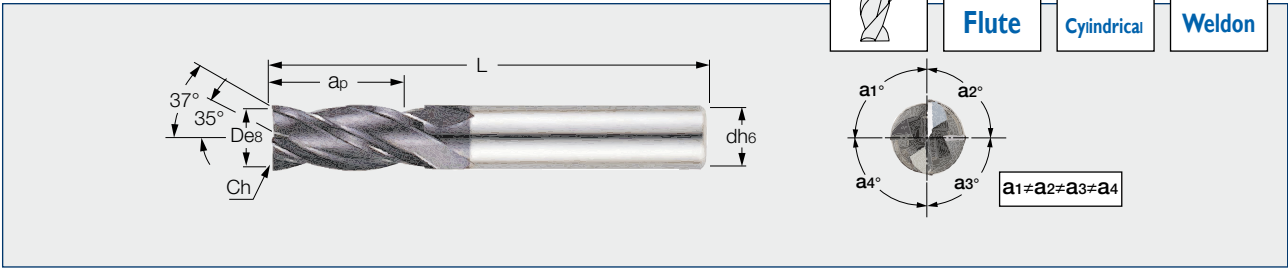
For user guide, see pages 106-114



SOLID CARBIDE ENDMILLS

MRC-H4M-VFR

4 Flute Endmills with Different Helix and Variable Pitch for
Vibration Dampening with Assorted Radii



Designation									Recommended Machining Data
	D	d	ap	L	Flute	Rd°	Shank	r	fz (mm/t)
MRC-H4M 06-12C06VFR0.2-57	6.00	6.00	12.00	57.00	4	5.0	C	0.20	0.03-0.06
MRC-H4M 06-12W06VFR0.2-57	6.00	6.00	12.00	57.00	4	5.0	W	0.20	0.03-0.06
MRC-H4M 08-16C08VFR0.4-63	8.00	8.00	16.00	63.00	4	5.0	C	0.40	0.03-0.08
MRC-H4M 08-16W08VFR0.4-63	8.00	8.00	16.00	63.00	4	5.0	W	0.40	0.03-0.08
MRC-H4M 10-20C10VFR0.5-72	10.00	10.00	20.00	72.00	4	5.0	C	0.50	0.03-0.09
MRC-H4M 10-20W10VFR0.5-72	10.00	10.00	20.00	72.00	4	5.0	W	0.50	0.03-0.09
MRC-H4M 12-24C12VFR0.6-83	12.00	12.00	24.00	83.00	4	5.0	C	0.60	0.04-0.10
MRC-H4M 12-24W12VFR0.6-83	12.00	12.00	24.00	83.00	4	5.0	W	0.60	0.04-0.10
MRC-H4M 14-28C14VFR0.7-83	14.00	14.00	28.00	83.00	4	5.0	C	0.70	0.04-0.11
MRC-H4M 14-28W14VFR0.7-83	14.00	14.00	28.00	83.00	4	5.0	W	0.70	0.04-0.11
MRC-H4M 16-32C16VFR0.8-92	16.00	16.00	32.00	92.00	4	5.0	C	0.80	0.05-0.11
MRC-H4M 16-32W16VFR0.8-92	16.00	16.00	32.00	92.00	4	5.0	W	0.80	0.05-0.11
MRC-H4M 20-40C20VFR1.0-104	20.00	20.00	40.00	104.00	4	5.0	C	1.00	0.05-0.11
MRC-H4M 20-40W20VFR1.0-104	20.00	20.00	40.00	104.00	4	5.0	W	1.00	0.05-0.11
MRC-H4M 25-50C25VFR1.2-121	25.00	25.00	50.00	121.00	4	5.0	C	1.20	0.06-0.11
MRC-H4M 25-50W25VFR1.2-121	25.00	25.00	50.00	121.00	4	5.0	W	1.20	0.06-0.11

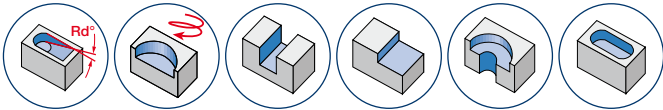
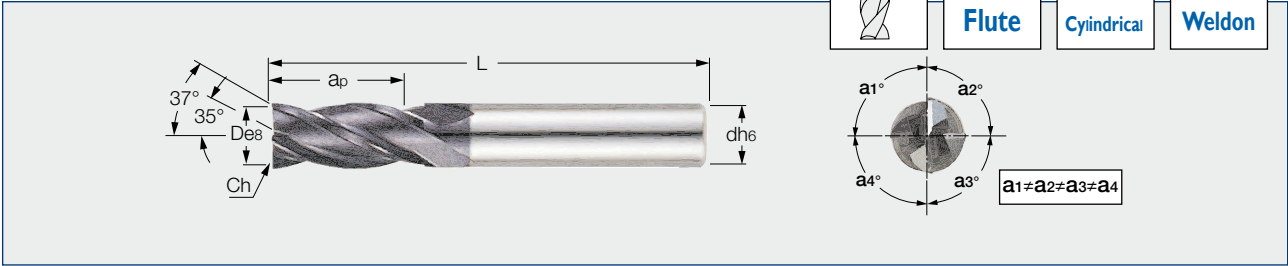
Available grade: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-H4M-VF-E (ECO-LINE)

4 Flute Endmills with Different Helix (35° & 37°) and Variable Pitch for Vibrations Dampening, Used for Very High Material Removal Rates



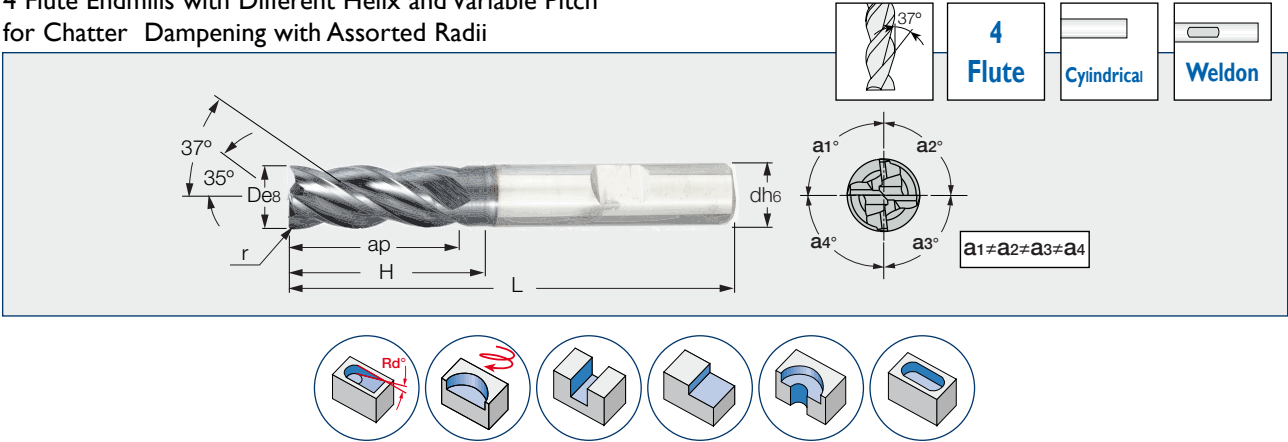
Designation									Recommended Machining Data
	D	d	ap	L	Flute	Rd°	Shank	Ch	fz (mm/t)
MRC-H4M 06-12C06VF-E57	6.00	6.00	12.00	57.00	4	5.0	C	0.25	0.03-0.07
MRC-H4M 06-12W06VF-E57	6.00	6.00	12.00	57.00	4	5.0	W	0.25	0.03-0.07
MRC-H4M 08-16C08VF-E63	8.00	8.00	16.00	63.00	4	5.0	C	0.3	0.03-0.09
MRC-H4M 08-16W08VF-E63	8.00	8.00	16.00	63.00	4	5.0	W	0.3	0.03-0.09
MRC-H4M 10-20C10VF-E72	10.00	10.00	20.00	72.00	4	5.0	C	0.4	0.03-0.09
MRC-H4M 10-20W10VF-E72	10.00	10.00	20.00	72.00	4	5.0	W	0.4	0.03-0.09
MRC-H4M 12-24C12VF-E83	12.00	12.00	24.00	83.00	4	5.0	C	0.5	0.04-0.10
MRC-H4M 12-24W12VF-E83	12.00	12.00	24.00	83.00	4	5.0	W	0.5	0.04-0.10
MRC-H4M 16-32C16VF-E92	16.00	16.00	32.00	92.00	4	5.0	C	0.6	0.04-0.11
MRC-H4M 16-32W16VF-E92	16.00	16.00	32.00	92.00	4	5.0	W	0.6	0.04-0.11
MRC-H4M 20-40C20VF-E104	20.00	20.00	40.00	104.00	4	5.0	C	0.6	0.05-0.11
MRC-H4M 20-40W20VF-E104	20.00	20.00	40.00	104.00	4	5.0	W	0.6	0.05-0.11

Available grade: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-H4L-VFR (3XD neck relief)
 4 Flute Endmills with Different Helix and Variable Pitch
 for Chatter Dampening with Assorted Radii



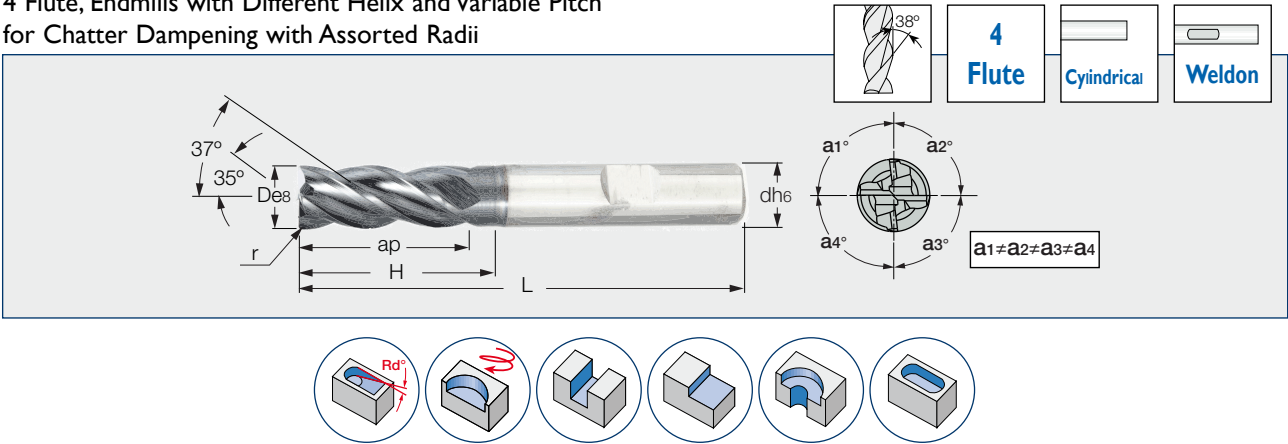
Designation										Recommended Machining Data
	D	d	ap	H	L	Flute	Rd°	Shank	r	fz (mm/t)
MRC-H4L 01-02/3C4VFR.05-50	1.00	4.00	2.00	3.00	50.00	4	5.0	C	0.05	0.01-0.01
MRC-H4L 02-04/6C4VFR.1-50	2.00	4.00	4.00	6.00	50.00	4	5.0	C	0.10	0.01-0.02
MRC-H4L 03-06/9C6VFR.15-57	3.00	6.00	6.00	9.00	57.00	4	5.0	C	0.15	0.01-0.04
MRC-H4L 04-08/12C6VFR.2-57	4.00	6.00	8.00	12.00	57.00	4	5.0	C	0.20	0.02-0.05
MRC-H4L 05-10/15C6VFR.2-57	5.00	6.00	10.00	15.00	57.00	4	5.0	C	0.20	0.03-0.06
MRC-H4L 06-12/20C6VFR.2-57	6.00	6.00	12.00	20.00	57.00	4	5.0	C	0.20	0.03-0.06
MRC-H4L 06-12/20W6VFR.2-57	6.00	6.00	12.00	20.00	57.00	4	5.0	W	0.20	0.03-0.06
MRC-H4L 08-16/26C8VFR.4-63	8.00	8.00	16.00	26.00	63.00	4	5.0	C	0.40	0.03-0.08
MRC-H4L 08-16/26W8VFR.4-63	8.00	8.00	16.00	26.00	63.00	4	5.0	W	0.40	0.03-0.08
MRC-H4L 10-20/32C10VFR.5	10.00	10.00	20.00	32.00	72.00	4	5.0	C	0.50	0.03-0.09
MRC-H4L 10-20/32W10VFR.5	10.00	10.00	20.00	32.00	72.00	4	5.0	W	0.50	0.03-0.09
MRC-H4L 12-24/38C12VFR.6	12.00	12.00	24.00	38.00	83.00	4	5.0	C	0.60	0.04-0.10
MRC-H4L 12-24/38W12VFR.6	12.00	12.00	24.00	38.00	83.00	4	5.0	W	0.60	0.04-0.10
MRC-H4L 16-32/50C16VFR.8	16.00	16.00	32.00	50.00	100.00	4	5.0	C	0.80	0.05-0.11
MRC-H4L 16-32/50W16VFR.8	16.00	16.00	32.00	50.00	100.00	4	5.0	W	0.80	0.05-0.11
MRC-H4L 20-40/60C20VFR1.0	20.00	20.00	40.00	60.00	110.00	4	5.0	C	1.00	0.05-0.11
MRC-H4L 20-40/60W20VFR1.0	20.00	20.00	40.00	60.00	110.00	4	5.0	W	1.00	0.05-0.11

Available grade: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-H4XL-VFR (4XD neck relief)
 4 Flute, Endmills with Different Helix and Variable Pitch
 for Chatter Dampening with Assorted Radii



Designation											Recommended Machining Data
	D	d	ap	H	L	Flute	Rd°	Shank	r		fz (mm/t)
MRC-H4XL 06-12/25C06VFR.2	6.00	6.00	12.00	25.00	61.00	4	5.0	C	0.20		0.03-0.06
MRC-H4XL 06-12/25W06VFR.2	6.00	6.00	12.00	25.00	61.00	4	5.0	W	0.20		0.03-0.06
MRC-H4XL 08-16/32C08VFR.4	8.00	8.00	16.00	32.00	68.00	4	5.0	C	0.40		0.03-0.08
MRC-H4XL 08-16/32W08VFR.4	8.00	8.00	16.00	32.00	68.00	4	5.0	W	0.40		0.03-0.08
MRC-H4XL 10-20/40C10VFR.5	10.00	10.00	20.00	40.00	80.00	4	5.0	C	0.50		0.03-0.09
MRC-H4XL 10-20/40W10VFR.5	10.00	10.00	20.00	40.00	80.00	4	5.0	W	0.50		0.03-0.09
MRC-H4XL 12-24/50C12VFR.6	12.00	12.00	24.00	50.00	95.00	4	5.0	C	0.60		0.04-0.10
MRC-H4XL 12-24/50W12VFR.6	12.00	12.00	24.00	50.00	95.00	4	5.0	W	0.60		0.04-0.10
MRC-H4XL 16-32/64C16VFR.8	16.00	16.00	32.00	64.00	115.00	4	5.0	C	0.80		0.05-0.11
MRC-H4XL 16-32/64W16VFR.8	16.00	16.00	32.00	64.00	115.00	4	5.0	W	0.80		0.05-0.11
MRC-H4XL 20-40/75C20VFR1.0	20.00	20.00	40.00	75.00	125.00	4	5.0	C	1.00		0.05-0.11
MRC-H4XL 20-40/75W20VFR1.0	20.00	20.00	40.00	75.00	125.00	4	5.0	W	1.00		0.05-0.11

Available grade: MC98

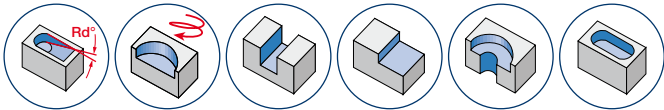
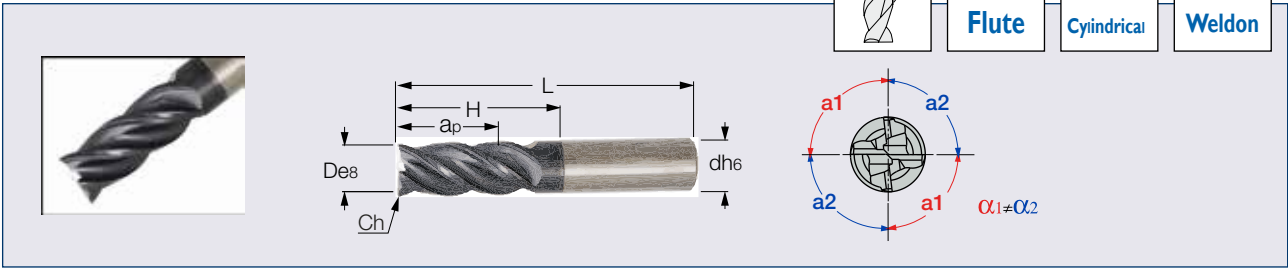
For user guide, see pages 106-114



SOLID CARBIDE ENDMILLS

MRC-E4L-VF

4 Flute Endmills, 38° Helix, Variable Pitch for
Vibration Dampening with 3xD Relieved Necks



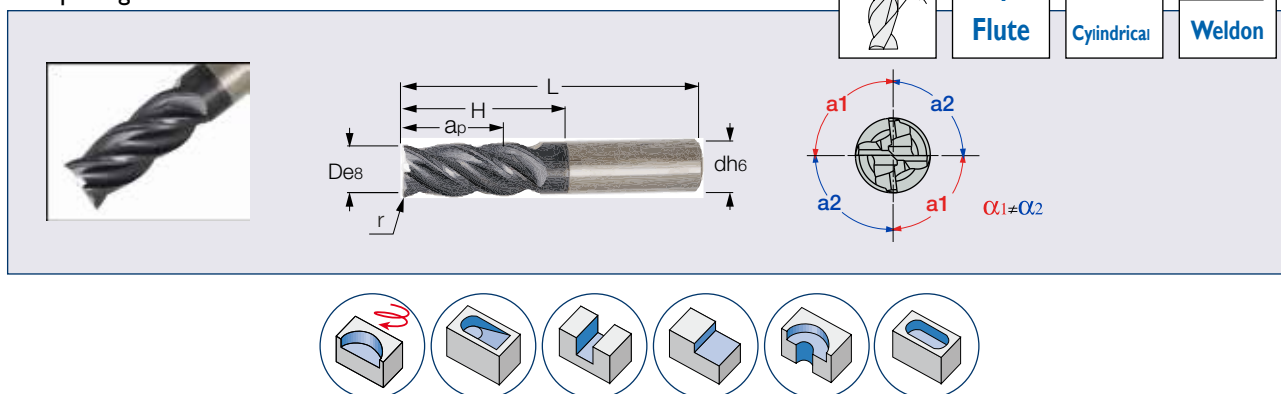
Designation										Recommended Machining Data	Tough ↔ Hard		
	D	d	ap	H	L	Flute	Rd°	Shank	Ch	fz (mm/t)	MC38	MC68	MC98
MRC-E4L 01-2/04C04VF50	1.00	4.00	2.00	4.00	50.00	4	5.0	C	0.04	0.02-0.05			●
MRC-E4L 02-4/06C04VF50	2.00	4.00	4.00	6.00	50.00	4	5.0	C	0.08	0.02-0.05			●
MRC-E4L 03-8/11C06VF57	3.00	6.00	8.00	11.00	57.00	4	5.0	C	0.10	0.02-0.05	●	●	●
MRC-E4L 04-10/14C06VF57	4.00	6.00	10.00	14.00	57.00	4	5.0	C	0.15	0.02-0.05	●	●	●
MRC-E4L 05-12/17C06VF57	5.00	6.00	12.00	17.00	57.00	4	5.0	C	0.18	0.02-0.06	●	●	●
MRC-E4L 06-14/20C06VFS57	6.00	6.00	14.00	20.00	57.00	4	5.0	C	0	0.03-0.07			●
MRC-E4L 06-14/20C06VF57	6.00	6.00	14.00	20.00	57.00	4	5.0	C	0.25	0.03-0.07	●	●	●
MRC-E4L 06-14/20W06VF57	6.00	6.00	14.00	20.00	57.00	4	5.0	W	0.25	0.03-0.07	●	●	●
MRC-E4L 08-18/26C08VFS63	8.00	8.00	18.00	26.00	63.00	4	5.0	C	0	0.03-0.08			●
MRC-E4L 08-18/26C08VF63	8.00	8.00	18.00	26.00	63.00	4	5.0	C	0.30	0.03-0.09	●	●	●
MRC-E4L 08-18/26W08VF63	8.00	8.00	18.00	26.00	63.00	4	5.0	W	0.30	0.03-0.09	●	●	●
MRC-E4L 10-22/32C10VFS72	10.00	10.00	22.00	32.00	72.00	4	5.0	C	0	0.03-0.09			●
MRC-E4L 10-22/32C10VF72	10.00	10.00	22.00	32.00	72.00	4	5.0	C	0.40	0.03-0.10	●	●	●
MRC-E4L 10-22/32W10VF72	10.00	10.00	22.00	32.00	72.00	4	5.0	W	0.40	0.03-0.10	●	●	
MRC-E4L 12-26/38C12VFS83	12.00	12.00	26.00	38.00	83.00	4	5.0	C	0	0.04-0.10			●
MRC-E4L 12-26/38C12VF83	12.00	12.00	26.00	38.00	83.00	4	5.0	C	0.50	0.04-0.11	●	●	●
MRC-E4L 12-26/38W12VF83	12.00	12.00	26.00	38.00	83.00	4	5.0	W	0.50	0.04-0.11	●	●	●
MRC-E4L 16-34/50C16VF100	16.00	16.00	34.00	50.00	100.00	4	5.0	C	0.60	0.05-0.13	●	●	●
MRC-E4L 16-34/50W16VF100	16.00	16.00	34.00	50.00	100.00	4	5.0	W	0.60	0.05-0.13	●	●	●
MRC-E4L 20-42/60C20VF110	20.00	20.00	42.00	60.00	110.00	4	5.0	C	0.60	0.05-0.17	●	●	●
MRC-E4L 20-42/60W20VF110	20.00	20.00	42.00	60.00	110.00	4	5.0	W	0.60	0.05-0.17	●	●	●
MRC-E4L 25-50/65C25VF121	25.00	25.00	50.00	65.00	121.00	4	5.0	C	0.60	0.05-0.17			●
MRC-E4L 25-50/65W25VF121	25.00	25.00	50.00	65.00	121.00	4	5.0	W	0.60	0.05-0.17			●

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-E4L

4 Flute Endmills, 38° Helix, Variable Pitch for Chatter Dampening with 3xD Relieved Necks with Corner Radii



Designation										Recommended Machining Data
	D	d	ap	H	L	Flute	r	Rd°	Shank	fz (mm/t)
MRC-E4L 06-12/42W06VFR.4	6.00	6.00	12.00	42.00	100.00	4	0.4	5.0	W	0.03-0.08
MRC-E4L 06-17/22C06VFR.3	6.00	6.00	17.00	22.00	66.00	4	0.3	5.0	c	0.03-0.08
MRC-E4L 08-16/62W08VFR.4	8.00	8.00	16.00	62.00	100.00	4	0.4	5.0	W	0.03-0.08
MRC-E4L 08-22/28C08VFR.4	8.00	8.00	22.00	28.00	80.00	4	0.4	5.0	c	0.03-0.08
MRC-E4L 10-20/60W10VFR.5	10.00	10.00	20.00	60.00	125.00	4	0.5	5.0	W	0.03-0.10
MRC-E4L 10-28/36C10VFR.5	10.00	10.00	28.00	36.00	73.00	4	0.5	5.0	c	0.03-0.10
MRC-E4L 12-24/73W12VFR.5	12.00	12.00	24.00	73.00	125.00	4	0.5	5.0	W	0.04-0.10
MRC-E4L 12-30/42C12VFR.5	12.00	12.00	30.00	42.00	83.00	4	0.5	5.0	c	0.04-0.10
MRC-E4L 16-32/100W16VFR.6	16.00	16.00	32.00	100.00	150.00	4	0.6	5.0	W	0.05-0.11

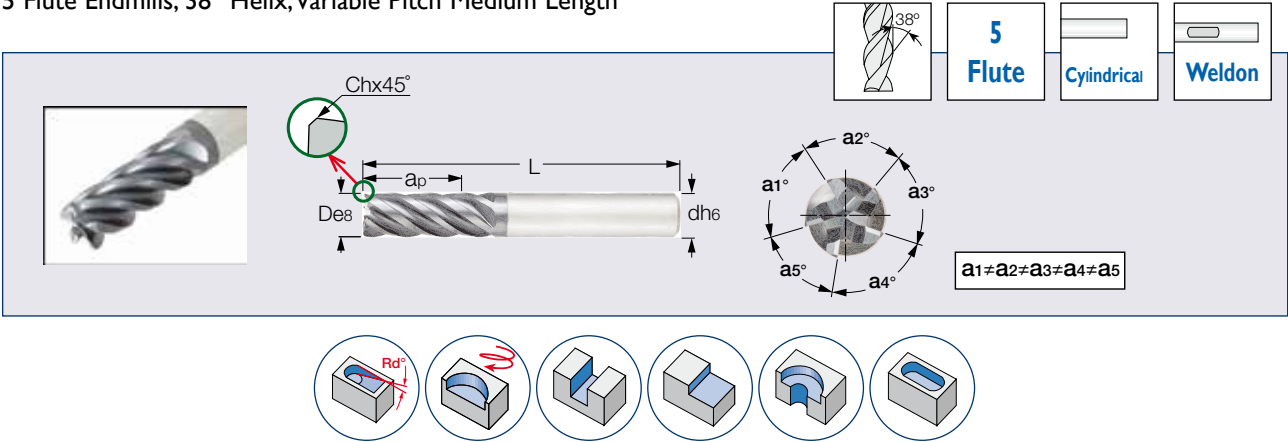
Available grade: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-E5L-VF

5 Flute Endmills, 38° Helix, Variable Pitch Medium Length



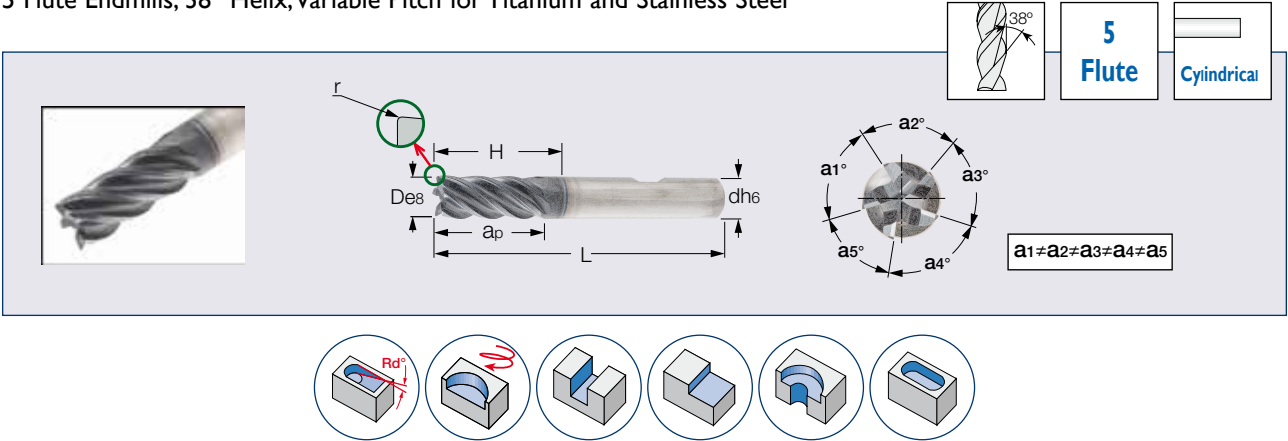
Designation	D	d	ap	L	Flute	Rd°	Shank	Ch	Recommended Machining Data
									fz (mm/t)
MRC-E5L 06-15C06VF57	6.00	6.00	15.00	57.00	5	5.0	C	0.20	0.03-0.07
MRC-E5L 06-15W06VF57	6.00	6.00	15.00	57.00	5	5.0	W	0.20	0.03-0.07
MRC-E5L 08-20C08VF63	8.00	8.00	20.00	63.00	5	5.0	C	0.25	0.03-0.09
MRC-E5L 08-20W08VF63	8.00	8.00	20.00	63.00	5	5.0	W	0.25	0.03-0.09
MRC-E5L 10-25C10VF72	10.00	10.00	25.00	72.00	5	5.0	C	0.30	0.03-0.10
MRC-E5L 10-25W10VF72	10.00	10.00	25.00	72.00	5	5.0	W	0.30	0.03-0.10
MRC-E5L 12-30C12VF83	12.00	12.00	30.00	83.00	5	5.0	C	0.40	0.04-0.11
MRC-E5L 12-30W12VF83	12.00	12.00	30.00	83.00	5	5.0	W	0.40	0.04-0.11
MRC-E5L 16-40C16VF100	16.00	16.00	40.00	100.00	5	5.0	C	0.50	0.05-0.13
MRC-E5L 16-40W16VF100	16.00	16.00	40.00	100.00	5	5.0	W	0.50	0.05-0.13
MRC-E5L 20-50C20VF125	20.00	20.00	50.00	125.00	5	5.0	C	0.50	0.05-0.17
MRC-E5L 20-50W20VF125	20.00	20.00	50.00	125.00	5	5.0	W	0.50	0.05-0.17

Available grade: MC98

For user guide, see pages 106-114

MRC-E5T (3XD neck relief)

5 Flute Endmills, 38° Helix, Variable Pitch for Titanium and Stainless Steel



Designation	D	d	ap	H	L	Flute	Rd°	Shank	R	Recommended Machining Data
										fz (mm/t)
MRC-E5T 04-11/16C6R.25-57	4.00	6.00	11.00	16.00	57.00	5	5.0	c	0.5	0.03-0.04
MRC-E5T 05-13/18C6R.25-51	5.00	6.00	13.00	18.00	51.00	5	5.0	c	0.6	0.03-0.07
MRC-E5T 06-12/18C6R.3-58	6.00	6.00	12.00	18.00	58.00	5	5.0	c	3.0	0.03-0.07
MRC-E5T 08-16/21C8R.5-63	8.00	8.00	16.00	21.00	63.00	5	5.0	c	5.0	0.03-0.09
MRC-E5T 10-22/28C10R.5-72	10.00	10.00	22.00	28.00	72.00	5	5.0	c	5.0	0.04-0.10
MRC-E5T 12-27/35C12R.6-83	12.00	12.00	27.00	35.00	83.00	5	5.0	c	0.5	0.05-0.08
MRC-E5T 16-32/45C16R.5-92	16.00	16.00	32.00	45.00	92.00	5	5.0	c	0.5	0.05-0.13

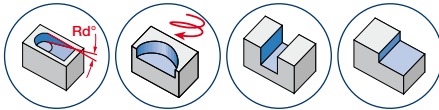
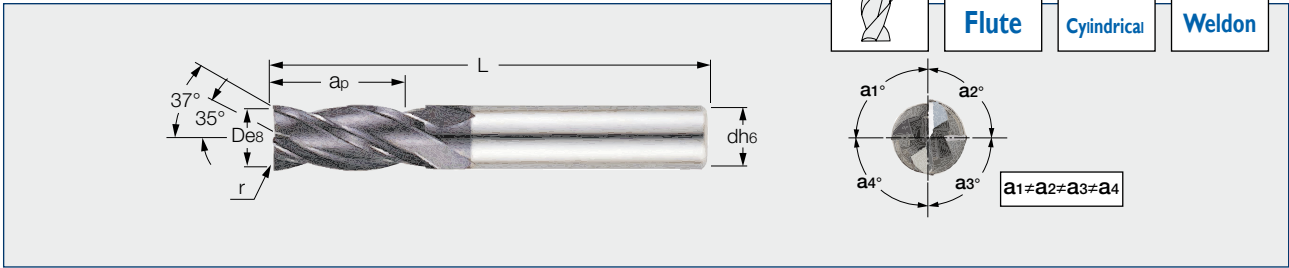
Available grade: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRCK-H4M-VFR

4 Flute Endmills with Different Helix (35° & 37°),Variable Pitch for Chatter Dampening with Radii, Used for High Titanium Removal Rates



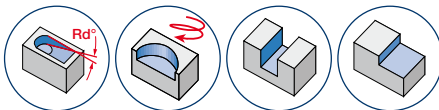
Designation									Recommended Machining Data
	D	d	ap	L	Flute	Rd°	Shank	r	fz (mm/t)
MRCK-H4M 04-08C06VFR0.2-57	6.00	6.00	12.00	57.00	4	5.0	C	0.2	0.03-0.05
MRCK-H4M 05-10C06VFR0.2-57	6.00	6.00	12.00	57.00	4	5.0	W	0.2	0.03-0.05
MRCK-H4M 06-12C06VFR0.2-57	8.00	8.00	16.00	63.00	4	5.0	C	0.2	0.03-0.06
MRCK-H4M 06-12W06VFR0.2-57	8.00	8.00	16.00	63.00	4	5.0	W	0.2	0.03-0.06
MRCK-H4M 08-16C08VFR0.4-63	10.00	10.00	20.00	72.00	4	5.0	C	0.4	0.03-0.06
MRCK-H4M 08-16W08VFR0.4-63	10.00	10.00	20.00	72.00	4	5.0	W	0.4	0.03-0.06
MRCK-H4M 10-20C10VFR0.5-72	12.00	12.00	24.00	83.00	4	5.0	C	0.5	0.03-0.07
MRCK-H4M 10-20W10VFR0.5-72	12.00	12.00	24.00	83.00	4	5.0	W	0.5	0.03-0.07
MRCK-H4M 12-24C12VFR0.6-83	16.00	16.00	32.00	92.00	4	5.0	C	0.6	0.04-0.08
MRCK-H4M 12-24W12VFR.6	16.00	16.00	32.00	92.00	4	5.0	W	0.6	0.04-0.08
MRCK-H4M 12-24W12VFR.6-83	20.00	20.00	40.00	104.00	4	5.0	C	0.6	0.04-0.08
MRCK-H4M 16-32C16VFR0.8-92	20.00	20.00	40.00	104.00	4	5.0	W	0.8	0.05-0.08
MRCK-H4M 16-32W16VFR0.8-92	16.00	16.00	32.00	92.00	4	5.0	W	0.8	0.05-0.08
MRCK-H4M 20-40C20VFR1.-104	20.00	20.00	40.00	104.00	4	5.0	C	I	0.05-0.08
MRCK-H4M 20-40W20VFR1.-104	20.00	20.00	40.00	104.00	4	5.0	W	I	0.05-0.08

Available grade: MC98

For user guide, see pages 106-114

MRCK-H4M-VFR-C

4 Flute Endmills with Different Helix (35° & 37°),Variable Pitch for Chatter Dampening with Radii and Internal Coolant, Used for Titanium



Designation									Recommended Machining Data
	D	d	ap	L	Flute	Rd°	Shank	r	fz (mm/t)
MRCK-H4M 06-12C06VFR.2-57C	6.00	6.00	12.00	57.00	4	5.0	C	0.2	0.03-0.06
MRCK-H4M 08-16W08VFR.4-63C	8.00	8.00	16.00	63.00	4	5.0	W	0.4	0.03-0.06
MRCK-H4M 10-20W10VFR.5-72C	10.00	10.00	20.00	72.00	4	5.0	C	0.5	0.03-0.07
MRCK-H4M 12-24W12VFR.6-83C	12.00	12.00	24.00	83.00	4	5.0	W	0.6	0.03-0.08
MRCK-H4M 16-32W16VFR.8-92C	16.00	16.00	32.00	92.00	4	5.0	C	0.8	0.03-0.08

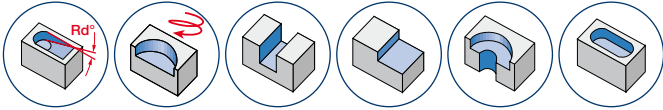
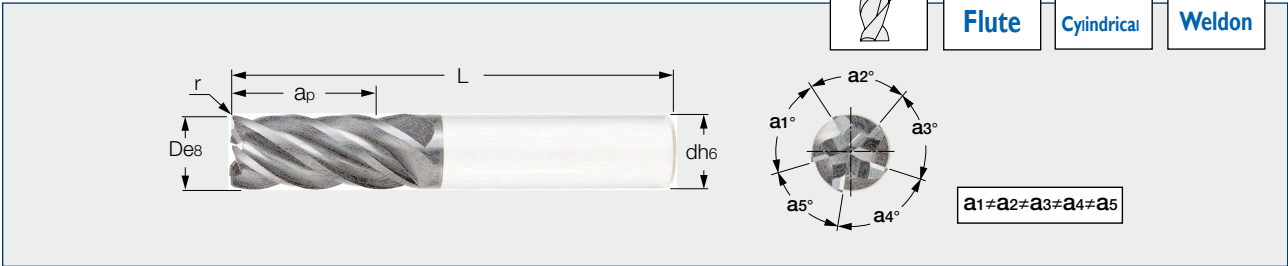
Available grade: MC38

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-H5M-VFR

5 Flute Endmills with Different Helix (36° & 38°) and Variable Pitch for Chatter Dampening with Assorted Radii



Designation										Recommended Machining Data
	D	d	a _p	L	Flute	R _d °	Shank	r		f _z (mm/t)
MRC-H5M 04-09C06VFR0.2-57	4.00	6.00	9.00	57.00	5	5.0	C	0.20		0.02-0.04
MRC-H5M 05-11C06VFR0.2-57	5.00	6.00	11.00	57.00	5	5.0	C	0.20		0.02-0.04
MRC-H5M 06-13C06VFR0.2-57	6.00	6.00	13.00	57.00	5	5.0	C	0.20		0.03-0.07
MRC-H5M 06-13W06VFR0.2-57	6.00	6.00	13.00	57.00	5	5.0	W	0.20		0.03-0.07
MRC-H5M 08-19C08VFR0.4-63	8.00	8.00	19.00	63.00	5	5.0	C	0.40		0.03-0.09
MRC-H5M 08-19W08VFR0.4-63	8.00	8.00	19.00	63.00	5	5.0	W	0.40		0.03-0.09
MRC-H5M 10-22C10VFR0.5-72	10.00	10.00	22.00	72.00	5	5.0	C	0.50		0.03-0.10
MRC-H5M 10-22W10VFR0.5-72	10.00	10.00	22.00	72.00	5	5.0	W	0.50		0.03-0.10
MRC-H5M 12-26C12VFR0.6-83	12.00	12.00	26.00	83.00	5	5.0	C	0.60		0.04-0.11
MRC-H5M 12-26W12VFR0.6-83	12.00	12.00	26.00	83.00	5	5.0	W	0.60		0.04-0.11
MRC-H5M 16-32C16VFR0.8-92	16.00	16.00	32.00	92.00	5	5.0	C	0.80		0.05-0.13
MRC-H5M 16-32W16VFR0.8-92	16.00	16.00	32.00	92.00	5	5.0	W	0.80		0.05-0.13
MRC-H5M 20-38C20VFR1-104	20.00	20.00	38.00	104.00	5	5.0	C	1.00		0.05-0.17
MRC-H5M 20-38W20VFR1-104	20.00	20.00	38.00	104.00	5	5.0	W	1.00		0.05-0.17

Available grade: MC98

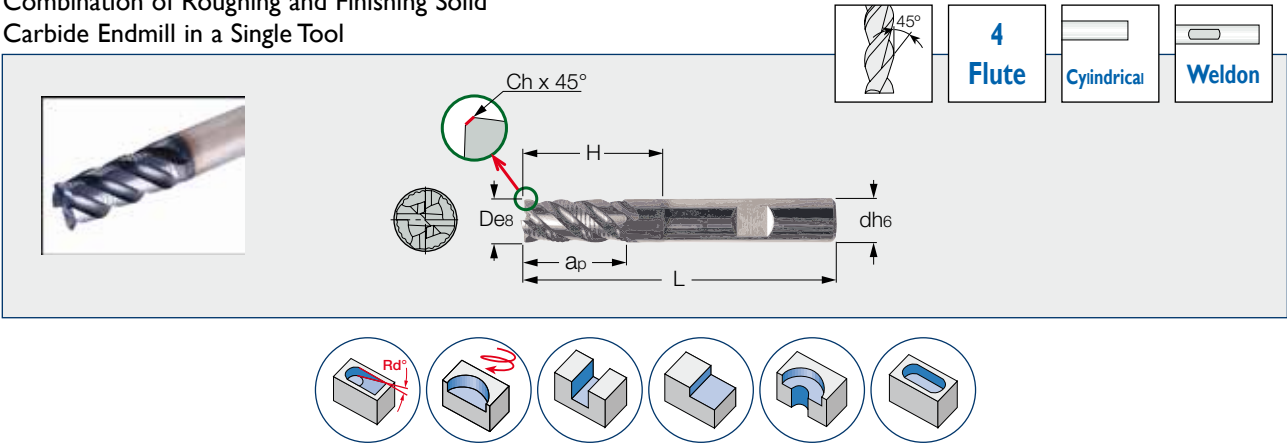
For user guide, see pages 106-114



SOLID CARBIDE ENDMILLS

MRFS-B44

Combination of Roughing and Finishing Solid Carbide Endmill in a Single Tool



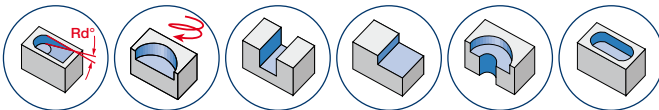
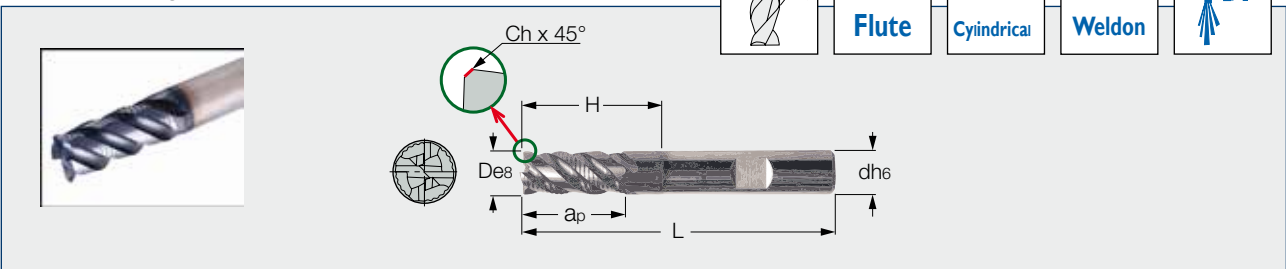
Designation											Recommended Machining Data	Tough ↔ Hard		
	D	d	a _p	H	L	Flute	R _d °	Shank	Ch	f _z (mm/t)		MC38	MC68	MC98
MRFS-B44 04-10C06-57	4.00	6.00	10.00	-	57.00	4	5.0	C	0.12	0.03-0.05				●
MRFS-B44 05-12C06-57	5.00	6.00	12.00	-	57.00	4	5.0	C	0.18	0.03-0.05				●
MRFS-B44 06-14/20C06-57	6.00	6.00	14.00	20.00	57.00	4	5.0	C	0.25	0.03-0.06				●
MRFS-B44 06-14/20W06-57	6.00	6.00	14.00	20.00	57.00	4	5.0	W	0.25	0.03-0.06				●
MRFS-B44 06-14C06-57	6.00	6.00	14.00	-	57.00	4	5.0	C	0.25	0.03-0.06	●	●	●	●
MRFS-B44 06-14W06-57	6.00	6.00	14.00	-	57.00	4	5.0	W	0.25	0.03-0.06		●	●	●
MRFS-B44 08-18/26C08-63	8.00	8.00	18.00	26.00	63.00	4	5.0	C	0.30	0.03-0.08				●
MRFS-B44 08-18/26W08-63	8.00	8.00	18.00	26.00	63.00	4	5.0	W	0.30	0.03-0.08				●
MRFS-B44 08-18C08-63	8.00	8.00	18.00	-	63.00	4	5.0	C	0.30	0.03-0.08	●	●	●	●
MRFS-B44 08-18W08-63	8.00	8.00	18.00	-	63.00	4	5.0	W	0.30	0.03-0.08	●	●	●	●
MRFS-B44 10-22/32C10-72	10.00	10.00	22.00	32.00	72.00	4	5.0	C	0.30	0.03-0.09				●
MRFS-B44 10-22/32W10-72	10.00	10.00	22.00	32.00	72.00	4	5.0	W	0.30	0.03-0.09				●
MRFS-B44 10-22C10-72	10.00	10.00	22.00	-	72.00	4	5.0	C	0.30	0.03-0.09	●	●	●	●
MRFS-B44 10-22W10-72	10.00	10.00	22.00	-	72.00	4	5.0	W	0.30	0.03-0.09		●	●	●
MRFS-B44 12-26/38C12-83	12.00	12.00	26.00	38.00	83.00	4	5.0	C	0.40	0.04-0.10				●
MRFS-B44 12-26/38W12-83	12.00	12.00	26.00	38.00	83.00	4	5.0	W	0.40	0.04-0.10				●
MRFS-B44 12-26C12-83	12.00	12.00	26.00	-	83.00	4	5.0	C	0.40	0.04-0.10			●	●
MRFS-B44 12-26W12-83	12.00	12.00	26.00	-	83.00	4	5.0	W	0.40	0.04-0.10	●	●	●	●
MRFS-B44 14-30C14-83	14.00	14.00	30.00	-	83.00	4	5.0	C	0.40	0.04-0.11	●	●	●	●
MRFS-B44 14-30W14-83	14.00	14.00	30.00	-	83.00	4	5.0	W	0.40	0.04-0.11	●	●	●	●
MRFS-B44 16-34/50C16-100	16.00	16.00	34.00	50.00	100.00	4	5.0	C	0.60	0.05-0.11				●
MRFS-B44 16-34/50W16-100	16.00	16.00	34.00	50.00	100.00	4	5.0	W	0.60	0.05-0.11				●
MRFS-B44 16-34C16-92	16.00	16.00	34.00	-	92.00	4	5.0	C	0.60	0.05-0.11	●	●	●	●
MRFS-B44 16-34W16-92	16.00	16.00	34.00	-	92.00	4	5.0	W	0.60	0.05-0.11	●	●	●	●
MRFS-B44 20-42/62C20-125	20.00	20.00	42.00	62.00	125.00	4	5.0	C	0.60	0.05-0.11				●
MRFS-B44 20-42/62W20-125	20.00	20.00	42.00	62.00	125.00	4	5.0	W	0.60	0.05-0.11				●
MRFS-B44 20-42C20-104	20.00	20.00	42.00	-	104.00	4	5.0	C	0.60	0.05-0.11	●	●	●	●
MRFS-B44 20-42W20-104	20.00	20.00	42.00	-	104.00	4	5.0	W	0.60	0.05-0.11	●	●	●	●
MRFS-B44 25-52C25-121	25.00	25.00	52.00	-	121.00	4	5.0	C	0.60	0.06-0.11	●	●	●	●
MRFS-B44 25-52W25-121	25.00	25.00	52.00	-	121.00	4	5.0	W	0.60	0.06-0.11		●	●	●

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRFS-B44 ...C

Combination of Roughing and Finishing Solid Carbide
Endmill in a Single Tool with Internal Coolant

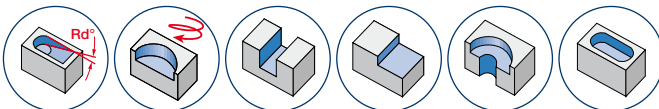
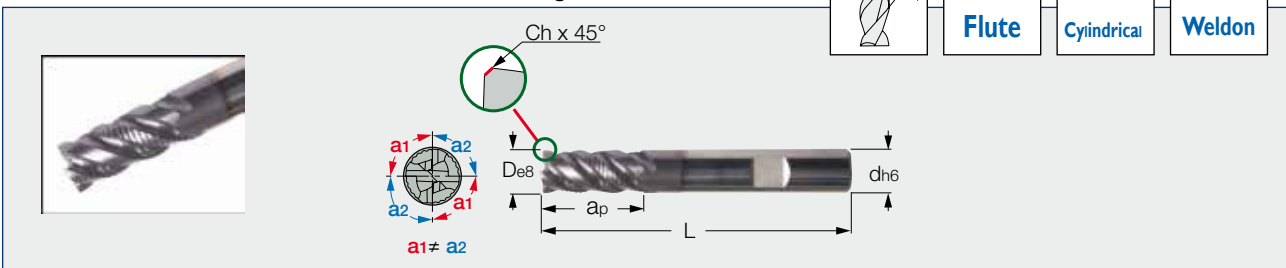


Designation									Recommended Machining Data
	D	d	a _p	L	Flute	Rd°	Shank	Ch	f _z (mm/t)
MRFS-B44 06-14C06-57C 38	6.00	6.00	14.00	57.00	4	5.0	C	0.25	0.03-0.06
MRFS-B44 08-18W08-63C 38	8.00	8.00	18.00	63.00	4	5.0	W	0.3	0.03-0.06
MRFS-B44 10-22W10-72C 38	10.00	10.00	22.00	72.00	4	5.0	W	0.3	0.03-0.06
MRFS-B44 12-26W12-83C 38	12.00	12.00	26.00	83.00	4	5.0	W	0.4	0.03-0.06
MRFS-B44 16-34W16-92C 38	16.00	16.00	34.00	92.00	4	5.0	W	0.6	0.03-0.08

Available grade: MC38 For user guide, see pages 106-114

MRFS-E44-VF

Combination of Roughing and Finishing Solid Carbide
Endmill with Variable Pitch for Vibration Free Milling



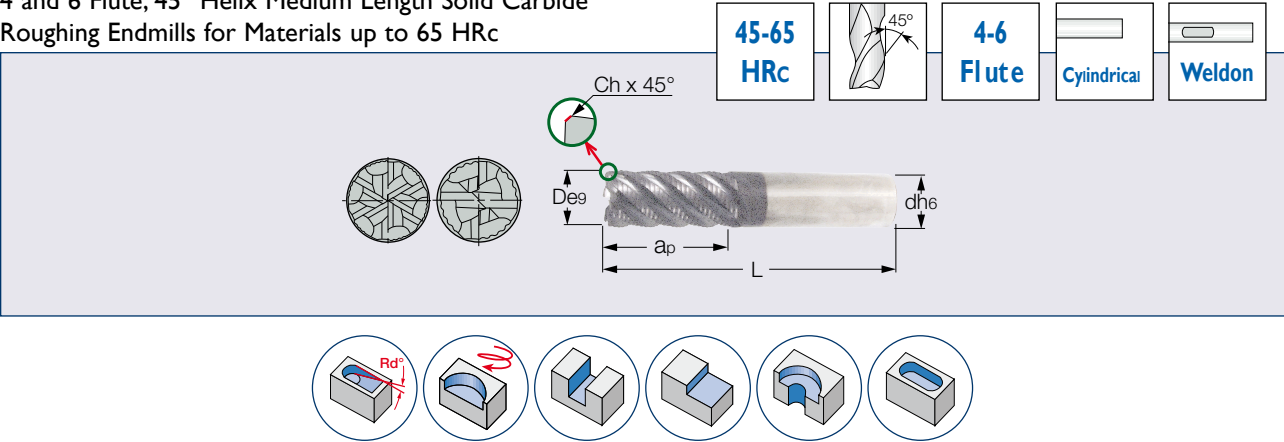
Designation									Recommended Machining Data
	D	d	a _p	L	Flute	Rd°	Shank ⁽¹⁾	Ch	f _z (mm/t)
MRFS-E44 06-14C06VF57	6.00	6.00	14.00	57.00	4	5.0	C	0.25	0.03-0.06
MRFS-E44 06-14W06VF57	6.00	6.00	14.00	57.00	4	5.0	W	0.25	0.03-0.06
MRFS-E44 08-18C08VF63	8.00	8.00	18.00	63.00	4	5.0	C	0.30	0.03-0.08
MRFS-E44 08-18W08VF63	8.00	8.00	18.00	63.00	4	5.0	W	0.30	0.03-0.08
MRFS-E44 10-22C10VF72	10.00	10.00	22.00	72.00	4	5.0	C	0.40	0.03-0.09
MRFS-E44 10-22W10VF72	10.00	10.00	22.00	72.00	4	5.0	W	0.40	0.03-0.09
MRFS-E44 12-26C12VF83	12.00	12.00	26.00	83.00	4	5.0	C	0.50	0.04-0.10
MRFS-E44 12-26W12VF83	12.00	12.00	26.00	83.00	4	5.0	W	0.50	0.04-0.10
MRFS-E44 14-30C14VF83	14.00	14.00	30.00	83.00	4	5.0	C	0.50	0.04-0.11
MRFS-E44 14-30W14VF83	14.00	14.00	30.00	83.00	4	5.0	W	0.50	0.04-0.11
MRFS-E44 16-34C16VF92	16.00	16.00	34.00	92.00	4	5.0	C	0.60	0.05-0.11
MRFS-E44 16-34W16VF92	16.00	16.00	34.00	92.00	4	5.0	W	0.60	0.05-0.11
MRFS-E44 20-42C20VF104	20.00	20.00	42.00	104.00	4	5.0	C	0.60	0.05-0.11
MRFS-E44 20-42W20VF104	20.00	20.00	42.00	104.00	4	5.0	W	0.60	0.05-0.11
MRFS-E44 25-52C25VF121	25.00	25.00	52.00	121.00	4	5.0	C	0.60	0.06-0.11
MRFS-E44 25-52W25VF121	25.00	25.00	52.00	121.00	4	5.0	W	0.60	0.06-0.11

Available grade: MC98 For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRR-B-MF

4 and 6 Flute, 45° Helix Medium Length Solid Carbide
Roughing Endmills for Materials up to 65 HRc



Designation										Recommended Machining Data
	D	d	ap	L	Flute	Rd°	Shank	Ch	fz (mm/t)	
MRR-B4MF 06-14C06-57	6.00	6.00	14.00	57.00	4	5.0	C	0.25	0.03-0.06	
MRR-B4MF 06-14W06-57	6.00	6.00	14.00	57.00	4	5.0	W	0.25	0.03-0.06	
MRR-B4MF 08-18C08-63	8.00	8.00	18.00	63.00	4	5.0	C	0.30	0.03-0.08	
MRR-B4MF 08-18W08-63	8.00	8.00	18.00	63.00	4	5.0	W	0.30	0.03-0.08	
MRR-B4MF 10-22C10-72	10.00	10.00	22.00	72.00	4	5.0	C	0.30	0.03-0.09	
MRR-B4MF 10-22W10-72	10.00	10.00	22.00	72.00	4	5.0	W	0.30	0.03-0.09	
MRR-B4MF 12-26C12-83	12.00	12.00	26.00	83.00	4	5.0	C	0.40	0.04-0.10	
MRR-B4MF 12-26W12-83	12.00	12.00	26.00	83.00	4	5.0	W	0.40	0.04-0.10	
MRR-B4MF 14-30C14-83	14.00	14.00	30.00	83.00	4	5.0	C	0.40	0.04-0.11	
MRR-B4MF 14-30W14-83	14.00	14.00	30.00	83.00	4	5.0	W	0.40	0.04-0.11	
MRR-B6MF 16-34C16-92	16.00	16.00	34.00	92.00	6	5.0	C	0.50	0.05-0.11	
MRR-B6MF 16-34W16-92	16.00	16.00	34.00	92.00	6	5.0	W	0.50	0.05-0.11	
MRR-B6MF 20-42C20-104	20.00	20.00	42.00	104.00	6	5.0	C	0.70	0.05-0.11	
MRR-B6MF 20-42W20-104	20.00	20.00	42.00	104.00	6	5.0	W	0.70	0.05-0.11	
MRR-B6MF 25-52C25-121	25.00	25.00	52.00	121.00	6	5.0	C	0.90	0.06-0.11	
MRR-B6MF 25-52W25-121	25.00	25.00	52.00	121.00	6	5.0	W	0.90	0.06-0.11	

Available grade: MC98

For user guide, see pages 106-114

The rougher's cutting edge profile has shallow serrations. This is a very durable design which leaves only a small amount of material for the finishing cut.

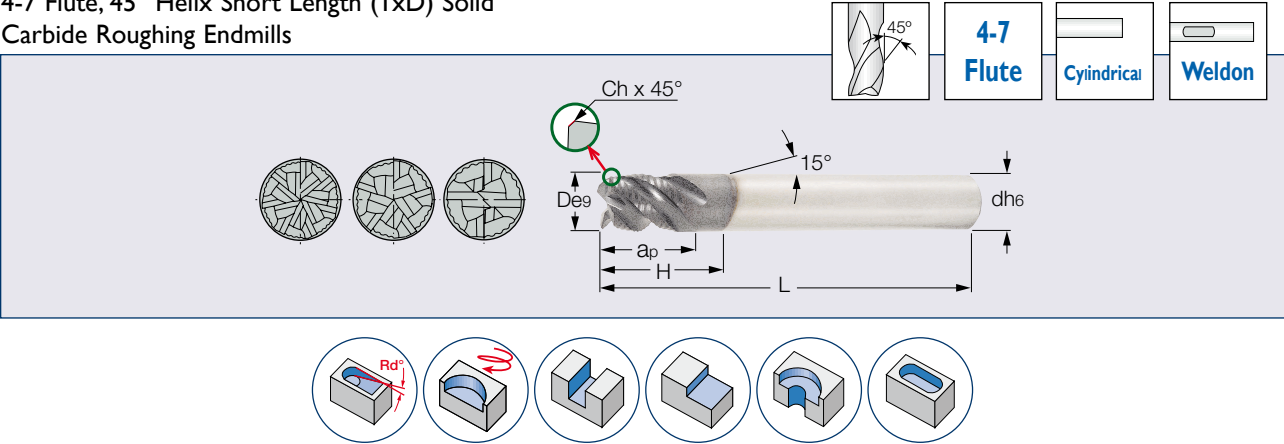
MRR-MF



SOLID CARBIDE ENDMILLS

MRR-B-S

4-7 Flute, 45° Helix Short Length (1xD) Solid Carbide Roughing Endmills



Designation											Recommended Machining Data
	D	d	ap	H	L	Flute	Rd°	Shank	Ch	fz (mm/t)	
MRR-B4S 05-05C06-57	5.00	6.00	5.00	10.00	57.00	4	5.0	C	0.20	0.02-0.05	
MRR-B4S 05-05W06-57	5.00	6.00	5.00	10.00	57.00	4	5.0	W	0.20	0.02-0.05	
MRR-B4S 06-06C06-57	6.00	6.00	6.00	-	57.00	4	5.0	C	0.25	0.03-0.06	
MRR-B4S 06-06W06-57	6.00	6.00	6.00	-	57.00	4	5.0	W	0.25	0.03-0.06	
MRR-B4S 07-07C08-63	7.00	8.00	7.00	-	63.00	4	5.0	C	0.25	0.03-0.07	
MRR-B4S 08-08C08-63	8.00	8.00	8.00	-	63.00	4	5.0	C	0.25	0.03-0.08	
MRR-B4S 08-08W08-63	8.00	8.00	8.00	-	63.00	4	5.0	W	0.25	0.03-0.08	
MRR-B4S 10-10C10-72	10.00	10.00	10.00	-	72.00	4	5.0	C	0.30	0.03-0.09	
MRR-B4S 10-10W10-72	10.00	10.00	10.00	-	72.00	4	5.0	W	0.30	0.03-0.09	
MRR-B4S 12-12C12-83	12.00	12.00	12.00	-	83.00	4	5.0	C	0.35	0.04-0.10	
MRR-B4S 12-12W12-83	12.00	12.00	12.00	-	83.00	4	5.0	W	0.35	0.04-0.10	
MRR-B5S 16-16C16-92	16.00	16.00	16.00	-	92.00	5	5.0	C	0.40	0.05-0.11	
MRR-B5S 16-16W16-92	16.00	16.00	16.00	-	92.00	5	5.0	W	0.40	0.05-0.11	
MRR-B7S 20-20C20-104	20.00	20.00	20.00	-	104.00	7	5.0	C	0.40	0.05-0.11	
MRR-B7S 20-20W20-104	20.00	20.00	20.00	-	104.00	7	5.0	W	0.40	0.05-0.11	

Available grade: MC98

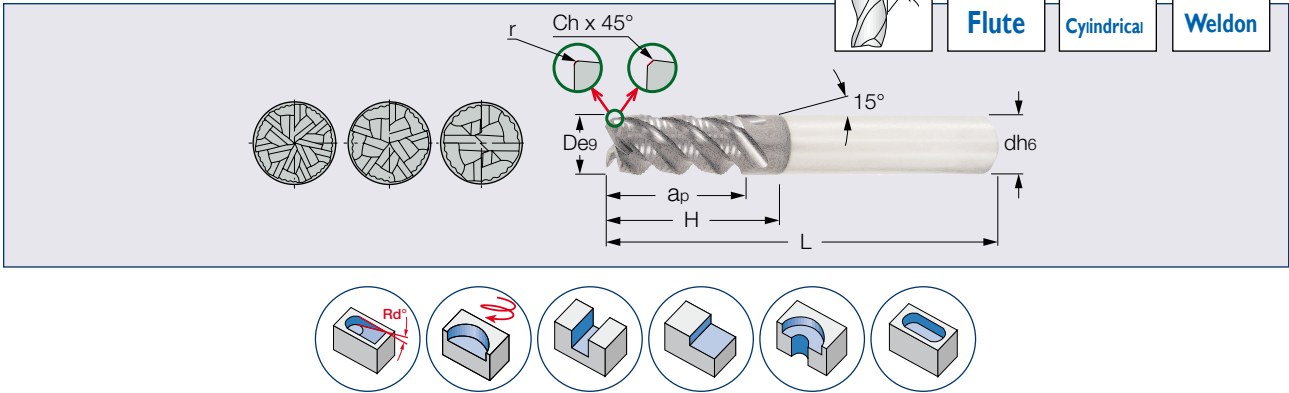
For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRR-B-M/MRR-B-M...R

4-7 Flute, 45° Helix Medium Length (2xD)

Solid Carbide Roughing Endmills



Designation											Recommended Machining Data
	D	d	ap	H	L	Flute	Ra°	Shank	r	Ch	fz (mm/t)
MRR-B4M 05-10C06-57	5.00	6.00	10.00	15.00	57.00	4	5.0	C	-	0.20	0.02-0.05
MRR-B4M 05-10V06-57	5.00	6.00	10.00	15.00	57.00	4	5.0	W	-	0.20	0.02-0.05
MRR-B4M 06-12C06-57	6.00	6.00	12.00	-	57.00	4	5.0	C	-	0.25	0.03-0.06
MRR-B4M 06-12V06-57	6.00	6.00	12.00	-	57.00	4	5.0	W	-	0.25	0.03-0.06
MRR-B4M 08-16C08-63	8.00	8.00	16.00	-	63.00	4	5.0	C	-	0.25	0.03-0.08
MRR-B4M 08-16V08-63	8.00	8.00	16.00	-	63.00	4	5.0	W	-	0.25	0.03-0.08
MRR-B4M 10-20C10-72	10.00	10.00	20.00	-	72.00	4	5.0	C	-	0.30	0.03-0.09
MRR-B4M 10-20C10-72R1.0	10.00	10.00	20.00	-	72.00	4	5.0	C	1.00	-	0.03-0.09
MRR-B4M 10-20W10-72	10.00	10.00	20.00	-	72.00	4	5.0	W	-	0.30	0.03-0.09
MRR-B4M 12-24C12-83	12.00	12.00	24.00	-	83.00	4	5.0	C	-	0.35	0.04-0.10
MRR-B4M 12-24C12-83R1.2	12.00	12.00	24.00	-	83.00	4	5.0	C	1.20	-	0.04-0.10
MRR-B4M 12-24W12-83	12.00	12.00	24.00	-	83.00	4	5.0	W	-	0.35	0.04-0.10
MRR-B4M 12-24W12-83R1.2	12.00	12.00	24.00	-	83.00	4	5.0	W	1.20	-	0.04-0.10
MRR-B5M 16-32C16-92	16.00	16.00	32.00	-	92.00	5	5.0	C	-	0.40	0.05-0.11
MRR-B5M 16-32C16-92R1.6	16.00	16.00	32.00	-	92.00	5	5.0	C	1.60	-	0.05-0.11
MRR-B5M 16-32W16-92	16.00	16.00	32.00	-	92.00	5	5.0	W	-	0.40	0.05-0.11
MRR-B5M 16-32W16-92R1.6	16.00	16.00	32.00	-	92.00	5	5.0	W	1.60	-	0.05-0.11
MRR-B7M 20-40C20-104	20.00	20.00	40.00	-	104.00	7	5.0	C	-	0.40	0.05-0.11
MRR-B7M 20-40V20-104	20.00	20.00	40.00	-	104.00	7	5.0	W	-	0.40	0.05-0.11

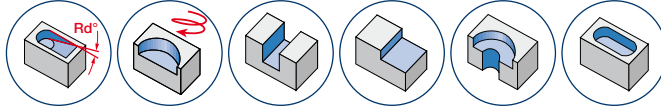
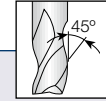
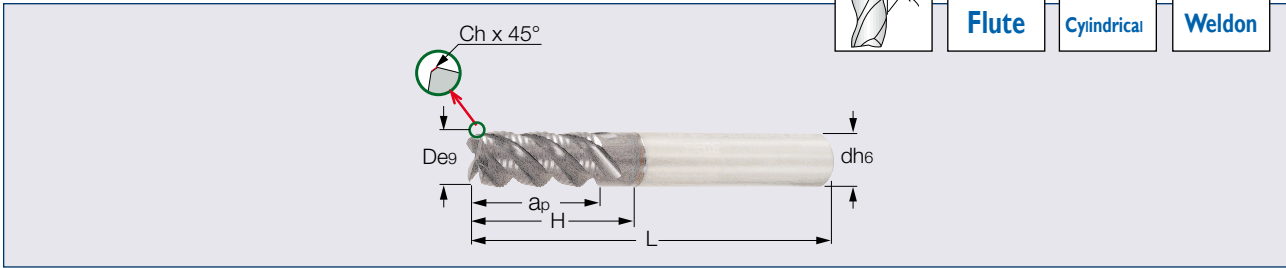
Available grade: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRR-B-L

4-7 Flute, 45° Helix Solid Carbide Roughing
Endmills with 3xD Relieved Necks



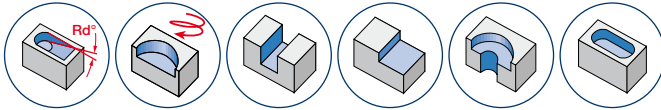
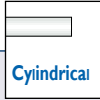
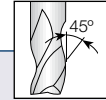
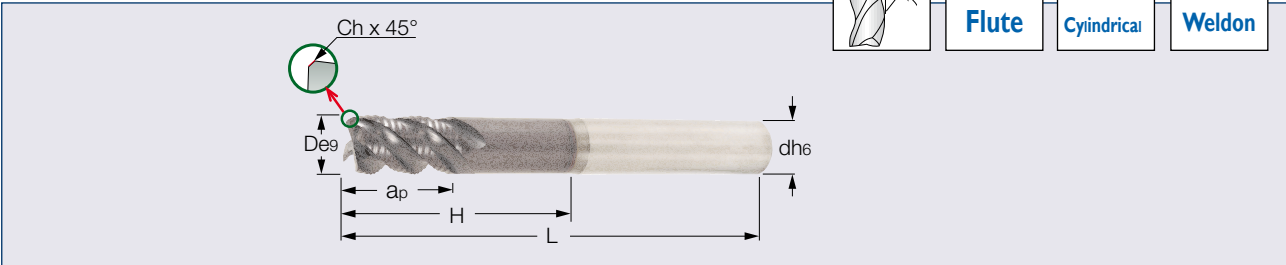
Designation	D	d	ap	H	L	Flute	Rd°	Shank	Ch	Recommended Machining Data fz (mm/t)
MRR-B4L 06-12/18C06-57	6.00	6.00	12.00	18.00	57.00	4	5.0	C	0.25	0.03-0.06
MRR-B4L 06-12/18W06-57 90	6.00	6.00	12.00	18.00	57.00	4	5.0	W	0.25	0.03-0.06
MRR-B4L 08-16/24C08-63	8.00	8.00	16.00	24.00	63.00	4	5.0	C	0.25	0.03-0.08
MRR-B4L 08-16/24W08-63 90	8.00	8.00	16.00	24.00	63.00	4	5.0	W	0.25	0.03-0.08
MRR-B4L 10-20/30C10-72	10.00	10.00	20.00	30.00	72.00	4	5.0	C	0.30	0.03-0.09
MRR-B4L 10-20/30W10-72 90	10.00	10.00	20.00	30.00	72.00	4	5.0	W	0.30	0.03-0.09
MRR-B4L 12-24/36C12-83	12.00	12.00	24.00	36.00	83.00	4	5.0	C	0.35	0.04-0.10
MRR-B4L 12-24/36W12-83	12.00	12.00	24.00	36.00	83.00	4	5.0	W	0.35	0.04-0.10
MRR-B5L 16-32/48C16-100	16.00	16.00	32.00	48.00	100.00	5	5.0	C	0.40	0.05-0.11
MRR-B5L 16-32/48W16-100	16.00	16.00	32.00	48.00	100.00	5	5.0	W	0.40	0.05-0.11
MRR-B7L 20-40/60C20-110	20.00	20.00	40.00	60.00	110.00	7	5.0	C	0.40	0.05-0.11
MRR-B7L 20-40/60W20-110	20.00	20.00	40.00	60.00	110.00	7	5.0	W	0.40	0.05-0.11

Available grade: MC98

For user guide, see pages 106-114

MRR-B-X

4-5 Flute, 45° Helix Solid Carbide Roughing
Endmills with 4xD Relieved Necks



Designation	D	d	ap	H	L	Flute	Rd°	Shank	Ch	Recommended Machining Data fz (mm/t)
MRR-B4X 08-12/32C08-68	8.00	8.00	12.00	32.00	68.00	4	5.0	C	0.25	0.03-0.08
MRR-B4X 08-12/32W08-68	8.00	8.00	12.00	32.00	68.00	4	5.0	W	0.25	0.03-0.08
MRR-B4X 10-15/40C10-80 90	10.00	10.00	15.00	40.00	80.00	4	5.0	C	0.30	0.03-0.09
MRR-B4X 10-15/40W10-80 90	10.00	10.00	15.00	40.00	80.00	4	5.0	W	0.30	0.03-0.09
MRR-B4X 12-18/48C12-100	12.00	12.00	18.00	48.00	100.00	4	5.0	C	0.35	0.04-0.10
MRR-B4X 12-18/48W12-100	16.00	16.00	18.00	48.00	100.00	4	5.0	W	0.35	0.05-0.11
MRR-B5X 16-24/64C16-115	16.00	16.00	24.00	64.00	115.00	5	5.0	C	0.40	0.05-0.11
MRR-B5X 16-24/64W16-115	16.00	16.00	24.00	64.00	115.00	5	5.0	W	0.40	0.05-0.11

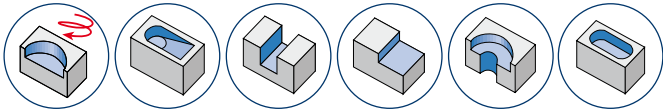
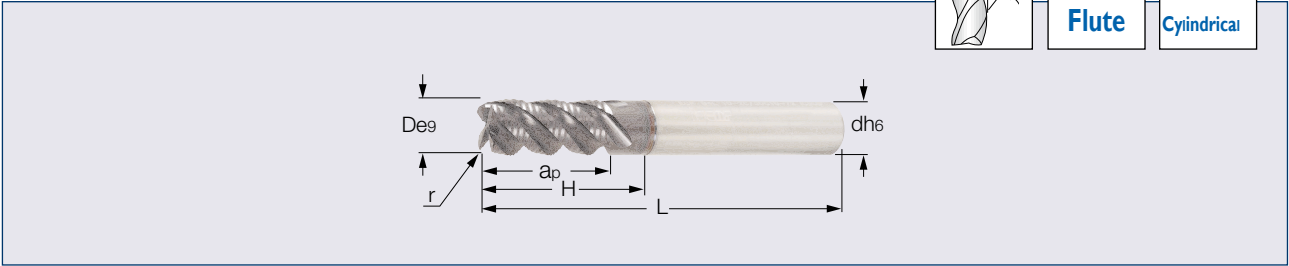
Available grade: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRR-B

4 Flute, 45° Helix Solid Carbide Roughing Endmills
with 4xD Relieved Necks with Assorted Radii



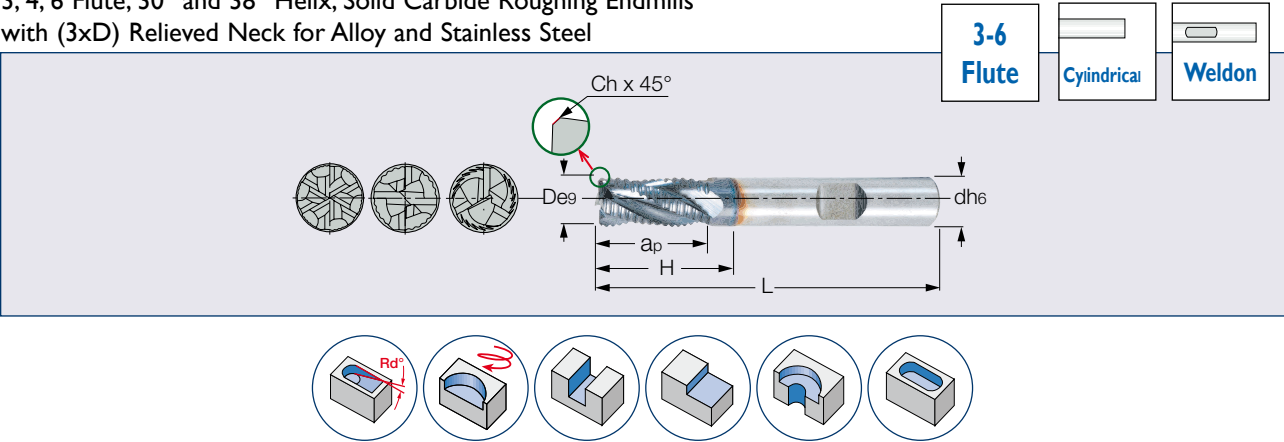
Designation										Recommended Machining Data
	D	d	ap	H	L	Flute	Ra°	Shank	r	fz (mm/t)
MRR030-08/11-3C06R.2-57	3.00	6.00	8.00	11.00	57.00	3	5.0	c	0.2	0.03-0.07
MRR035-08/11-3C06R.2-57	3.50	6.00	8.00	11.00	57.00	3	5.0	c	0.2	0.03-0.07
MRR040-08/11-3C06R.2-57	4.00	6.00	8.00	11.00	57.00	3	5.0	c	0.2	0.03-0.08
MRR050-10/13-3C06R.2-57	5.00	6.00	10.00	13.00	57.00	3	5.0	c	0.2	0.03-0.09
MRR-B4L 06-16/24C06R.4-66	6.00	6.00	16.00	24.00	66.00	4	5.0	c	0.4	0.03-0.06
MRR-B4L 08-22/30C08R.4	8.00	8.00	22.00	30.00	80.00	4	5.0	c	0.4	0.03-0.08
MRR-B4L 10-28/38C10R.5	10.00	10.00	28.00	38.00	100.00	4	5.0	c	0.5	0.03-0.09
MRR-B4L 12-32/40C12R.5	12.00	12.00	32.00	40.00	100.00	4	5.0	c	0.5	0.04-0.1
MRR-B4L 16-38/50C16R.5	16.00	16.00	38.00	50.00	115.00	5	5.0	c	0.5	0.05-0.11

Available grade: MC98
For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRRF-A/E-3,4,6

3, 4, 6 Flute, 30° and 38° Helix, Solid Carbide Roughing Endmills
with (3xD) Relieved Neck for Alloy and Stainless Steel



Designation											Recommended Machining Data
	D	d	ap	H	L	Flute	Rd°	Shank	Ch	fz (mm/t)	
MRRF040E08-3C06	4.00	6.00	8.00	13.00	57.00	3	5.0	C	0.25	0.02-0.05	
MRRF050E10-3C06	5.00	6.00	10.00	17.00	57.00	3	5.0	C	0.30	0.02-0.05	
MRRF060E13-3C06	6.00	6.00	13.00	21.00	57.00	3	5.0	C	0.30	0.03-0.06	
MRRF060E13-3W06	6.00	6.00	13.00	21.00	57.00	3	5.0	W	0.30	0.03-0.06	
MRRF070E20-3C08	7.00	8.00	20.00	26.00	63.00	3	5.0	C	0.30	0.03-0.07	
MRRF080E20-3C08	8.00	8.00	20.00	28.00	63.00	3	5.0	C	0.30	0.03-0.08	
MRRF080E20-3W08	8.00	8.00	20.00	28.00	63.00	3	5.0	W	0.30	0.03-0.08	
MRRF090A22-4C10	9.00	10.00	22.00	30.00	72.00	4	5.0	C	0.30	0.03-0.08	
MRRF100A22-4C10	10.00	10.00	22.00	30.00	72.00	4	5.0	C	0.30	0.03-0.09	
MRRF100A22-4W10	10.00	10.00	22.00	30.00	72.00	4	5.0	W	0.30	0.03-0.09	
MRRF110A25-4C12	11.00	12.00	25.00	31.00	83.00	4	5.0	C	0.30	0.03-0.09	
MRRF120A25-4C12	12.00	12.00	25.00	37.00	83.00	4	5.0	C	0.40	0.04-0.10	
MRRF120A25-4W12	12.00	12.00	25.00	37.00	83.00	4	5.0	W	0.40	0.04-0.10	
MRRF130A25-4C14	13.00	14.00	25.00	32.00	83.00	4	5.0	C	0.40	0.04-0.10	
MRRF140A25-4C14	14.00	14.00	25.00	37.00	83.00	4	5.0	C	0.50	0.04-0.11	
MRRF140A25-4W14	14.00	14.00	25.00	37.00	83.00	4	5.0	W	0.50	0.04-0.11	
MRRF160A32-4C16	16.00	16.00	32.00	44.00	92.00	4	5.0	C	0.50	0.05-0.11	
MRRF160A32-4W16	16.00	16.00	32.00	44.00	92.00	4	5.0	W	0.50	0.05-0.11	
MRRF180A32-4C18	18.00	18.00	32.00	44.00	92.00	4	5.0	C	0.50	0.05-0.11	
MRRF180A32-4W18	18.00	18.00	32.00	44.00	92.00	4	5.0	W	0.50	0.05-0.11	
MRRF200A38-4C20	20.00	20.00	38.00	55.00	104.00	4	5.0	C	0.60	0.05-0.11	
MRRF200A38-4W20	20.00	20.00	38.00	55.00	104.00	4	5.0	W	0.60	0.05-0.11	
MRRF250A45-6W25	25.00	25.00	45.00	64.00	121.00	6	5.0	W	0.60	0.06-0.11	

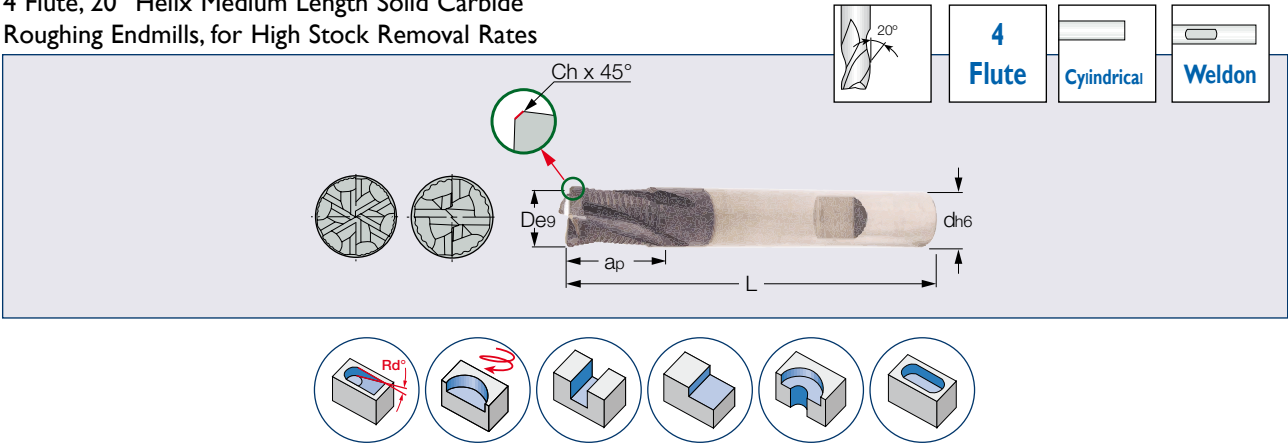
Available grade: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRR-T-M

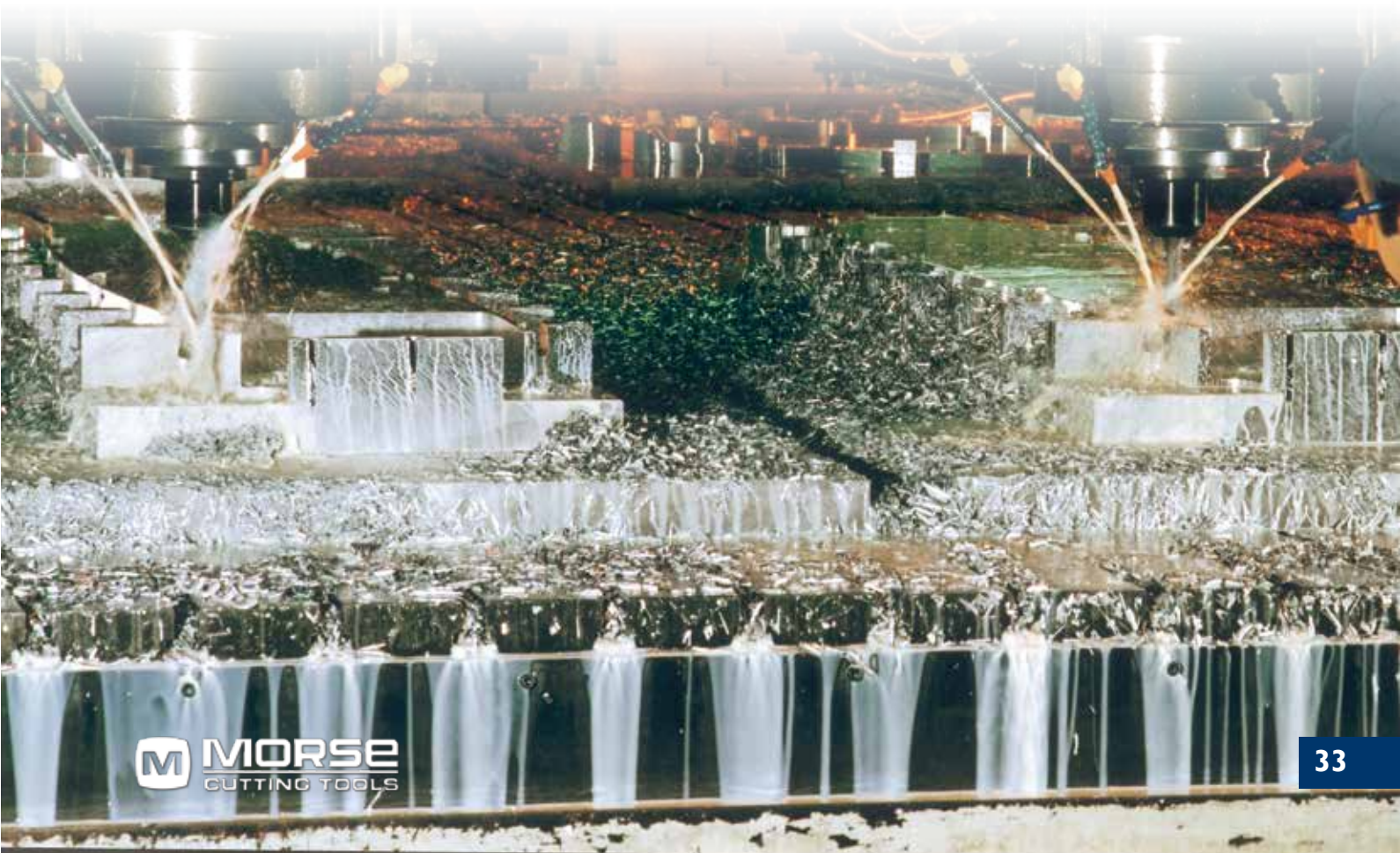
4 Flute, 20° Helix Medium Length Solid Carbide
Roughing Endmills, for High Stock Removal Rates



Designation	D	d	ap	L	Flute	Rd°	Shank	Ch	Recommended Machining Data
									fz (mm/t)
MRR-T4M 06-10-C06-57	6.00	6.00	10.00	57.00	4	5.0	C	0.30	0.03-0.06
MRR-T4M 06-10-W06-57	6.00	6.00	10.00	57.00	4	5.0	W	0.30	0.03-0.06
MRR-T4M 08-16-C08-63	8.00	8.00	16.00	63.00	4	5.0	C	0.40	0.03-0.08
MRR-T4M 08-16-W08-63	8.00	8.00	16.00	63.00	4	5.0	W	0.40	0.03-0.08
MRR-T4M 10-20-C10-72	10.00	10.00	20.00	72.00	4	5.0	C	0.40	0.03-0.09
MRR-T4M 10-20-W10-72	10.00	10.00	20.00	72.00	4	5.0	W	0.40	0.03-0.09
MRR-T4M 12-24-C12-83	12.00	12.00	24.00	83.00	4	5.0	C	0.40	0.04-0.10
MRR-T4M 12-24-W12-83	12.00	12.00	24.00	83.00	4	5.0	W	0.40	0.04-0.10
MRR-T4M 16-32-C16-92	16.00	16.00	32.00	92.00	4	5.0	C	0.50	0.05-0.11
MRR-T4M 16-32-W16-92	16.00	16.00	32.00	92.00	4	5.0	W	0.50	0.05-0.11
MRR-T4M 20-40-C20-104	20.00	20.00	40.00	104.00	4	5.0	C	0.50	0.05-0.11
MRR-T4M 20-40-W20-104	20.00	20.00	40.00	104.00	4	5.0	W	0.50	0.05-0.11

Available grade: MC98

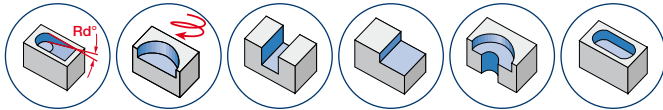
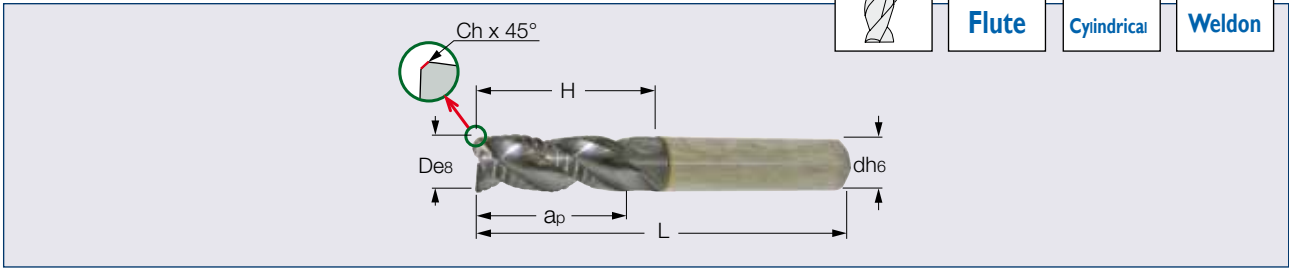
For user guide, see pages 106-114



SOLID CARBIDE ENDMILLS

MRCP-E3L

3 Flute, 38° Helix Solid Carbide Roughing Endmills with Chip Splitting Cutting Edges and (3xD) Relieved Necks



Designation										Recommended Machining Data
	D	d	ap	H	L	Flute	Rd°	Shank	Ch	fz (mm/t)
MRCP-E3L 05-12/17C06S57	5.00	6.00	12.00	17.00	57.00	3	5.0	C	0.20	0.02-0.05
MRCP-E3L 05-12/17W06S57	5.00	6.00	12.00	17.00	57.00	3	5.0	W	0.20	0.02-0.05
MRCP-E3L 06-14/20C06S57	6.00	6.00	14.00	20.00	57.00	3	5.0	C	0.30	0.03-0.06
MRCP-E3L 06-14/20W06S57	6.00	6.00	14.00	20.00	57.00	3	5.0	W	0.30	0.03-0.06
MRCP-E3L 08-18/26C08S63	8.00	8.00	18.00	26.00	63.00	3	5.0	C	0.40	0.03-0.08
MRCP-E3L 08-18/26W08S63	8.00	8.00	18.00	26.00	63.00	3	5.0	W	0.40	0.03-0.08
MRCP-E3L 10-22/32C10S72	10.00	10.00	22.00	32.00	72.00	3	5.0	C	0.40	0.03-0.09
MRCP-E3L 10-22/32W10S72	10.00	10.00	22.00	32.00	72.00	3	5.0	W	0.40	0.03-0.09
MRCP-E3L 12-26/38C12S83	12.00	12.00	26.00	38.00	83.00	3	5.0	C	0.40	0.04-0.10
MRCP-E3L 12-26/38W12S83	12.00	12.00	26.00	38.00	83.00	3	5.0	W	0.40	0.04-0.10
MRCP-E3L 14-30/44C14S100	14.00	14.00	30.00	44.00	100.00	3	5.0	C	0.50	0.05-0.11
MRCP-E3L 14-30/44W14S100	14.00	14.00	30.00	44.00	100.00	3	5.0	W	0.50	0.05-0.11
MRCP-E3L 16-34/50C16S100	16.00	16.00	34.00	50.00	100.00	3	5.0	C	0.50	0.05-0.11
MRCP-E3L 16-34/50W16S100	16.00	16.00	34.00	50.00	100.00	3	5.0	W	0.50	0.05-0.11
MRCP-E3L 20-42/62C20S125	20.00	20.00	42.00	62.00	125.00	3	5.0	C	0.50	0.05-0.11
MRCP-E3L 20-42/62W20S125	20.00	20.00	42.00	62.00	125.00	3	5.0	W	0.50	0.05-0.11

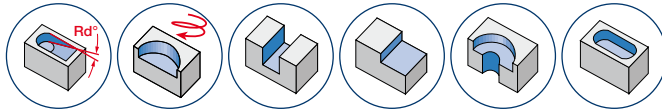
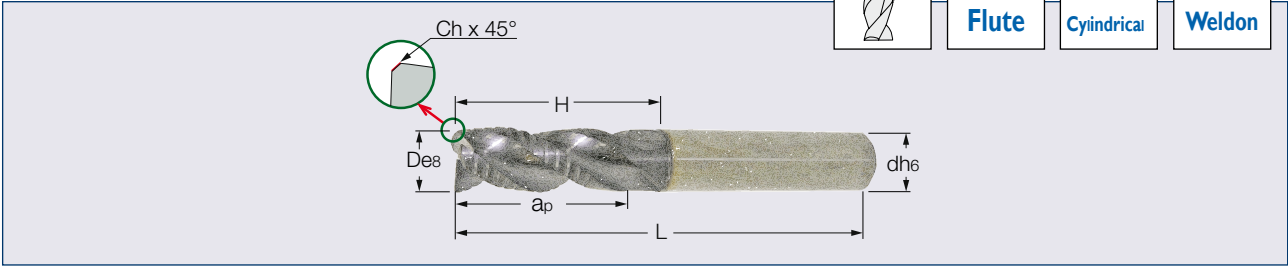
Available grade: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRCP-E4L

4 Flute, 38° Helix Solid Carbide Roughing Endmills with Chip Splitting Cutting Edges and (3xD) Relieved Necks



Designation											Recommended Machining Data
	D	d	a_p	H	L	Flute	R_d°	Shank	Ch	f_z (mm/t)	
MRCP-E4L 05-12/17C06S57	5.00	6.00	12.00	17.00	57.00	4	5.0	C	0.20	0.02-0.05	
MRCP-E4L 05-12/17W06S57	5.00	6.00	12.00	17.00	57.00	4	5.0	W	0.20	0.02-0.05	
MRCP-E4L 06-14/20C06S57	6.00	6.00	14.00	20.00	57.00	4	5.0	C	0.30	0.03-0.06	
MRCP-E4L 06-14/20W06S57	6.00	6.00	14.00	20.00	57.00	4	5.0	W	0.30	0.03-0.06	
MRCP-E4L 08-18/26C08S63	8.00	8.00	18.00	26.00	63.00	4	5.0	C	0.40	0.03-0.08	
MRCP-E4L 08-18/26W08S63	8.00	8.00	18.00	26.00	63.00	4	5.0	W	0.40	0.03-0.08	
MRCP-E4L 10-22/32C10S72	10.00	10.00	22.00	32.00	72.00	4	5.0	C	0.40	0.03-0.09	
MRCP-E4L 10-22/32W10S72	10.00	10.00	22.00	32.00	72.00	4	5.0	W	0.40	0.03-0.09	
MRCP-E4L 12-26/38C12S83	12.00	12.00	26.00	38.00	83.00	4	5.0	C	0.40	0.04-0.10	
MRCP-E4L 12-26/38W12S83	12.00	12.00	26.00	38.00	83.00	4	5.0	W	0.40	0.04-0.10	
MRCP-E4L 14-30/44C14S100	14.00	14.00	30.00	44.00	100.00	4	5.0	C	0.50	0.04-0.11	
MRCP-E4L 14-30/44W14S100	14.00	14.00	30.00	44.00	100.00	4	5.0	W	0.50	0.04-0.11	
MRCP-E4L 16-34/50C16S100	16.00	16.00	34.00	50.00	100.00	4	5.0	C	0.50	0.05-0.12	
MRCP-E4L 16-34/50W16S100	16.00	16.00	34.00	50.00	100.00	4	5.0	W	0.50	0.05-0.12	
MRCP-E4L 20-42/62C20S125	20.00	20.00	42.00	62.00	125.00	4	5.0	C	0.50	0.05-0.15	
MRCP-E4L 20-42/62W20S125	20.00	20.00	42.00	62.00	125.00	4	5.0	W	0.50	0.05-0.15	

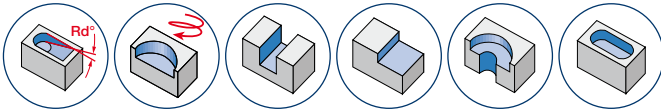
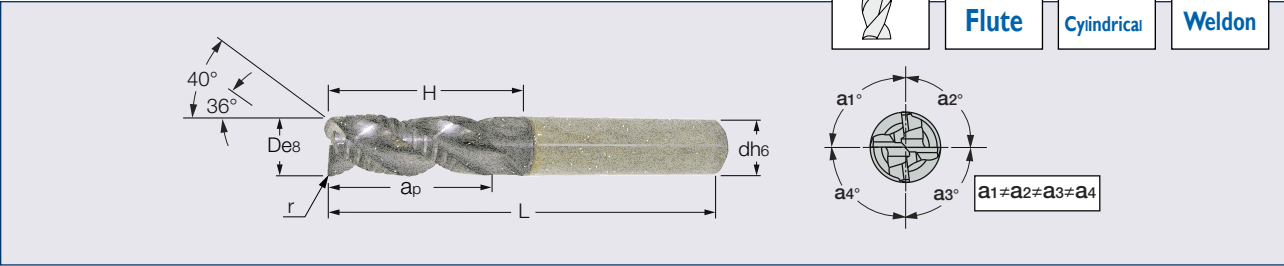
Available grade: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRCP-H4L-VF

4 Flute, Different Helix Solid Carbide Roughing Endmills with Chip Splitting Cutting Edges and (3xD) Relieved Necks with Radii



Designation											Recommended Machining Data
	D	d	ap	H	L	Flute	Rd°	Shank	r		fz (mm/t)
MRCP-H4L 06-12/20C6VFR.2	6.00	6.00	14.00	20.00	57.00	4	5.0	C	0.20		0.03-0.06
MRCP-H4L 06-12/20W6VFR.2	6.00	6.00	14.00	20.00	57.00	4	5.0	W	0.20		0.03-0.06
MRCP-H4L 08-16/26C8VFR.4	8.00	8.00	18.00	26.00	63.00	4	5.0	C	0.40		0.03-0.08
MRCP-H4L 08-16/26W8VFR.4	8.00	8.00	18.00	26.00	63.00	4	5.0	W	0.40		0.03-0.08
MRCP-H4L 10-20/32C10VFR.5	10.00	10.00	22.00	32.00	72.00	4	5.0	C	0.50		0.03-0.09
MRCP-H4L 10-20/32W10VFR.5	10.00	10.00	22.00	32.00	72.00	4	5.0	W	0.50		0.03-0.09
MRCP-H4L 12-24/38C12VFR.6	12.00	12.00	26.00	38.00	83.00	4	5.0	C	0.60		0.04-0.10
MRCP-H4L 12-24/38W12VFR.6	12.00	12.00	26.00	38.00	83.00	4	5.0	W	0.60		0.04-0.10
MRCP-H4L 16-32/50C16VFR.8	16.00	16.00	34.00	50.00	100.00	4	5.0	C	0.80		0.05-0.12
MRCP-H4L 16-32/50W16VFR.8	16.00	16.00	34.00	50.00	100.00	4	5.0	W	0.80		0.05-0.12
MRCP-H4L 20-40/60C20VFR1.0	20.00	20.00	42.00	62.00	125.00	4	5.0	C	1.00		0.05-0.15
MRCP-H4L 20-40/60W20VFR1.0	20.00	20.00	42.00	62.00	125.00	4	5.0	W	1.00		0.05-0.15

Most recommended for machining stainless steel.

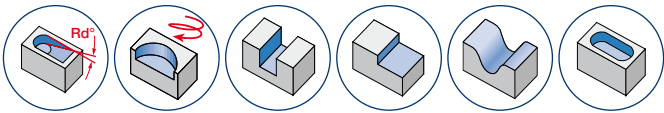
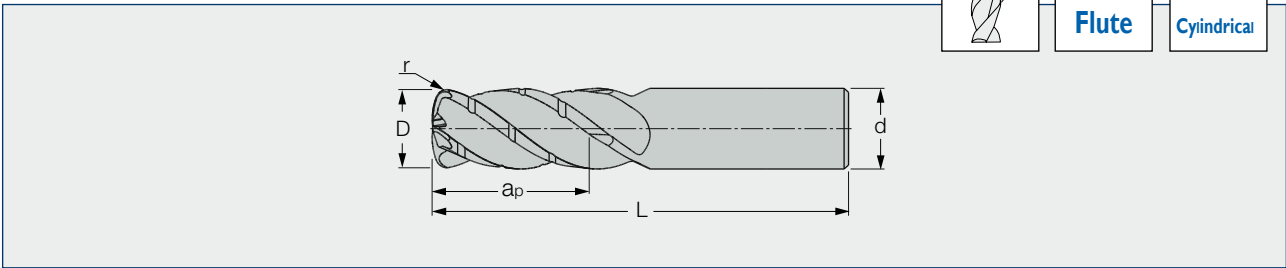
Available grade: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRFP-E-4/5-VF

4 and 5 Flute, 38° Helix, Solid Carbide Roughing Endmills with Chip Splitting Cutting Edges, Variable Pitch and Large Radius Frontal Edge for High Feed Rates



Designation	D	d	L	Rp*	Flute	ap	fz (min)	fz (max)	ap	fz (min)	fz (max)
MRFP-E4VF 06-12C06R1.0M57	6.00	6.00	57.00	1.00	4	12.00	0.025	0.07	0.30	0.10	0.30
MRFP-E4VF 08-16C08R1.4M63	8.00	8.00	63.00	1.40	4	16.00	0.03	0.10	0.40	0.10	0.40
MRFP-E4VF 10-20C10R1.7M72	10.00	10.00	72.00	1.70	4	20.00	0.03	0.10	0.50	0.15	0.50
MRFP-E4VF 12-25C12R2.0M83	12.00	12.00	83.00	2.00	4	24.00	0.04	0.10	0.60	0.15	0.50
MRFP-E4VF 16-32C16R2.7M92	16.00	16.00	92.00	2.70	4	32.00	0.05	0.12	0.80	0.20	0.60
MRFP-E4VF 20-40C20R3.4M104	20.00	20.00	104.00	3.40	4	40.00	0.05	0.12	1.00	0.20	0.70
MRFP-E5VF 10-24C10R1.7M72	10.00	10.00	72.00	1.70	5	24.00	0.03	0.11	0.50	0.15	0.50
MRFP-E5VF 12-32C12R2.0M83	12.00	12.00	83.00	2.00	5	32.00	0.04	0.11	0.60	0.15	0.50
MRFP-E5VF 16-40C16R2.7M92	16.00	16.00	92.00	2.70	5	40.00	0.05	0.12	0.80	0.20	0.60
MRFP-E5VF 20-48C20R3.4M104	20.00	20.00	104.00	3.40	5	48.00	0.05	0.12	1.00	0.20	0.70

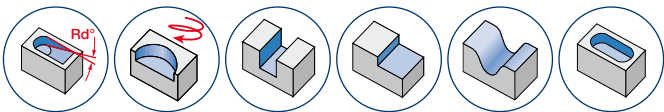
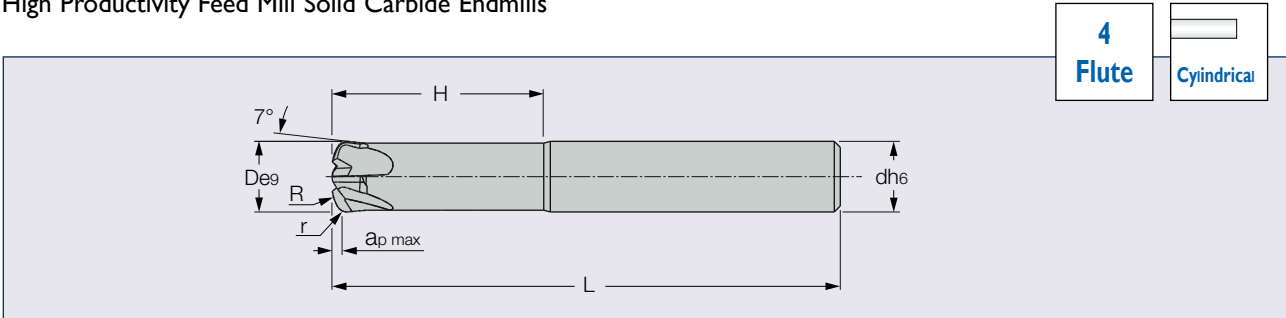
* Rp: Radius for programming

Available grade: MC93

For user guide, see pages 106-114

MRFF-S4

High Productivity Feed Mill Solid Carbide Endmills



Designation	D	d	L	H	r	R	Recommended Machining			Tough ↔ Hard	
							ap max	fz min	fz max	MC92	MC93
MRFF-S2 01-04/03C6RP.15M50	1.00	6.00	50.00	3.00	0.15	0.1	0.06	0.02	0.05	●	
MRFF-S2 02-07/06C6RP.3M50	2.00	6.00	50.00	6.00	0.30	0.2	0.12	0.10	0.14	●	
MRFF-S2 03-1/09C06RP.5M50	3.00	6.00	50.00	9.00	0.50	0.4	0.20	0.10	0.20	●	
MRFF-S4-06 030/20C06R1.0M	6.00	6.00	57.00	20.00	1.23	5.3	0.30	0.10	0.30		●
MRFF-S4-08 035/26C08R1.3M	8.00	8.00	63.00	26.00	1.62	7.0	0.40	0.10	0.40		●
MRFF-S4-10 040/30C10R1.6M	10.00	10.00	72.00	30.00	2.01	8.8	0.50	0.15	0.50		●
MRFF-S4-12 045/34C12R2.0M	12.00	12.00	83.00	34.00	2.47	10.6	0.60	0.15	0.50		●
MRFF-S4-16 055/42C16R2.6M	16.00	16.00	92.00	42.00	3.25	14.0	0.80	0.20	0.60		●
MRFF-S4-20 060/46C20R3.2M	20.00	20.00	104.00	46.00	4.02	17.7	1.00	0.20	0.70		●

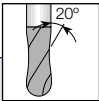
* Rp: Radius for programming

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

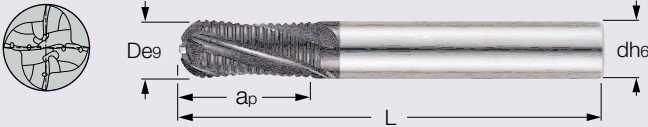
MRBRF-T
3, 4 Flute, 20° Helix Long Solid Carbide Roughing Ball Nose, for
Materials up to 55 HRc

45-55
HRc

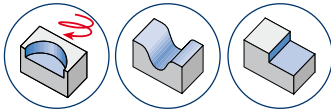


3-4
Flute





HARD MATERIALS



Designation	D	d	ap	L	Flute	Shank
MRBRF-T3 06-16C06M57	6.00	6.00	16.00	57.00	3	C
MRBRF-T3 08-16C08M63	8.00	8.00	16.00	63.00	3	C
MRBRF-T4 10-22C10M72	10.00	10.00	22.00	72.00	4	C
MRBRF-T4 12-26C12M83	12.00	12.00	26.00	83.00	4	C
MRBRF-T4 14-26C14M83	14.00	14.00	26.00	83.00	4	C
MRBRF-T4 16-32C16M92	16.00	16.00	32.00	92.00	4	C
MRBRF-T4 18-32C18M92	18.00	18.00	32.00	92.00	4	C
MRBRF-T4 20-38C20M104	20.00	20.00	38.00	104.00	4	C

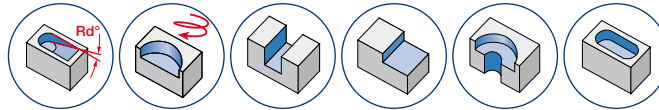
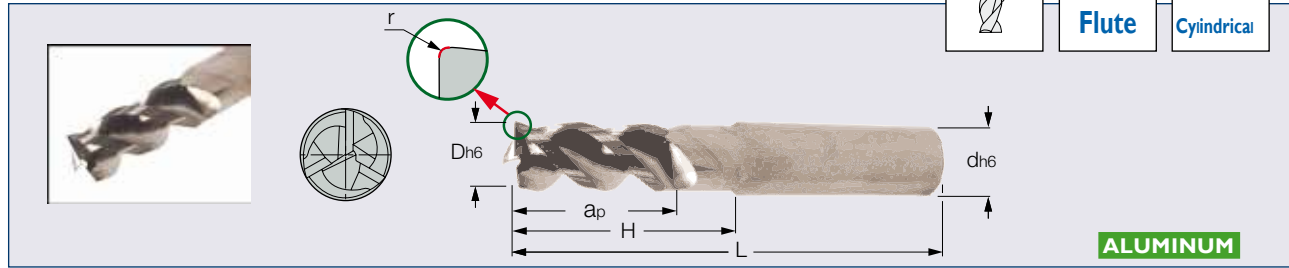
Available grade: MC93
For user guide, see pages 106-114



SOLID CARBIDE ENDMILLS

MRCA-H3-VF

Solid Carbide Endmills with Different Helix and Variable Pitch,
3, 4 and 5xD Neck Relief for Machining Aluminum



										Recommended Machining Data
Designation	D	a _p	H	L	d	r	Flute	Ra°	Shank	f _z (mm/t)
MRCA-H3 01-04C06VF-R.05	1.00	4.00	-	57.00	6.00	0.05	3	5.0	C	0.01-0.01
MRCA-H3 015-04/06C06VF-R01	1.50	4.00	6.00	57.00	6.00	0.10	3	5.0	C	0.01-0.01
MRCA-H3 02-05/08C06VF-R01	2.00	5.00	8.00	57.00	6.00	0.10	3	5.0	C	0.01-0.02
MRCA-H3 025-05/08C06VF-R01	2.50	5.00	8.00	57.00	6.00	0.10	3	5.0	C	0.01-0.02
MRCA-H3 03-07/12C06VF-R01	3.00	7.00	12.00	57.00	6.00	0.10	3	5.0	C	0.03-0.05
MRCA-H3 04-10/16C06VF-R02	4.00	10.00	16.00	57.00	6.00	0.20	3	5.0	C	0.03-0.05
MRCA-H3 05-12/20C06VF-R02	5.00	12.00	20.00	57.00	6.00	0.20	3	5.0	C	0.03-0.06
MRCA-H3 06-09/18C06VF-R02	6.00	9.00	18.00	57.00	6.00	0.20	3	5.0	C	0.03-0.07
MRCA-H3 06-09/18C06VF-R04	6.00	9.00	18.00	57.00	6.00	0.40	3	5.0	C	0.03-0.07
MRCA-H3 06-09/18C06VF-R08	6.00	9.00	18.00	57.00	6.00	0.80	3	5.0	C	0.03-0.07
MRCA-H3 06-09/30C06VF-R02	6.00	9.00	30.00	65.00	6.00	0.20	3	5.0	C	0.03-0.07
MRCA-H3 06-09/30C06VF-R04	6.00	9.00	30.00	65.00	6.00	0.40	3	5.0	C	0.03-0.07
MRCA-H3 06-09/30C06VF-R08	6.00	9.00	30.00	65.00	6.00	0.80	3	5.0	C	0.03-0.07
MRCA-H3 06-14/24C06VF-R02	6.00	14.00	24.00	60.00	6.00	0.20	3	5.0	C	0.03-0.07
MRCA-H3 08-12/24C08VF-R02	8.00	12.00	24.00	63.00	8.00	0.20	3	5.0	C	0.03-0.09
MRCA-H3 08-12/24C08VF-R04	8.00	12.00	24.00	63.00	8.00	0.40	3	5.0	C	0.03-0.09
MRCA-H3 08-12/24C08VF-R08	8.00	12.00	24.00	63.00	8.00	0.80	3	5.0	C	0.03-0.09
MRCA-H3 08-12/24C08VF-R30	8.00	12.00	24.00	63.00	8.00	3.00	3	5.0	C	0.03-0.09
MRCA-H3 08-12/40C08VF-R02	8.00	12.00	40.00	79.00	8.00	0.20	3	5.0	C	0.03-0.09
MRCA-H3 08-12/40C08VF-R04	8.00	12.00	40.00	79.00	8.00	0.40	3	5.0	C	0.03-0.09
MRCA-H3 08-12/40C08VF-R08	8.00	12.00	40.00	79.00	8.00	0.80	3	5.0	C	0.03-0.09
MRCA-H3 08-18/32C08VF-R02	8.00	18.00	32.00	68.00	8.00	0.20	3	5.0	C	0.03-0.09
MRCA-H3 10-15/30C10VF-R02	10.00	15.00	30.00	72.00	10.00	0.20	3	5.0	C	0.03-0.10
MRCA-H3 10-15/30C10VF-R04	10.00	15.00	30.00	72.00	10.00	0.40	3	5.0	C	0.03-0.10
MRCA-H3 10-15/30C10VF-R08	10.00	15.00	30.00	72.00	10.00	0.80	3	5.0	C	0.03-0.10
MRCA-H3 10-15/30C10VF-R16	10.00	15.00	30.00	72.00	10.00	1.60	3	5.0	C	0.03-0.10
MRCA-H3 10-15/30C10VF-R30	10.00	15.00	30.00	72.00	10.00	3.00	3	5.0	C	0.03-0.10
MRCA-H3 10-15/50C10VF-R02	10.00	15.00	50.00	92.00	10.00	0.20	3	5.0	C	0.03-0.10
MRCA-H3 10-15/50C10VF-R04	10.00	15.00	50.00	92.00	10.00	0.40	3	5.0	C	0.03-0.10
MRCA-H3 10-15/50C10VF-R08	10.00	15.00	50.00	92.00	10.00	0.80	3	5.0	C	0.03-0.10
MRCA-H3 10-15/50C10VF-R16	10.00	15.00	50.00	92.00	10.00	1.60	3	5.0	C	0.03-0.10
MRCA-H3 10-15/50C10VF-R20	10.00	15.00	50.00	92.00	10.00	2.00	3	5.0	C	0.03-0.10
MRCA-H3 10-15/50C10VF-R30	10.00	15.00	50.00	92.00	10.00	3.00	3	5.0	C	0.03-0.10
MRCA-H3 10-22/40C10VF-R02	10.00	22.00	40.00	80.00	10.00	0.20	3	5.0	C	0.03-0.10
MRCA-H3 10-22/40C10VF-R30	10.00	22.00	40.00	80.00	10.00	3.00	3	5.0	C	0.03-0.10
MRCA-H3 12-18/36C12VF-R02	12.00	18.00	36.00	83.00	12.00	0.20	3	5.0	C	0.04-0.11
MRCA-H3 12-18/36C12VF-R04	12.00	18.00	36.00	83.00	12.00	0.40	3	5.0	C	0.04-0.11
MRCA-H3 12-18/36C12VF-R08	12.00	18.00	36.00	83.00	12.00	0.80	3	5.0	C	0.04-0.11
MRCA-H3 12-18/36C12VF-R16	12.00	18.00	36.00	83.00	12.00	1.60	3	5.0	C	0.04-0.11
MRCA-H3 12-18/36C12VF-R20	12.00	18.00	36.00	83.00	12.00	2.00	3	5.0	C	0.04-0.11
MRCA-H3 12-18/36C12VF-R25	12.00	18.00	36.00	83.00	12.00	2.50	3	5.0	C	0.04-0.11
MRCA-H3 12-18/36C12VF-R30	12.00	18.00	36.00	83.00	12.00	3.00	3	5.0	C	0.04-0.11
MRCA-H3 12-18/60C12VF-R02	12.00	18.00	60.00	100.00	12.00	0.20	3	5.0	C	0.04-0.11
MRCA-H3 12-18/60C12VF-R04	12.00	18.00	60.00	100.00	12.00	0.40	3	5.0	C	0.04-0.11
MRCA-H3 12-18/60C12VF-R08	12.00	18.00	60.00	100.00	12.00	0.80	3	5.0	C	0.04-0.11
MRCA-H3 12-18/60C12VF-R16	12.00	18.00	60.00	100.00	12.00	1.60	3	5.0	C	0.04-0.11
MRCA-H3 12-18/60C12VF-R20	12.00	18.00	60.00	100.00	12.00	2.00	3	5.0	C	0.04-0.11

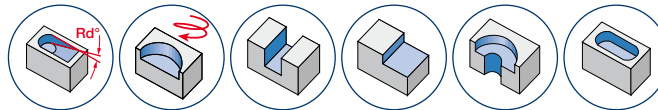
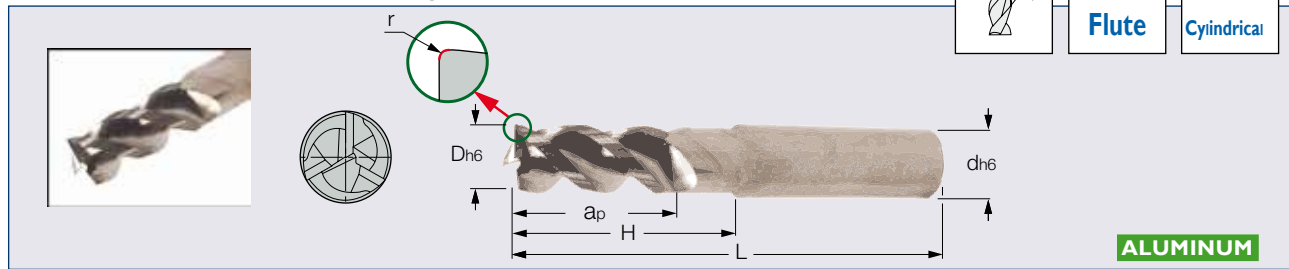
Available grade MC08 (uncoated).

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRCA-H3-VF (continued)

Solid Carbide Endmills with Different Helix and Variable Pitch,
3, 4 and 5xD Neck Relief for Machining Aluminum



Designation										Recommended Machining Data
	D	ap	H	L	d	r	Flute	Rd°	Shank	fz (mm/t)
MRCA-H3 12-18/60C12VF-R25	12.00	18.00	60.00	100.00	12.00	2.50	3	5.0	C	0.04-0.11
MRCA-H3 12-18/60C12VF-R30	12.00	18.00	60.00	100.00	12.00	3.00	3	5.0	C	0.04-0.11
MRCA-H3 12-26/48C12VF-R02	12.00	26.00	48.00	93.00	12.00	0.20	3	5.0	C	0.04-0.11
MRCA-H3 16-24/48C16VF-R02	16.00	24.00	48.00	92.00	16.00	0.20	3	5.0	C	0.05-0.13
MRCA-H3 16-24/48C16VF-R04	16.00	24.00	48.00	92.00	16.00	0.40	3	5.0	C	0.05-0.13
MRCA-H3 16-24/48C16VF-R08	16.00	24.00	48.00	92.00	16.00	0.80	3	5.0	C	0.05-0.13
MRCA-H3 16-24/48C16VF-R16	16.00	24.00	48.00	92.00	16.00	1.60	3	5.0	C	0.05-0.13
MRCA-H3 16-24/48C16VF-R20	16.00	24.00	48.00	92.00	16.00	2.00	3	5.0	C	0.05-0.13
MRCA-H3 16-24/48C16VF-R25	16.00	24.00	48.00	92.00	16.00	2.50	3	5.0	C	0.05-0.13
MRCA-H3 16-24/48C16VF-R30	16.00	24.00	48.00	92.00	16.00	3.00	3	5.0	C	0.05-0.13
MRCA-H3 16-24/48C16VF-R32	16.00	24.00	48.00	92.00	16.00	3.20	3	5.0	C	0.05-0.13
MRCA-H3 16-24/48C16VF-R40	16.00	24.00	48.00	92.00	16.00	4.00	3	5.0	C	0.05-0.13
MRCA-H3 16-24/48C16VF-R50	16.00	24.00	48.00	92.00	16.00	5.00	3	5.0	C	0.05-0.13
MRCA-H3 16-24/80C16VF-R02	16.00	24.00	80.00	128.00	16.00	0.20	3	5.0	C	0.05-0.13
MRCA-H3 16-24/80C16VF-R04	16.00	24.00	80.00	128.00	16.00	0.40	3	5.0	C	0.05-0.13
MRCA-H3 16-24/80C16VF-R08	16.00	24.00	80.00	128.00	16.00	0.80	3	5.0	C	0.05-0.13
MRCA-H3 16-24/80C16VF-R16	16.00	24.00	80.00	128.00	16.00	1.60	3	5.0	C	0.05-0.13
MRCA-H3 16-24/80C16VF-R20	16.00	24.00	80.00	128.00	16.00	2.00	3	5.0	C	0.05-0.13
MRCA-H3 16-24/80C16VF-R25	16.00	24.00	80.00	128.00	16.00	2.50	3	5.0	C	0.05-0.13
MRCA-H3 16-24/80C16VF-R30	16.00	24.00	80.00	128.00	16.00	3.00	3	5.0	C	0.05-0.13
MRCA-H3 16-24/80C16VF-R32	16.00	24.00	80.00	128.00	16.00	3.20	3	5.0	C	0.05-0.13
MRCA-H3 16-24/80C16VF-R40	16.00	24.00	80.00	128.00	16.00	4.00	3	5.0	C	0.05-0.13
MRCA-H3 16-24/80C16VF-R50	16.00	24.00	80.00	128.00	16.00	5.00	3	5.0	C	0.05-0.13
MRCA-H3 16-34/64C16VF-R02	16.00	34.00	64.00	115.00	16.00	0.20	3	5.0	C	0.05-0.13
MRCA-H3 20-30/100C20VF-R02	20.00	30.00	100.00	150.00	20.00	0.20	3	5.0	C	0.05-0.14
MRCA-H3 20-30/100C20VF-R04	20.00	30.00	100.00	150.00	20.00	0.40	3	5.0	C	0.05-0.14
MRCA-H3 20-30/100C20VF-R08	20.00	30.00	100.00	150.00	20.00	0.80	3	5.0	C	0.05-0.14
MRCA-H3 20-30/100C20VF-R16	20.00	30.00	100.00	150.00	20.00	1.60	3	5.0	C	0.05-0.14
MRCA-H3 20-30/100C20VF-R20	20.00	30.00	100.00	150.00	20.00	2.00	3	5.0	C	0.05-0.14
MRCA-H3 20-30/100C20VF-R32	20.00	30.00	100.00	150.00	20.00	3.20	3	5.0	C	0.05-0.14
MRCA-H3 20-30/100C20VF-R40	20.00	30.00	100.00	150.00	20.00	4.00	3	5.0	C	0.05-0.14
MRCA-H3 20-30/100C20VF-R50	20.00	30.00	100.00	150.00	20.00	5.00	3	5.0	C	0.05-0.14
MRCA-H3 20-30/60C20VF-R02	20.00	30.00	60.00	110.00	20.00	0.20	3	5.0	C	0.05-0.14
MRCA-H3 20-30/60C20VF-R04	20.00	30.00	60.00	110.00	20.00	0.40	3	5.0	C	0.05-0.14
MRCA-H3 20-30/60C20VF-R08	20.00	30.00	60.00	110.00	20.00	0.80	3	5.0	C	0.05-0.14
MRCA-H3 20-30/60C20VF-R16	20.00	30.00	60.00	110.00	20.00	1.60	3	5.0	C	0.05-0.14
MRCA-H3 20-30/60C20VF-R20	20.00	30.00	60.00	110.00	20.00	2.00	3	5.0	C	0.05-0.14
MRCA-H3 20-30/60C20VF-R32	20.00	30.00	60.00	110.00	20.00	3.20	3	5.0	C	0.05-0.14
MRCA-H3 20-30/60C20VF-R40	20.00	30.00	60.00	110.00	20.00	4.00	3	5.0	C	0.05-0.14
MRCA-H3 20-30/60C20VF-R50	20.00	30.00	60.00	110.00	20.00	5.00	3	5.0	C	0.05-0.14
MRCA-H3 20-42/80C20VF-R02	20.00	42.00	80.00	130.00	20.00	0.20	3	5.0	C	0.05-0.14
MRCA-H3 25-38/125C25VF-R02	25.00	38.00	125.00	185.00	25.00	0.20	3	5.0	C	0.05-0.15
MRCA-H3 25-38/125C25VF-R08	25.00	38.00	125.00	185.00	25.00	0.80	3	5.0	C	0.05-0.15
MRCA-H3 25-38/125C25VF-R16	25.00	38.00	125.00	185.00	25.00	1.60	3	5.0	C	0.05-0.15

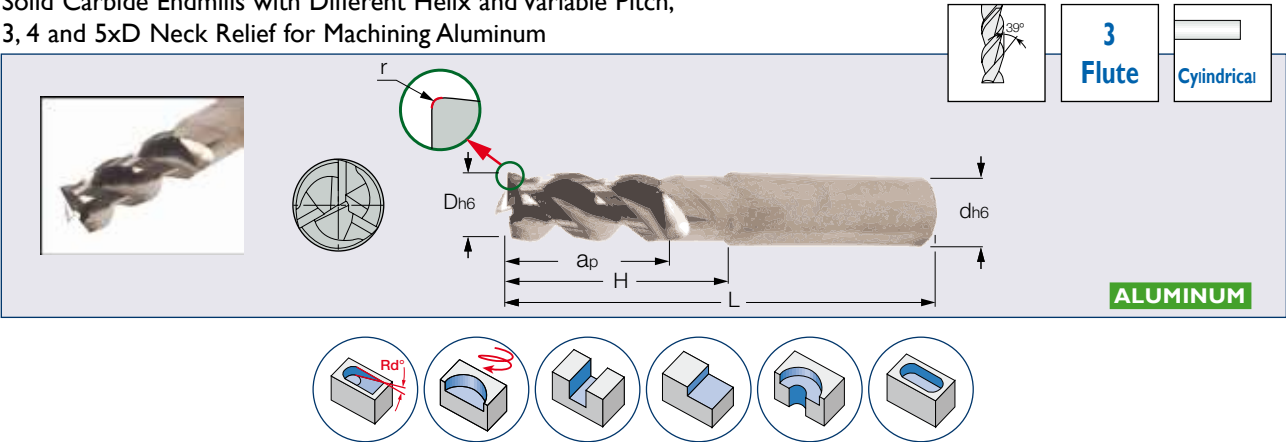
Available grade MC08 (uncoated).

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRCA-H3-VF (continued)

Solid Carbide Endmills with Different Helix and Variable Pitch,
3, 4 and 5xD Neck Relief for Machining Aluminum



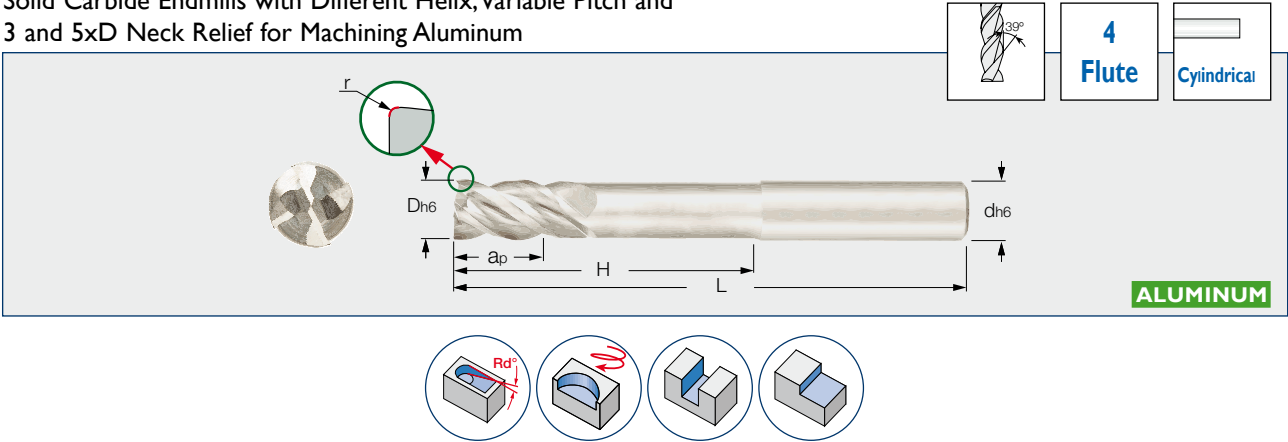
Designation										Recommended Machining Data
	D	a _p	H	L	d	r	Flute	Rd°	Shank	f _z (mm/t)
MRCA-H3 25-38/125C25VF-R20	25.00	38.00	125.00	185.00	25.00	2.00	3	5.0	C	0.05-0.15
MRCA-H3 25-38/125C25VF-R32	25.00	38.00	125.00	185.00	25.00	3.20	3	5.0	C	0.05-0.15
MRCA-H3 25-38/125C25VF-R40	25.00	38.00	125.00	185.00	25.00	4.00	3	5.0	C	0.05-0.15
MRCA-H3 25-38/125C25VF-R50	25.00	38.00	125.00	185.00	25.00	5.00	3	5.0	C	0.05-0.15
MRCA-H3 25-38/75C25VF-R02	25.00	38.00	75.00	130.00	25.00	0.20	3	5.0	C	0.05-0.15
MRCA-H3 25-38/75C25VF-R04	25.00	38.00	75.00	130.00	25.00	0.40	3	5.0	C	0.05-0.15
MRCA-H3 25-38/75C25VF-R08	25.00	38.00	75.00	130.00	25.00	0.80	3	5.0	C	0.05-0.15
MRCA-H3 25-38/75C25VF-R16	25.00	38.00	75.00	130.00	25.00	1.60	3	5.0	C	0.05-0.15
MRCA-H3 25-38/75C25VF-R20	25.00	38.00	75.00	130.00	25.00	2.00	3	5.0	C	0.05-0.15
MRCA-H3 25-38/75C25VF-R32	25.00	38.00	75.00	130.00	25.00	3.20	3	5.0	C	0.05-0.15
MRCA-H3 25-38/75C25VF-R40	25.00	38.00	75.00	130.00	25.00	4.00	3	5.0	C	0.05-0.15
MRCA-H3 25-38/75C25VF-R50	25.00	38.00	75.00	130.00	25.00	5.00	3	5.0	C	0.05-0.15
MRCA-H3 25-52/100C25VF-R02	25.00	52.00	100.00	158.00	25.00	0.20	3	5.0	C	0.05-0.15

Available grade MC08 (uncoated).
For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRCA-H4-VF

Solid Carbide Endmills with Different Helix, Variable Pitch and 3 and 5xD Neck Relief for Machining Aluminum



Designation										Recommended Machining Data
	D	ap	H	L	d	r	Flute	Rd°	Shank	fz (mm/t)
MRCA-H4 06-09/30C06VFR02	6.00	9.00	30.00	65.00	6.00	0.20	4	5.0	C	0.03-0.07
MRCA-H4 06-12/18C06VFR02	6.00	12.00	18.00	57.00	6.00	0.20	4	5.0	C	0.03-0.07
MRCA-H4 08-12/40C08VFR02	8.00	12.00	40.00	79.00	8.00	0.20	4	5.0	C	0.03-0.09
MRCA-H4 08-16/24C08VFR02	8.00	16.00	24.00	63.00	8.00	0.20	4	5.0	C	0.03-0.09
MRCA-H4 10-15/50C10VFR02	10.00	15.00	50.00	92.00	10.00	0.20	4	5.0	C	0.04-0.10
MRCA-H4 10-20/30C10VFR02	10.00	20.00	30.00	72.00	10.00	0.20	4	5.0	C	0.04-0.10
MRCA-H4 12-18/60C12VFR02	12.00	18.00	60.00	100.00	12.00	0.20	4	5.0	C	0.04-0.11
MRCA-H4 12-24/36C12VFR02	12.00	24.00	36.00	83.00	12.00	0.20	4	5.0	C	0.04-0.11
MRCA-H4 16-24/80C16VFR02	16.00	24.00	80.00	128.00	16.00	0.20	4	5.0	C	0.05-0.13
MRCA-H4 16-32/48C16VFR02	16.00	32.00	48.00	100.00	16.00	0.20	4	5.0	C	0.05-0.13
MRCA-H4 20-30/100C20VFR02	20.00	30.00	100.00	150.00	20.00	0.20	4	5.0	C	0.05-0.14
MRCA-H4 20-40/60C20VFR02	20.00	40.00	60.00	110.00	20.00	0.20	4	5.0	C	0.05-0.14
MRCA-H4 25-38/125C25VFR02	25.00	38.00	125.00	185.00	25.00	0.20	4	5.0	C	0.08-0.14
MRCA-H4 25-50/75C25VFR02	25.00	50.00	75.00	130.00	25.00	0.20	4	5.0	C	0.08-0.14

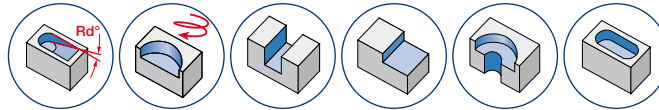
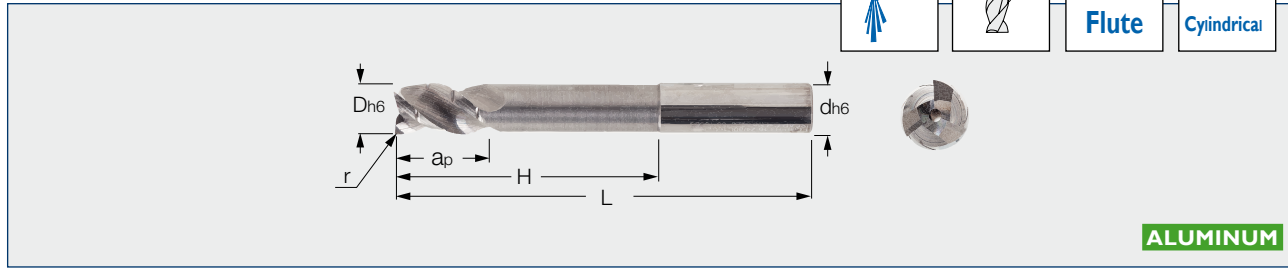
Available grade: MC08 (Uncoated)
For user guide, see pages 106-114



SOLID CARBIDE ENDMILLS

MRCAP-H3-VF-C

Solid Carbide Endmills with Different Helix, Variable Pitch, Chip Splitters and Center Coolant Holes 4 and 5xD Neck Relief for Machining Aluminum



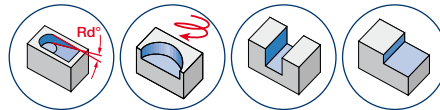
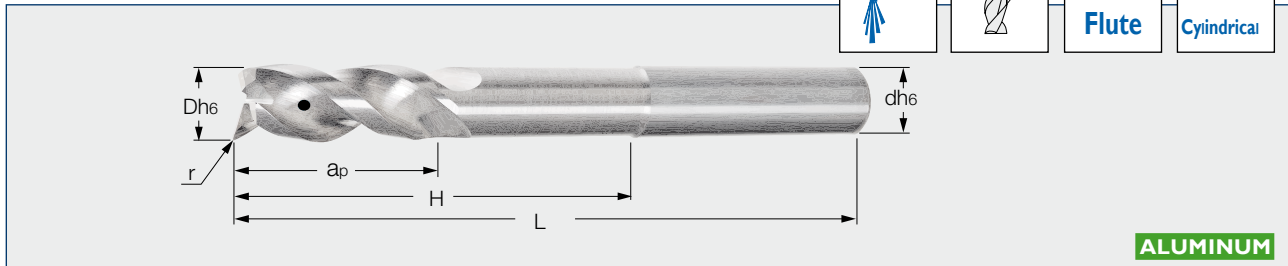
Designation	D	a _p	H	L	d	r	Flute	Rd°	Shank	Recommended Machining Data
										f _z (mm/t)
MRCAP-H3 10-15/50C10VFR02C	10.00	15.00	50.00	92.00	10.00	0.20	3	5.0	C	0.03-0.10
MRCAP-H3 10-22/40C10VFR02C	10.00	22.00	40.00	80.00	10.00	0.20	3	5.0	C	0.03-0.10
MRCAP-H3 12-18/60C12VFR02C	12.00	18.00	60.00	100.00	12.00	0.20	3	5.0	C	0.04-0.11
MRCAP-H3 12-26/48C12VFR02C	12.00	26.00	48.00	93.00	12.00	0.20	3	5.0	C	0.04-0.11
MRCAP-H3 16-24/80C16VFR02C	16.00	24.00	80.00	128.00	16.00	0.20	3	5.0	C	0.05-0.13
MRCAP-H3 16-34/64C16VFR02C	16.00	34.00	64.00	115.00	16.00	0.20	3	5.0	C	0.05-0.13
MRCAP-H320-30/100C20VFR02C	20.00	30.00	100.00	150.00	20.00	0.20	3	5.0	C	0.05-0.14
MRCAP-H3 20-42/80C20VFR02C	20.00	42.00	80.00	130.00	20.00	0.20	3	5.0	C	0.05-0.14

Available grade MC08 (uncoated).

For user guide, see pages 106-114

MRCA-H3-VF-C

Solid Carbide Endmills with Different Helix, Variable Pitch, Coolant Holes and 3 and 5xD Neck Relief for Machining Aluminum



Designation	D	a _p	H	L	d	r	Flute	Rd°	Shank	Recommended Machining Data
										f _z (mm/t)
MRCA-H3 06-12/18C06VF-R02C	6.00	12.00	18.00	57.00	6.00	0.20	3	5.0	C	0.03-0.07
MRCA-H3 06-12/30C06VF-R02C	6.00	12.00	30.00	65.00	6.00	0.20	3	5.0	C	0.03-0.07
MRCA-H3 08-16/24C08VF-R02C	8.00	16.00	24.00	63.00	8.00	0.20	3	5.0	C	0.03-0.09
MRCA-H3 08-16/40C08VF-R02C	8.00	16.00	40.00	79.00	8.00	0.20	3	5.0	C	0.03-0.09
MRCA-H3 10-20/30C10VF-R02C	10.00	20.00	30.00	72.00	10.00	0.20	3	5.0	C	0.03-0.10
MRCA-H3 10-20/50C10VF-R02C	10.00	20.00	50.00	100.00	10.00	0.20	3	5.0	C	0.03-0.10
MRCA-H3 12-24/36C12VF-R02C	12.00	24.00	36.00	83.00	12.00	0.20	3	5.0	C	0.04-0.11
MRCA-H3 12-24/60C12VF-R02C	12.00	24.00	60.00	100.00	12.00	0.20	3	5.0	C	0.04-0.11
MRCA-H3 16-32/48C16VF-R02C	16.00	32.00	48.00	92.00	16.00	0.20	3	5.0	C	0.05-0.13
MRCA-H3 16-32/80C16VF-R02C	16.00	32.00	80.00	128.00	16.00	0.20	3	5.0	C	0.05-0.13
MRCA-H3 25-50/75C25VF-R02C	25.00	50.00	75.00	130.00	25.00	0.20	3	5.0	C	0.05-0.15

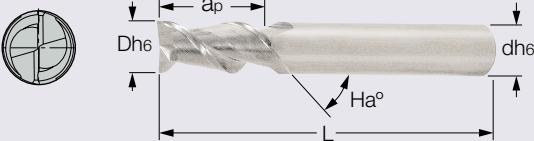
Available grade: MC08 (Uncoated)

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRCA-B-2

2 Flute, 45° Helix Medium Length Solid Carbide Endmills for Machining Aluminum



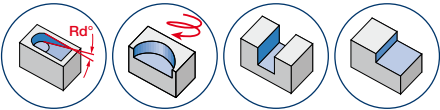


2

Flute



ALUMINUM



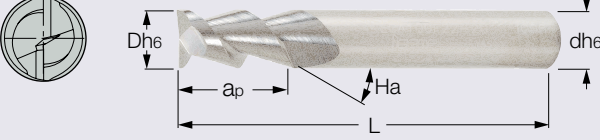
Designation									Recommended Machining Data
	D	d	ap	L	Flute	Ha°	Rd°	Shank	fz (mm/t)
MRCA040B12-2C06	4.00	6.00	12.00	57.00	2	45.0	5.0	C	0.02-0.05
MRCA050B14-2C06	5.00	6.00	14.00	57.00	2	45.0	5.0	C	0.02-0.06
MRCA060B16-2C06	6.00	6.00	16.00	57.00	2	45.0	5.0	C	0.03-0.07
MRCA080B20-2C08	8.00	8.00	20.00	63.00	2	45.0	5.0	C	0.03-0.09
MRCA100B22-2C10	10.00	10.00	22.00	72.00	2	45.0	5.0	C	0.03-0.10
MRCA120B25-2C12	12.00	12.00	25.00	83.00	2	45.0	5.0	C	0.04-0.11
MRCA160B32-2C16	16.00	16.00	32.00	92.00	2	45.0	5.0	C	0.05-0.13
MRCA200B38-2C20	20.00	20.00	38.00	104.00	2	45.0	5.0	C	0.05-0.13

Available grade: MC08 (Uncoated)

For user guide, see pages 106-114

MRCA-F-2

2 Flute, 55° Helix Medium Length Solid Carbide Endmills for Machining Aluminum



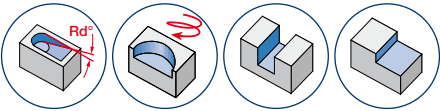


2

Flute



ALUMINUM



Designation									Recommended Machining Data
	D	d	ap	L	Flute	Ha°	Rd°	Shank	fz (mm/t)
MRCA040F11-2C04	4.00	4.00	11.00	50.00	2	55.0	5.0	C	0.02-0.05
MRCA060F13-2C06	6.00	6.00	13.00	57.00	2	55.0	5.0	C	0.03-0.07
MRCA080F20-2C08	8.00	8.00	20.00	63.00	2	55.0	5.0	C	0.03-0.09
MRCA100F22-2C10	10.00	10.00	22.00	72.00	2	55.0	5.0	C	0.03-0.10
MRCA120F25-2C12	12.00	12.00	25.00	83.00	2	55.0	5.0	C	0.04-0.11
MRCA160F32-2C16	16.00	16.00	32.00	92.00	2	55.0	5.0	C	0.05-0.13
MRCA200F38-2C20	20.00	20.00	38.00	104.00	2	55.0	5.0	C	0.05-0.13
MRCA250F45-2C25	25.00	25.00	45.00	121.00	2	55.0	5.0	C	0.05-0.13

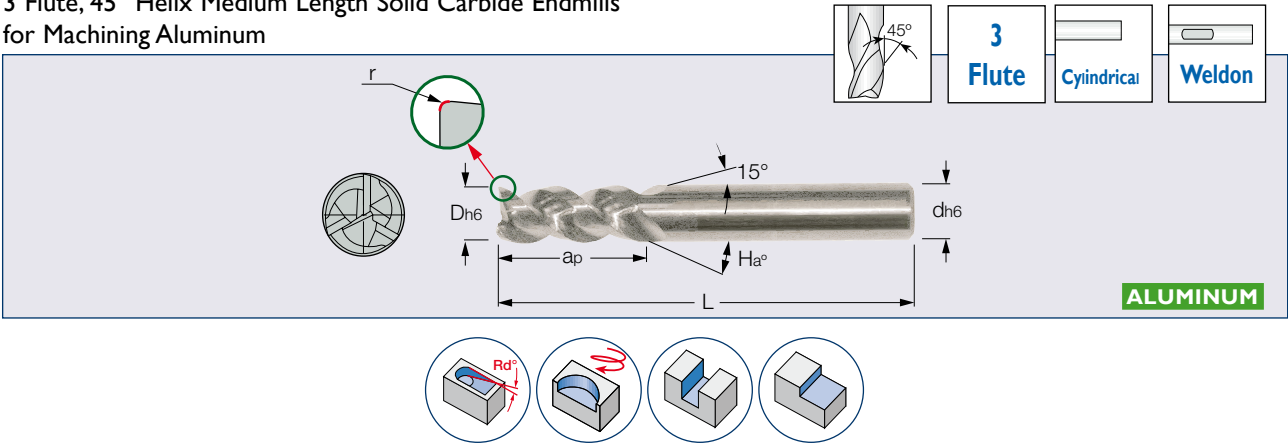
Available grade: MC08 (Uncoated)

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRCA-B-3

3 Flute, 45° Helix Medium Length Solid Carbide Endmills
for Machining Aluminum



Designation											Recommended Machining Data
	D	d	ap	L	Flute	Ha°	Rd°	Shank	r	fz (mm/t)	
MRCA-B-3 04-12C06-57	4.00	6.00	12.00	57.00	3	45.0	5.0	C	0.10	0.02-0.05	
MRCA-B-3 04-12W06-57	4.00	6.00	12.00	57.00	3	45.0	5.0	W	0.10	0.02-0.05	
MRCA-B-3 05-14C06-57	5.00	6.00	14.00	57.00	3	45.0	5.0	C	0.20	0.02-0.06	
MRCA-B-3 05-14W06-57	5.00	6.00	14.00	57.00	3	45.0	5.0	W	0.20	0.02-0.06	
MRCA-B-3 06-16C06-57	6.00	6.00	16.00	57.00	3	45.0	5.0	C	0.20	0.03-0.07	
MRCA-B-3 06-16W06-57	6.00	6.00	16.00	57.00	3	45.0	5.0	W	0.20	0.03-0.07	
MRCA-B-3 08-20C08-63	8.00	8.00	21.50	63.00	3	45.0	5.0	C	0.20	0.03-0.09	
MRCA-B-3 08-20W08-63	8.00	8.00	21.50	63.00	3	45.0	5.0	W	0.20	0.03-0.09	
MRCA-B-3 10-22C10-72	10.00	10.00	23.50	72.00	3	45.0	5.0	C	0.20	0.03-0.10	
MRCA-B-3 10-22W10-72	10.00	10.00	23.50	72.00	3	45.0	5.0	W	0.20	0.03-0.10	
MRCA-B-3 12-25C12-83	12.00	12.00	25.00	83.00	3	45.0	5.0	C	0.20	0.04-0.11	
MRCA-B-3 12-25W12-83	12.00	12.00	25.00	83.00	3	45.0	5.0	W	0.20	0.04-0.11	
MRCA-B-3 14-30C14-83	14.00	14.00	30.00	83.00	3	45.0	5.0	C	0.20	0.04-0.12	
MRCA-B-3 14-30W14-83	14.00	14.00	30.00	83.00	3	45.0	5.0	W	0.20	0.04-0.12	
MRCA-B-3 16-32C16-92	16.00	16.00	32.00	92.00	3	45.0	5.0	C	0.20	0.05-0.13	
MRCA-B-3 16-32W16-92	16.00	16.00	32.00	92.00	3	45.0	5.0	W	0.20	0.05-0.13	
MRCA-B-3 20-38C20-104	20.00	20.00	38.00	104.00	3	45.0	5.0	C	0.20	0.05-0.13	
MRCA-B-3 20-38W20-104	20.00	20.00	38.00	104.00	3	45.0	5.0	W	0.20	0.05-0.13	

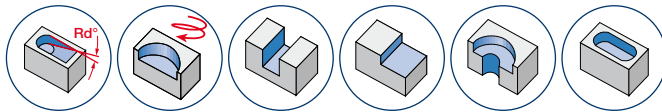
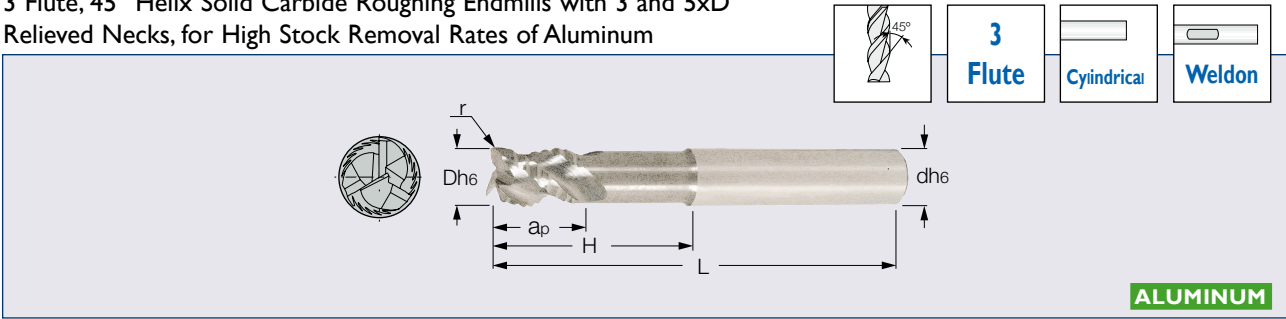
Available grade: MC08 (Uncoated)
For user guide, see pages 106-114



SOLID CARBIDE ENDMILLS

MRR-B3-R

3 Flute, 45° Helix Solid Carbide Roughing Endmills with 3 and 5xD
Relieved Necks, for High Stock Removal Rates of Aluminum



Designation											Recommended Machining Data
	D	d	H	L	Flute	Rd°	ap	Shank	r	fz (mm/t)	
MRR-B3 06-09/21C06R02A57	6.00	6.00	21.00	57.00	3	20.0	9.00	C	0.20	0.03-0.07	
MRR-B3 06-09/21W06R02A57	6.00	6.00	21.00	57.00	3	20.0	9.00	W	0.20	0.03-0.07	
MRR-B3 06-09/30C06R02A65	6.00	6.00	30.00	65.00	3	20.0	9.00	C	0.20	0.03-0.07	
MRR-B3 06-09/30W06R02A65	6.00	6.00	30.00	65.00	3	20.0	9.00	W	0.20	0.03-0.07	
MRR-B3 08-12/27C08R02A63	8.00	8.00	27.00	63.00	3	20.0	12.00	C	0.20	0.03-0.15	
MRR-B3 08-12/27W08R02A63	8.00	8.00	27.00	63.00	3	20.0	12.00	W	0.20	0.03-0.15	
MRR-B3 08-12/40C08R02A78	8.00	8.00	40.00	78.00	3	20.0	12.00	C	0.20	0.03-0.15	
MRR-B3 08-12/40W08R02A78	8.00	8.00	40.00	78.00	3	20.0	12.00	W	0.20	0.03-0.15	
MRR-B3 10-12/31C10R02A72	10.00	10.00	31.00	72.00	3	20.0	12.00	C	0.20	0.05-0.20	
MRR-B3 10-12/31W10R02A72	10.00	10.00	31.00	72.00	3	20.0	12.00	W	0.20	0.05-0.20	
MRR-B3 10-12/50C10R02A100	10.00	10.00	50.00	100.00	3	20.0	12.00	C	0.20	0.05-0.20	
MRR-B3 10-12/50W10R02A100	10.00	10.00	50.00	100.00	3	20.0	12.00	W	0.20	0.05-0.20	
MRR-B3 12-12/37C12R02A83	12.00	12.00	37.00	83.00	3	20.0	12.00	C	0.20	0.07-0.22	
MRR-B3 12-12/37W12R02A83	12.00	12.00	37.00	83.00	3	20.0	12.00	W	0.20	0.07-0.22	
MRR-B3 12-14/55C12R02A100	12.00	12.00	55.00	100.00	3	20.0	14.00	C	0.20	0.07-0.22	
MRR-B3 12-14/55W12R02A100	12.00	12.00	55.00	100.00	3	20.0	14.00	W	0.20	0.07-0.22	
MRR-B3 16-14/43C16R02A92	16.00	16.00	43.00	92.00	3	20.0	14.00	C	0.20	0.07-0.25	
MRR-B3 16-14/43W16R02A92	16.00	16.00	43.00	92.00	3	20.0	14.00	W	0.20	0.07-0.25	
MRR-B3 16-18/80C16R02A150	16.00	16.00	80.00	150.00	3	20.0	18.00	C	0.20	0.07-0.25	
MRR-B3 16-18/80W16R02A150	16.00	16.00	80.00	150.00	3	20.0	18.00	W	0.20	0.07-0.25	
MRR-B3 20-17/53C20R02A104	20.00	20.00	53.00	104.00	3	20.0	17.00	C	0.20	0.07-0.25	
MRR-B3 20-17/53W20R02A104	20.00	20.00	53.00	104.00	3	20.0	17.00	W	0.20	0.07-0.25	
MRR-B3 20-22/80C20R02A150	20.00	20.00	80.00	150.00	3	20.0	22.00	C	0.20	0.07-0.25	
MRR-B3 20-22/80W20R02A150	20.00	20.00	80.00	150.00	3	20.0	22.00	W	0.20	0.07-0.25	

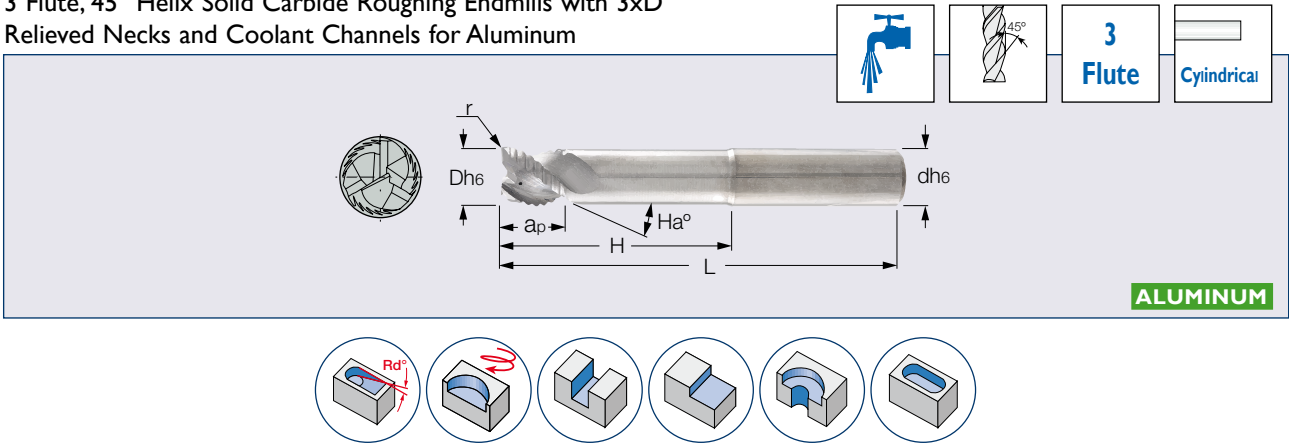
Available grade: MC08 (Uncoated)

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRR-B3-R-C

3 Flute, 45° Helix Solid Carbide Roughing Endmills with 3xD Relieved Necks and Coolant Channels for Aluminum

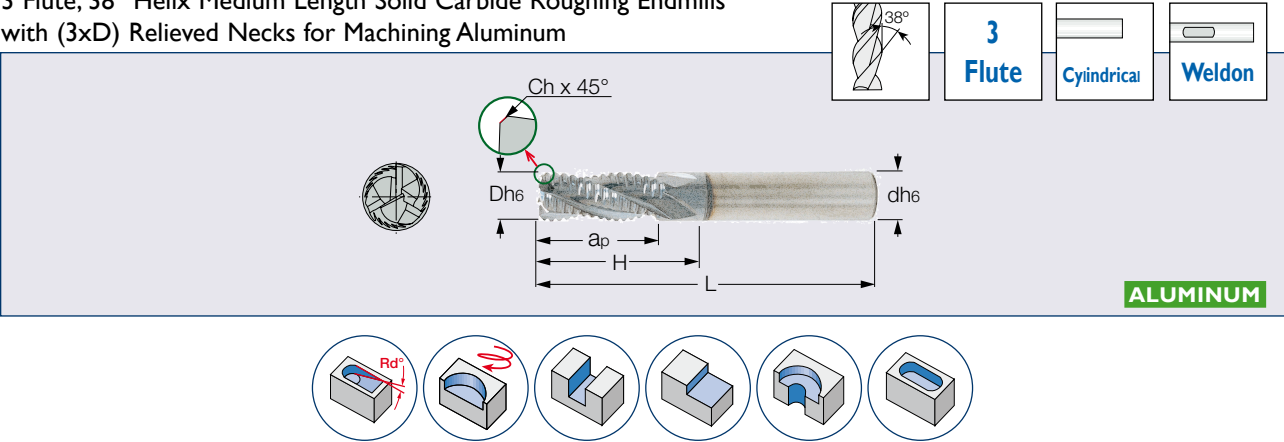


Designation											Recommended Machining Data
	D	d	H	L	Flute	Rd°	ap	Shank	r	fz (mm/t)	
MRR-B3 08-12/41C08R02A83C	8.00	8.00	41.00	83.00	3	20.0	12.00	C	0.20	0.05-0.15	
MRR-B3 08-12/41C08R20A83C	8.00	8.00	41.00	83.00	3	20.0	12.00	C	2.00	0.05-0.15	
MRR-B3 10-12/41C10R.2A83C	10.00	10.00	41.00	83.00	3	20.0	12.00	C	0.20	0.07-0.20	
MRR-B3 10-12/41C10R20A83C	10.00	10.00	41.00	83.00	3	20.0	12.00	C	2.00	0.07-0.20	
MRR-B3 12-12/41C12R.2A87C	12.00	12.00	41.00	87.00	3	20.0	12.00	C	0.20	0.10-0.22	
MRR-B316-14/47C16R20A109C	16.00	16.00	47.00	109.00	3	20.0	14.00	C	2.00	0.10-0.25	
MRR-B316-14/60C16R.2A109C	16.00	16.00	60.00	109.00	3	20.0	14.00	C	0.20	0.10-0.25	
MRR-B316-14/60C16R40A109C	16.00	16.00	60.00	109.00	3	20.0	14.00	C	4.00	0.10-0.25	
MRR-B320-17/60C20R40A111C	20.00	20.00	60.00	111.00	3	20.0	17.00	C	4.00	0.10-0.25	
MRR-B320-30/100C25R4A150C	20.00	20.00	100.00	150.00	3	20.0	30.00	C	4.00	0.10-0.25	
MRR-B325-25/74C25R40A130C	25.00	25.00	74.00	130.00	3	20.0	25.00	C	4.00	0.10-0.25	

Available grade: MC08 (Uncoated)
For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRRC-E-3
 3 Flute, 38° Helix Medium Length Solid Carbide Roughing Endmills
 with (3xD) Relieved Necks for Machining Aluminum



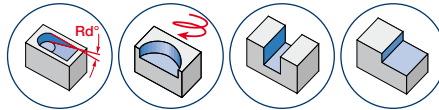
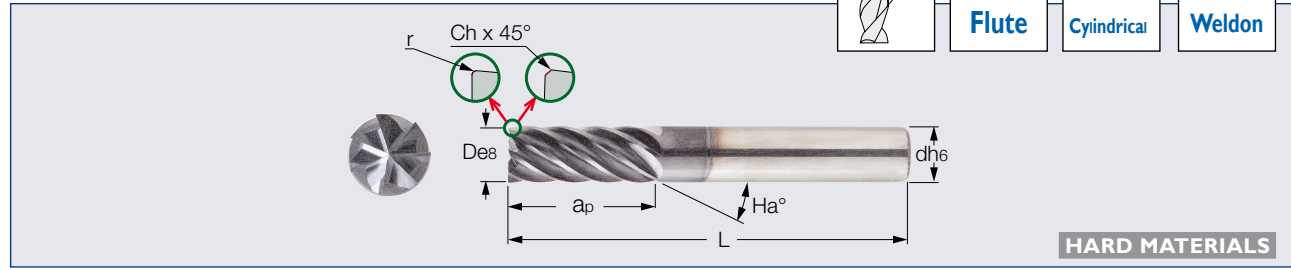
Designation										Recommended Machining Data
	D	d	ap	H	L	Flute	Rd°	Shank	Ch	fz (mm/t)
MRRC060E13-3C06	6.00	6.00	13.00	21.00	57.00	3	5.0	C	0.50	0.03-0.07
MRRC060E13-3W06	6.00	6.00	13.00	21.00	57.00	3	5.0	W	0.50	0.03-0.07
MRRC080E20-3C08	8.00	8.00	20.00	28.00	63.00	3	5.0	C	0.50	0.03-0.15
MRRC080E20-3W08	8.00	8.00	20.00	28.00	63.00	3	5.0	W	0.50	0.03-0.15
MRRC100E22-3C10	10.00	10.00	22.00	30.00	72.00	3	5.0	C	0.60	0.05-0.20
MRRC100E22-3W10	10.00	10.00	22.00	30.00	72.00	3	5.0	W	0.60	0.05-0.20
MRRC120E25-3C12	12.00	12.00	25.00	37.00	83.00	3	5.0	C	0.60	0.07-0.22
MRRC120E25-3W12	12.00	12.00	25.00	37.00	83.00	3	5.0	W	0.60	0.07-0.22
MRRC140E25-3W14	14.00	14.00	25.00	37.00	83.00	3	5.0	W	0.60	0.07-0.22
MRRC160E32-3C16	16.00	16.00	32.00	44.00	92.00	3	5.0	C	0.60	0.07-0.25
MRRC160E32-3W16	16.00	16.00	32.00	44.00	92.00	3	5.0	W	0.60	0.07-0.25
MRRC180E32-3W18	18.00	18.00	32.00	44.00	92.00	3	5.0	W	0.60	0.07-0.25
MRRC200E38-3C20	20.00	20.00	38.00	55.00	104.00	3	5.0	C	0.70	0.07-0.25
MRRC200E38-3W20	20.00	20.00	38.00	55.00	104.00	3	5.0	W	0.70	0.07-0.25
MRRC250E45-3C25	25.00	25.00	45.00	64.00	121.00	3	5.0	C	0.70	0.07-0.25
MRRC250E45-3W25	25.00	25.00	45.00	64.00	121.00	3	5.0	W	0.70	0.07-0.25

Available grade: MC08 (Uncoated)
 For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-E7/H7-VF

7 Flute Endmills with Different Helix and Variable Pitch for Chatter Free High Speed Finish Milling



Designation											Recommended Machining Data
	D	d	ap	L	Flute	Ha°	Ra°	Ch	r	Shank	fz (mm/t)
MRC-E7 02-04C06VF-M57	2.00	6.00	4.00	57.00	7	38.0	3.0	0.05	-	C	0.01-0.02
MRC-E7 03-06C06VF-M57	3.00	6.00	6.00	57.00	7	38.0	3.0	0.1	-	C	0.02-0.05
MRC-E7 04-08C06VF-M57	4.00	6.00	8.00	57.00	7	38.0	3.0	0.1	-	C	0.02-0.05
MRC-E7 05-10C06VF-M57	5.00	6.00	10.00	57.00	7	38.0	3.0	0.2	-	C	0.03-0.07
MRC-H7 06-12C06VF-M57	6.00	6.00	12.00	57.00	7	37.0	3.0	-	-	C	0.03-0.07
MRC-H7 06-12C06VFR.2M57	6.00	6.00	12.00	57.00	7	37.0	3.0	-	0.20	C	0.03-0.10
MRC-H7 06-18C06VF-M65	6.00	6.00	18.00	65.00	7	37.0	3.0	0.2	-	C	0.03-0.07
MRC-H7 06-24C06VF-70	6.00	6.00	24.00	70.00	7	37.0	3.0	0.2	-	C	0.03-0.07
MRC-H7 06-36C06VF-90	6.00	6.00	36.00	90.00	7	37.0	3.0	0.2	-	C	0.03-0.07
MRC-H7 08-16C08VF-M63	8.00	8.00	16.00	63.00	7	37.0	3.0	-	-	C	0.03-0.09
MRC-H7 08-16C08VFR.4M63	8.00	8.00	16.00	63.00	7	37.0	3.0	-	0.40	C	0.04-0.12
MRC-H7 08-24C08VF-M90	8.00	8.00	24.00	90.00	7	37.0	3.0	0.2	-	C	0.03-0.08
MRC-H7 08-32C08VF-90	8.00	8.00	32.00	90.00	7	37.0	3.0	0.2	-	C	0.03-0.09
MRC-H7 08-48C08VF-110	8.00	8.00	48.00	110.00	7	37.0	3.0	0.2	-	C	0.03-0.08
MRC-H7 10-20C10VF-M72	10.00	10.00	20.00	72.00	7	37.0	3.0	-	-	C	0.03-0.10
MRC-H7 10-20C10VFR.5M72	10.00	10.00	20.00	72.00	7	37.0	3.0	-	0.50	C	0.03-0.03
MRC-H7 10-20W10VF-M72	10.00	10.00	20.00	72.00	7	37.0	3.0	-	-	W	0.03-0.10
MRC-H7 10-30C10VF-M100	10.00	10.00	30.00	100.00	7	37.0	3.0	0.3	-	C	0.03-0.10
MRC-H7 10-40C10VF-100	10.00	10.00	40.00	100.00	7	37.0	3.0	0.3	-	C	0.03-0.10
MRC-H7 10-60C10VF-130	10.00	10.00	60.00	130.00	7	37.0	3.0	0.3	-	C	0.03-0.10
MRC-H7 12-24C12VF-M83	12.00	12.00	24.00	83.00	7	37.0	3.0	-	-	C	0.04-0.11
MRC-H7 12-24C12VFR.6M83	12.00	12.00	24.00	83.00	7	37.0	3.0	-	0.60	C	0.04-0.04
MRC-H7 12-24W12VF-M83	12.00	12.00	24.00	83.00	7	37.0	3.0	-	-	W	0.04-0.12
MRC-H7 12-36C12VF-M110	12.00	12.00	36.00	110.00	7	37.0	3.0	0.3	-	C	0.04-0.12
MRC-H7 12-48C12VF-110	12.00	12.00	48.00	110.00	7	37.0	3.0	0.3	-	C	0.04-0.11
MRC-H7 12-72C12VF-140	12.00	12.00	72.00	140.00	7	37.0	3.0	0.3	-	C	0.04-0.12
MRC-H7 16-32C16VF-M92	16.00	16.00	32.00	92.00	7	37.0	3.0	-	-	C	0.05-0.13
MRC-H7 16-32C16VFR.8M92	16.00	16.00	32.00	92.00	7	37.0	3.0	-	0.80	C	0.05-0.05
MRC-H7 16-32W16VF-M92	16.00	16.00	32.00	92.00	7	37.0	3.0	-	-	W	0.05-0.13
MRC-H7 16-48C12VF-M131	16.00	16.00	48.00	131.00	7	37.0	3.0	0.3	-	C	0.05-0.13
MRC-H7 16-64C16VF-131	16.00	16.00	64.00	131.00	7	37.0	3.0	0.3	-	C	0.05-0.13
MRC-H7 16-96C16VF-175	16.00	16.00	96.00	175.00	7	37.0	3.0	0.3	-	C	0.05-0.13
MRC-H7 20-40C20VF-M104	20.00	20.00	40.00	104.00	7	37.0	3.0	-	-	C	0.05-0.13
MRC-H7 20-40C20VFR.1M104	20.00	20.00	40.00	104.00	7	37.0	3.0	-	1.00	C	0.05-0.05
MRC-H7 20-40W20VF-M104	20.00	20.00	40.00	104.00	7	37.0	3.0	-	-	W	0.05-0.13
MRC-H7 20-60C20VF-M140	20.00	20.00	60.00	140.00	7	37.0	3.0	0.4	-	C	0.05-0.13
MRC-H7 20-80C20VF-140	20.00	20.00	80.00	140.00	7	37.0	3.0	0.4	-	C	0.05-0.13

Available grade: MC92

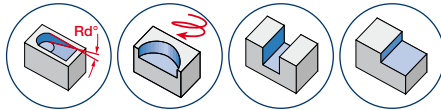
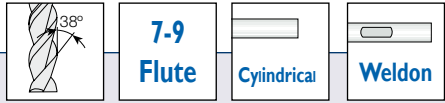
For user guide, see pages 106-114

• Can machine at radial width of cut (ae) of up to 0.10xD

SOLID CARBIDE ENDMILLS

MRCK-H7/9-CFR

7 and 9 Flute Endmills with Different Helix and Variable Pitch for Chatter Dampening on Titanium



Designation	D	d	ap	L	Flute	r	Rd°	Shank ⁽¹⁾
MRCK-H7 06-13C06VFR0.2T57	6.00	6.00	13.00	57.00	7	0.20	5.0	C
MRCK-H7 06-13W06VFR0.2T57	6.00	6.00	13.00	57.00	7	0.20	5.0	W
MRCK-H7 08-19C08VFR0.4T63	8.00	8.00	19.00	63.00	7	0.40	5.0	C
MRCK-H7 08-19W08VFR0.4T63	8.00	8.00	19.00	63.00	7	0.40	5.0	W
MRCK-H7 10-22C10VFR0.5T72	10.00	10.00	22.00	72.00	7	0.50	5.0	C
MRCK-H7 10-22W10VFR0.5T72	10.00	10.00	22.00	72.00	7	0.50	5.0	W
MRCK-H7 12-26C12VFR0.6T83	12.00	12.00	26.00	83.00	7	0.60	5.0	C
MRCK-H7 12-26W12VFR0.6T83	12.00	12.00	26.00	83.00	7	0.60	5.0	W
MRCK-H9 16-32C16VFR0.8T92	16.00	16.00	32.00	92.00	9	0.80	5.0	C
MRCK-H9 16-32W16VFR0.8T92	16.00	16.00	32.00	92.00	9	0.80	5.0	W
MRCK-H9 20-38C20VFR1T104	20.00	20.00	38.00	104.00	9	1.00	5.0	C
MRCK-H9 20-38W20VFR1T104	20.00	20.00	38.00	104.00	9	1.00	5.0	W

Available grade: MC98

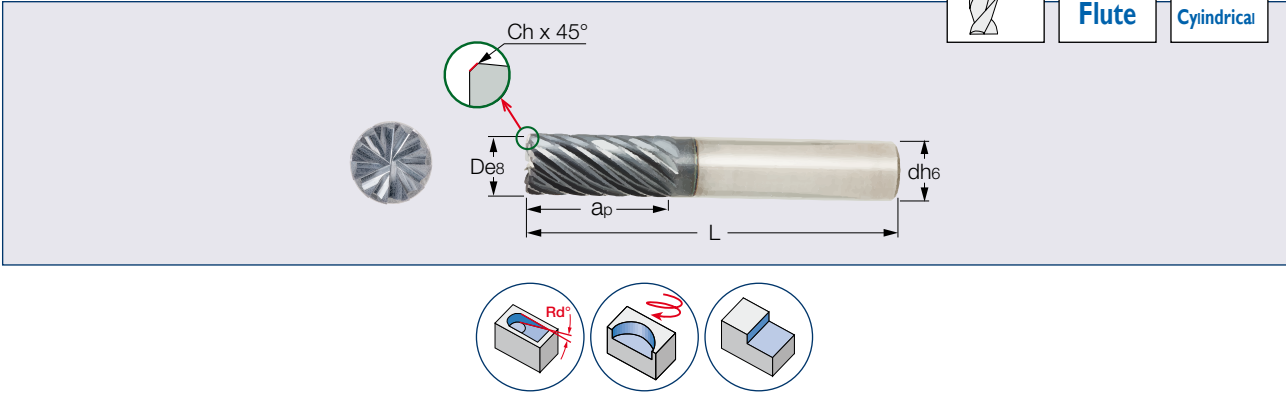
Feed Recommendations

Designation	Finishing		High Speed Machining	
	Vc m/min	Fz mm/t	Vc m/min	fz (max) mm/t
MRCK-H7 06-13C06VFR0.2T57	25-40	0.02-0.04	30-60	0.08-0.15
MRCK-H7 06-13W06VFR0.2T57	25-40	0.02-0.04	30-60	0.08-0.15
MRCK-H7 08-19C08VFR0.4T63	25-40	0.02-0.04	30-60	0.08-0.15
MRCK-H7 08-19W08VFR0.4T63	25-40	0.02-0.04	30-60	0.08-0.15
MRCK-H7 10-22C10VFR0.5T72	40-60	0.03-0.05	50-80	0.10-0.25
MRCK-H7 10-22W10VFR0.5T72	40-60	0.03-0.05	50-80	0.10-0.25
MRCK-H7 12-26C12VFR0.6T83	40-60	0.03-0.05	50-80	0.10-0.25
MRCK-H7 12-26W12VFR0.6T83	40-60	0.03-0.05	50-80	0.10-0.25
MRCK-H9 16-32C16VFR0.8T92	50-100	0.04-0.07	100-130	0.15-0.30
MRCK-H9 16-32W16VFR0.8T92	50-100	0.04-0.07	100-130	0.15-0.30
MRCK-H9 20-38C20VFR1T104	50-100	0.04-0.07	100-130	0.15-0.30
MRCK-H9 20-38W20VFR1T104	50-100	0.04-0.07	100-130	0.15-0.30

SOLID CARBIDE ENDMILLS

MRC-H-VF

6-20 Flute Endmills with Different Helix and Variable Pitch, for
Vibration Free High Speed Finish Milling



Designation	D	d	ap	L	Flute	Ch	Ha°	Rd°	Recommended Machining Data
									fz (mm/t)
MRC-H6 06-12C06VF-H57	6.00	6.00	12.00	57.00	6	0.2x45°	45.0	3.0	0.03-0.07
MRC-H8 08-16C08VF-H63	8.00	8.00	16.00	63.00	8	0.2x45°	45.0	3.0	0.03-0.09
MRC-H10 10-20C10VF-H72	10.00	10.00	20.00	72.00	10	0.3x45°	35.0	3.0	0.03-0.10
MRC-H12 12-24C12VF-H83	12.00	12.00	24.00	83.00	12	0.3x45°	35.0	3.0	0.04-0.11
MRC-H16 16-32C16VF-H92	16.00	16.00	32.00	92.00	16	0.3x45°	35.0	3.0	0.05-0.13
MRC-H20 20-40C20VFH104	20.00	20.00	40.00	104.00	20	0.4x45°	30.0	3.0	0.05-0.13

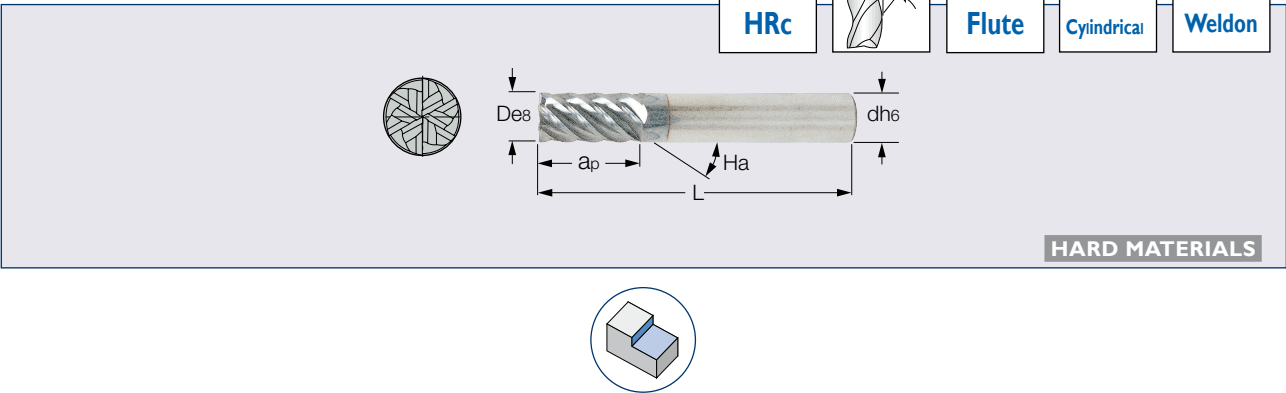
Available grade: MC92

For user guide, see pages 106-114

• Can machine at radial width of cut (ae) of up to 0.06xD

MRCH-B-6

6 Flute, 45° Helix Medium Length Solid Carbide Endmills, for
Finishing of Hard Materials up to 65 HRC



Designation	D	d	ap	L	Flute	Ha°	Shank	Recommended Machining Data
								fz (mm/t)
MRCH060B16-6C06	6.00	6.00	16.00	57.00	6	45.0	C	0.03-0.07
MRCH060B16-6W06	6.00	6.00	16.00	57.00	6	45.0	W	0.03-0.07
MRCH080B20-6C08	8.00	8.00	20.00	63.00	6	45.0	C	0.03-0.09
MRCH080B20-6W08	8.00	8.00	20.00	63.00	6	45.0	W	0.03-0.09
MRCH100B22-6C10	10.00	10.00	22.00	72.00	6	45.0	C	0.03-0.10
MRCH100B22-6W10	10.00	10.00	22.00	72.00	6	45.0	W	0.03-0.10
MRCH120B25-6C12	12.00	12.00	25.00	83.00	6	45.0	C	0.04-0.11
MRCH120B25-6W12	12.00	12.00	25.00	83.00	6	45.0	W	0.04-0.11
MRCH160B32-6C16	16.00	16.00	32.00	92.00	6	45.0	C	0.05-0.13
MRCH160B32-6W16	16.00	16.00	32.00	92.00	6	45.0	W	0.05-0.13
MRCH200B38-6C20	20.00	20.00	38.00	104.00	6	45.0	C	0.05-0.13
MRCH200B38-6W20	20.00	20.00	38.00	104.00	6	45.0	W	0.05-0.13

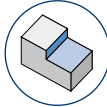
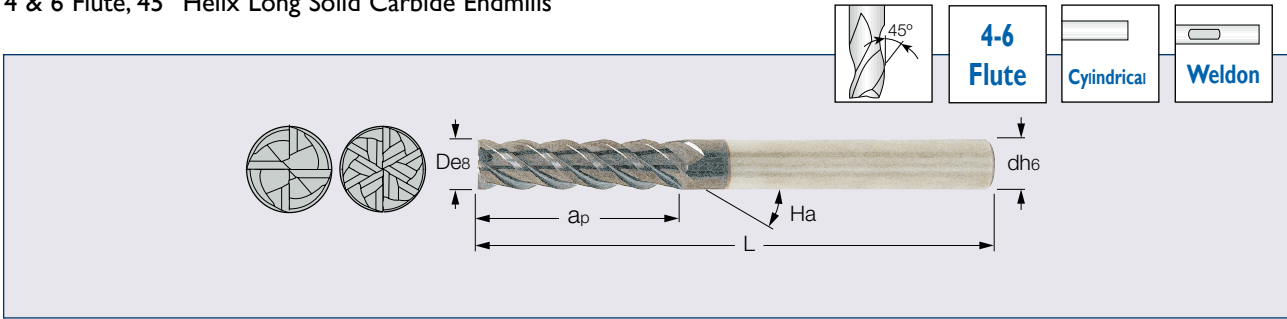
Available grade: MC93

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRCL-B-4/6

4 & 6 Flute, 45° Helix Long Solid Carbide Endmills



Designation								Recommended Machining Data
	D	d	ap	L	Flute	Ha°	Shank	fz (mm/t)
MRCL060B24-4C06	6.00	6.00	24.00	65.00	4	45.0	C	0.03-0.07
MRCL060B24-4W06	6.00	6.00	24.00	65.00	4	45.0	W	0.03-0.07
MRCL080B32-4C08	8.00	8.00	32.00	80.00	4	45.0	C	0.03-0.09
MRCL080B32-4W08	8.00	8.00	32.00	80.00	4	45.0	W	0.03-0.09
MRCL100B40-4C10	10.00	10.00	40.00	100.00	4	45.0	C	0.03-0.10
MRCL100B40-4W10	10.00	10.00	40.00	100.00	4	45.0	W	0.03-0.10
MRCL120B48-4C12	12.00	12.00	48.00	100.00	4	45.0	C	0.04-0.11
MRCL120B48-4W12	12.00	12.00	48.00	100.00	4	45.0	W	0.04-0.11
MRCL140B50-4C14	14.00	14.00	50.00	100.00	4	45.0	C	0.04-0.12
MRCL140B50-4W14	14.00	14.00	50.00	100.00	4	45.0	W	0.04-0.12
MRCL160B56-6C16	16.00	16.00	56.00	115.00	6	45.0	C	0.05-0.13
MRCL160B56-6W16	16.00	16.00	56.00	115.00	6	45.0	W	0.05-0.13
MRCL200B60-6C20	20.00	20.00	60.00	125.00	6	45.0	C	0.05-0.13
MRCL200B60-6W20	20.00	20.00	60.00	125.00	6	45.0	W	0.05-0.13

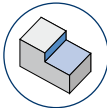
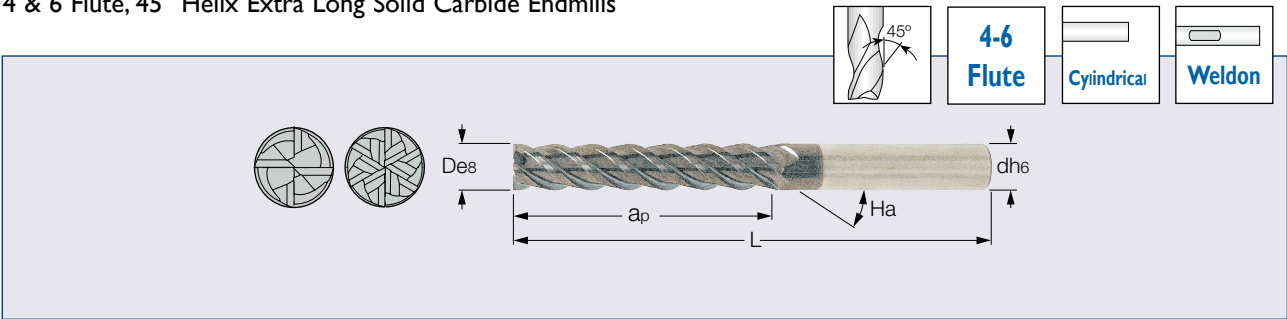
Available grades: MC98

For user guide, see pages 106-114

Smooth cutting in long depth of cut

MRCXL-B-4/6

4 & 6 Flute, 45° Helix Extra Long Solid Carbide Endmills



Designation								Recommended Machining Data
	D	d	ap	L	Flute	Ha°	Shank	fz (mm/t)
MRCXLI00B60-4C10	10.00	10.00	60.00	110.00	4	45.0	C	0.03-0.10
MRCXLI00B60-4W10	10.00	10.00	60.00	110.00	4	45.0	W	0.03-0.10
MRCXLI20B72-4C12	12.00	12.00	72.00	150.00	4	45.0	C	0.04-0.11
MRCXLI20B72-4W12	12.00	12.00	72.00	150.00	4	45.0	W	0.04-0.11
MRCXLI60B80-6C16	16.00	16.00	80.00	150.00	6	45.0	C	0.05-0.13
MRCXLI60B80-6W16	16.00	16.00	80.00	150.00	6	45.0	W	0.05-0.13
MRCXL200B80-6C20	20.00	20.00	80.00	150.00	6	45.0	C	0.05-0.13

Available grades: MC98

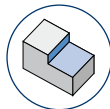
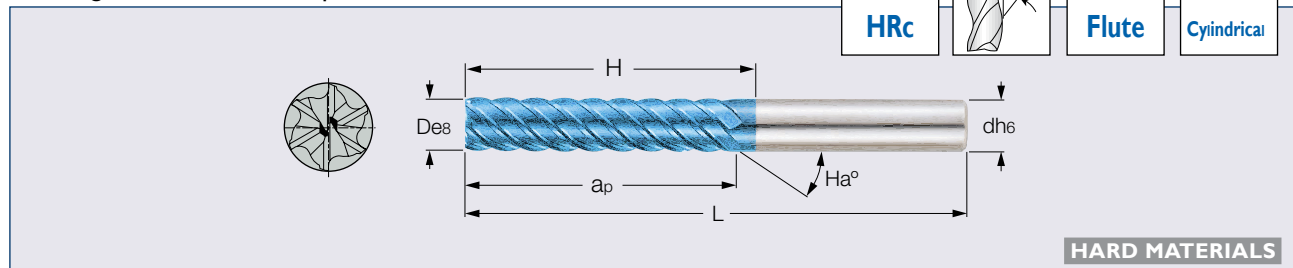
For user guide, see pages 106-114

Smooth cutting in long depth of cut

SOLID CARBIDE ENDMILLS

MRC-B6...R

6 Flute, 45° Helix Extra Long Solid Carbide Endmills, for
Finishing of Hard Materials up to 65 HRc with Various Radii



Designation	D	d	a _p	H	L	Flute	r	H _a °	Shank	Recommended Machining Data f _z (mm/t)
MRC-B6 06-06/14C06R.25H50	6.00	6.00	6.00	14.00	50.00	6	0.20	45	C	0.03-0.07
MRC-B6 06-06/14C06R.5H50	6.00	6.00	6.00	14.00	50.00	6	0.50	45	C	0.03-0.07
MRC-B6 06-13C06R.5H70	6.00	6.00	13.00		70.00	6	0.50	45	C	0.03-0.07
MRC-B6 06-26C06R.5H70	6.00	6.00	26.00		70.00	6	0.50	45	C	0.03-0.07
MRC-B6 08-08/24C08R.5H60	8.00	8.00	8.00	24.00	60.00	6	0.50	45	C	0.03-0.09
MRC-B6 08-19C08R.5H90	8.00	8.00	19.00		90.00	6	0.50	45	C	0.03-0.09
MRC-B6 08-36C08R.5H90	8.00	8.00	36.00		90.00	6	0.50	45	C	0.03-0.09
MRC-B6 10-22C10R.5H100	10.00	10.00	22.00		100.00	6	0.50	45	C	0.03-0.1
MRC-B6 10-10/30C10R1H70	10.00	10.00	10.00	30.00	70.00	6	1.00	45	C	0.03-0.1
MRC-B6 10-22C10R1H100	10.00	10.00	22.00		100.00	6	1.00	45	C	0.03-0.1
MRC-B6 10-46C10R1H100	10.00	10.00	46.00		100.00	6	1.00	45	C	0.03-0.1
MRC-B6 12-26C12R.5H110	12.00	12.00	26.00		110.00	6	0.50	45	C	0.04-0.11
MRC-B6 12-12/30C12R1H75	12.00	12.00	12.00	30.00	75.00	6	1.00	45	C	0.04-0.11
MRC-B6 12-26C12R1H110	12.00	12.00	26.00		110.00	6	1.00	45	C	0.04-0.11
MRC-B6 12-56C12R1H110	12.00	12.00	56.00		110.00	6	1.00	45	C	0.04-0.11
MRC-B6 16-32C16R1H130	16.00	16.00	32.00		130.00	6	1.00	45	C	0.05-0.13
MRC-B6 16-32C16R1.5H130	16.00	16.00	32.00		130.00	6	1.50	45	C	0.05-0.13
MRC-B6 16-66C16R1.5H130	16.00	16.00	66.00		130.00	6	1.50	45	C	0.05-0.13
MRC-B6 20-38C20R1H140	20.00	20.00	38.00		140.00	6	1.00	45	C	0.05-0.013
MRC-B6 20-38C20R1.5H140	20.00	20.00	38.00		140.00	6	1.50	45	C	0.05-0.013
MRC-B6 20-38C20R2H140	20.00	20.00	38.00		140.00	6	2.00	45	C	0.05-0.013
MRC-B6 20-76C20R2H140	20.00	20.00	76.00		140.00	6	2.00	45	C	0.05-0.013

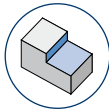
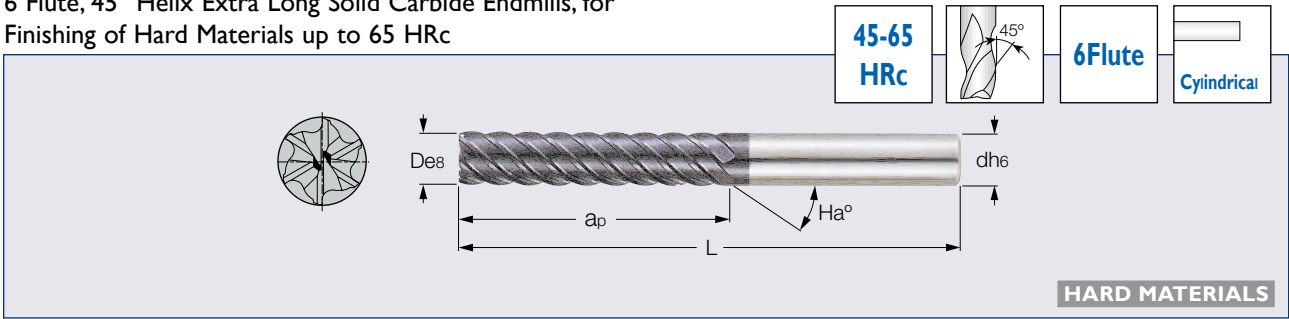
Available grade: MC72

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-B6

6 Flute, 45° Helix Extra Long Solid Carbide Endmills, for Finishing of Hard Materials up to 65 HRc



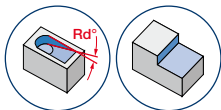
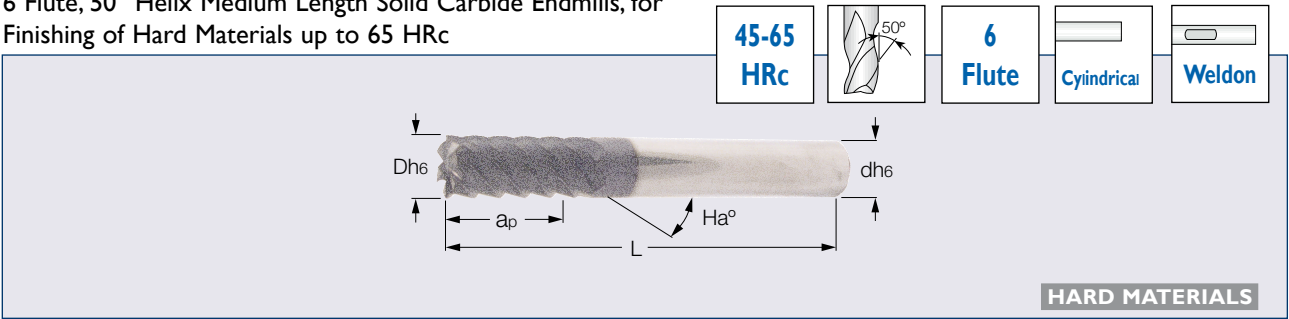
Designation								Recommended Machining Data
	D	d	a_p	L	Flute	H_a°	Shank	f_z (mm/t)
MRC-B6 060-026C06-70	6.00	6.00	26.00	70.00	6	45.0	C	0.03-0.07
MRC-B6 080-036C08-90	8.00	8.00	36.00	90.00	6	45.0	C	0.03-0.09
MRC-B6 100-46C10-100	10.00	10.00	46.00	100.00	6	45.0	C	0.03-0.10
MRC-B6 120-56C12-110	12.00	12.00	56.00	110.00	6	45.0	C	0.04-0.11
MRC-B6 160-66C16-130	16.00	16.00	66.00	130.00	6	45.0	C	0.05-0.13
MRC-B6 200-76C20-140	20.00	20.00	76.00	140.00	6	45.0	C	0.05-0.13
MRC-B6 250-92C25-180	25.00	25.00	92.00	180.00	6	45.0	C	0.05-0.13

Available grade: MC93

For user guide, see pages 106-114

MRC-D6

6 Flute, 50° Helix Medium Length Solid Carbide Endmills, for Finishing of Hard Materials up to 65 HRc



Designation									Recommended Machining Data
	D	d	a_p	L	Flute	H_a°	Shank	R_d°	f_z (mm/t)
MRC-D6 06-13C06H57	6.00	6.00	13.00	57.00	6	50.0	C	5.0	0.03-0.07
MRC-D6 08-20C08H63	8.00	8.00	20.00	63.00	6	50.0	C	5.0	0.03-0.09
MRC-D6 10-22C10H72	10.00	10.00	22.00	72.00	6	50.0	C	5.0	0.03-0.10
MRC-D6 12-25C12H83	12.00	12.00	25.00	83.00	6	50.0	C	5.0	0.04-0.11
MRC-D6 12-25W12H83	12.00	12.00	25.00	83.00	6	50.0	W	5.0	0.04-0.11
MRC-D6 14-30C14H83	14.00	14.00	30.00	83.00	6	50.0	C	5.0	0.04-0.12
MRC-D6 16-32C16H92	16.00	16.00	32.00	92.00	6	50.0	C	5.0	0.05-0.13
MRC-D6 20-38C20H104	20.00	20.00	38.00	104.00	6	50.0	C	5.0	0.05-0.13

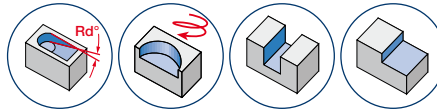
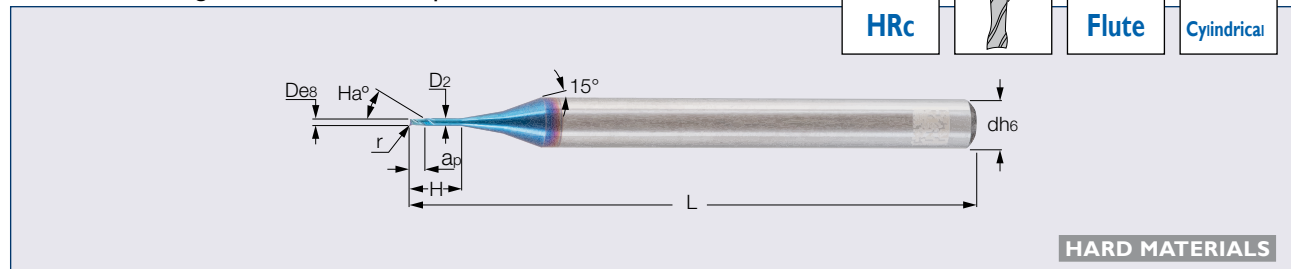
Available grade: MC93

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-A2-R (rib processing)

2 Flute, 30° Helix and Corner Radii Solid Carbide Endmills
for Rib Processing on Hard Materials up to 65 HRC



Designation	D	d	a_p	r	H	L	D_2	Flute	H_{a}	Shank
MRC-A2 005-007/1.5C4R05H45	0.50	4.00	0.70	0.05	1.50	45.00	0.45	2	30.0	C
MRC-A2 005-007/2.5C4R05H45	0.50	4.00	0.70	0.05	2.50	45.00	0.45	2	30.0	C
MRC-A2 005-007/4C4R05H45	0.50	4.00	0.70	0.05	4.00	45.00	0.45	2	30.0	C
MRC-A2 006-009/2C4R.1H45	0.60	4.00	0.90	0.10	2.00	45.00	0.55	2	30.0	C
MRC-A2 006-009/2C4R05H45	0.60	4.00	0.90	0.05	2.00	45.00	0.55	2	30.0	C
MRC-A2 006-009/3C4R05H45	0.60	4.00	0.90	0.05	3.00	45.00	0.55	2	30.0	C
MRC-A2 006-009/4C4R05H45	0.60	4.00	0.90	0.05	4.00	45.00	0.55	2	30.0	C
MRC-A2 007-010/4C4R.1H45	0.70	4.00	1.00	0.10	4.00	45.00	0.65	2	30.0	C
MRC-A2 008-012/2C4R.1H45	0.80	4.00	1.20	0.10	2.00	45.00	0.75	2	30.0	C
MRC-A2 008-012/4C4R.1H45	0.80	4.00	1.20	0.10	4.00	45.00	0.75	2	30.0	C
MRC-A2 008-012/6C4R.1H45	0.80	4.00	1.20	0.10	6.00	45.00	0.75	2	30.0	C
MRC-A2 010-015/4C6R.1H50	1.00	6.00	1.50	0.10	4.00	50.00	0.95	2	30.0	C
MRC-A2 010-015/4C6R.2H50	1.00	6.00	1.50	0.20	4.00	50.00	0.95	2	30.0	C
MRC-A2 010-015/4C6R.3H50	1.00	6.00	1.50	0.30	4.00	50.00	0.95	2	30.0	C
MRC-A2 010-015/6C6R.1H50	1.00	6.00	1.50	0.10	6.00	50.00	0.95	2	30.0	C
MRC-A2 010-015/6C6R.2H50	1.00	6.00	1.50	0.20	6.00	50.00	0.95	2	30.0	C
MRC-A2 010-015/6C6R.3H50	1.00	6.00	1.50	0.30	6.00	50.00	0.95	2	30.0	C
MRC-A2 010-015/8C6R.2H50	1.00	6.00	1.50	0.20	8.00	50.00	0.95	2	30.0	C
MRC-A2 010-015/8C6R.3H50	1.00	6.00	1.50	0.30	8.00	50.00	0.95	2	30.0	C
MRC-A2 015-025/10C6R.2H50	1.50	6.00	2.50	0.20	10.00	50.00	1.45	2	30.0	C
MRC-A2 015-025/12C6R.2H50	1.50	6.00	2.50	0.20	12.00	50.00	1.45	2	30.0	C
MRC-A2 015-025/4C6R.2H50	1.50	6.00	2.50	0.20	4.00	50.00	1.45	2	30.0	C
MRC-A2 015-025/4C6R.3H50	1.50	6.00	2.50	0.30	4.00	50.00	1.45	2	30.0	C
MRC-A2 015-025/6C6R.2H50	1.50	6.00	2.50	0.20	6.00	50.00	1.45	2	30.0	C
MRC-A2 015-025/6C6R.3H50	1.50	6.00	2.50	0.30	6.00	50.00	1.45	2	30.0	C
MRC-A2 015-025/8C6R.2H50	1.50	6.00	2.50	0.20	8.00	50.00	1.45	2	30.0	C
MRC-A2 015-025/8C6R.3H50	1.50	6.00	2.50	0.30	8.00	50.00	1.45	2	30.0	C
MRC-A2 020-030/10C6R.2H55	2.00	6.00	3.00	0.20	10.00	55.00	1.95	2	30.0	C
MRC-A2 020-030/10C6R.3H55	2.00	6.00	3.00	0.30	10.00	55.00	1.95	2	30.0	C
MRC-A2 020-030/10C6R.5H55	2.00	6.00	3.00	0.50	10.00	55.00	1.95	2	30.0	C
MRC-A2 020-030/12C6R.2H55	2.00	6.00	3.00	0.20	12.00	55.00	1.95	2	30.0	C
MRC-A2 020-030/12C6R.3H55	2.00	6.00	3.00	0.30	12.00	55.00	1.95	2	30.0	C
MRC-A2 020-030/12C6R.5H55	2.00	6.00	3.00	0.50	12.00	55.00	1.95	2	30.0	C
MRC-A2 020-030/16C6R.3H55	2.00	6.00	3.00	0.30	16.00	55.00	1.95	2	30.0	C
MRC-A2 020-030/6C6R.2H50	2.00	6.00	3.00	0.20	6.00	50.00	1.95	2	30.0	C
MRC-A2 020-030/6C6R.3H50	2.00	6.00	3.00	0.30	6.00	50.00	1.95	2	30.0	C
MRC-A2 020-030/6C6R.5H50	2.00	6.00	3.00	0.50	6.00	50.00	1.95	2	30.0	C
MRC-A2 020-030/8C6R.2H50	2.00	6.00	3.00	0.20	8.00	50.00	1.95	2	30.0	C
MRC-A2 020-030/8C6R.3H50	2.00	6.00	3.00	0.30	8.00	50.00	1.95	2	30.0	C
MRC-A2 030-040/10C6R.2H55	3.00	6.00	4.00	0.20	10.00	55.00	2.85	2	30.0	C
MRC-A2 030-040/10C6R.3H55	3.00	6.00	4.00	0.30	10.00	55.00	2.85	2	30.0	C
MRC-A2 030-040/10C6R.5H55	3.00	6.00	4.00	0.50	10.00	55.00	2.85	2	30.0	C
MRC-A2 030-040/12C6R.2H55	3.00	6.00	4.00	0.20	12.00	55.00	2.85	2	30.0	C
MRC-A2 030-040/12C6R.3H55	3.00	6.00	4.00	0.30	12.00	55.00	2.85	2	30.0	C
MRC-A2 030-040/12C6R.5H55	3.00	6.00	4.00	0.50	12.00	55.00	2.85	2	30.0	C

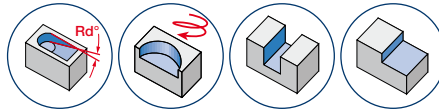
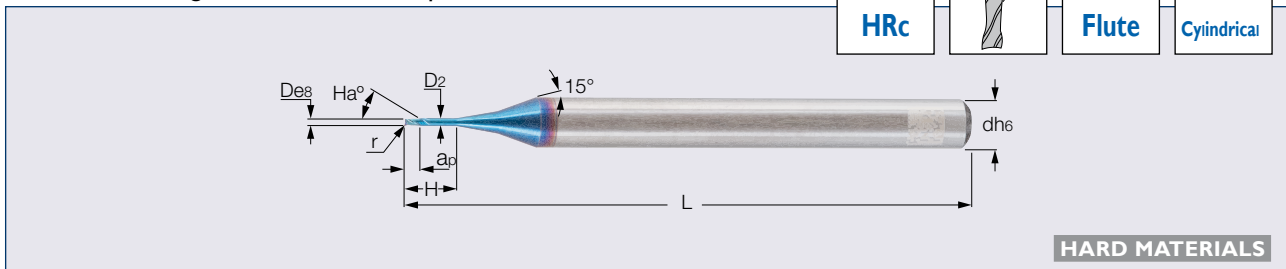
Available grade: MC72

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-A2-R (rib processing) (continued)

2 Flute, 30° Helix and Corner Radii Solid Carbide Endmills
for Rib Processing on Hard Materials up to 65 HRC



Designation	D	d	a_p	r	H	L	D_2	Flute	H_{a}	Shank
MRC-A2 030-040/16C6R.2H55	3.00	6.00	4.00	0.20	16.00	55.00	2.85	2	30.0	C
MRC-A2 030-040/16C6R.3H55	3.00	6.00	4.00	0.30	16.00	55.00	2.85	2	30.0	C
MRC-A2 030-040/16C6R.5H55	3.00	6.00	4.00	0.50	16.00	55.00	2.85	2	30.0	C
MRC-A2 030-040/20C6R.5H55	3.00	6.00	4.00	0.50	20.00	55.00	2.85	2	30.0	C
MRC-A2 030-040/8C6R.2H55	3.00	6.00	4.00	0.20	8.00	55.00	2.85	2	30.0	C
MRC-A2 030-040/8C6R.3H55	3.00	6.00	4.00	0.30	8.00	55.00	2.85	2	30.0	C
MRC-A2 040-050/10C6R.3H55	4.00	6.00	5.00	0.30	10.00	55.00	3.85	2	30.0	C
MRC-A2 040-050/12C6R.2H55	4.00	6.00	5.00	0.20	12.00	55.00	3.85	2	30.0	C
MRC-A2 040-050/12C6R.3H55	4.00	6.00	5.00	0.30	12.00	55.00	3.85	2	30.0	C
MRC-A2 040-050/12C6R.5H55	4.00	6.00	5.00	0.50	12.00	55.00	3.85	2	30.0	C
MRC-A2 040-050/12C6R1.H55	4.00	6.00	5.00	1.00	12.00	55.00	3.85	2	30.0	C
MRC-A2 040-050/16C6R.2H55	4.00	6.00	5.00	0.20	16.00	55.00	3.85	2	30.0	C
MRC-A2 040-050/16C6R.3H55	4.00	6.00	5.00	0.30	16.00	55.00	3.85	2	30.0	C
MRC-A2 040-050/16C6R.5H55	4.00	6.00	5.00	0.50	16.00	55.00	3.85	2	30.0	C
MRC-A2 040-050/16C6R1.H55	4.00	6.00	5.00	1.00	16.00	55.00	3.85	2	30.0	C
MRC-A2 040-050/20C6R.2H55	4.00	6.00	5.00	0.20	20.00	55.00	3.85	2	30.0	C
MRC-A2 040-050/20C6R.3H55	4.00	6.00	5.00	0.30	20.00	55.00	3.85	2	30.0	C
MRC-A2 040-050/20C6R.5H55	4.00	6.00	5.00	0.50	20.00	55.00	3.85	2	30.0	C
MRC-A2 060-070/20C6R.3H60	6.00	6.00	7.00	0.30	20.00	60.00	5.85	2	30.0	C
MRC-A2 060-070/20C6R.5H60	6.00	6.00	7.00	0.50	20.00	60.00	5.85	2	30.0	C
MRC-A2 060-070/20C6R1.H60	6.00	6.00	7.00	1.00	20.00	60.00	5.85	2	30.0	C
MRC-A2 060-070/20C6R1.5H60	6.00	6.00	7.00	1.50	20.00	60.00	5.85	2	30.0	C
MRC-A2 060-070/20C6R2.H60	6.00	6.00	7.00	2.00	20.00	60.00	5.85	2	30.0	C
MRC-A2 080-090/25C8R.3H60	8.00	8.00	9.00	0.30	25.00	60.00	7.70	2	30.0	C
MRC-A2 080-090/25C8R.5H60	8.00	8.00	9.00	0.50	25.00	60.00	7.70	2	30.0	C
MRC-A2 080-090/25C8R1.H60	8.00	8.00	9.00	1.00	25.00	60.00	7.70	2	30.0	C
MRC-A2 080-090/25C8R1.5H60	8.00	8.00	9.00	1.50	25.00	60.00	7.70	2	30.0	C
MRC-A2 080-090/25C8R2.H60	8.00	8.00	9.00	2.00	25.00	60.00	7.70	2	30.0	C
MRC-A2 100-090/32C10R.3H70	10.00	10.00	9.00	0.30	32.00	70.00	9.70	2	30.0	C
MRC-A2 100-111/32C10R1.5H70	10.00	10.00	11.00	1.50	32.00	70.00	9.70	2	30.0	C
MRC-A2 100-110/32C10R.5H70	10.00	10.00	11.00	0.50	32.00	70.00	9.70	2	30.0	C
MRC-A2 100-110/32C10R1.H70	10.00	10.00	11.00	1.00	32.00	70.00	9.70	2	30.0	C
MRC-A2 100-110/32C10R2.H70	10.00	10.00	11.00	2.00	32.00	70.00	9.70	2	30.0	C
MRC-A2 120-12/38C12R1.5H80	12.00	12.00	12.00	1.50	38.00	80.00	11.70	2	30.0	C
MRC-A2 120-120/38C12R.5H80	12.00	12.00	12.00	0.50	38.00	80.00	11.70	2	30.0	C
MRC-A2 120-120/38C12R1.H80	12.00	12.00	12.00	1.00	38.00	80.00	11.70	2	30.0	C
MRC-A2 120-120/38C12R2.H80	12.00	12.00	12.00	2.00	38.00	80.00	11.70	2	30.0	C

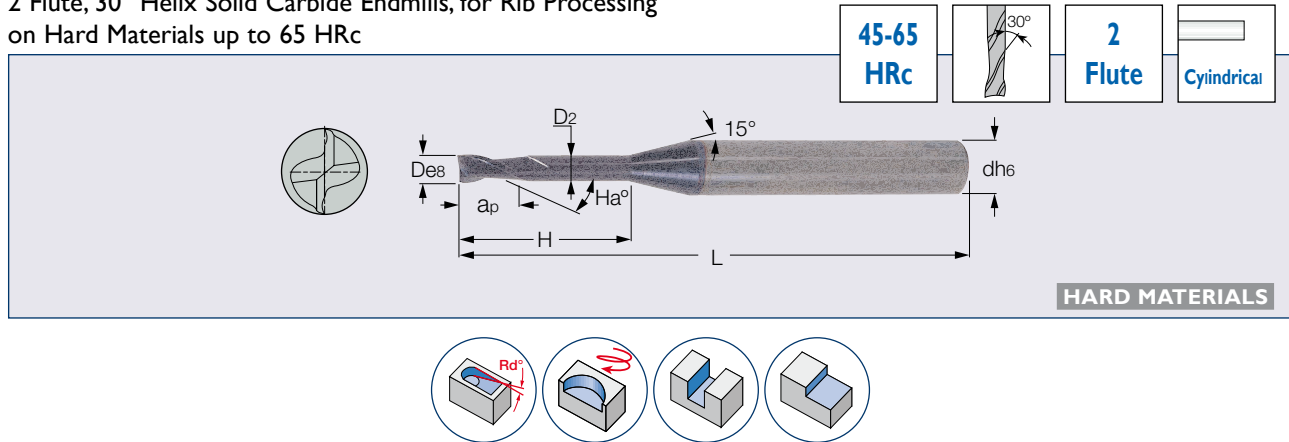
Available grade: MC72

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-A2 (rib processing)

2 Flute, 30° Helix Solid Carbide Endmills, for Rib Processing
on Hard Materials up to 65 HRc



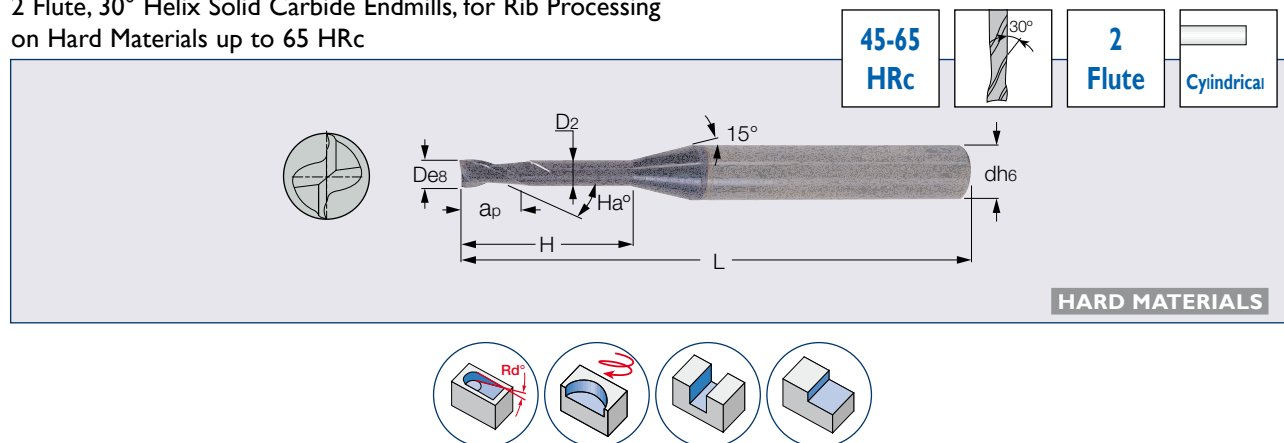
Designation											Recommended Machining Data	Tough ↔ Hard	
	D	d	ap	H	L	D2	Flute	Ha°	Rd°	Shank	fz (mm/t)	MC72	MC93
MRC-A2 001-0015/003C4H45	0.1	4	0.15	0.3	45	0.085	2	30	3	C	0.01-0.012	●	
MRC-A2 001-0015/005C4H45	0.1	4	0.15	0.5	45	0.085	2	30	3	C	0.01-0.012	●	
MRC-A2 002-003/005C4H45	0.2	4	0.3	0.5	45	0.17	2	30	3	C	0.01-0.012	●	
MRC-A2 002-003/01C4H45	0.2	4	0.3	1	45	0.17	2	30	3	C	0.01-0.012	●	
MRC-A2 002-003/015C4H45	0.2	4	0.3	1.5	45	0.17	2	30	3	C	0.01-0.012	●	
MRC-A2 003-0045/01C4H45	0.3	4	0.45	1	45	0.27	2	30	3	C	0.01-0.012	●	
MRC-A2 003-0045/015C4H45	0.3	4	0.45	1.5	45	0.27	2	30	3	C	0.01-0.012	●	
MRC-A2 003-0045/02C4H45	0.3	4	0.45	2	45	0.27	2	30	3	C	0.01-0.012	●	
MRC-A2 003-0045/03C4H45	0.3	4	0.45	3	45	0.27	2	30	3	C	0.01-0.012	●	
MRC-A2 003-0045/04C4H45	0.3	4	0.45	4	45	0.27	2	30	3	C	0.01-0.012	●	
MRC-A2 004-006/01C4H45	0.4	4	0.6	2	45	0.37	2	30	3	C	0.01-0.012	●	
MRC-A2 004-006/02C4M45	0.4	4	0.6	2	45	0.37	2	30	3	C	0.01-0.012	●	●
MRC-A2 004-006/03C4M45	0.4	4	0.6	3	45	0.37	2	30	3	C	0.01-0.012		●
MRC-A2 004-006/04C4M45	0.4	4	0.6	4	45	0.37	2	30	3	C	0.01-0.012		●
MRC-A2 004-006/05C4M45	0.4	4	0.6	5	45	0.37	2	30	3	C	0.01-0.012		●
MRC-A2 005-007/02C4M45	0.5	4	0.7	2	45	0.45	2	30	3	C	0.01-0.012	●	●
MRC-A2 005-007/04C4M45	0.5	4	0.7	4	45	0.45	2	30	3	C	0.01-0.012	●	●
MRC-A2 005-007/06C4M45	0.5	4	0.7	6	45	0.45	2	30	3	C	0.01-0.012	●	●
MRC-A2 005-007/08C4M45	0.5	4	0.7	8	45	0.45	2	30	3	C	0.01-0.012		●
MRC-A2 006-009/02C4M45	0.6	4	0.9	2	45	0.55	2	30	3	C	0.01-0.02	●	●
MRC-A2 006-009/04C4M45	0.6	4	0.9	4	45	0.55	2	30	3	C	0.01-0.02		●
MRC-A2 006-009/06C4M45	0.6	4	0.9	6	45	0.55	2	30	3	C	0.01-0.02		●
MRC-A2 006-009/08C4M45	0.6	4	0.9	8	45	0.55	2	30	3	C	0.01-0.02		●
MRC-A2 006-009/10C4M45	0.6	4	0.9	10	45	0.55	2	30	3	C	0.01-0.02		●
MRC-A2 007-010/02C4M45	0.7	4	1	2	45	0.65	2	30	3	C	0.01-0.03		●
MRC-A2 007-010/08C4M45	0.7	4	1	8	45	0.65	2	30	3	C	0.01-0.03		●
MRC-A2 008-012/04C4M45	0.8	4	1.2	4	45	0.75	2	30	3	C	0.01-0.03	●	●
MRC-A2 008-012/06C4M45	0.8	4	1.2	6	45	0.75	2	30	3	C	0.01-0.03	●	●
MRC-A2 008-012/08C4M45	0.8	4	1.2	8	45	0.75	2	30	3	C	0.01-0.03		●
MRC-A2 008-012/10C4M45	0.8	4	1.2	10	45	0.75	2	30	3	C	0.01-0.03		●
MRC-A2 009-0135/06C4M45	0.9	4	1.35	6	45	0.85	2	30	3	C	0.01-0.03		●
MRC-A2 009-0135/10C4M45	0.9	4	1.35	10	45	0.85	2	30	3	C	0.01-0.03		●
MRC-A2 009-0135/15C4M50	0.9	4	1.35	15	50	0.85	2	30	3	C	0.01-0.03		●
MRC-A2 010-015/04C4M45	1	4	1.5	4	45	0.97	2	30	3	C	0.01-0.01	●	●
MRC-A2 010-015/06C4M45	1	4	1.5	6	45	0.97	2	30	3	C	0.01-0.01	●	●
MRC-A2 010-015/08C4M45	1	4	1.5	8	45	0.95	2	30	3	C	0.01-0.01	●	●
MRC-A2 010-015/10C4M45	1	4	1.5	10	45	0.95	2	30	3	C	0.01-0.01	●	●
MRC-A2 010-015/12C4M45	1	4	1.5	12	45	0.93	2	30	3	C	0.01-0.01	●	●
MRC-A2 010-015/16C4M50	1	4	1.5	16	50	0.93	2	30	3	C	0.01-0.01		●
MRC-A2 010-015/20C4M55	1	4	1.5	20	55	0.93	2	30	3	C	0.01-0.01	●	●
MRC-A2 012-018/06C4M45	1.2	4	1.8	6	45	1.17	2	30	3	C	0.01-0.01	●	●
MRC-A2 012-018/08C4M45	1.2	4	1.8	8	45	1.15	2	30	3	C	0.01-0.01		●
MRC-A2 012-018/10C4M45	1.2	4	1.8	10	45	1.15	2	30	3	C	0.01-0.01		●
MRC-A2 012-018/16C4M50	1.2	4	1.8	16	50	1.13	2	30	3	C	0.01-0.01		●
MRC-A2 014-021/06C4M45	1.4	4	2.1	6	45	1.35	2	30	3	C	0.01-0.01		●
MRC-A2 014-021/08C4M45	1.4	4	2.1	8	45	1.35	2	30	3	C	0.01-0.01		●

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-A2 (rib processing) (continued)

2 Flute, 30° Helix Solid Carbide Endmills, for Rib Processing
on Hard Materials up to 65 HRC



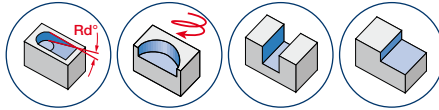
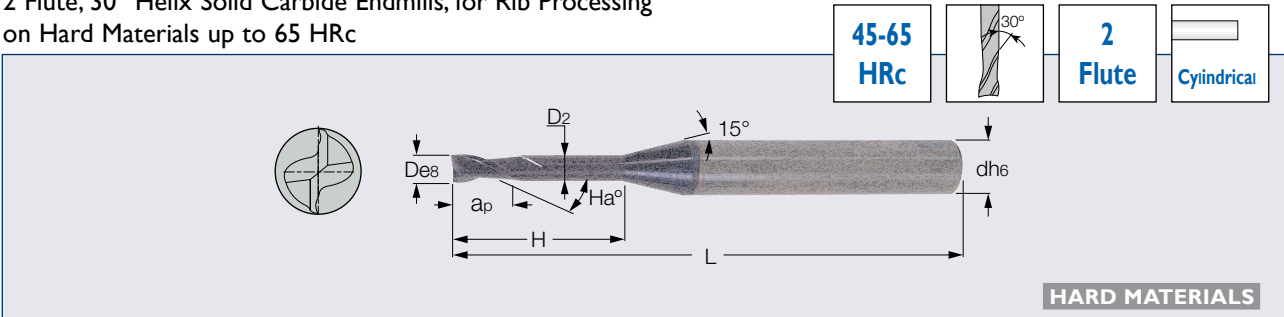
Designation											Recommended Machining Data	Tough ↔ Hard	
	D	d	ap	H	L	D2	Flute	Ha°	Rd°	Shank	fz (mm/t)	MC72	MC93
MRC-A2 014-021/10C4M45	1.4	4	2.1	10	45	1.35	2	30	3	C	0.01-0.01		●
MRC-A2 015-023/06C4M45	1.5	4	2.3	6	45	1.47	2	30	3	C	0.01-0.02	●	●
MRC-A2 015-023/08C4M45	1.5	4	2.3	8	45	1.45	2	30	3	C	0.01-0.02	●	●
MRC-A2 015-023/10C4M45	1.5	4	2.3	10	45	1.45	2	30	3	C	0.01-0.02	●	●
MRC-A2 015-023/12C4M45	1.5	4	2.3	12	45	1.41	2	30	3	C	0.01-0.02	●	●
MRC-A2 015-023/14C4M50	1.5	4	2.3	14	50	1.41	2	30	3	C	0.01-0.02		●
MRC-A2 015-023/16C4M50	1.5	4	2.3	16	50	1.41	2	30	3	C	0.01-0.02	●	●
MRC-A2 015-023/20C4M55	1.5	4	2.3	20	55	1.41	2	30	3	C	0.01-0.02	●	●
MRC-A2 016-024/06C4M45	1.6	4	2.4	6	45	1.57	2	30	3	C	0.01-0.02		●
MRC-A2 016-024/08C4M45	1.6	4	2.4	8	45	1.55	2	30	3	C	0.01-0.02		●
MRC-A2 016-024/10C4M45	1.6	4	2.4	10	45	1.55	2	30	3	C	0.01-0.02		●
MRC-A2 016-024/18C4M55	1.6	4	2.4	18	55	1.53	2	30	3	C	0.01-0.02		●
MRC-A2 016-024/26C4M60	1.6	4	2.4	26	60	1.53	2	30	3	C	0.01-0.02		●
MRC-A2 018-027/06C4M45	1.8	4	2.7	6	45	1.77	2	30	3	C	0.01-0.03		●
MRC-A2 018-027/08C4M45	1.8	4	2.7	8	45	1.75	2	30	3	C	0.01-0.03		●
MRC-A2 018-027/10C4M45	1.8	4	2.7	10	45	1.75	2	30	3	C	0.01-0.03		●
MRC-A2 018-027/12C4M45	1.8	4	2.7	12	45	1.73	2	30	3	C	0.01-0.03		●
MRC-A2 018-027/14C4M50	1.8	4	2.7	14	50	1.73	2	30	3	C	0.01-0.03		●
MRC-A2 018-027/18C4M50	1.8	4	2.7	18	50	1.71	2	30	3	C	0.01-0.03		●
MRC-A2 020-030/06C4M45	2	4	3	6	45	1.97	2	30	3	C	0.01-0.03	●	●
MRC-A2 020-030/08C4M45	2	4	3	8	45	1.95	2	30	3	C	0.01-0.03	●	●
MRC-A2 020-030/10C4M45	2	4	3	10	45	1.95	2	30	3	C	0.01-0.03	●	●
MRC-A2 020-030/12C4M45	2	4	3	12	45	1.93	2	30	3	C	0.01-0.03	●	●
MRC-A2 020-030/14C4M50	2	4	3	14	50	1.93	2	30	3	C	0.01-0.03	●	●
MRC-A2 020-030/16C4M50	2	4	3	16	50	1.91	2	30	3	C	0.01-0.03	●	●
MRC-A2 020-030/18C4M55	2	4	3	18	55	1.91	2	30	3	C	0.01-0.03		●
MRC-A2 020-030/20C4M55	2	4	3	20	55	1.89	2	30	3	C	0.01-0.03	●	●
MRC-A2 020-030/25C4M60	2	4	3	25	60	1.89	2	30	3	C	0.01-0.03	●	●
MRC-A2 020-030/30C4M70	2	4	3	30	70	1.89	2	30	3	C	0.01-0.03	●	●
MRC-A2 025-037/08C4M45	2.5	4	3.7	8	45	2.4	2	30	3	C	0.01-0.03		●
MRC-A2 025-037/10C4M45	2.5	4	3.7	10	45	2.4	2	30	3	C	0.01-0.03		●
MRC-A2 025-037/12C4M45	2.5	4	3.7	12	45	2.4	2	30	3	C	0.01-0.03		●
MRC-A2 025-037/14C4M50	2.5	4	3.7	14	50	2.4	2	30	3	C	0.01-0.03		●
MRC-A2 025-037/16C4M55	2.5	4	3.7	16	55	2.4	2	30	3	C	0.01-0.03		●
MRC-A2 025-037/18C4M55	2.5	4	3.7	18	55	2.4	2	30	3	C	0.01-0.03		●
MRC-A2 025-037/20C4M60	2.5	4	3.7	20	60	2.4	2	30	3	C	0.01-0.03		●
MRC-A2 025-037/25C4M70	2.5	4	3.7	25	70	2.4	2	30	3	C	0.01-0.03		●
MRC-A2 025-037/30C4M80	2.5	4	3.7	30	80	2.4	2	30	3	C	0.01-0.03		●
MRC-A2 030-045/08C6M45	3	6	4.5	8	45	2.85	2	30	3	C	0.01-0.04		●
MRC-A2 030-045/10C6M45	3	6	4.5	10	45	2.85	2	30	3	C	0.01-0.04		●
MRC-A2 030-045/12C6M45	3	6	4.5	12	45	2.85	2	30	3	C	0.01-0.04	●	●
MRC-A2 030-045/14C6M50	3	6	4.5	14	50	2.85	2	30	3	C	0.01-0.04		●
MRC-A2 030-045/16C6M55	3	6	4.5	16	55	2.85	2	30	3	C	0.01-0.04	●	●
MRC-A2 030-045/18C6M55	3	6	4.5	18	55	2.85	2	30	3	C	0.01-0.04		●

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-A2 (rib processing) (continued)

2 Flute, 30° Helix Solid Carbide Endmills, for Rib Processing
on Hard Materials up to 65 HRc



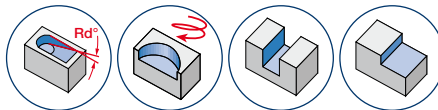
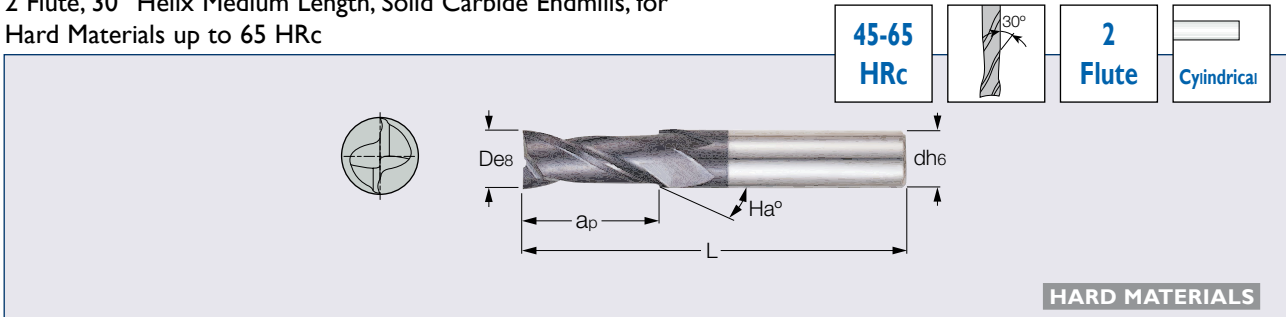
Designation											Recommended Machining Data	Tough ↔ Hard	
	D	d	ap	H	L	D2	Flute	Ha°	Rd°	Shank	fz (mm/t)	MC72	MC93
MRC-A2 030-045/20C6M60	3	6	4.5	20	60	2.85	2	30	3	C	0.01-0.04	●	●
MRC-A2 030-045/25C6M65	3	6	4.5	25	65	2.85	2	30	3	C	0.01-0.04	●	●
MRC-A2 030-045/30C6M70	3	6	4.5	30	70	2.85	2	30	3	C	0.01-0.04	●	●
MRC-A2 030-045/35C6M80	3	6	4.5	35	80	2.85	2	30	3	C	0.01-0.04	●	●
MRC-A2 030-045/40C6M90	3	6	4.5	40	90	2.85	2	30	3	C	0.01-0.04	●	●
MRC-A2 040-060/12C6M50	4	6	6	12	50	3.8	2	30	3	C	0.02-0.05	●	●
MRC-A2 040-060/16C6M60	4	6	6	16	60	3.8	2	30	3	C	0.02-0.05	●	●
MRC-A2 040-060/20C6M60	4	6	6	20	60	3.8	2	30	3	C	0.02-0.05	●	●
MRC-A2 040-060/25C6M70	4	6	6	25	70	3.8	2	30	3	C	0.02-0.05	●	●
MRC-A2 040-060/30C6M70	4	6	6	30	70	3.8	2	30	3	C	0.02-0.05	●	●
MRC-A2 040-060/35C6M80	4	6	6	35	80	3.8	2	30	3	C	0.02-0.05		●
MRC-A2 040-060/40C6M90	4	6	6	40	90	3.8	2	30	3	C	0.02-0.05		●
MRC-A2 040-060/45C6M90	4	6	6	45	90	3.8	2	30	3	C	0.02-0.05		●
MRC-A2 040-060/50C6M100	4	6	6	50	100	3.8	2	30	3	C	0.02-0.05		●
MRC-A2 050-075/16C6M60	5	6	7.5	16	60	4.8	2	30	3	C	0.02-0.06		●
MRC-A2 050-075/20C6M60	5	6	7.5	20	60	4.8	2	30	3	C	0.02-0.06		●
MRC-A2 050-075/25C6M70	5	6	7.5	25	70	4.8	2	30	3	C	0.02-0.06		●
MRC-A2 050-075/30C6M80	5	6	7.5	30	80	4.8	2	30	3	C	0.02-0.06		●
MRC-A2 050-075/35C6M80	5	6	7.5	35	80	4.8	2	30	3	C	0.02-0.06		●
MRC-A2 050-075/40C6M80	5	6	7.5	40	80	4.8	2	30	3	C	0.02-0.06		●
MRC-A2 050-075/50C6M110	5	6	7.5	50	110	4.8	2	30	3	C	0.02-0.06		●
MRC-A2 060-090/20C6M80	6	6	9	20	80	5.7	2	30	3	C	0.02-0.06		●
MRC-A2 060-090/30C6M90	6	6	9	30	90	5.7	2	30	3	C	0.02-0.06		●
MRC-A2 060-090/40C6M100	6	6	9	40	100	5.6	2	30	3	C	0.02-0.06		●
MRC-A2 060-090/50C6M110	6	6	9	50	110	5.6	2	30	3	C	0.02-0.06		●

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-A2 (medium length)

2 Flute, 30° Helix Medium Length, Solid Carbide Endmills, for Hard Materials up to 65 HRc



Designation									Recommended Machining Data
	D	d	a_p	L	Flute	H_a°	R_d°	Shank	f_z (mm/t)
MRC-A2 010-025C06-40	1.00	6.00	2.50	40.00	2	30.0	5.0	C	0.00-0.01
MRC-A2 015-040C06-40	1.50	6.00	4.00	40.00	2	30.0	5.0	C	0.00-0.02
MRC-A2 020-060C06-40	2.00	6.00	6.00	40.00	2	30.0	5.0	C	0.01-0.03
MRC-A2 025-080C06-40	2.50	6.00	8.00	40.00	2	30.0	5.0	C	0.01-0.03
MRC-A2 030-080C06-45	3.00	6.00	8.00	45.00	2	30.0	5.0	C	0.01-0.04
MRC-A2 035-10C06M45	3.50	6.00	10.00	45.00	2	30.0	5.0	C	0.01-0.04
MRC-A2 040-11C06-45	4.00	6.00	11.00	45.00	2	30.0	5.0	C	0.02-0.05
MRC-A2 045-11C06-45	4.50	6.00	11.00	45.00	2	30.0	5.0	C	0.02-0.05
MRC-A2 050-13C06-50	5.00	6.00	13.00	50.00	2	30.0	5.0	C	0.02-0.06
MRC-A2 055-13C06-50	5.50	6.00	13.00	50.00	2	30.0	5.0	C	0.02-0.06
MRC-A2 060-13C06-50	6.00	6.00	13.00	50.00	2	30.0	5.0	C	0.03-0.07
MRC-A2 065-16C08-60	6.50	8.00	16.00	60.00	2	30.0	5.0	C	0.03-0.07
MRC-A2 070-16C08-60	7.00	8.00	16.00	60.00	2	30.0	5.0	C	0.03-0.08
MRC-A2 075-16C08-60	7.50	8.00	16.00	60.00	2	30.0	5.0	C	0.03-0.08
MRC-A2 080-19C08-60	8.00	8.00	19.00	60.00	2	30.0	5.0	C	0.03-0.09
MRC-A2 085-19C10-70	8.50	10.00	19.00	70.00	2	30.0	5.0	C	0.03-0.09
MRC-A2 090-19C10-70	9.00	10.00	19.00	70.00	2	30.0	5.0	C	0.03-0.09
MRC-A2 095-19C10-70	9.50	10.00	19.00	70.00	2	30.0	5.0	C	0.03-0.09
MRC-A2 100-22C10-70	10.00	10.00	22.00	70.00	2	30.0	5.0	C	0.03-0.10
MRC-A2 105-22C12-75	10.50	12.00	22.00	75.00	2	30.0	5.0	C	0.03-0.10
MRC-A2 110-22C12-75	11.00	12.00	22.00	75.00	2	30.0	5.0	C	0.03-0.10
MRC-A2 115-22C12-75	11.50	12.00	22.00	75.00	2	30.0	5.0	C	0.03-0.10
MRC-A2 120-26C12-75	12.00	12.00	26.00	75.00	2	30.0	5.0	C	0.04-0.11
MRC-A2 130-26C12-85	13.00	12.00	26.00	85.00	2	30.0	5.0	C	0.04-0.11
MRC-A2 140-26C14-85	14.00	14.00	26.00	85.00	2	30.0	5.0	C	0.04-0.12
MRC-A2 150-26C16-90	15.00	16.00	26.00	90.00	2	30.0	5.0	C	0.04-0.12
MRC-A2 160-32C16-100	16.00	16.00	32.00	100.00	2	30.0	5.0	C	0.05-0.13
MRC-A2 170-32C16-100	17.00	16.00	32.00	100.00	2	30.0	5.0	C	0.05-0.13
MRC-A2 180-32C18-100	18.00	18.00	32.00	100.00	2	30.0	5.0	C	0.05-0.13
MRC-A2 190-32C20-100	19.00	20.00	32.00	100.00	2	30.0	5.0	C	0.05-0.13
MRC-A2 200-38C20-105	20.00	20.00	38.00	105.00	2	30.0	5.0	C	0.05-0.13
MRC-A2 220-38C20-105	22.00	20.00	38.00	105.00	2	30.0	5.0	C	0.05-0.13
MRC-A2 250-45C25-120	25.00	25.00	45.00	120.00	2	30.0	5.0	C	0.05-0.13

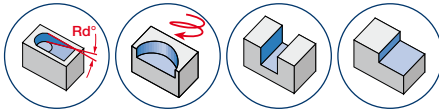
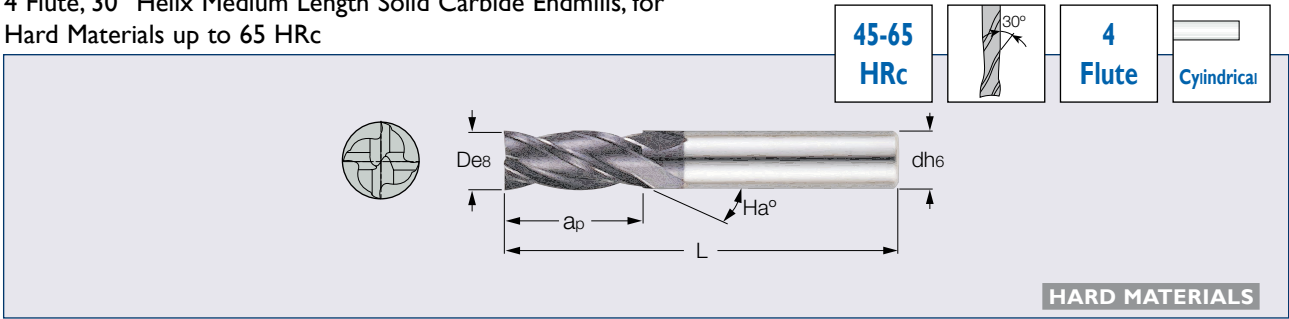
Available grade: MC93

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-A4

4 Flute, 30° Helix Medium Length Solid Carbide Endmills, for Hard Materials up to 65 HRc



Designation									Recommended Machining Data
	D	d	a _p	L	Flute	H _a °	R _a °	Shank	f _z (mm/t)
MRC-A4 020-060C06-50	2.00	6.00	6.00	50.00	4	30.0	5.0	C	0.01-0.03
MRC-A4 025-080C06-50	2.50	6.00	8.00	50.00	4	30.0	5.0	C	0.01-0.03
MRC-A4 030-080C06-50	3.00	6.00	8.00	50.00	4	30.0	5.0	C	0.01-0.04
MRC-A4 035-10C06-50	3.50	6.00	10.00	50.00	4	30.0	5.0	C	0.01-0.04
MRC-A4 040-11C06-50	4.00	6.00	11.00	50.00	4	30.0	5.0	C	0.02-0.05
MRC-A4 045-11C06-50	4.50	6.00	11.00	50.00	4	30.0	5.0	C	0.02-0.05
MRC-A4 050-13C06-50	5.00	6.00	13.00	50.00	4	30.0	5.0	C	0.02-0.06
MRC-A4 055-13C06-50	5.50	6.00	13.00	50.00	4	30.0	5.0	C	0.02-0.06
MRC-A4 060-13C06-50	6.00	6.00	13.00	50.00	4	30.0	5.0	C	0.03-0.07
MRC-A4 065-16C08-63	6.50	8.00	16.00	63.00	4	30.0	5.0	C	0.03-0.07
MRC-A4 070-16C08-63	7.00	8.00	16.00	63.00	4	30.0	5.0	C	0.03-0.08
MRC-A4 075-16C08-63	7.50	8.00	16.00	63.00	4	30.0	5.0	C	0.03-0.08
MRC-A4 080-19C08-63	8.00	8.00	19.00	63.00	4	30.0	5.0	C	0.03-0.09
MRC-A4 085-19C10-72	8.50	10.00	19.00	72.00	4	30.0	5.0	C	0.03-0.09
MRC-A4 090-19C10-72	9.00	10.00	19.00	72.00	4	30.0	5.0	C	0.03-0.09
MRC-A4 095-19C10-70	9.50	10.00	19.00	70.00	4	30.0	5.0	C	0.03-0.09
MRC-A4 100-22C10-72	10.00	10.00	22.00	72.00	4	30.0	5.0	C	0.03-0.10
MRC-A4 105-22C12-75	10.50	12.00	22.00	75.00	4	30.0	5.0	C	0.03-0.10
MRC-A4 110-22C12-75	11.00	12.00	22.00	75.00	4	30.0	5.0	C	0.03-0.10
MRC-A4 115-22C12-75	11.50	12.00	22.00	75.00	4	30.0	5.0	C	0.03-0.10
MRC-A4 120-26C12-73	12.00	12.00	26.00	73.00	4	30.0	5.0	C	0.04-0.11
MRC-A4 130-26C12-85	13.00	12.00	26.00	85.00	4	30.0	5.0	C	0.04-0.11
MRC-A4 140-26C12-85	14.00	12.00	26.00	85.00	4	30.0	5.0	C	0.04-0.12
MRC-A4 140-26C14-83	14.00	14.00	26.00	83.00	4	30.0	5.0	C	0.04-0.12
MRC-A4 140-26C16-85	14.00	16.00	26.00	85.00	4	30.0	5.0	C	0.04-0.12
MRC-A4 150-26C16-92	15.00	16.00	26.00	92.00	4	30.0	5.0	C	0.04-0.12
MRC-A4 160-32C16-92	16.00	16.00	32.00	92.00	4	30.0	5.0	C	0.05-0.13
MRC-A4 170-32C16-100	17.00	16.00	32.00	100.00	4	30.0	5.0	C	0.05-0.13
MRC-A4 180-32C18-100	18.00	18.00	32.00	100.00	4	30.0	5.0	C	0.05-0.13
MRC-A4 190-32C20-100	19.00	20.00	32.00	100.00	4	30.0	5.0	C	0.05-0.13
MRC-A4 200-38C20-104	20.00	20.00	38.00	104.00	4	30.0	5.0	C	0.05-0.13
MRC-A4 220-38C20-105	22.00	20.00	38.00	105.00	4	30.0	5.0	C	0.05-0.13
MRC-A4 240-45C25-120	24.00	25.00	45.00	120.00	4	30.0	5.0	C	0.05-0.13
MRC-A4 250-45C25-120	25.00	25.00	45.00	120.00	4	30.0	5.0	C	0.05-0.13

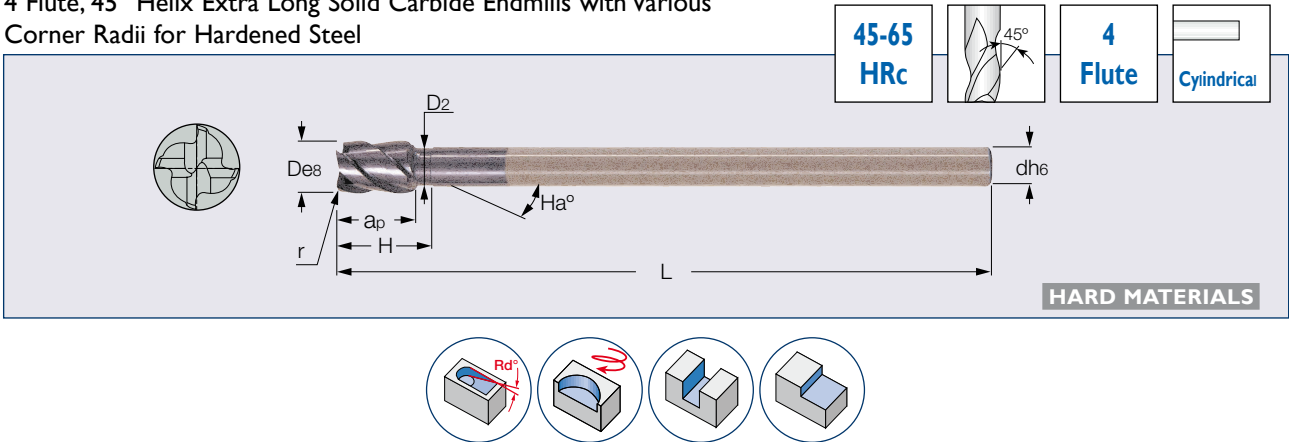
Available grade: MC93

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-B4-R

4 Flute, 45° Helix Extra Long Solid Carbide Endmills with Various Corner Radii for Hardened Steel



Designation												Recommended Machining Data
	D	d	r	ap	H	D2	L	Flute	Ha°	Rd°	Shank	fz (mm/t)
MRC-B4 10-15C08R.5M130	10.00	8.00	0.50	15.00	19.20	7.50	130.00	4	45.0	5.0	C	0.03-0.10
MRC-B4 10-15C08R1M130	10.00	8.00	1.00	15.00	19.20	7.50	130.00	4	45.0	5.0	C	0.03-0.10
MRC-B4 12-18C10R.5M150	12.00	10.00	0.50	18.00	22.20	9.50	150.00	4	45.0	5.0	C	0.04-0.11
MRC-B4 12-18C10R1M150	12.00	10.00	1.00	18.00	22.20	9.50	150.00	4	45.0	5.0	C	0.04-0.11
MRC-B4 14-21C12R.5M160	14.00	12.00	0.50	21.00	25.20	11.50	160.00	4	45.0	5.0	C	0.04-0.12
MRC-B4 18-27C16R0.5M180	18.00	16.00	0.50	27.00	31.20	15.50	180.00	4	45.0	5.0	C	0.05-0.13

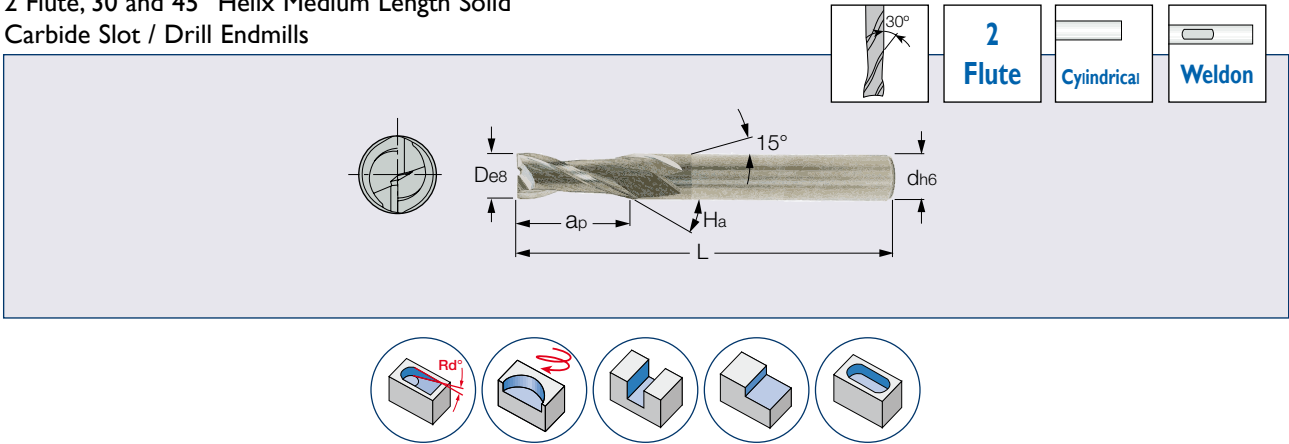
Available grade: MC93

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-A-2

2 Flute, 30 and 45° Helix Medium Length Solid Carbide Slot / Drill Endmills



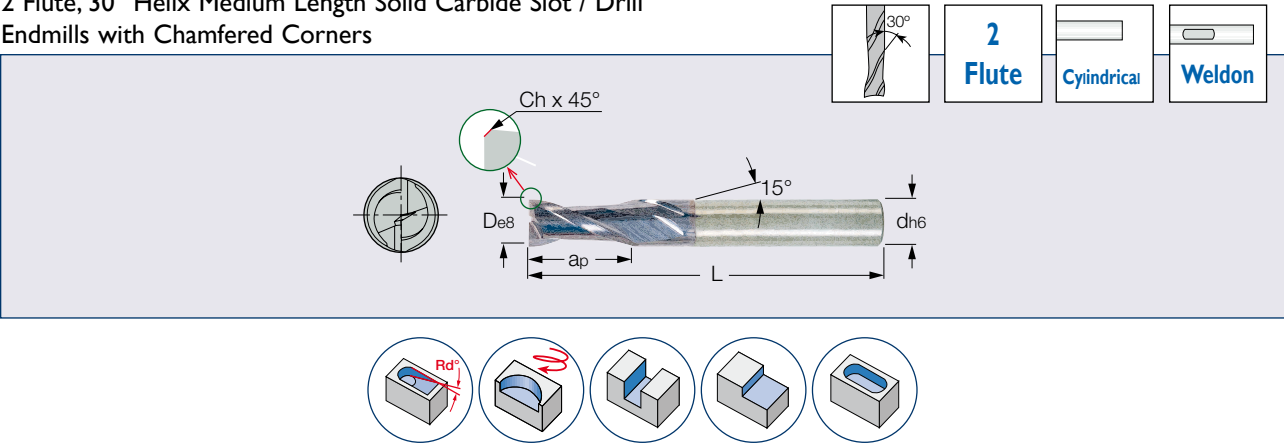
Designation									Recommended Machining Data
	D	d	ap	L	Flute	Ha°	Rd°	Shank	fz (mm/t)
MRC020B07-2C03 ⁽¹⁾	2.00	3.00	7.00	38.00	2	45.0	5.0	C	0.01-0.03
MRC020B07-2C06 ⁽¹⁾	2.00	6.00	7.00	57.00	2	45.0	5.0	C	0.01-0.03
MRC025A07-2C03	2.50	3.00	7.00	38.00	2	30.0	5.0	C	0.01-0.03
MRC030A10-2C03	3.00	3.00	10.00	38.00	2	30.0	5.0	C	0.01-0.04
MRC030A10-2C06	3.00	6.00	10.00	57.00	2	30.0	5.0	C	0.01-0.04
MRC035A12-2C04	3.50	4.00	12.00	50.00	2	30.0	5.0	C	0.01-0.04
MRC040A12-2C04	4.00	4.00	12.00	50.00	2	30.0	5.0	C	0.02-0.05
MRC045A14-2C06	4.50	6.00	14.00	57.00	2	30.0	5.0	C	0.02-0.05
MRC050A14-2C05	5.00	5.00	14.00	50.00	2	30.0	5.0	C	0.02-0.06
MRC050A14-2C06	5.00	6.00	14.00	57.00	2	30.0	5.0	C	0.02-0.06
MRC055A16-2C06	5.50	6.00	16.00	57.00	2	30.0	5.0	C	0.02-0.06
MRC060A16-2C06	6.00	6.00	16.00	57.00	2	30.0	5.0	C	0.03-0.07
MRC060A16-2W06	6.00	6.00	16.00	57.00	2	30.0	5.0	W	0.03-0.07
MRC065A20-2C07	6.50	7.00	20.00	60.00	2	30.0	5.0	C	0.03-0.07
MRC070A20-2C07	7.00	7.00	20.00	60.00	2	30.0	5.0	C	0.03-0.08
MRC080A20-2C08	8.00	8.00	20.00	63.00	2	30.0	5.0	C	0.03-0.09
MRC080A20-2W08	8.00	8.00	20.00	63.00	2	30.0	5.0	W	0.03-0.09
MRC085A22-2C10	8.50	10.00	22.00	72.00	2	30.0	5.0	C	0.03-0.09
MRC100A22-2C10	10.00	10.00	22.00	72.00	2	30.0	5.0	C	0.03-0.10
MRC120A25-2C12	12.00	12.00	25.00	83.00	2	30.0	5.0	C	0.04-0.11
MRC140A25-2C14	14.00	14.00	25.00	83.00	2	30.0	5.0	C	0.04-0.12
MRC160A32-2C16	16.00	16.00	32.00	92.00	2	30.0	5.0	C	0.05-0.13
MRC180A32-2C18	18.00	18.00	32.00	92.00	2	30.0	5.0	C	0.05-0.13
MRC200A38-2C20	20.00	20.00	38.00	104.00	2	30.0	5.0	C	0.05-0.13

⁽¹⁾ 45° helix
 Available grades: MC98
 For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRCC-A-2

2 Flute, 30° Helix Medium Length Solid Carbide Slot / Drill
Endmills with Chamfered Corners



Designation	D	d	Flute	ap	L	Rd°	Shank	Ch	Recommended Machining Data
									fz (mm/t)
MRCC020B07-2C03 ⁽¹⁾	2.00	3.00	2	7.00	38.00	5.0	C	0.10	0.01-0.03
MRCC025A07-2C03	2.50	3.00	2	7.00	38.00	5.0	C	0.10	0.01-0.03
MRCC030A10-2C03	3.00	3.00	2	10.00	38.00	5.0	C	0.10	0.01-0.04
MRCC035A12-2C04	3.50	4.00	2	12.00	50.00	5.0	C	0.10	0.01-0.04
MRCC040A12-2C04	4.00	4.00	2	12.00	50.00	5.0	C	0.15	0.02-0.05
MRCC050A14-2C05	5.00	5.00	2	14.00	50.00	5.0	C	0.15	0.02-0.06
MRCC060A16-2C06	6.00	6.00	2	16.00	57.00	5.0	C	0.15	0.03-0.07
MRCC060A16-2VW06	6.00	6.00	2	16.00	57.00	5.0	W	0.15	0.03-0.07
MRCC080A20-2C08	8.00	8.00	2	20.00	63.00	5.0	C	0.15	0.03-0.09
MRCC100A22-2C10	10.00	10.00	2	22.00	72.00	5.0	C	0.25	0.03-0.10
MRCC120A25-2C12	12.00	12.00	2	25.00	83.00	5.0	C	0.25	0.04-0.11
MRCC160A32-2C16	16.00	16.00	2	32.00	92.00	5.0	C	0.25	0.05-0.13
MRCC200A38-2C20	20.00	20.00	2	38.00	104.00	5.0	C	0.25	0.05-0.13

⁽¹⁾ 45° helix

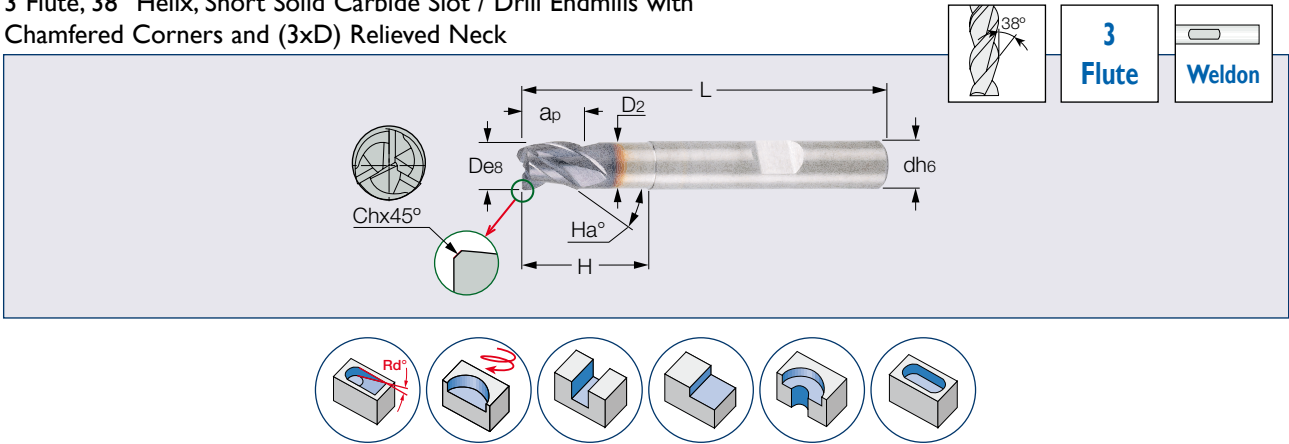
Available grades: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRCS/MRCCS-E-3

3 Flute, 38° Helix, Short Solid Carbide Slot / Drill Endmills with Chamfered Corners and (3xD) Relieved Neck



Designation												Recommended Machining Data
	D	d	a_p	H	D_2	L	Flute	H_a°	Rd°	Shank	Ch	f_z (mm/t)
MRCS020E03-3W06-57	2.00	6.00	3.00	7.00	1.90	57.00	3	38.0	5.0	W	-	0.01-0.03
MRCS025E03-3W06-57	2.50	6.00	3.00	7.00	2.40	57.00	3	38.0	5.0	W	-	0.01-0.03
MRCS030E04-3W06-57	3.00	6.00	4.00	10.00	2.90	57.00	3	38.0	5.0	W	-	0.01-0.04
MRCS035E04-3W06-57	3.50	6.00	4.00	12.00	3.40	57.00	3	38.0	5.0	W	-	0.01-0.04
MRCS040E05-3W06-57	4.00	6.00	5.00	12.00	3.90	57.00	3	38.0	5.0	W	-	0.02-0.05
MRCS050E06-3W06-57	5.00	6.00	6.00	14.00	4.90	57.00	3	38.0	5.0	W	-	0.02-0.06
MRCCS060E07-3W06-57	6.00	6.00	7.00	16.00	5.90	57.00	3	38.0	5.0	W	0.15	0.03-0.07
MRCCS070E08-3W08-63	7.00	8.00	8.00	20.00	6.70	63.00	3	38.0	5.0	W	0.15	0.03-0.08
MRCCS080E09-3W08-63	8.00	8.00	9.00	20.00	7.60	63.00	3	38.0	5.0	W	0.15	0.03-0.09
MRCCS090E10-3W10-72	9.00	10.00	10.00	20.00	8.60	72.00	3	38.0	5.0	W	0.15	0.03-0.09
MRCCS100E11-3W10-72	10.00	10.00	11.00	22.00	9.50	72.00	3	38.0	5.0	W	0.25	0.03-0.10
MRCCS120E12-3W12-83	12.00	12.00	12.00	25.00	11.30	83.00	3	38.0	5.0	W	0.25	0.04-0.11
MRCCS160E16-3W16-92	16.00	16.00	16.00	32.00	15.20	92.00	3	38.0	5.0	W	0.25	0.05-0.13

Available grades: MC98

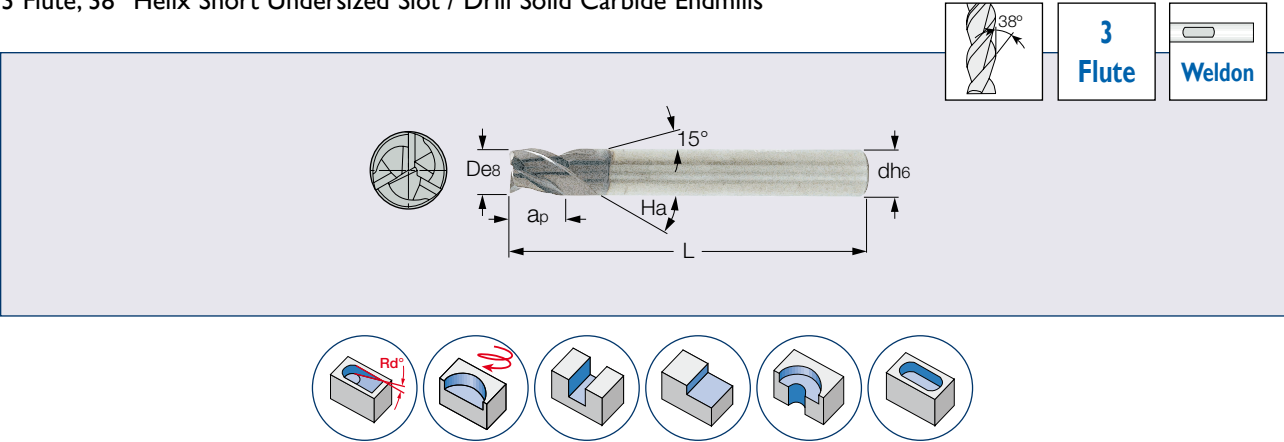
For user guide, see pages 106-114

Due to short and stable design, feed can be increased by 25%

SOLID CARBIDE ENDMILLS

MRCU-E-3

3 Flute, 38° Helix Short Undersized Slot / Drill Solid Carbide Endmills



Designation									Recommended Machining Data
	D	d	ap	L	Flute	Ha°	Ra°	Shank	fz (mm/t)
MRCU028E04-3W06-57	2.80	6.00	4.00	57.00	3	38.0	5.0	W	0.01-0.04
MRCU038E05-3W06-57	3.80	6.00	5.00	57.00	3	38.0	5.0	W	0.01-0.04
MRCU048E06-3W06-57	4.80	6.00	6.00	57.00	3	38.0	5.0	W	0.02-0.05
MRCU057E07-3W06-57	5.70	6.00	7.00	57.00	3	38.0	5.0	W	0.02-0.06
MRCU067E08-3W08-63	6.70	8.00	8.00	63.00	3	38.0	5.0	W	0.03-0.07
MRCU077E09-3W08-63	7.70	8.00	9.00	63.00	3	38.0	5.0	W	0.03-0.08
MRCU097E11-3W10-72	9.70	10.00	11.00	72.00	3	38.0	5.0	W	0.03-0.09
MRCU117E12-3W12-73	11.70	12.00	12.00	73.00	3	38.0	5.0	W	0.03-0.10
MRCU137E16-3W14-83	13.70	14.00	14.00	83.00	3	38.0	5.0	W	0.04-0.11
MRCU157E16-3W16-92	15.70	16.00	16.00	92.00	3	38.0	5.0	W	0.04-0.12
MRCU177E18-3W18-92	17.70	18.00	18.00	92.00	3	38.0	5.0	W	0.05-0.13

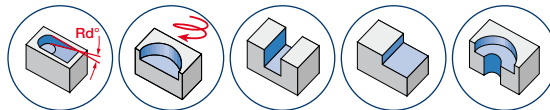
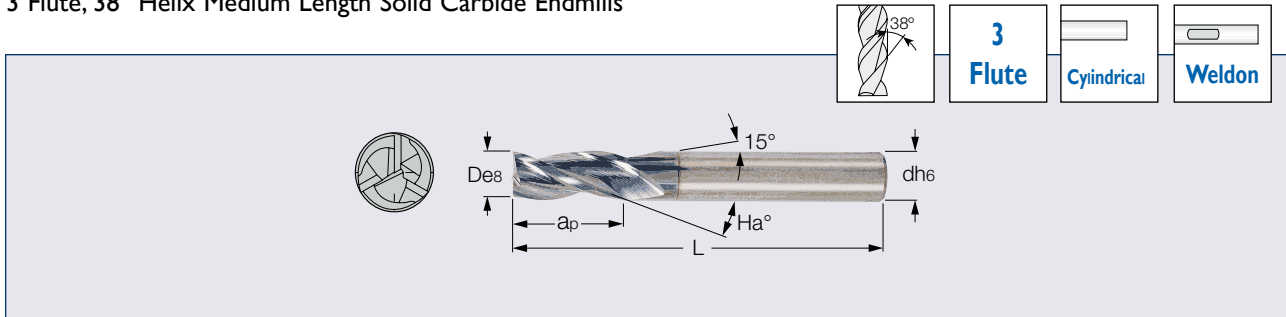
Available grade: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-E-3

3 Flute, 38° Helix Medium Length Solid Carbide Endmills



Designation									Recommended Machining Data
	D	d	ap	L	Flute	Ha°	Rd°	Shank	fz (mm/t)
MRC010E025-3C03	1.00	3.00	2.50	38.00	3	38.0	5.0	C	0.01-0.01
MRC015E04-3C04	1.50	4.00	4.00	50.00	3	38.0	5.0	C	0.01-0.02
MRC025E07-3C03	2.50	3.00	7.00	38.00	3	38.0	5.0	C	0.01-0.03
MRC030E10-3C03	3.00	3.00	10.00	38.00	3	38.0	5.0	C	0.01-0.04
MRC030E10-3C06	3.00	6.00	10.00	57.00	3	38.0	5.0	C	0.01-0.04
MRC035E12-3C04	3.50	4.00	12.00	50.00	3	38.0	5.0	C	0.01-0.04
MRC040E12-3C04	4.00	4.00	12.00	50.00	3	38.0	5.0	C	0.02-0.05
MRC040E12-3C06	4.00	6.00	12.00	57.00	3	38.0	5.0	C	0.02-0.05
MRC045E14-3C06	4.50	6.00	14.00	57.00	3	38.0	5.0	C	0.02-0.05
MRC050E14-3C05	5.00	5.00	14.00	50.00	3	38.0	5.0	C	0.02-0.06
MRC050E14-3C06	5.00	6.00	14.00	57.00	3	38.0	5.0	C	0.02-0.06
MRC050E14-3VW06	5.00	6.00	14.00	57.00	3	38.0	5.0	W	0.02-0.06
MRC060E16-3C06	6.00	6.00	16.00	57.00	3	38.0	5.0	C	0.03-0.07
MRC060E16-3VW06	6.00	6.00	16.00	57.00	3	38.0	5.0	W	0.03-0.07
MRC070E20-3C07	7.00	7.00	20.00	60.00	3	38.0	5.0	C	0.03-0.08
MRC080E20-3C08	8.00	8.00	20.00	63.00	3	38.0	5.0	C	0.03-0.09
MRC080E20-3VW08	8.00	8.00	20.00	63.00	3	38.0	5.0	W	0.03-0.09
MRC100E22-3C10	10.00	10.00	22.00	72.00	3	38.0	5.0	C	0.03-0.10
MRC100E22-3W10	10.00	10.00	22.00	72.00	3	38.0	5.0	W	0.03-0.10
MRC120E25-3C12	12.00	12.00	25.00	83.00	3	38.0	5.0	C	0.04-0.11
MRC120E25-3W12	12.00	12.00	25.00	83.00	3	38.0	5.0	W	0.04-0.11
MRC140E25-3C14	14.00	14.00	25.00	83.00	3	38.0	5.0	C	0.04-0.12
MRC140E25-3W14	14.00	14.00	25.00	83.00	3	38.0	5.0	W	0.04-0.12
MRC160E32-3C16	16.00	16.00	32.00	92.00	3	38.0	5.0	C	0.05-0.13
MRC160E32-3W16	16.00	16.00	32.00	92.00	3	38.0	5.0	W	0.05-0.13
MRC180E32-3C18	18.00	18.00	32.00	92.00	3	38.0	5.0	C	0.05-0.13
MRC180E32-3W18	18.00	18.00	32.00	92.00	3	38.0	5.0	W	0.05-0.13
MRC200E38-3C20	20.00	20.00	38.00	104.00	3	38.0	5.0	C	0.05-0.13
MRC200E38-3W20	20.00	20.00	38.00	104.00	3	38.0	5.0	W	0.05-0.13

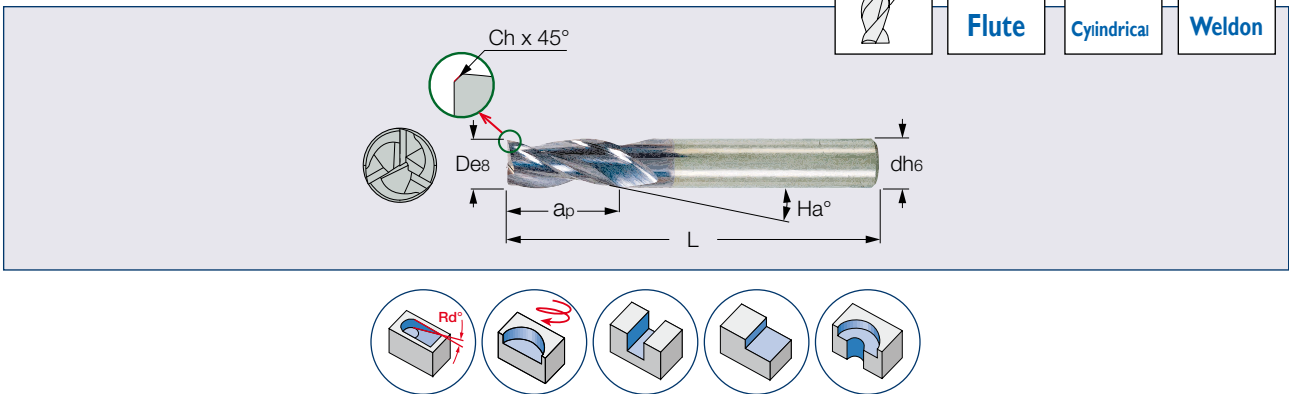
Available grades: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRCC-E-3

3 Flute, 38° Helix Medium Length Slot / Drill Solid Carbide
Endmills with Chamfered Corners



Designation										Recommended Machining Data
	D	d	ap	L	Flute	Ha°	Rd°	Shank	Ch	fz (mm/t)
MRCC020B07-3C03 ⁽¹⁾	2.00	3.00	7.00	38.00	3	45.0	5.0	C	0.10	0.01-0.03
MRCC025E07-3C03	2.50	3.00	7.00	38.00	3	38.0	5.0	C	0.10	0.01-0.03
MRCC030E10-3C03	3.00	3.00	10.00	38.00	3	38.0	5.0	C	0.10	0.01-0.04
MRCC035E12-3C04	3.50	4.00	12.00	50.00	3	38.0	5.0	C	0.10	0.01-0.04
MRCC040E12-3C04	4.00	4.00	12.00	50.00	3	38.0	5.0	C	0.15	0.02-0.05
MRCC050E14-3C05	5.00	5.00	14.00	50.00	3	38.0	5.0	C	0.15	0.02-0.06
MRCC060E16-3C06	6.00	6.00	16.00	57.00	3	38.0	5.0	C	0.15	0.03-0.07
MRCC060E16-3W06	6.00	6.00	16.00	57.00	3	38.0	5.0	W	0.15	0.03-0.07
MRCC080E20-3C08	8.00	8.00	20.00	63.00	3	38.0	5.0	C	0.15	0.03-0.09
MRCC080E20-3W08	8.00	8.00	20.00	63.00	3	38.0	5.0	W	0.15	0.03-0.09
MRCC100E22-3C10	10.00	10.00	22.00	72.00	3	38.0	5.0	C	0.25	0.03-0.10
MRCC100E22-3W10	10.00	10.00	22.00	72.00	3	38.0	5.0	W	0.25	0.03-0.10
MRCC120E25-3C12	12.00	12.00	25.00	83.00	3	38.0	5.0	C	0.25	0.04-0.11
MRCC120E25-3W12	12.00	12.00	25.00	83.00	3	38.0	5.0	W	0.25	0.04-0.11
MRCC160E32-3C16	16.00	16.00	32.00	92.00	3	38.0	5.0	C	0.25	0.05-0.13
MRCC160E32-3W16	16.00	16.00	32.00	92.00	3	38.0	5.0	W	0.25	0.05-0.13
MRCC200E38-3C20	20.00	20.00	38.00	104.00	3	38.0	5.0	C	0.25	0.05-0.13
MRCC200E38-3W20	20.00	20.00	38.00	104.00	3	38.0	5.0	W	0.25	0.05-0.13

(1) 45° helix

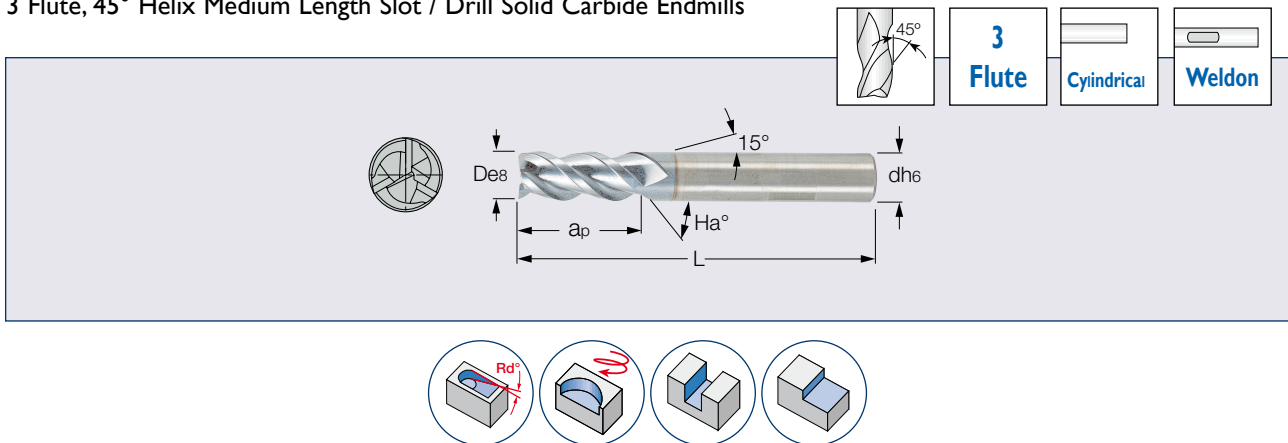
Available grades: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-B-3

3 Flute, 45° Helix Medium Length Slot / Drill Solid Carbide Endmills



Designation									Recommended Machining Data
	D	d	ap	L	Flute	Ha°	Ra°	Shank	fz (mm/t)
MRC020B07-3C03	2.00	3.00	7.00	38.00	3	45.0	5.0	C	0.01-0.03
MRC020B07-3C06	2.00	6.00	7.00	57.00	3	45.0	5.0	C	0.01-0.03
MRC025B07-3C03	2.50	3.00	7.00	38.00	3	45.0	5.0	C	0.01-0.03
MRC030B10-3C03	3.00	3.00	10.00	38.00	3	45.0	5.0	C	0.01-0.04
MRC030B10-3C06	3.00	6.00	10.00	57.00	3	45.0	5.0	C	0.01-0.04
MRC040B12-3C04	4.00	4.00	12.00	50.00	3	45.0	5.0	C	0.02-0.05
MRC040B12-3C06	4.00	6.00	12.00	57.00	3	45.0	5.0	C	0.02-0.05
MRC050B14-3C05	5.00	5.00	14.00	50.00	3	45.0	5.0	C	0.02-0.06
MRC050B14-3C06	5.00	6.00	14.00	57.00	3	45.0	5.0	C	0.02-0.06
MRC060B16-3C06	6.00	6.00	16.00	57.00	3	45.0	5.0	C	0.03-0.07
MRC060B16-3V06	6.00	6.00	16.00	57.00	3	45.0	5.0	W	0.03-0.07
MRC070B16-3C07	7.00	7.00	16.00	60.00	3	45.0	5.0	C	0.03-0.08
MRC080B20-3C08	8.00	8.00	20.00	63.00	3	45.0	5.0	C	0.03-0.09
MRC080B20-3V08	8.00	8.00	20.00	63.00	3	45.0	5.0	W	0.03-0.09
MRC090B20-3C09	9.00	9.00	20.00	67.00	3	45.0	5.0	C	0.03-0.09
MRC100B22-3C10	10.00	10.00	22.00	72.00	3	45.0	5.0	C	0.03-0.10
MRC100B22-3V10	10.00	10.00	22.00	72.00	3	45.0	5.0	W	0.03-0.10
MRC120B25-3C12	12.00	12.00	25.00	83.00	3	45.0	5.0	C	0.04-0.11
MRC120B25-3V12	12.00	12.00	25.00	83.00	3	45.0	5.0	W	0.04-0.11
MRC140B25-3C14	14.00	14.00	25.00	83.00	3	45.0	5.0	C	0.04-0.12
MRC140B25-3V14	14.00	14.00	25.00	83.00	3	45.0	5.0	W	0.04-0.12
MRC160B32-3C16	16.00	16.00	32.00	92.00	3	45.0	5.0	C	0.05-0.13
MRC160B32-3V16	16.00	16.00	32.00	92.00	3	45.0	5.0	W	0.05-0.13
MRC180B32-3C18	18.00	18.00	32.00	92.00	3	45.0	5.0	C	0.05-0.13
MRC180B32-3V18	18.00	18.00	32.00	92.00	3	45.0	5.0	W	0.05-0.13
MRC200B38-3C20	20.00	20.00	38.00	104.00	3	45.0	5.0	C	0.05-0.13
MRC200B38-3V20	20.00	20.00	38.00	104.00	3	45.0	5.0	W	0.05-0.13

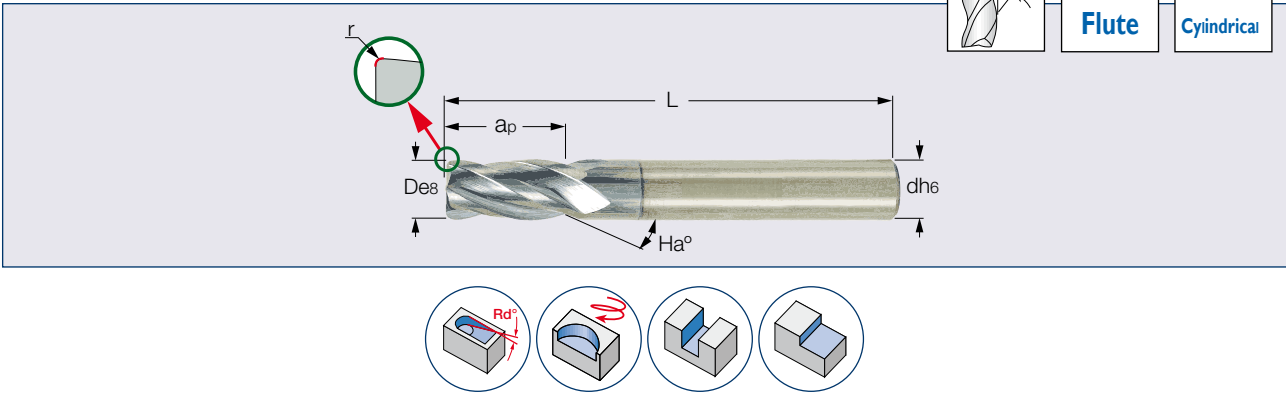
Available grade: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-B-3R

3 Flute, 45° Helix Medium Length Slot / Drill Solid Carbide Endmills with Corner Radii



Designation											Recommended Machining Data
	D	d	ap	L	Flute	Ha°	Rd°	Shank	r		fz (mm/t)
MRC060B13-3C06R0.5	6.00	6.00	13.00	57.00	3	45.0	5.0	C	0.50		0.03-0.07
MRC060B13-3C06R1.0	6.00	6.00	13.00	57.00	3	45.0	5.0	C	1.00		0.03-0.07
MRC080B20-3C08R0.5	8.00	8.00	20.00	63.00	3	45.0	5.0	C	0.50		0.03-0.09
MRC080B20-3C08R1	8.00	8.00	20.00	63.00	3	45.0	5.0	C	1.00		0.03-0.09
MRC080B20-3C08R1.5	8.00	8.00	20.00	63.00	3	45.0	5.0	C	1.50		0.03-0.09
MRC080B20-3C08R2	8.00	8.00	20.00	63.00	3	45.0	5.0	C	2.00		0.03-0.09
MRC100B22-3C10R0.5	10.00	10.00	22.00	72.00	3	45.0	5.0	C	0.50		0.03-0.10
MRC100B22-3C10R1	10.00	10.00	22.00	72.00	3	45.0	5.0	C	1.00		0.03-0.10
MRC100B22-3C10R1.5	10.00	10.00	22.00	72.00	3	45.0	5.0	C	1.50		0.03-0.10
MRC100B22-3C10R2	10.00	10.00	22.00	72.00	3	45.0	5.0	C	2.00		0.03-0.10
MRC100B22-3C10R3	10.00	10.00	22.00	72.00	3	45.0	5.0	C	3.00		0.03-0.10
MRC120B25-3C12R0.5	12.00	12.00	25.00	83.00	3	45.0	5.0	C	0.50		0.04-0.11
MRC120B25-3C12R1	12.00	12.00	25.00	83.00	3	45.0	5.0	C	1.00		0.04-0.11
MRC120B25-3C12R1.5	12.00	12.00	25.00	83.00	3	45.0	5.0	C	1.50		0.04-0.11
MRC120B25-3C12R2	12.00	12.00	25.00	83.00	3	45.0	5.0	C	2.00		0.04-0.11
MRC120B25-3C12R3	12.00	12.00	25.00	83.00	3	45.0	5.0	C	3.00		0.04-0.11
MRC160B32-3C16R0.5	16.00	16.00	32.00	92.00	3	45.0	5.0	C	0.50		0.05-0.13
MRC160B32-3C16R1	16.00	16.00	32.00	92.00	3	45.0	5.0	C	1.00		0.05-0.13
MRC160B32-3C16R2	16.00	16.00	32.00	92.00	3	45.0	5.0	C	2.00		0.05-0.13
MRC160B32-3C16R3	16.00	16.00	32.00	92.00	3	45.0	5.0	C	3.00		0.05-0.13
MRC200B38-3C20R0.5	20.00	20.00	38.00	104.00	3	45.0	5.0	C	0.50		0.05-0.13
MRC200B38-3C20R1	20.00	20.00	38.00	104.00	3	45.0	5.0	C	1.00		0.05-0.13
MRC200B38-3C20R2	20.00	20.00	38.00	104.00	3	45.0	5.0	C	2.00		0.05-0.13
MRC200B38-3C20R3	20.00	20.00	38.00	104.00	3	45.0	5.0	C	3.00		0.05-0.13
MRC200B38-3C20R4	20.00	20.00	38.00	104.00	3	45.0	5.0	C	4.00		0.05-0.13

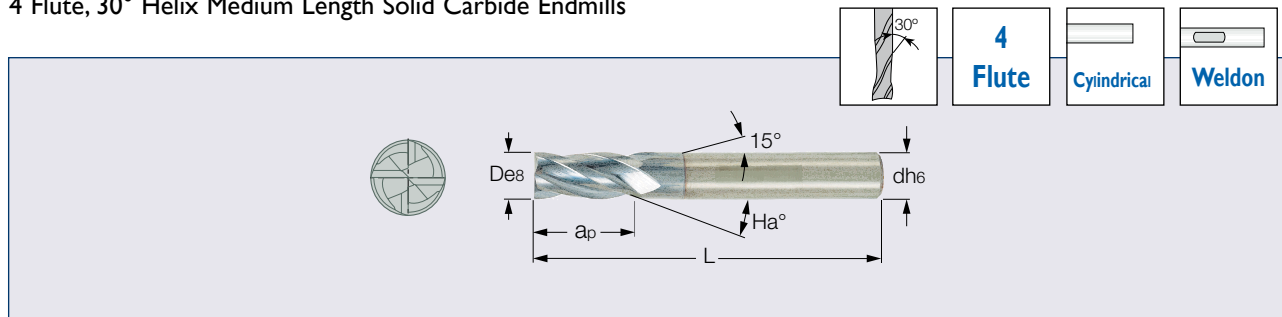
Available grade: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-A-4

4 Flute, 30° Helix Medium Length Solid Carbide Endmills



Designation	D	d	ap	L	Flute	Ha°	Rd°	Shank	Recommended Machining Data
									fz (mm/t)
MRC020A07-4C03	2.00	3.00	7.00	38.00	4	30.0	5.0	C	0.01-0.03
MRC025A07-4C03	2.50	3.00	7.00	38.00	4	30.0	5.0	C	0.01-0.03
MRC030A10-4C03	3.00	3.00	10.00	38.00	4	30.0	5.0	C	0.01-0.04
MRC030A10-4C06	3.00	6.00	10.00	57.00	4	30.0	5.0	C	0.01-0.04
MRC035A12-4C04	3.50	4.00	12.00	50.00	4	30.0	5.0	C	0.01-0.04
MRC040A12-4C04	4.00	4.00	12.00	50.00	4	30.0	5.0	C	0.02-0.05
MRC040A12-4C06	4.00	6.00	12.00	57.00	4	30.0	5.0	C	0.02-0.05
MRC045A14-4C06	4.50	6.00	14.00	57.00	4	30.0	5.0	C	0.02-0.05
MRC050A14-4C05	5.00	5.00	14.00	50.00	4	30.0	5.0	C	0.02-0.06
MRC050A14-4C06	5.00	6.00	14.00	57.00	4	30.0	5.0	C	0.02-0.06
MRC060A16-4C06	6.00	6.00	16.00	57.00	4	30.0	5.0	C	0.03-0.07
MRC060A16-4VW06	6.00	6.00	16.00	57.00	4	30.0	5.0	W	0.03-0.07
MRC070A20-4C07	7.00	7.00	20.00	60.00	4	30.0	5.0	C	0.03-0.08
MRC075A20-4C08	7.50	8.00	20.00	63.00	4	30.0	5.0	C	0.03-0.08
MRC080A20-4C08	8.00	8.00	20.00	63.00	4	30.0	5.0	C	0.03-0.09
MRC080A20-4VW08	8.00	8.00	20.00	63.00	4	30.0	5.0	W	0.03-0.09
MRC100A22-4C10	10.00	10.00	22.00	72.00	4	30.0	5.0	C	0.03-0.10
MRC100A22-4VW10	10.00	10.00	22.00	72.00	4	30.0	5.0	W	0.03-0.10
MRC120A25-4C12	12.00	12.00	25.00	83.00	4	30.0	5.0	C	0.04-0.11
MRC120A25-4VW12	12.00	12.00	25.00	83.00	4	30.0	5.0	W	0.04-0.11
MRC140A25-4C14	14.00	14.00	25.00	83.00	4	30.0	5.0	C	0.04-0.12
MRC140A32-4C14	14.00	14.00	32.00	83.00	4	30.0	5.0	C	0.04-0.12
MRC160A32-4C16	16.00	16.00	32.00	92.00	4	30.0	5.0	C	0.05-0.13
MRC160A32-4VW16	16.00	16.00	32.00	92.00	4	30.0	5.0	W	0.05-0.13
MRC160A40-4C16-92	16.00	16.00	40.00	92.00	4	30.0	5.0	C	0.05-0.13
MRC180A32-4C18	18.00	18.00	32.00	92.00	4	30.0	5.0	C	0.05-0.13
MRC200A38-4C20	20.00	20.00	38.00	104.00	4	30.0	5.0	C	0.05-0.13
MRC200A38-4VW20	20.00	20.00	38.00	104.00	4	30.0	5.0	W	0.05-0.13

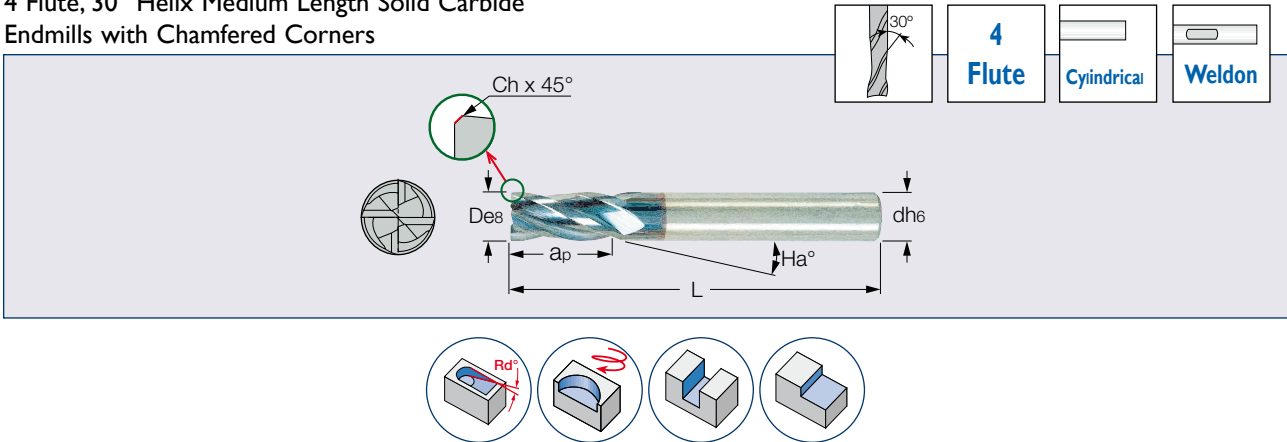
Available grade: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRCC-A-4

4 Flute, 30° Helix Medium Length Solid Carbide
Endmills with Chamfered Corners



Designation											Recommended Machining Data
	D	d	ap	L	Flute	Ha°	Rd°	Shank	Ch	fz (mm/t)	
MRCC020B07-4C03 ⁽¹⁾	2.00	3.00	7.00	38.00	4	45.0	5.0	C	0.10	0.01-0.03	
MRCC025A07-4C03	2.50	3.00	7.00	38.00	4	30.0	5.0	C	0.10	0.01-0.03	
MRCC030A10-4C03	3.00	3.00	10.00	38.00	4	30.0	5.0	C	0.10	0.01-0.04	
MRCC035A12-4C04	3.50	4.00	12.00	50.00	4	30.0	5.0	C	0.10	0.01-0.04	
MRCC040A12-4C04	4.00	4.00	12.00	50.00	4	30.0	5.0	C	0.15	0.02-0.05	
MRCC050A14-4C05	5.00	5.00	14.00	50.00	4	30.0	5.0	C	0.15	0.02-0.06	
MRCC060A16-4C06	6.00	6.00	16.00	57.00	4	30.0	5.0	C	0.15	0.03-0.07	
MRCC080A20-4C08	8.00	8.00	20.00	63.00	4	30.0	5.0	C	0.15	0.03-0.09	
MRCC080A20-4W08	8.00	8.00	20.00	63.00	4	30.0	5.0	W	0.15	0.03-0.09	
MRCC100A22-4C10	10.00	10.00	22.00	72.00	4	30.0	5.0	C	0.25	0.03-0.10	
MRCC100A22-4W10	10.00	10.00	22.00	72.00	4	30.0	5.0	W	0.25	0.03-0.10	
MRCC120A25-4C12	12.00	12.00	25.00	83.00	4	30.0	5.0	C	0.25	0.04-0.11	
MRCC120A25-4W12	12.00	12.00	25.00	83.00	4	30.0	5.0	W	0.25	0.04-0.11	
MRCC160A32-4C16	16.00	16.00	32.00	92.00	4	30.0	5.0	C	0.25	0.05-0.13	
MRCC160A32-4W16	16.00	16.00	32.00	92.00	4	30.0	5.0	W	0.25	0.05-0.13	
MRCC200A38-4W20	20.00	20.00	38.00	104.00	4	30.0	5.0	W	0.25	0.05-0.13	
MRCC200A38-4C20	20.00	20.00	38.00	104.00	4	30.0	5.0	C	0.25	0.05-0.13	

Available grade: MC98

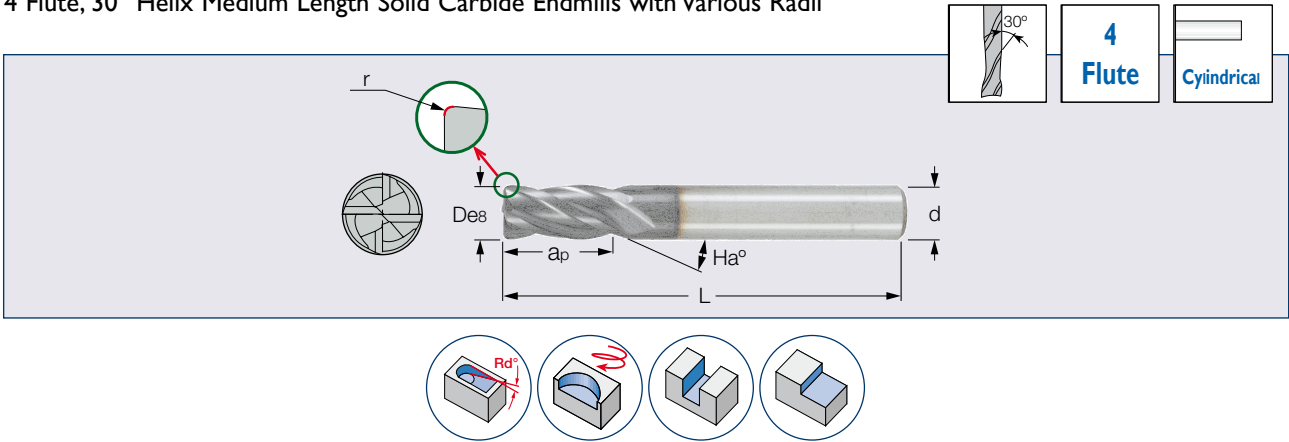
For user guide, see pages 106-114

(1) 45° helix

SOLID CARBIDE ENDMILLS

MRC-A-4R

4 Flute, 30° Helix Medium Length Solid Carbide Endmills with Various Radii



Designation	D	d	ap	L	Flute	Ha°	Rd°	Shank	r	Recommended Machining Data
										fz (mm/t)
MRC030A10-4C03R0.6	3.00	3.00	10.00	38.00	4	30.0	5.0	C	0.60	0.01-0.04
MRC030A10-4C03R0.8	3.00	3.00	10.00	38.00	4	30.0	5.0	C	0.80	0.01-0.04
MRC030A10-4C04R0.4	3.00	4.00	10.00	50.00	4	30.0	5.0	C	0.40	0.01-0.04
MRC035A12-4C04R0.4	3.50	4.00	12.00	50.00	4	30.0	5.0	C	0.40	0.01-0.04
MRC040A07-4C04R0.4	4.00	4.00	7.00	50.00	4	30.0	5.0	C	0.40	0.02-0.05
MRC040A10-4C04R1.0	4.00	4.00	10.00	50.00	4	30.0	5.0	C	1.00	0.02-0.05
MRC040A12-4C04R0.4	4.00	4.00	12.00	50.00	4	30.0	5.0	C	0.40	0.02-0.05
MRC040A12-4C04R0.8	4.00	4.00	12.00	50.00	4	30.0	5.0	C	0.80	0.02-0.05
MRC050A14-4C05R0.5	5.00	5.00	14.00	50.00	4	30.0	5.0	C	0.50	0.02-0.06
MRC050A20-4C05R0.8	5.00	5.00	20.00	50.00	4	30.0	5.0	C	0.80	0.02-0.06
MRC060A16-4C06R0.4	6.00	6.00	16.00	57.00	4	30.0	5.0	C	0.40	0.03-0.07
MRC060A16-4C06R0.8	6.00	6.00	16.00	57.00	4	30.0	5.0	C	0.80	0.03-0.07
MRC080A20-4C08R0.8	8.00	8.00	20.00	63.00	4	30.0	5.0	C	0.80	0.03-0.09

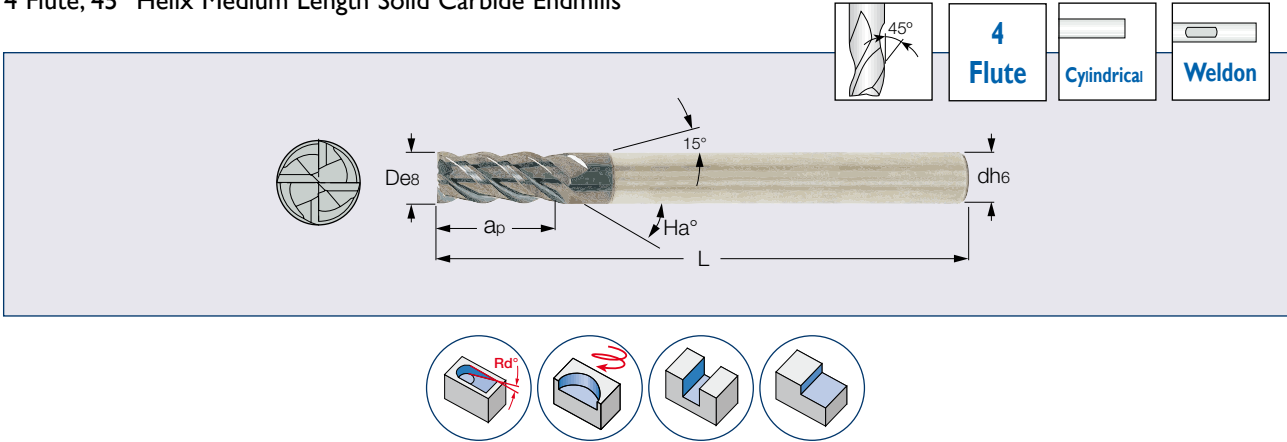
Available grade: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-B-4

4 Flute, 45° Helix Medium Length Solid Carbide Endmills



Designation									Recommended Machining Data
	D	d	ap	L	Flute	Ha°	Ra°	Shank	fz (mm/t)
MRC020B07-4C03	2.00	3.00	7.00	38.00	4	45.0	5.0	C	0.01-0.03
MRC020B07-4C06	2.00	6.00	7.00	57.00	4	45.0	5.0	C	0.01-0.03
MRC030B10-4C03	3.00	3.00	10.00	38.00	4	45.0	5.0	C	0.01-0.04
MRC030B10-4C06	3.00	6.00	10.00	57.00	4	45.0	5.0	C	0.01-0.04
MRC040B12-4C04	4.00	4.00	12.00	50.00	4	45.0	5.0	C	0.02-0.05
MRC040B12-4C06	4.00	6.00	12.00	57.00	4	45.0	5.0	C	0.02-0.05
MRC050B14-4C05	5.00	5.00	14.00	50.00	4	45.0	5.0	C	0.02-0.06
MRC050B14-4C06	5.00	6.00	14.00	57.00	4	45.0	5.0	C	0.02-0.06
MRC060B16-4C06	6.00	6.00	16.00	57.00	4	45.0	5.0	C	0.03-0.07
MRC060B16-4W06	6.00	6.00	16.00	57.00	4	45.0	5.0	W	0.03-0.07
MRC070B16-4C07	7.00	7.00	16.00	60.00	4	45.0	5.0	C	0.03-0.08
MRC080B20-4C08	8.00	8.00	20.00	63.00	4	45.0	5.0	C	0.03-0.09
MRC080B20-4W08	8.00	8.00	20.00	63.00	4	45.0	5.0	W	0.03-0.09
MRC090B20-4C09	9.00	9.00	20.00	67.00	4	45.0	5.0	C	0.03-0.09
MRC100B22-4C10	10.00	10.00	22.00	72.00	4	45.0	5.0	C	0.03-0.10
MRC100B22-4W10	10.00	10.00	22.00	72.00	4	45.0	5.0	W	0.03-0.10
MRC120B25-4C12	12.00	12.00	25.00	83.00	4	45.0	5.0	C	0.04-0.11
MRC120B25-4W12	12.00	12.00	25.00	83.00	4	45.0	5.0	W	0.04-0.11
MRC140B25-4C14	14.00	14.00	25.00	83.00	4	45.0	5.0	C	0.04-0.12
MRC160B32-4C16	16.00	16.00	32.00	92.00	4	45.0	5.0	C	0.05-0.13
MRC160B32-4W16	16.00	16.00	32.00	92.00	4	45.0	5.0	W	0.05-0.13
MRC180B32-4C18	18.00	18.00	32.00	92.00	4	45.0	5.0	C	0.05-0.13
MRC200B38-4C20	20.00	20.00	38.00	104.00	4	45.0	5.0	C	0.05-0.13
MRC200B38-4W20	20.00	20.00	38.00	104.00	4	45.0	5.0	W	0.05-0.13

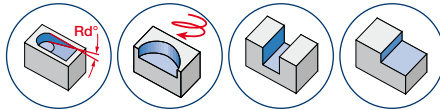
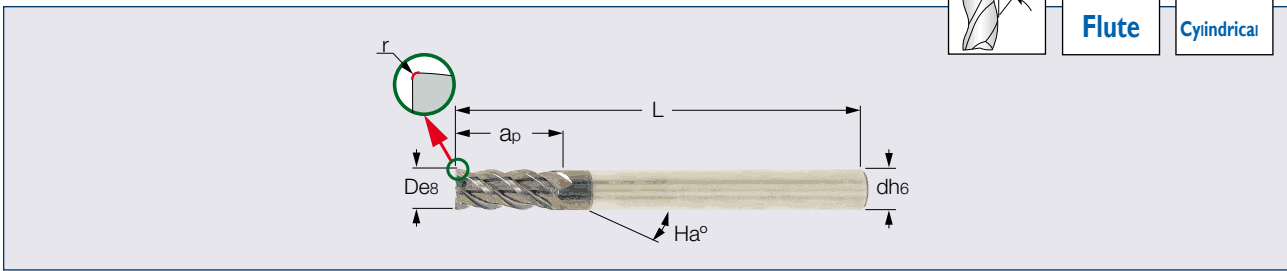
Available grade: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-B-4R

4 Flute, 45° Helix Medium Length Solid Carbide Endmills with Various Radii



Designation										Recommended Machining Data
	D	d	ap	L	Flute	Ha°	Rd°	Shank	r	fz (mm/t)
MRC060B16-4C06R0.5	6.00	6.00	16.00	57.00	4	45.0	5.0	C	0.50	0.03-0.07
MRC060B16-4C06R1	6.00	6.00	16.00	57.00	4	45.0	5.0	C	1.00	0.03-0.07
MRC080B20-4C08R0.5	8.00	8.00	20.00	63.00	4	45.0	5.0	C	0.50	0.03-0.09
MRC080B20-4C08R1	8.00	8.00	20.00	63.00	4	45.0	5.0	C	1.00	0.03-0.09
MRC080B20-4C08R1.5	8.00	8.00	20.00	63.00	4	45.0	5.0	C	1.50	0.03-0.09
MRC080B20-4C08R2	8.00	8.00	20.00	63.00	4	45.0	5.0	C	2.00	0.03-0.09
MRC100B22-4C10R0.5	10.00	10.00	22.00	72.00	4	45.0	5.0	C	0.50	0.03-0.10
MRC100B22-4C10R1	10.00	10.00	22.00	72.00	4	45.0	5.0	C	1.00	0.03-0.10
MRC100B22-4C10R1.5	10.00	10.00	22.00	72.00	4	45.0	5.0	C	1.50	0.03-0.10
MRC100B22-4C10R2	10.00	10.00	22.00	72.00	4	45.0	5.0	C	2.00	0.03-0.10
MRC100B22-4C10R3	10.00	10.00	22.00	72.00	4	45.0	5.0	C	3.00	0.03-0.10
MRC120B25-4C12R0.5	12.00	12.00	25.00	83.00	4	45.0	5.0	C	0.50	0.04-0.11
MRC120B25-4C12R1	12.00	12.00	25.00	83.00	4	45.0	5.0	C	1.00	0.04-0.11
MRC120B25-4C12R1.5	12.00	12.00	25.00	83.00	4	45.0	5.0	C	1.50	0.04-0.11
MRC120B25-4C12R2	12.00	12.00	25.00	83.00	4	45.0	5.0	C	2.00	0.04-0.11
MRC120B25-4C12R3	12.00	12.00	25.00	83.00	4	45.0	5.0	C	3.00	0.04-0.11
MRC160B32-4C16R0.5	16.00	16.00	32.00	92.00	4	45.0	5.0	C	0.50	0.05-0.13
MRC160B32-4C16R1	16.00	16.00	32.00	92.00	4	45.0	5.0	C	1.00	0.05-0.13
MRC160B32-4C16R1.5	16.00	16.00	32.00	92.00	4	45.0	5.0	C	1.50	0.05-0.13
MRC160B32-4C16R2	16.00	16.00	32.00	92.00	4	45.0	5.0	C	2.00	0.05-0.13
MRC160B32-4C16R2.5	16.00	16.00	32.00	92.00	4	45.0	5.0	C	2.50	0.05-0.13
MRC160B32-4C16R3	16.00	16.00	32.00	92.00	4	45.0	5.0	C	3.00	0.05-0.13
MRC200B38-4C20R0.5	20.00	20.00	38.00	104.00	4	45.0	5.0	C	0.50	0.05-0.13
MRC200B38-4C20R1	20.00	20.00	38.00	104.00	4	45.0	5.0	C	1.00	0.05-0.13
MRC200B38-4C20R1.5	20.00	20.00	38.00	104.00	4	45.0	5.0	C	1.50	0.05-0.13
MRC200B38-4C20R2	20.00	20.00	38.00	104.00	4	45.0	5.0	C	2.00	0.05-0.13
MRC200B38-4C20R2.5	20.00	20.00	38.00	104.00	4	45.0	5.0	C	2.50	0.05-0.13
MRC200B38-4C20R3	20.00	20.00	38.00	104.00	4	45.0	5.0	C	3.00	0.05-0.13
MRC200B38-4C20R4	20.00	20.00	38.00	104.00	4	45.0	5.0	C	4.00	0.05-0.13
MRC200B38-4C20R5	20.00	20.00	38.00	104.00	4	45.0	5.0	C	5.00	0.05-0.13

Available grade: MC98

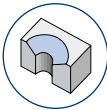
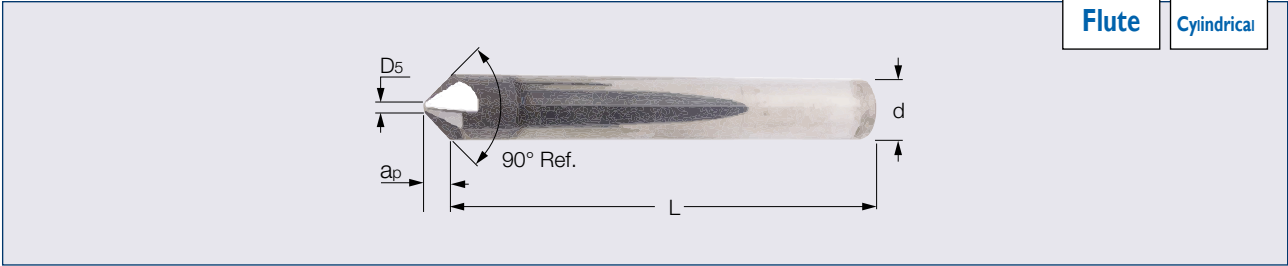
For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRCF../45
45° Chamfering and Countersinking Solid Carbide Endmills

4
Flute

Cylindrical



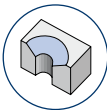
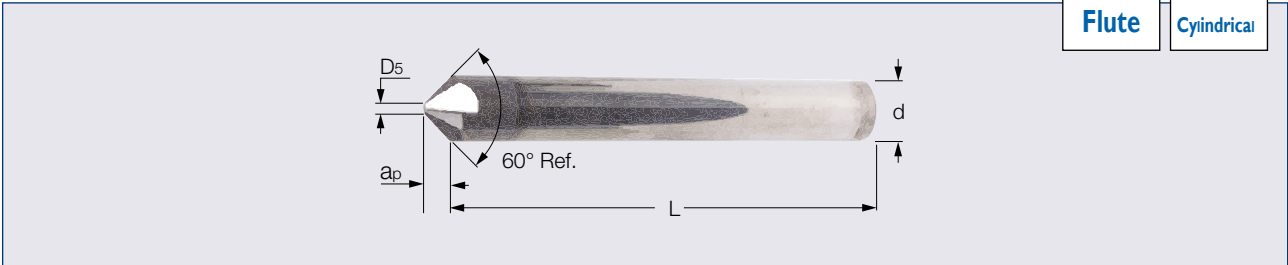
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MRCF D-1.5/45-4C04	1.00	4.00	1.50	50.00	4	C
MRCF D-2/45-4C06	2.00	6.00	2.00	57.00	4	C
MRCF D-3/45-4C08	2.00	8.00	3.00	63.00	4	C
MRCF D-4/45-4C10	2.00	10.00	4.00	72.00	4	C
MRCF D-5/45-4C12	2.00	12.00	5.00	83.00	4	C

Available grade: MC98
For user guide, see pages 106-114

MRCF../60
60° Chamfering and Countersinking Solid Carbide Endmills

4
Flute

Cylindrical



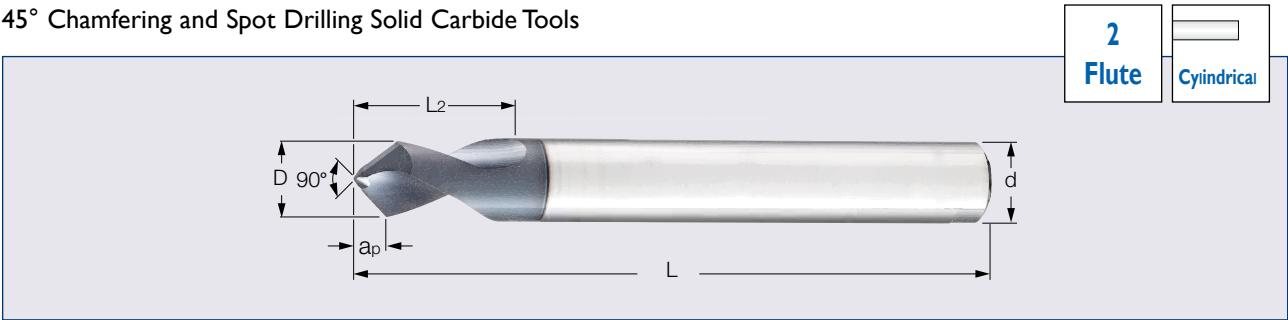
Designation	D5	d	ap	L	Flute	Shank
MRCF-D2.6/60-4C04-50	1.00	4.00	2.60	50.00	4	C
MRCF-D3.4/60-4C06-57	2.00	6.00	3.40	57.00	4	C
MRCF-D5.2/60-4C08-63	2.00	8.00	5.20	63.00	4	C
MRCF-D6.9/60-4C10-72	2.00	10.00	6.90	72.00	4	C
MRCF-D8.6/60-4C12-83	2.00	12.00	8.60	83.00	4	C

Available grade: MC98
For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

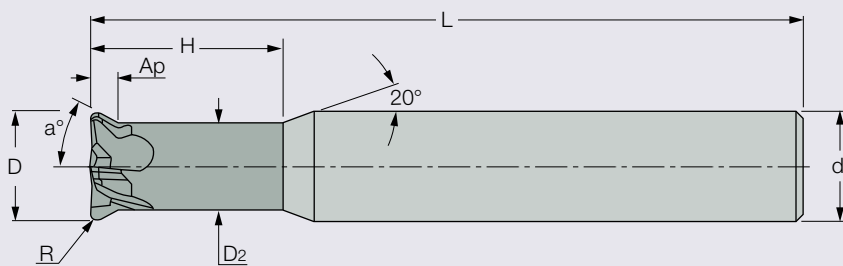
MRD-S2

45° Chamfering and Spot Drilling Solid Carbide Tools



Designation	D	d	L	ap	L2	MC08	MC98
MRD-S2 030/90C03-38	3.00	3.00	38.00	1.37	6.00	●	●
MRD-S2 040/90C04-50	4.00	4.00	50.00	1.79	8.00	●	●
MRD-S2 050/90C05-50	5.00	5.00	50.00	2.24	10.00	●	●
MRD-S2 060/90C06-57	6.00	6.00	57.00	2.71	12.00	●	●
MRD-S2 080/90C08-63	8.00	8.00	63.00	3.63	16.00	●	●
MRD-S2 100/90C10-72	10.00	10.00	72.00	4.55	20.00	●	●
MRD-S2 120/90C12-73	12.00	12.00	73.00	5.47	24.00	●	●

For user guide, see pages 106-114



MRDT ☐ / ☐ S ☐ / ☐

-4C ☐ R ☐ M ☐

ØD H Ap a° Ød R L

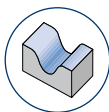
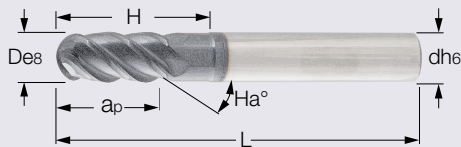
According to customer specifications



SOLID CARBIDE ENDMILLS

MRB-E4L

4 Flute Ball Nose VF for Ultra Hard Steels Above 52 HRc



Designation	D	d	ap	H	L	Flute	Shank
MRB-E4L 03-06/10C06VF-57	3.00	6.00	6.00	10.00	57.00	4	c
MRB-E4L 03-22/30C06VF-100	3.00	6.00	22.00	30.00	100.00	4	c
MRB-E4L 04-08/13C06VF-57	4.00	6.00	8.00	13.00	57.00	4	c
MRB-E4L 04-16/40C06VF-100	4.00	6.00	16.00	40.00	100.00	4	c
MRB-E4L 04-25/28C06VF-58	4.00	6.00	25.00	28.00	58.00	4	c
MRB-E4L 05-10/15C06VF-57	5.00	6.00	10.00	15.00	57.00	4	c
MRB-E4L 06-12/18C06VF-57	6.00	6.00	12.00	18.00	57.00	4	c
MRB-E4L 06-20C06VF-100	6.00	6.00	20.00	-	100.00	4	c
MRB-E4L 08-16/24C08VF-63	8.00	8.00	16.00	24.00	63.00	4	c
MRB-E4L 08-27/32C10VF-73	8.00	10.00	27.00	32.00	73.00	4	c
MRB-E4L 10-20/30C10VF-72	10.00	10.00	20.00	30.00	72.00	4	c
MRB-E4L 12-24/36C12VF-83	12.00	12.00	24.00	36.00	83.00	4	c
MRB-E4L 16-32/48C16VF-92	16.00	16.00	32.00	48.00	92.00	4	c

Available grade: MC92

For user guide, see pages 106-114

MRB-E4T

4 Flute Ball Nose VF for Titanium and Stainless Steels

Designation	D	d	ap	H	L	Flute	Shank
MRB-E4T 06-10/15C06VF-57	6.00	6.00	10.00	15.00	57.00	4	c
MRB-E4T 08-12/20C08VF-63	8.00	8.00	12.00	20.00	63.00	4	c
MRB-E4T 10-14/25C10VF-72	10.00	10.00	14.00	25.00	72.00	4	c
MRB-E4T 12-16/30C12VF-83	12.00	12.00	16.00	30.00	83.00	4	c
MRB-E4T 16-22/38C16VF-92	16.00	16.00	22.00	38.00	92.00	4	c

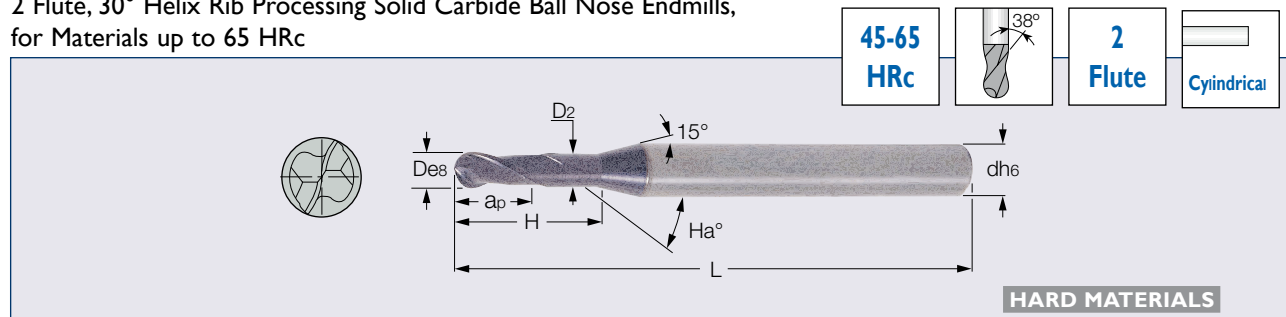
Available grade: MC92

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRB-A2 (rib processing)

2 Flute, 30° Helix Rib Processing Solid Carbide Ball Nose Endmills,
for Materials up to 65 HRc



Designation	D	d	ap	H	L	D2	Flute	Ha°	Shank
MRB-A2 004-006/01C4M45	0.40	4.00	0.60	45.00	1.00	0.36	2	30.0	C
MRB-A2 004-006/02C4M45	0.40	4.00	0.60	45.00	2.00	0.36	2	30.0	C
MRB-A2 004-006/03C4M45	0.40	4.00	0.60	45.00	3.00	0.36	2	30.0	C
MRB-A2 005-007/02C4M45	0.50	4.00	0.70	45.00	2.00	0.45	2	30.0	C
MRB-A2 005-007/04C4M45	0.50	4.00	0.70	45.00	4.00	0.45	2	30.0	C
MRB-A2 005-007/06C4M45	0.50	4.00	0.70	45.00	6.00	0.45	2	30.0	C
MRB-A2 005-007/08C4M45	0.50	4.00	0.70	45.00	8.00	0.45	2	30.0	C
MRB-A2 006-009/02C4M45	0.60	4.00	0.90	45.00	2.00	0.55	2	30.0	C
MRB-A2 006-009/04C4M45	0.60	4.00	0.90	45.00	4.00	0.55	2	30.0	C
MRB-A2 006-009/06C4M45	0.60	4.00	0.90	45.00	6.00	0.55	2	30.0	C
MRB-A2 006-009/08C4M45	0.60	4.00	0.90	45.00	8.00	0.55	2	30.0	C
MRB-A2 008-012/02C4M45	0.80	4.00	1.20	45.00	2.00	0.75	2	30.0	C
MRB-A2 008-012/04C4M45	0.80	4.00	1.20	45.00	4.00	0.75	2	30.0	C
MRB-A2 008-012/06C4M45	0.80	4.00	1.20	45.00	6.00	0.75	2	30.0	C
MRB-A2 008-012/10C4M45	0.80	4.00	1.20	45.00	10.00	0.75	2	30.0	C
MRB-A2 010-015/03C4M45	1.00	4.00	1.50	45.00	3.00	0.97	2	30.0	C
MRB-A2 010-015/04C4M45	1.00	4.00	1.50	45.00	4.00	0.97	2	30.0	C
MRB-A2 010-015/05C4M45	1.00	4.00	1.50	45.00	5.00	0.97	2	30.0	C
MRB-A2 010-015/06C4M45	1.00	4.00	1.50	45.00	6.00	0.97	2	30.0	C
MRB-A2 010-015/07C4M45	1.00	4.00	1.50	45.00	7.00	0.95	2	30.0	C
MRB-A2 010-015/08C4M45	1.00	4.00	1.50	45.00	8.00	0.95	2	30.0	C
MRB-A2 010-015/10C4M45	1.00	4.00	1.50	45.00	10.00	0.95	2	30.0	C
MRB-A2 010-015/12C4M45	1.00	4.00	1.50	45.00	12.00	0.93	2	30.0	C
MRB-A2 010-015/14C4M50	1.00	4.00	1.50	50.00	14.00	0.93	2	30.0	C
MRB-A2 010-015/16C4M50	1.00	4.00	1.50	50.00	16.00	0.93	2	30.0	C
MRB-A2 010-015/20C4M55	1.00	4.00	1.50	55.00	20.00	0.93	2	30.0	C
MRB-A2 012-018/08C4M45	1.20	4.00	1.80	45.00	8.00	1.17	2	30.0	C
MRB-A2 012-018/12C4M45	1.20	4.00	1.80	45.00	12.00	1.13	2	30.0	C
MRB-A2 014-021/08C4M45	1.40	4.00	2.10	45.00	8.00	1.35	2	30.0	C
MRB-A2 014-021/16C4M50	1.40	4.00	2.10	50.00	16.00	1.31	2	30.0	C
MRB-A2 015-015/03C04M50	1.50	4.00	1.50	50.00	3.00	1.47	2	30.0	C
MRB-A2 015-023/06C4M45	1.50	4.00	2.30	45.00	6.00	1.47	2	30.0	C
MRB-A2 015-023/08C4M45	1.50	4.00	2.30	45.00	8.00	1.45	2	30.0	C
MRB-A2 015-023/10C4M45	1.50	4.00	2.30	45.00	10.00	1.45	2	30.0	C
MRB-A2 015-023/12C4M45	1.50	4.00	2.30	45.00	12.00	1.43	2	30.0	C
MRB-A2 015-023/16C4M50	1.50	4.00	2.30	50.00	16.00	1.41	2	30.0	C
MRB-A2 015-023/20C4M55	1.50	4.00	2.30	55.00	20.00	1.39	2	30.0	C
MRB-A2 016-024/08C4M45	1.60	4.00	2.40	45.00	8.00	1.55	2	30.0	C
MRB-A2 016-024/12C4M45	1.60	4.00	2.40	45.00	12.00	1.53	2	30.0	C
MRB-A2 016-024/16C4M50	1.60	4.00	2.40	50.00	16.00	1.51	2	30.0	C
MRB-A2 018-027/08C4M45	1.80	4.00	2.70	45.00	8.00	1.75	2	30.0	C
MRB-A2 018-027/12C4M45	1.80	4.00	2.70	45.00	12.00	1.73	2	30.0	C
MRB-A2 018-027/16C4M50	1.80	4.00	2.70	50.00	16.00	1.71	2	30.0	C
MRB-A2 020-030/04C4M45	2.00	4.00	3.00	45.00	4.00	1.97	2	30.0	C
MRB-A2 020-030/06C4M45	2.00	4.00	3.00	45.00	6.00	1.97	2	30.0	C
MRB-A2 020-030/10C4M45	2.00	4.00	3.00	45.00	10.00	1.93	2	30.0	C

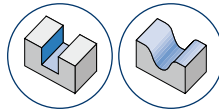
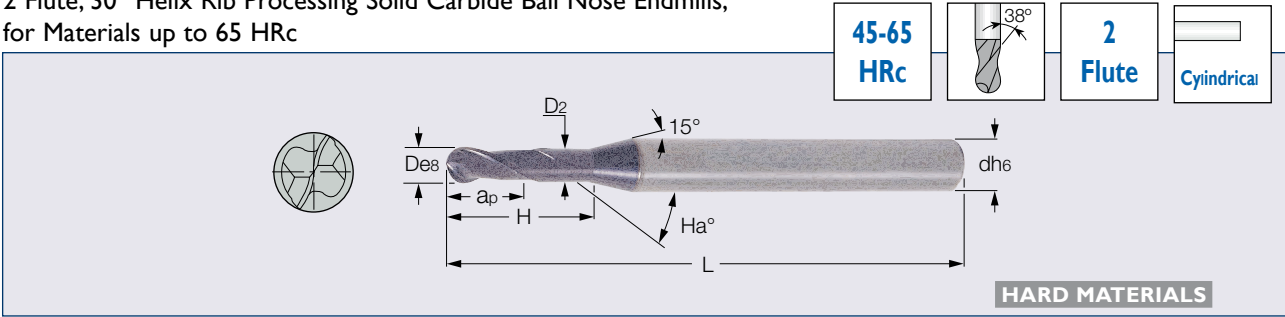
Available grade: MC93

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRB-A2 (rib processing) (continued)

2 Flute, 30° Helix Rib Processing Solid Carbide Ball Nose Endmills,
for Materials up to 65 HRc



Designation	D	d	ap	H	L	D2	Flute	Ha°	Shank
MRB-A2 020-030/12C4M50	2.00	4.00	3.00	50.00	12.00	1.93	2	30.0	C
MRB-A2 020-030/14C4M50	2.00	4.00	3.00	50.00	14.00	1.93	2	30.0	C
MRB-A2 020-030/16C4M50	2.00	4.00	3.00	50.00	16.00	1.91	2	30.0	C
MRB-A2 020-030/20C4M55	2.00	4.00	3.00	55.00	20.00	1.89	2	30.0	C
MRB-A2 020-030/25C4M60	2.00	4.00	3.00	60.00	25.00	1.89	2	30.0	C
MRB-A2 020-030/30C4M70	2.00	4.00	3.00	70.00	30.00	1.89	2	30.0	C
MRB-A2 030-045/08C6M50	3.00	6.00	4.50	50.00	8.00	2.85	2	30.0	C
MRB-A2 030-045/10C6M50	3.00	6.00	4.50	50.00	10.00	2.85	2	30.0	C
MRB-A2 030-045/12C6M50	3.00	6.00	4.50	50.00	12.00	2.85	2	30.0	C
MRB-A2 030-045/16C6M55	3.00	6.00	4.50	55.00	16.00	2.85	2	30.0	C
MRB-A2 030-045/20C6M60	3.00	6.00	4.50	60.00	20.00	2.85	2	30.0	C
MRB-A2 030-045/25C6M65	3.00	6.00	4.50	65.00	25.00	2.85	2	30.0	C
MRB-A2 030-045/30C6M70	3.00	6.00	4.50	70.00	30.00	2.85	2	30.0	C
MRB-A2 030-045/35C6M80	3.00	6.00	4.50	80.00	35.00	2.85	2	30.0	C
MRB-A2 040-060/10C6M60	4.00	6.00	6.00	60.00	10.00	3.80	2	30.0	C
MRB-A2 040-060/12C6M60	4.00	6.00	6.00	60.00	12.00	3.80	2	30.0	C
MRB-A2 040-060/16C6M60	4.00	6.00	6.00	60.00	16.00	3.80	2	30.0	C
MRB-A2 040-060/20C6M65	4.00	6.00	6.00	65.00	20.00	3.80	2	30.0	C
MRB-A2 040-060/25C6M70	4.00	6.00	6.00	70.00	25.00	3.80	2	30.0	C
MRB-A2 040-060/30C6M70	4.00	6.00	6.00	70.00	30.00	3.80	2	30.0	C
MRB-A2 040-060/35C6M80	4.00	6.00	6.00	80.00	35.00	3.80	2	30.0	C
MRB-A2 040-060/45C6M90	4.00	6.00	6.00	90.00	45.00	3.80	2	30.0	C
MRB-A2 040-060/50C6M100	4.00	6.00	6.00	100.00	50.00	3.80	2	30.0	C
MRB-A2 050-075/16C6M60	5.00	6.00	7.50	60.00	16.00	4.80	2	30.0	C
MRB-A2 050-075/20C6M60	5.00	6.00	7.50	60.00	20.00	4.80	2	30.0	C
MRB-A2 050-075/25C6M70	5.00	6.00	7.50	70.00	25.00	4.80	2	30.0	C
MRB-A2 050-075/30C6M80	5.00	6.00	7.50	80.00	30.00	4.80	2	30.0	C
MRB-A2 050-075/35C6M80	5.00	6.00	7.50	80.00	35.00	4.80	2	30.0	C
MRB-A2 060-090/20C6M80	6.00	6.00	9.00	80.00	20.00	5.80	2	30.0	C
MRB-A2 060-090/30C6M90	6.00	6.00	9.00	90.00	30.00	5.80	2	30.0	C
MRB-A2 060-090/40C6M100	6.00	6.00	9.00	100.00	40.00	5.80	2	30.0	C
MRB-A2 060-090/50C6M110	6.00	6.00	9.00	110.00	50.00	5.80	2	30.0	C

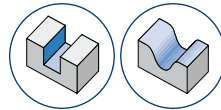
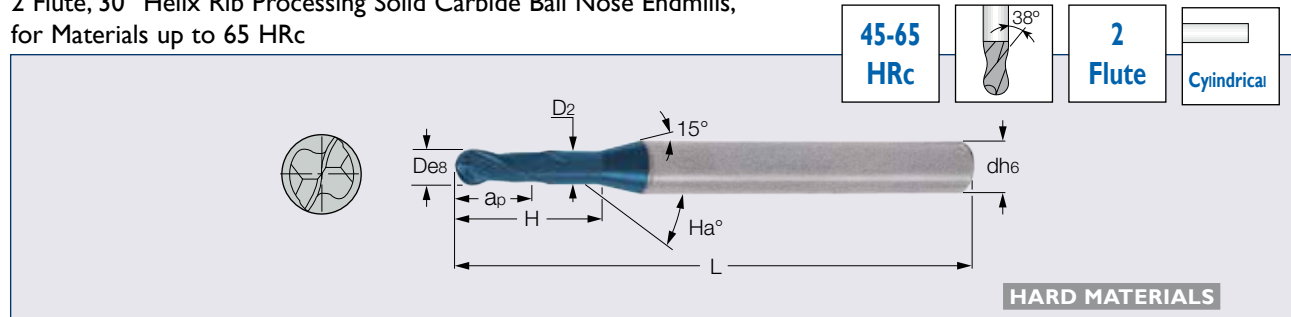
Available grade: MC93

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRB-A2 (rib processing)

2 Flute, 30° Helix Rib Processing Solid Carbide Ball Nose Endmills,
for Materials up to 65 HRc



Designation	D	d	a _p	H	L	D ₂	Flute	Ha°	Shank
MRB-A2 001-001/003C4H45	0.10	4.00	0.10	0.30	45.00	0.085	2	30.0	C
MRB-A2 001-001/005C4H45	0.10	4.00	0.10	0.50	45.00	0.085	2	30.0	C
MRB-A2 002-002/005C4H45	0.20	4.00	0.20	0.50	45.00	0.17	2	30.0	C
MRB-A2 002-002/01C4H45 72	0.20	4.00	0.20	1.00	45.00	0.17	2	30.0	C
MRB-A2 002-002/015C4H45	0.20	4.00	0.20	1.50	45.00	0.17	2	30.0	C
MRB-A2 003-003/01C4H45 72	0.30	4.00	0.30	1.00	45.00	0.27	2	30.0	C
MRB-A2 003-003/02C4H45 72	0.30	4.00	0.30	2.00	45.00	0.27	2	30.0	C
MRB-A2 003-003/03C4H45 72	0.30	4.00	0.30	3.00	45.00	0.27	2	30.0	C
MRB-A2 004-004/03C4H45 72	0.40	4.00	0.40	3.00	45.00	0.37	2	30.0	C
MRB-A2 005-004/02C4H45 72	0.50	4.00	0.40	2.00	45.00	0.45	2	30.0	C
MRB-A2 005-004/04C4H45 72	0.50	4.00	0.40	4.00	45.00	0.45	2	30.0	C
MRB-A2 005-004/08C4H45 72	0.50	4.00	0.40	8.00	45.00	0.45	2	30.0	C
MRB-A2 006-005/02C4H45 72	0.60	4.00	0.50	2.00	45.00	0.55	2	30.0	C
MRB-A2 006-005/04C4H45 72	0.60	4.00	0.50	4.00	45.00	0.55	2	30.0	C
MRB-A2 006-005/08C4H45 72	0.60	4.00	0.50	8.00	45.00	0.55	2	30.0	C
MRB-A2 008-006/02C4H45 72	0.80	4.00	0.60	2.00	45.00	0.75	2	30.0	C
MRB-A2 008-006/04C4H45 72	0.80	4.00	0.60	4.00	45.00	0.75	2	30.0	C
MRB-A2 008-006/06C4H45 72	0.80	4.00	0.60	6.00	45.00	0.75	2	30.0	C
MRB-A2 008-006/10C4H45 72	0.80	4.00	0.60	10.00	45.00	0.75	2	30.0	C
MRB-A2 010-008/03C4H45 72	1.00	4.00	0.80	3.00	45.00	0.95	2	30.0	C
MRB-A2 010-008/04C4H45 72	1.00	4.00	0.80	4.00	45.00	0.95	2	30.0	C
MRB-A2 010-008/05C4H45 72	1.00	4.00	0.80	5.00	45.00	0.95	2	30.0	C
MRB-A2 010-008/06C4H45 72	1.00	4.00	0.80	6.00	45.00	0.95	2	30.0	C
MRB-A2 010-008/08C4H45 72	1.00	4.00	0.80	8.00	45.00	0.95	2	30.0	C
MRB-A2 010-008/10C4H45 72	1.00	4.00	0.80	10.00	45.00	0.95	2	30.0	C
MRB-A2 010-008/12C4H45 72	1.00	4.00	0.80	12.00	45.00	0.95	2	30.0	C
MRB-A2 010-008/16C4H50 72	1.00	4.00	0.80	16.00	50.00	0.95	2	30.0	C
MRB-A2 010-008/20C4H55 72	1.00	4.00	0.80	20.00	55.00	0.95	2	30.0	C
MRB-A2 012-010/08C4H45 72	1.20	4.00	1.00	8.00	45.00	1.15	2	30.0	C
MRB-A2 015-012/06C4H45 72	1.50	4.00	1.20	6.00	45.00	1.45	2	30.0	C
MRB-A2 015-012/08C4H45 72	1.50	4.00	1.20	8.00	45.00	1.45	2	30.0	C
MRB-A2 015-012/10C4H45 72	1.50	4.00	1.20	10.00	45.00	1.45	2	30.0	C
MRB-A2 015-012/12C4H45 72	1.50	4.00	1.20	12.00	45.00	1.45	2	30.0	C
MRB-A2 015-012/16C4H50 72	1.50	4.00	1.20	16.00	50.00	1.45	2	30.0	C
MRB-A2 015-012/20C4H55 72	1.50	4.00	1.20	20.00	55.00	1.45	2	30.0	C
MRB-A2 020-016/04C4H45 72	2.00	4.00	1.60	4.00	45.00	1.95	2	30.0	C
MRB-A2 020-016/06C4H45 72	2.00	4.00	1.60	6.00	45.00	1.95	2	30.0	C
MRB-A2 020-016/10C4H45 72	2.00	4.00	1.60	10.00	45.00	1.95	2	30.0	C
MRB-A2 020-016/12C4H50 72	2.00	4.00	1.60	12.00	50.00	1.95	2	30.0	C
MRB-A2 020-016/14C4H50 72	2.00	4.00	1.60	14.00	50.00	1.95	2	30.0	C
MRB-A2 020-016/16C4H50 72	2.00	4.00	1.60	16.00	50.00	1.95	2	30.0	C
MRB-A2 020-016/20C4H55 72	2.00	4.00	1.60	20.00	55.00	1.95	2	30.0	C
MRB-A2 020-016/25C4H60 72	2.00	4.00	1.60	25.00	60.00	1.95	2	30.0	C
MRB-A2 020-016/30C4H70 72	2.00	4.00	1.60	30.00	70.00	1.95	2	30.0	C
MRB-A2 030-024/12C6H50 72	3.00	6.00	2.40	12.00	50.00	2.85	2	30.0	C
MRB-A2 030-024/16C6H55 72	3.00	6.00	2.40	16.00	55.00	2.85	2	30.0	C
MRB-A2 030-024/20C6H60 72	3.00	6.00	2.40	20.00	60.00	2.85	2	30.0	C

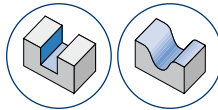
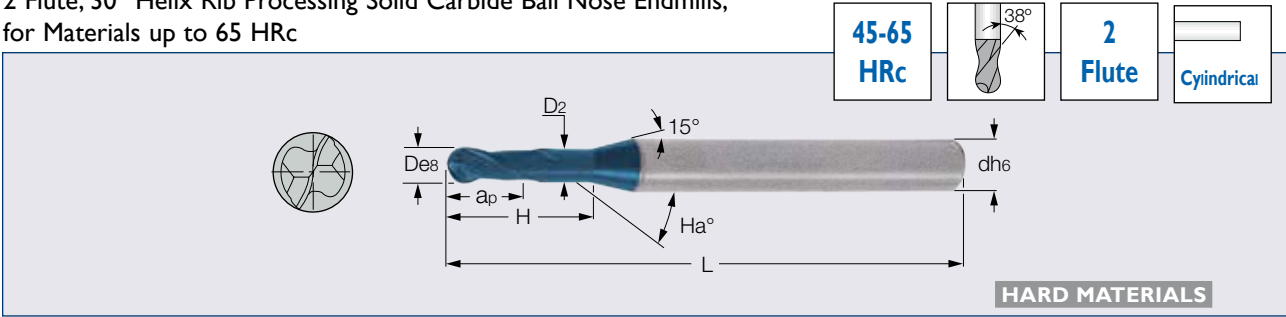
Available grade: MC72

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRB-A2 (rib processing) (continued)

2 Flute, 30° Helix Rib Processing Solid Carbide Ball Nose Endmills,
for Materials up to 65 HRc



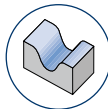
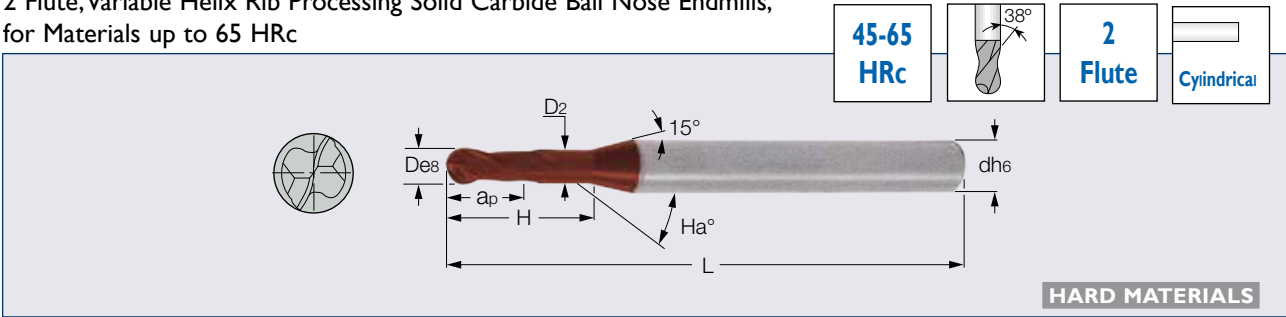
Designation	D	d	a_p	H	L	D_2	Flute	H_{a°	Shank
MRB-A2 030-024/25C6H65 72	3.00	6.00	2.4	25.00	65.00	2.85	2	30.0	C
MRB-A2 030-024/30C6H70 72	3.00	6.00	2.4	30.00	70.00	2.85	2	30.0	C
MRB-A2 030-024/35C6H80 72	3.00	6.00	2.4	35.00	80.00	2.85	2	30.0	C
MRB-A2 040-032/16C6H60 72	4.00	6.00	3.2	16.00	60.00	3.85	2	30.0	C
MRB-A2 040-032/20C6H65 72	4.00	6.00	3.2	20.00	65.00	3.85	2	30.0	C
MRB-A2 040-032/25C6H70 72	4.00	6.00	3.2	25.00	70.00	3.85	2	30.0	C

Available grade: MC72

For user guide, see pages 106-114

MRB-H2 (rib processing)

2 Flute, Variable Helix Rib Processing Solid Carbide Ball Nose Endmills,
for Materials up to 65 HRc



Designation	D	r	d	a_p	L	H	D_2	Flute	H_{a°	Shank
MRB-H2 008-006/4C4H50	0.80	0.40	4.00	0.65	50.00	4.00	0.75	2	30.0	C
MRB-H2 008-006/10C4H50	0.80	0.40	4.00	0.65	50.00	10.00	0.75	2	30.0	C
MRB-H2 010-008/2C4H50	1.00	0.50	4.00	0.85	50.00	2.00	0.95	2	30.0	C
MRB-H2 010-008/4C4H50	1.00	0.50	4.00	0.85	50.00	4.00	0.95	2	30.0	C
MRB-H2 010-008/6C4H50	1.00	0.50	4.00	0.85	50.00	6.00	0.95	2	30.0	C
MRB-H2 012-010/2C4H50	1.20	0.60	4.00	1.05	50.00	2.00	1.15	2	30.0	C
MRB-H2 015-012/3C4H50	1.50	0.75	4.00	1.25	50.00	3.00	1.40	2	30.0	C
MRB-H2 015-012/6C4H50	1.50	0.75	4.00	1.25	50.00	6.00	1.40	2	30.0	C
MRB-H2 020-016/4C4H50	2.00	1.00	4.00	1.65	50.00	4.00	1.90	2	30.0	C
MRB-H2 020-016/10C4H50	2.00	1.00	4.00	1.65	50.00	10.00	1.90	2	30.0	C

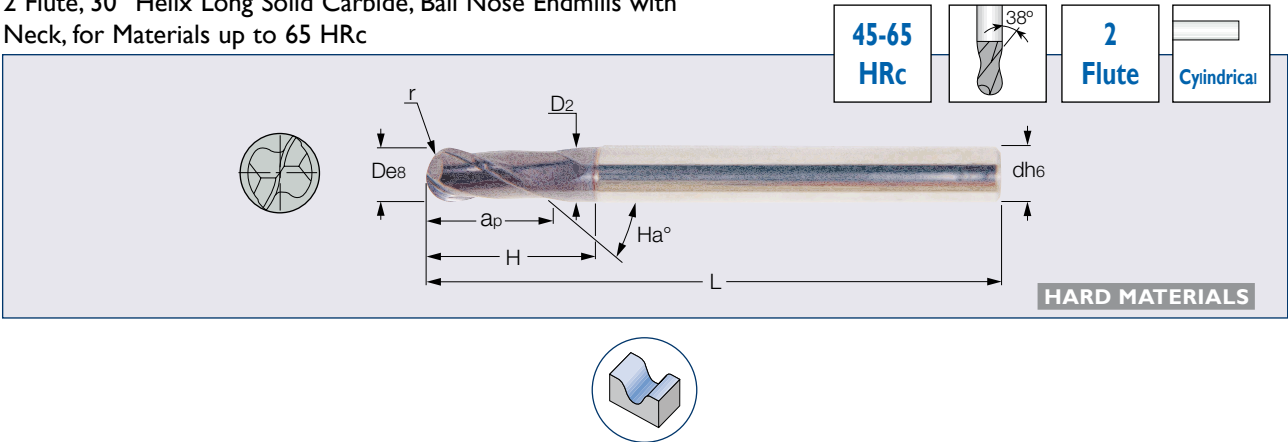
Available grade: MC62

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRB-A2 (long with neck)

2 Flute, 30° Helix Long Solid Carbide, Ball Nose Endmills with Neck, for Materials up to 65 HRc



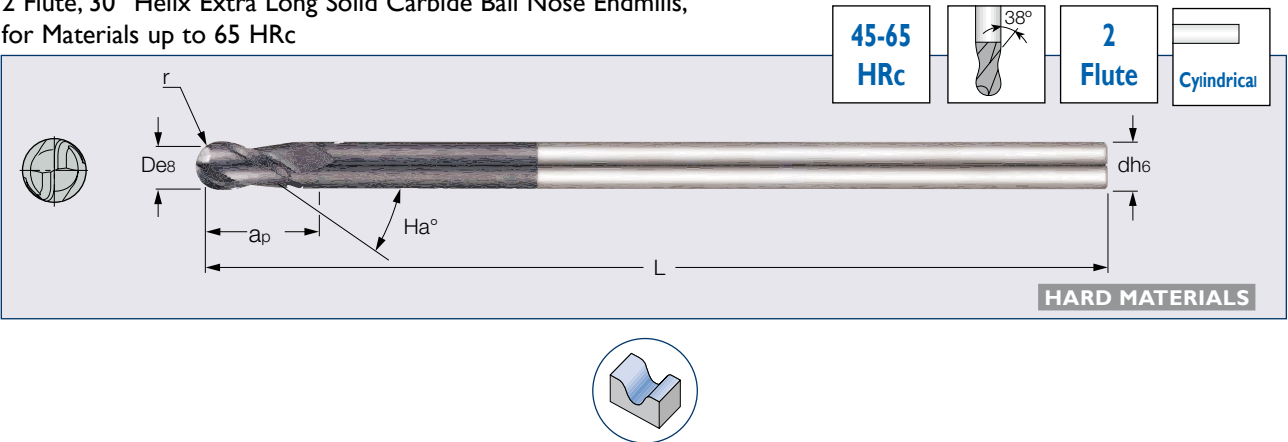
Designation	D	r	d	ap	H	L	D2	Flute	Ha°	Shank
MRB-A2 03-08C06M70	3.00	1.50	6.00	8.00	-	70.00	-	2	30.0	C
MRB-A2 04-08C06M70	4.00	2.00	6.00	8.00	-	70.00	-	2	30.0	C
MRB-A2 05-12C06M80	5.00	2.50	6.00	12.00	-	80.00	-	2	30.0	C
MRB-A2 06-12/22C06M80	6.00	3.00	6.00	12.00	22.00	80.00	5.80	2	30.0	C
MRB-A2 07-14C08M90	7.00	3.50	8.00	14.00	-	90.00	-	2	30.0	C
MRB-A2 08-14/27C08M90	8.00	4.00	8.00	14.00	27.00	90.00	7.80	2	30.0	C
MRB-A2 10-18/31C10M100	10.00	5.00	10.00	18.00	31.00	100.00	9.80	2	30.0	C
MRB-A2 12-22/35C12M110	12.00	6.00	12.00	22.00	35.00	110.00	11.80	2	30.0	C
MRB-A2 14-26C12M120	14.00	7.00	12.00	26.00	-	120.00	-	2	30.0	C
MRB-A2 16-30/50C16M140	16.00	8.00	16.00	30.00	50.00	140.00	15.80	2	30.0	C
MRB-A2 18-34C16M140	18.00	9.00	16.00	34.00	-	140.00	-	2	30.0	C

Available grade: MC93

For user guide, see pages 106-114

MRB-A2 (extra long)

2 Flute, 30° Helix Extra Long Solid Carbide Ball Nose Endmills, for Materials up to 65 HRc



Designation	D	r	d	ap	L	Flute	Ha°	Shank
MRB-A2 02-06C03M80	2.00	1.00	3.00	6.00	80.00	2	30.0	C
MRB-A2 03-08C03M100	3.00	1.50	3.00	8.00	100.00	2	30.0	C
MRB-A2 04-08C04M100	4.00	2.00	4.00	8.00	100.00	2	30.0	C
MRB-A2 05-10C06M120	5.00	2.50	6.00	10.00	120.00	2	30.0	C
MRB-A2 06-10C06M120	6.00	3.00	6.00	10.00	120.00	2	30.0	C
MRB-A2 08-14C08M140	8.00	4.00	8.00	14.00	140.00	2	30.0	C
MRB-A2 10-18C10M180	10.00	5.00	10.00	18.00	180.00	2	30.0	C
MRB-A2 12-22C12M200	12.00	6.00	12.00	22.00	200.00	2	30.0	C
MRB-A2 16-30C16M250	16.00	8.00	16.00	30.00	250.00	2	30.0	C
MRB-A2 20-38C20M250	20.00	10.00	20.00	38.00	250.00	2	30.0	C

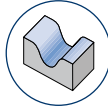
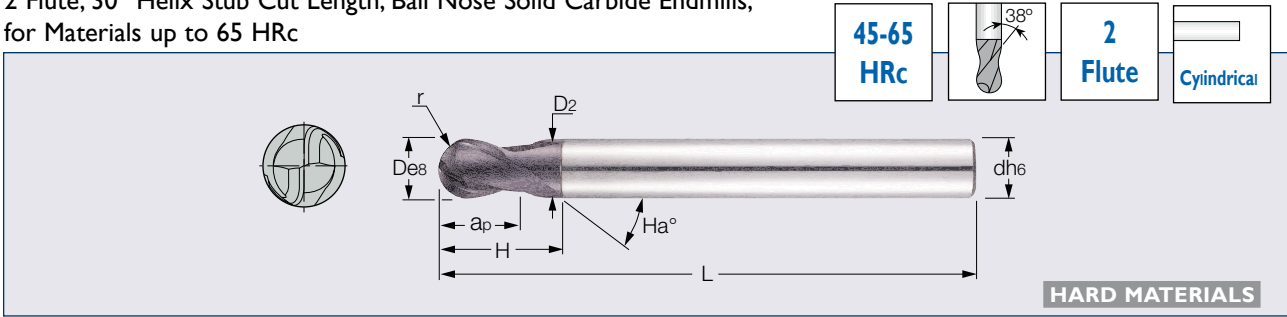
Available grade: MC93

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRB-A2 (stub cut length)

2 Flute, 30° Helix Stub Cut Length, Ball Nose Solid Carbide Endmills,
for Materials up to 65 HRc



Designation	D	r	d	ap	L	H	D2	Flute	Ha°	Shank
MRB-A2 01-01/02C04H50	1.00	0.50	4.00	1.00	50.00	2.20	0.95	2	30.0	C
MRB-A2 012-012/02C04H50	1.20	0.60	4.00	1.20	50.00	2.60	1.10	2	30.0	C
MRB-A2 015-015/03C04H50	1.50	0.75	4.00	1.50	50.00	3.00	1.40	2	30.0	C
MRB-A2 02-02/04C06H50	2.00	1.00	6.00	2.00	50.00	4.00	1.90	2	30.0	C
MRB-A2 03-03/06C06H60	3.00	1.50	6.00	3.00	60.00	6.00	2.90	2	30.0	C
MRB-A2 04-04/08C06H70	4.00	2.00	6.00	4.00	70.00	8.00	3.90	2	30.0	C
MRB-A2 05-05/10C06H80	5.00	2.50	6.00	5.00	80.00	10.00	4.90	2	30.0	C
MRB-A2 06-06/12C06H90	6.00	3.00	6.00	6.00	90.00	12.00	5.90	2	30.0	C
MRB-A2 07-07/14C08H90	7.00	3.50	8.00	7.00	90.00	14.00	6.90	2	30.0	C
MRB-A2 08-08/16C08H100	8.00	4.00	8.00	8.00	100.00	16.00	7.90	2	30.0	C
MRB-A2 09-09/18C10H100	9.00	4.50	10.00	9.00	100.00	18.00	8.90	2	30.0	C
MRB-A2 10-10/20C10H100	10.00	5.00	10.00	10.00	100.00	20.00	9.90	2	30.0	C
MRB-A2 12-12/24C12H110	12.00	6.00	12.00	12.00	110.00	24.00	11.90	2	30.0	C
MRB-A2 16-16/32C16H140	16.00	8.00	16.00	16.00	140.00	32.00	15.80	2	30.0	C
MRB-A2 18-18/36C18H140	18.00	9.00	18.00	18.00	140.00	36.00	17.80	2	30.0	C
MRB-A2 20-20/40C20H160	20.00	10.00	20.00	20.00	160.00	40.00	19.80	2	30.0	C
MRB-A2 25-25/50C25H180	25.00	12.50	25.00	25.00	180.00	50.00	24.80	2	30.0	C

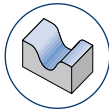
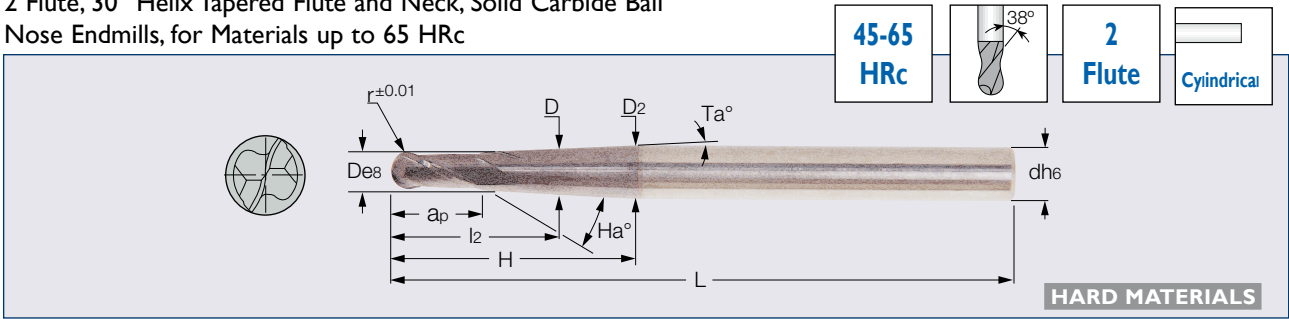
Available grade: MC93

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRB-A2 (tapered flute & neck)

2 Flute, 30° Helix Tapered Flute and Neck, Solid Carbide Ball
Nose Endmills, for Materials up to 65 HRc



Designation	D	r	d	a _p	l ₂	H	D ₂	T _a °	L	Flute	H _a °	Shank
MRB-A2 01-02/04/1.5C06M60	1.00	0.50	6.00	2.00	4.0	23.00	2.00	1.5	60.00	2	30.0	C
MRB-A2 01-02/04/3.0C06M80	1.00	0.50	6.00	2.00	4.0	42.00	5.00	3.0	80.00	2	30.0	C
MRB-A2 01-02/04/5.0C06M60	1.00	0.50	6.00	2.00	4.0	23.00	4.30	5.0	60.00	2	30.0	C
MRB-A2 02-04/06/1.5C06M60	2.00	1.00	6.00	4.00	6.0	23.00	2.90	1.5	60.00	2	30.0	C
MRB-A2 02-04/06/3.0C06M80	2.00	1.00	6.00	4.00	6.0	41.00	5.70	3.0	80.00	2	30.0	C
MRB-A2 02-04/06/5.0C06M60	2.00	1.00	6.00	4.00	6.0	23.00	5.00	5.0	60.00	2	30.0	C
MRB-A2 03-06/08/1.5C06M90	3.00	1.50	6.00	6.00	8.0	52.00	5.30	1.5	90.00	2	30.0	C
MRB-A2 03-06/08/3.0C06M70	3.00	1.50	6.00	6.00	8.0	32.00	5.60	3.0	70.00	2	30.0	C
MRB-A2 04-08/10/1.5C06M90	4.00	2.00	6.00	8.00	10.0	49.00	6.00	1.5	90.00	2	30.0	C
MRB-A2 04-08/10/3.0C06M70	4.00	2.00	6.00	8.00	10.0	28.00	6.00	3.0	70.00	2	30.0	C
MRB-A2 05-10/12/1.5C08M110	5.00	2.50	8.00	10.00	12.0	61.00	7.60	1.5	110.00	2	30.0	C
MRB-A2 05-10/12/3.0C08M90	5.00	2.50	8.00	10.00	12.0	41.00	8.00	3.0	90.00	2	30.0	C
MRB-A2 06-12/15/1.5C08M110	6.00	3.00	8.00	12.00	15.0	53.00	8.00	1.5	110.00	2	30.0	C
MRB-A2 06-12/15/3.0C08M90	6.00	3.00	8.00	12.00	15.0	34.00	8.00	3.0	90.00	2	30.0	C
MRB-A2 08-14/17/1.5C10M120	8.00	4.00	10.00	14.00	17.0	55.00	10.00	1.5	120.00	2	30.0	C
MRB-A2 08-14/17/3.0C10M100	8.00	4.00	10.00	14.00	17.0	36.00	10.00	3.0	100.00	2	30.0	C
MRB-A2 10-18/21/1.5C12M130	10.00	5.00	12.00	18.00	21.0	59.00	12.00	1.5	130.00	2	30.0	C
MRB-A2 10-18/21/3.0C12M110	10.00	5.00	12.00	18.00	21.0	40.00	12.00	3.0	110.00	2	30.0	C
MRB-A2 12-22/25/1.5C16M160	12.00	6.00	16.00	22.00	25.0	83.00	15.00	1.5	160.00	2	30.0	C
MRB-A2 12-22/25/3.0C16M140	12.00	6.00	16.00	22.00	25.0	63.00	16.00	3.0	140.00	2	30.0	C

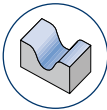
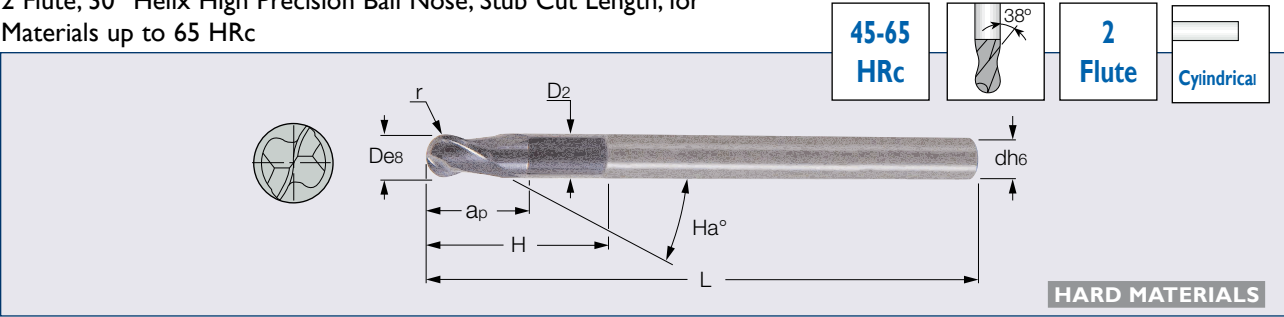
Available grade: MC93

For user guide, see pages 106-114



SOLID CARBIDE ENDMILLS

MRB-A2 (precision stub cut)
 2 Flute, 30° Helix High Precision Ball Nose, Stub Cut Length, for
 Materials up to 65 HRc



Designation	D	r	d	a_p	H	L	D_2	Flute	Ha°	Shank
MRB-A2 01-01/02C04M50	1.00	0.50	4.00	1.00	2.20	50.00	0.95	2	30.0	C
MRB-A2 01-01/02C06M50	1.00	0.50	6.00	1.00	2.20	50.00	0.95	2	30.0	C
MRB-A2 012-012/02C04M50	1.20	0.60	4.00	1.20	2.60	50.00	1.10	2	30.0	C
MRB-A2 02-02/04C06M50	2.00	1.00	6.00	2.00	4.00	50.00	1.90	2	30.0	C
MRB-A2 025-025/05C06M60	2.50	1.30	6.00	2.50	5.00	60.00	2.40	2	30.0	C
MRB-A2 03-03/06C06M60	3.00	1.50	6.00	3.00	6.00	60.00	2.90	2	30.0	C
MRB-A2 04-04/08C06M70	4.00	2.00	6.00	4.00	8.00	70.00	3.90	2	30.0	C
MRB-A2 05-05/10C06M80	5.00	2.50	6.00	5.00	10.00	80.00	4.90	2	30.0	C
MRB-A2 06-06/12C06M90	6.00	3.00	6.00	6.00	12.00	90.00	5.90	2	30.0	C
MRB-A2 07-07/14C08M90	7.00	3.50	8.00	7.00	14.00	90.00	6.90	2	30.0	C
MRB-A2 08-08/16C08M100	8.00	4.00	8.00	8.00	16.00	100.00	7.90	2	30.0	C
MRB-A2 09-09/18C10M100	9.00	4.50	10.00	9.00	18.00	100.00	8.90	2	30.0	C
MRB-A2 10-10/20C10M100	10.00	5.00	10.00	10.00	20.00	100.00	9.90	2	30.0	C
MRB-A2 12-12/24C12M110	12.00	6.00	12.00	12.00	24.00	110.00	11.90	2	30.0	C
MRB-A2 14-14/28C14M110	14.00	7.00	14.00	14.00	28.00	110.00	13.80	2	30.0	C
MRB-A2 16-16/32C16M140	16.00	8.00	16.00	16.00	32.00	140.00	15.80	2	30.0	C
MRB-A2 18-18/36C18M140	18.00	9.00	18.00	18.00	36.00	140.00	17.80	2	30.0	C
MRB-A2 25-25/50C25M180	25.00	12.50	25.00	25.00	50.00	180.00	24.80	2	30.0	C

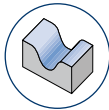
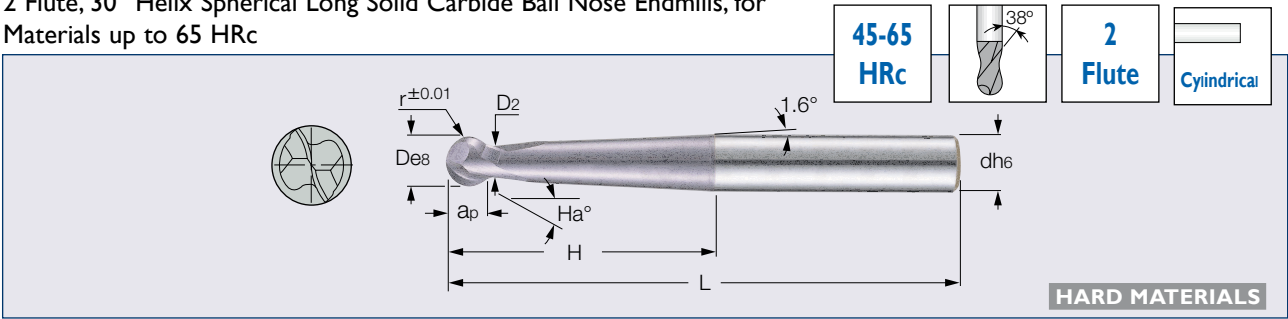
Available grade: MC93
 For user guide, see pages 106-114



SOLID CARBIDE ENDMILLS

MRSB-A2

2 Flute, 30° Helix Spherical Long Solid Carbide Ball Nose Endmills, for Materials up to 65 HRc



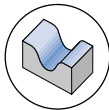
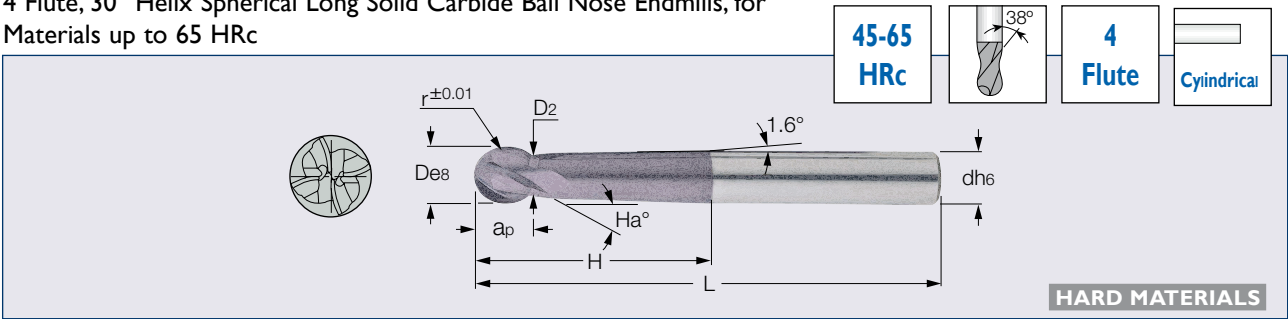
Designation	D	r	d	a _p	H	D ₂	L	Flute	Ha°	Shank
MRSB-A2 03 02/30C06M80	3.00	1.50	6.00	2.30	30.00	2.50	80.00	2	30.0	C
MRSB-A2 04 03/30C06M80	4.00	2.00	6.00	3.10	30.00	3.30	80.00	2	30.0	C
MRSB-A2 05 03/38C06M80	5.00	2.50	6.00	3.90	38.00	4.10	80.00	2	30.0	C
MRSB-A2 06 04/28C06M100	6.00	3.00	6.00	4.90	28.00	4.70	100.00	2	30.0	C
MRSB-A2 08 06/33C08M100	8.00	4.00	8.00	6.30	33.00	6.50	100.00	2	30.0	C
MRSB-A2 10 07/40C10M100	10.00	5.00	10.00	7.90	40.00	8.20	100.00	2	30.0	C
MRSB-A2 12 09/49C12M100	12.00	6.00	12.00	9.50	49.00	9.80	100.00	2	30.0	C
MRSB-A2 16 12/59C16M150	16.00	8.00	16.00	12.40	59.00	13.40	150.00	2	30.0	C

Available grade: MC93

For user guide, see pages 106-114

MRSB-A4

4 Flute, 30° Helix Spherical Long Solid Carbide Ball Nose Endmills, for Materials up to 65 HRc



Designation	D	r	d	a _p	H	D ₂	L	Flute	Ha°	Shank
MRSB-A4 05 3/38C06M80	5.00	2.50	6.00	3.90	38.00	4.10	80.00	4	30.0	C
MRSB-A4 06 4/28C06M100	6.00	3.00	6.00	4.90	28.00	4.70	100.00	4	30.0	C
MRSB-A4 08 6/33C08M100	8.00	4.00	8.00	6.30	33.00	6.50	100.00	4	30.0	C
MRSB-A4 10 7/40C10M100	10.00	5.00	10.00	7.90	40.00	8.20	100.00	4	30.0	C
MRSB-A4 12 9/49C12M100	12.00	6.00	12.00	9.50	49.00	9.80	100.00	4	30.0	C
MRSB-A4 16 12/59C16M150	16.00	8.00	16.00	12.40	59.00	13.40	150.00	4	30.0	C

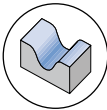
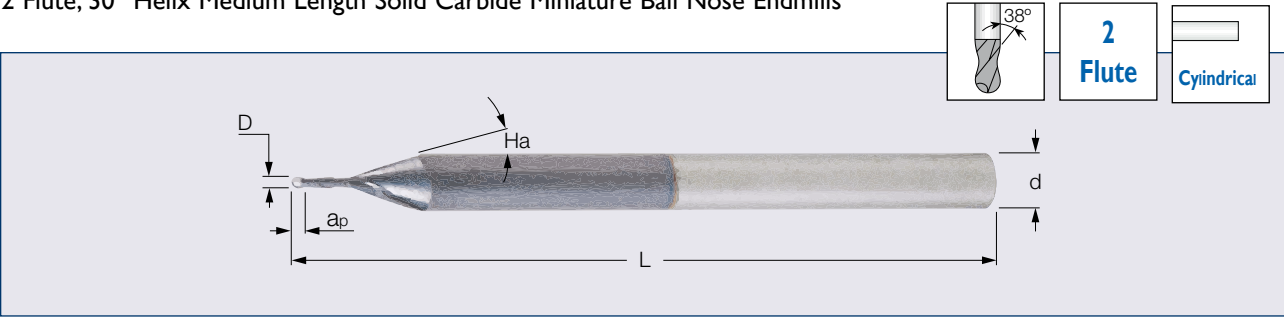
Available grade: MC93

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRBM-A-2

2 Flute, 30° Helix Medium Length Solid Carbide Miniature Ball Nose Endmills



Designation	D	r	d	a _p	L	Flute	H _a °	Shank	MC08	MC98
MRBM004A008-2C03	0.40	0.20	3.00	0.80	38.00	2	30.0	C	●	●
MRBM005A010-2C03	0.50	0.25	3.00	1.00	38.00	2	30.0	C	●	●
MRBM006A012-2C03	0.60	0.30	3.00	1.20	38.00	2	30.0	C	●	●
MRBM007A014-2C03	0.70	0.35	3.00	1.40	38.00	2	30.0	C	●	●
MRBM008A016-2C03	0.80	0.40	3.00	1.60	38.00	2	30.0	C	●	●
MRBM010A025-2C04	1.00	0.50	4.00	2.50	50.00	2	30.0	C	●	●
MRBM011A025-2C04	1.10	0.55	4.00	2.50	50.00	2	30.0	C	●	●
MRBM012A030-2C04	1.20	0.60	4.00	3.00	50.00	2	30.0	C	●	●
MRBM016A040-2C04	1.60	0.80	4.00	4.00	50.00	2	30.0	C	●	●
MRBM020A060-2C04	2.00	1.00	4.00	6.00	50.00	2	30.0	C	●	●

For user guide, see pages 106-114

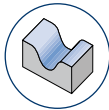
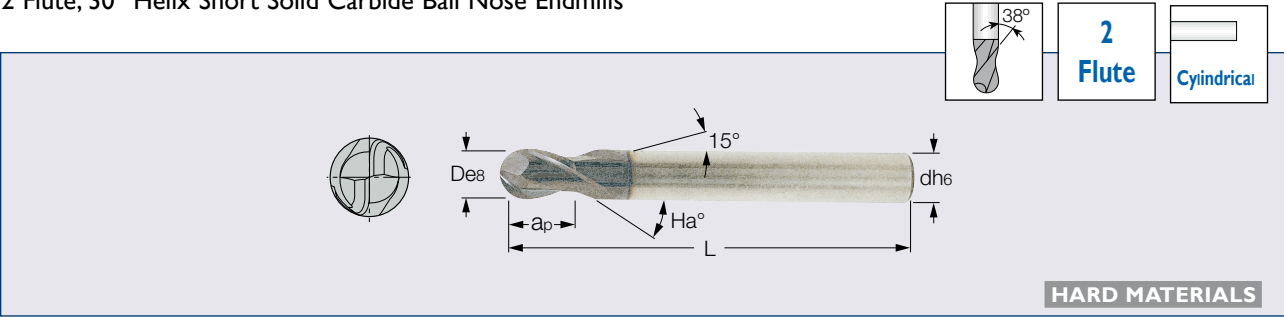
D	Tolerance
D ≤ 0.6	D 0.000 -0.010
0.6 < D ≤ 2	D 0.000 -0.012



SOLID CARBIDE ENDMILLS

MRB-A-2

2 Flute, 30° Helix Short Solid Carbide Ball Nose Endmills



Designation	D	d	a_p	L	Flute	H_a°	Shank	MC08	MC93	MC98
MRB020A04-2C03	2.00	3.00	4.00	38.00	2	30.0	C		●	●
MRB030A05-2C03	3.00	3.00	5.00	38.00	2	30.0	C			●
MRB030A05-2C06	3.00	6.00	5.00	57.00	2	30.0	C	●	●	●
MRB040A07-2C04	4.00	4.00	7.00	50.00	2	30.0	C			●
MRB040A07-2C06	4.00	6.00	7.00	57.00	2	30.0	C		●	●
MRB050A08-2C05	5.00	5.00	8.00	50.00	2	30.0	C			●
MRB050A08-2C06	5.00	6.00	8.00	57.00	2	30.0	C		●	●
MRB060A08-2C06	6.00	6.00	8.00	57.00	2	30.0	C	●	●	●
MRB080A11-2C08	8.00	8.00	11.00	63.00	2	30.0	C	●	●	●
MRB100A13-2C10	10.00	10.00	13.00	72.00	2	30.0	C	●	●	●
MRB120A14-2C12	12.00	12.00	14.00	83.00	2	30.0	C		●	●
MRB160A16-2C16	16.00	16.00	16.00	92.00	2	30.0	C			●
MRB200A20-2C20	20.00	20.00	20.00	104.00	2	30.0	C			●

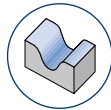
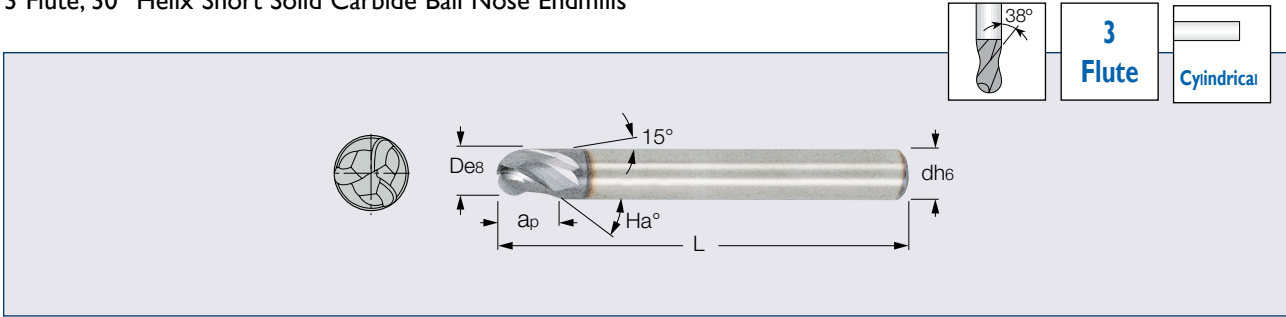
Short and stable design for Profiling (roughing).

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRB-A-3

3 Flute, 30° Helix Short Solid Carbide Ball Nose Endmills



Designation	D	d	ap	L	Flute	Ha°	Shank
MRB016A020-3C03	1.60	3.00	2.00	38.00	3	30.0	C
MRB030A05-3C03	3.00	3.00	5.00	38.00	3	30.0	C
MRB030A05-3C06	3.00	6.00	5.00	57.00	3	30.0	C
MRB040A07-3C04	4.00	4.00	7.00	50.00	3	30.0	C
MRB040A07-3C06	4.00	6.00	7.00	57.00	3	30.0	C
MRB050A08-3C05	5.00	5.00	8.00	50.00	3	30.0	C
MRB050A08-3C06	5.00	6.00	8.00	57.00	3	30.0	C
MRB060A08-3C06	6.00	6.00	8.00	57.00	3	30.0	C
MRB080A11-3C08	8.00	8.00	11.00	63.00	3	30.0	C
MRB100A13-3C10	10.00	10.00	13.00	72.00	3	30.0	C
MRB120A14-3C12	12.00	12.00	14.00	83.00	3	30.0	C

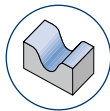
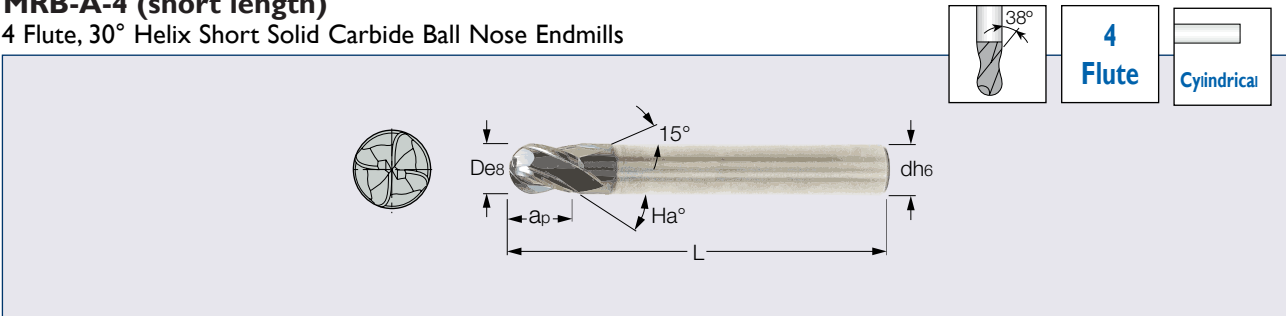
Short and stable design for contouring (roughing).

Available grades: MC98

For user guide, see pages 106-114

MRB-A-4 (short length)

4 Flute, 30° Helix Short Solid Carbide Ball Nose Endmills



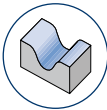
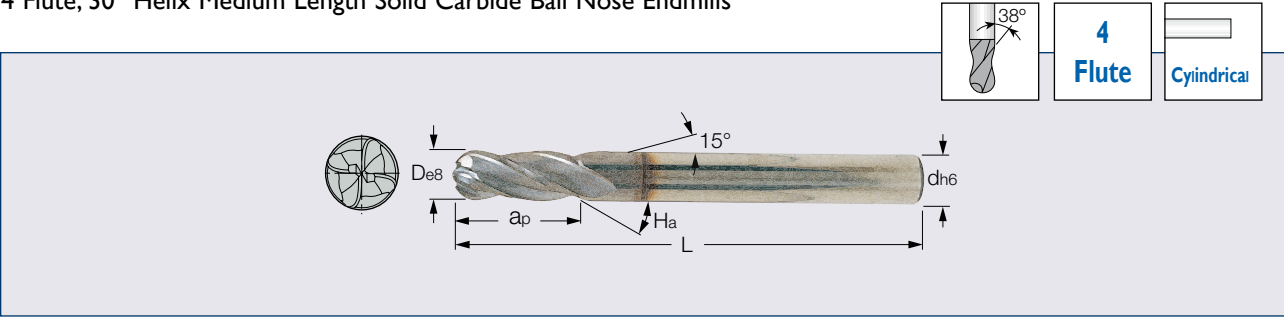
Designation	D	d	ap	L	Flute	Ha°	Shank
MRB030A05-4C03	3.00	3.00	5.00	38.00	4	30.0	C
MRB030A05-4C06	3.00	6.00	5.00	57.00	4	30.0	C
MRB040A07-4C04	4.00	4.00	7.00	50.00	4	30.0	C
MRB040A07-4C06	4.00	6.00	7.00	50.00	4	30.0	C
MRB050A08-4C06	5.00	6.00	8.00	57.00	4	30.0	C
MRB060A08-4C06	6.00	6.00	8.00	57.00	4	30.0	C
MRB080A11-4C08	8.00	8.00	11.00	63.00	4	30.0	C
MRB100A13-4C10	10.00	10.00	13.00	72.00	4	30.0	C
MRB120A14-4C12	12.00	12.00	14.00	83.00	4	30.0	C
MRB140A14-4C14	14.00	14.00	14.00	83.00	4	30.0	C
MRB160A16-4C16	16.00	16.00	16.00	92.00	4	30.0	C
MRB200A20-4C20	20.00	20.00	20.00	104.00	4	30.0	C

Available grade: MC98

For user guide, see pages 106-114 For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

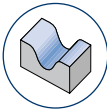
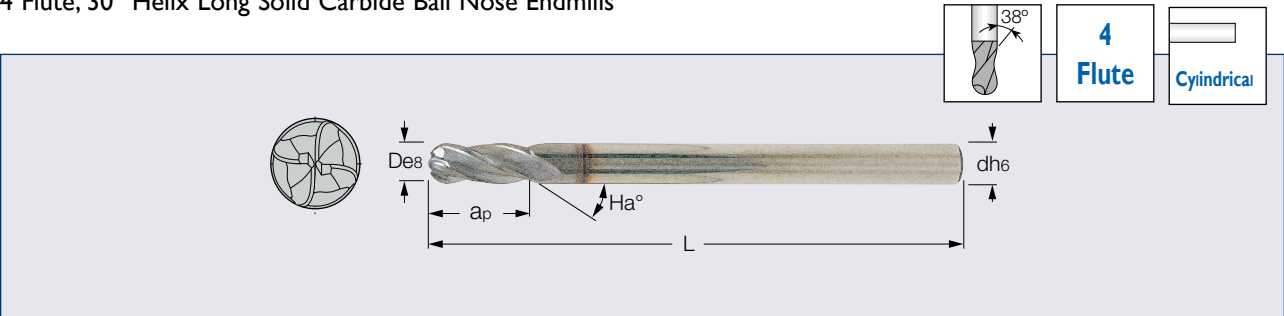
MRB-A-4 (medium length)
4 Flute, 30° Helix Medium Length Solid Carbide Ball Nose Endmills



Designation	D	d	ap	L	Flute	Ha°	Shank
MRB030A08-4C04	3.00	4.00	8.00	50.00	4	30.0	C
MRB040A12-4C04	4.00	4.00	12.00	50.00	4	30.0	C
MRB050A14-4C05	5.00	5.00	14.00	50.00	4	30.0	C
MRB060A16-4C06	6.00	6.00	16.00	57.00	4	30.0	C
MRB080A20-4C08	8.00	8.00	20.00	63.00	4	30.0	C
MRB090A11-4C09	9.00	9.00	11.00	63.00	4	30.0	C
MRB100A22-4C10	10.00	10.00	22.00	72.00	4	30.0	C
MRB120A25-4C12	12.00	12.00	25.00	83.00	4	30.0	C
MRB160A32-4C16	16.00	16.00	32.00	92.00	4	30.0	C
MRB200A38-4C20	20.00	20.00	38.00	104.00	4	30.0	C

Available grade: MC98
For user guide, see pages 106-114

MRBL-A-4
4 Flute, 30° Helix Long Solid Carbide Ball Nose Endmills



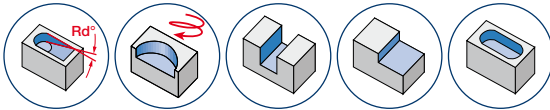
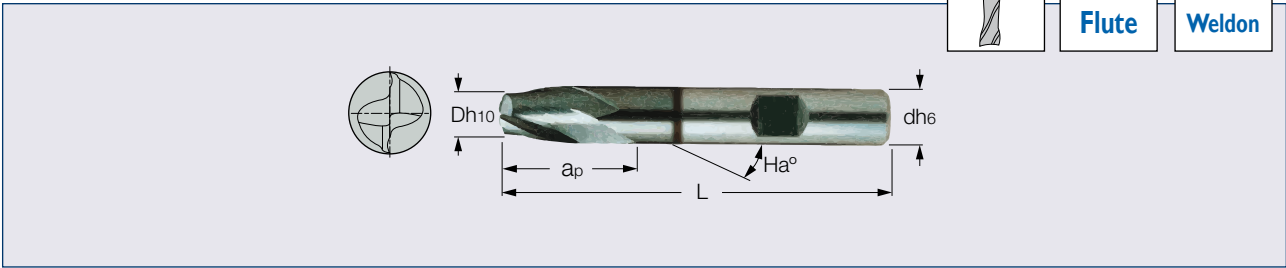
Designation	D	d	ap	L	Flute	Ha°	Shank
MRBL040A12-4C04	4.00	4.00	12.00	80.00	4	30.0	C
MRBL060A16-4C06	6.00	6.00	16.00	100.00	4	30.0	C
MRBL070A16-4C07	7.00	7.00	16.00	100.00	4	30.0	C
MRBL080A20-4C08	8.00	8.00	20.00	100.00	4	30.0	C
MRBL090A20-4C09	9.00	9.00	20.00	100.00	4	30.0	C
MRBL100A22-4C10	10.00	10.00	22.00	100.00	4	30.0	C
MRBL120A25-4C12	12.00	12.00	25.00	100.00	4	30.0	C
MRBL160A32-4C16	16.00	16.00	32.00	125.00	4	30.0	C

Available grade: MC98
For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-A2 (economical-short)

Economical Type 2 Flute, 30° Helix Center Cutting
Short Solid Carbide Endmills



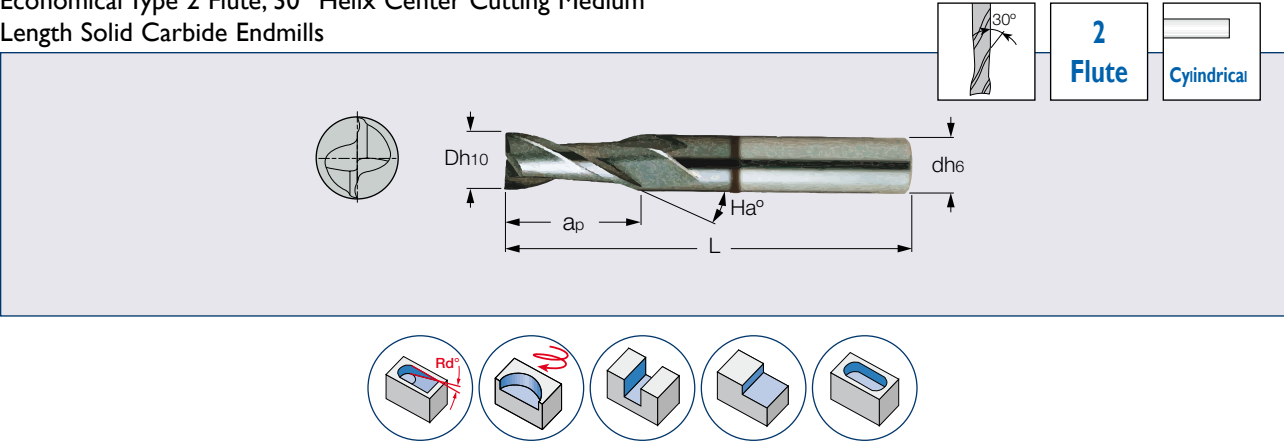
Designation									Recommended Machining Data	MC08	MC98
	D	a_p	d	L	Flute	H_{a°	R_d°	Shank	f_z (mm/t)		
MRC-A2 02-03W06E50	2.00	3.00	6.00	50.00	2	30.0	5.0	W	0.01-0.03	●	●
MRC-A2 03-04W06E50	3.00	4.00	6.00	50.00	2	30.0	5.0	W	0.01-0.04	●	●
MRC-A2 035-04W06E50	3.50	4.00	6.00	50.00	2	30.0	5.0	W	0.01-0.04	●	●
MRC-A2 04-05W06E54	4.00	5.00	6.00	54.00	2	30.0	5.0	W	0.02-0.05	●	●
MRC-A2 045-05W06E54	4.50	5.00	6.00	54.00	2	30.0	5.0	W	0.02-0.05	●	●
MRC-A2 05-06W06E54	5.00	6.00	6.00	54.00	2	30.0	5.0	W	0.02-0.06	●	●
MRC-A2 06-07W06E54	6.00	7.00	6.00	54.00	2	30.0	5.0	W	0.03-0.07	●	●
MRC-A2 07-08W08E58	7.00	8.00	8.00	58.00	2	30.0	5.0	W	0.03-0.08	●	●
MRC-A2 08-09W08E58	8.00	9.00	8.00	58.00	2	30.0	5.0	W	0.03-0.09	●	●
MRC-A2 09-10W10E66	9.00	10.00	10.00	66.00	2	30.0	5.0	W	0.03-0.09	●	●
MRC-A2 10-11W10E66	10.00	11.00	10.00	66.00	2	30.0	5.0	W	0.03-0.10	●	●
MRC-A2 12-12W12E73	12.00	12.00	12.00	73.00	2	30.0	5.0	W	0.04-0.11	●	●
MRC-A2 14-14W14E75	14.00	14.00	14.00	75.00	2	30.0	5.0	W	0.04-0.12	●	●
MRC-A2 16-16W16E82	16.00	16.00	16.00	82.00	2	30.0	5.0	W	0.05-0.13	●	●
MRC-A2 18-18W18E84	18.00	18.00	18.00	84.00	2	30.0	5.0	W	0.05-0.13	●	●
MRC-A2 20-20W20E92	20.00	20.00	20.00	92.00	2	30.0	5.0	W	0.05-0.13	●	●

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-A2 (economical-medium)

Economical Type 2 Flute, 30° Helix Center Cutting Medium
Length Solid Carbide Endmills



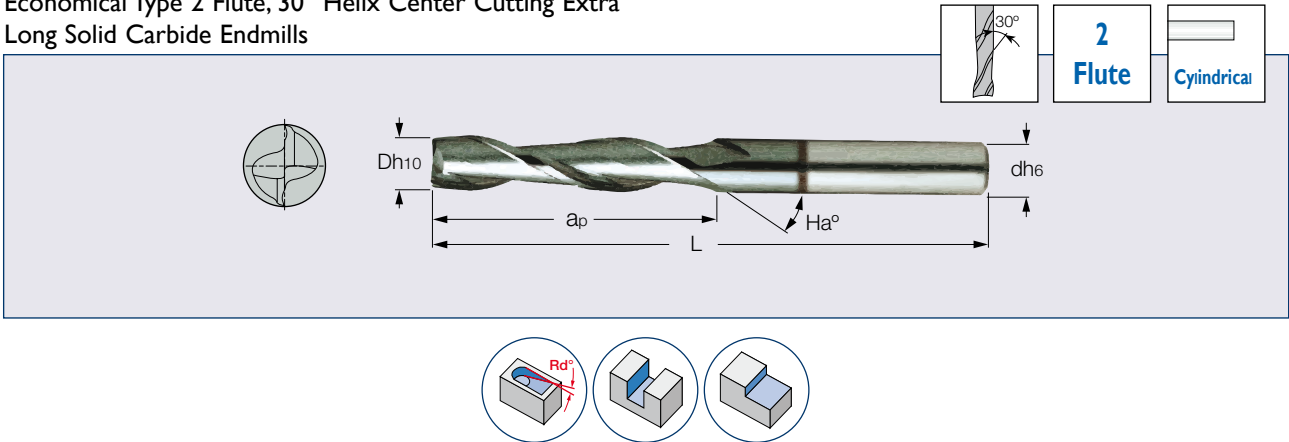
Designation									Recommended Machining Data	MC08	MC98
	D	d	a _p	L	Flute	H _a °	R _d °	Shank	f _z (mm/t)		
MRC-A2 01-03C04E50	1.00	4.00	3.00	50.00	2	30.0	5.0	C	0.00-0.01	●	●
MRC-A2 015-045C04E50	1.50	4.00	4.50	50.00	2	30.0	5.0	C	0.00-0.02	●	●
MRC-A2 02-08C02E32	2.00	2.00	8.00	32.00	2	30.0	5.0	C	0.01-0.03	●	●
MRC-A2 025-08C025E32	2.50	2.50	8.00	32.00	2	30.0	5.0	C	0.01-0.03	●	●
MRC-A2 03-12C03E38	3.00	3.00	12.00	38.00	2	30.0	5.0	C	0.01-0.04	●	●
MRC-A2 035-12C035E32	3.50	3.50	12.00	32.00	2	30.0	5.0	C	0.01-0.04	●	●
MRC-A2 04-12C04E50	4.00	4.00	12.00	50.00	2	30.0	5.0	C	0.02-0.05	●	●
MRC-A2 045-14C045E50	4.50	4.50	14.00	50.00	2	30.0	5.0	C	0.02-0.05	●	●
MRC-A2 05-14C05E50	5.00	5.00	14.00	50.00	2	30.0	5.0	C	0.02-0.06	●	●
MRC-A2 055-16C055E50	5.50	5.50	16.00	50.00	2	30.0	5.0	C	0.02-0.06	●	●
MRC-A2 06-16C06E50	6.00	6.00	16.00	50.00	2	30.0	5.0	C	0.03-0.07	●	●
MRC-A2 07-20C07E60	7.00	7.00	20.00	60.00	2	30.0	5.0	C	0.03-0.08	●	●
MRC-A2 08-20C08E63	8.00	8.00	20.00	63.00	2	30.0	5.0	C	0.03-0.09	●	●
MRC-A2 09-20C09E60	9.00	9.00	20.00	60.00	2	30.0	5.0	C	0.03-0.09	●	●
MRC-A2 10-22C10E72	10.00	10.00	22.00	72.00	2	30.0	5.0	C	0.03-0.10	●	●
MRC-A2 12-22C12E70	12.00	12.00	22.00	70.00	2	30.0	5.0	C	0.04-0.11	●	●
MRC-A2 14-25C14E75	14.00	14.00	25.00	75.00	2	30.0	5.0	C	0.04-0.12	●	●
MRC-A2 16-25C16E75	16.00	16.00	25.00	75.00	2	30.0	5.0	C	0.05-0.13	●	●
MRC-A2 20-32C20E100	20.00	20.00	32.00	100.00	2	30.0	5.0	C	0.05-0.13	●	●

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-A2 (economical-extra long)

Economical Type 2 Flute, 30° Helix Center Cutting Extra
Long Solid Carbide Endmills



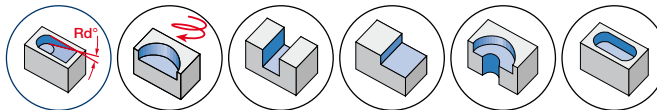
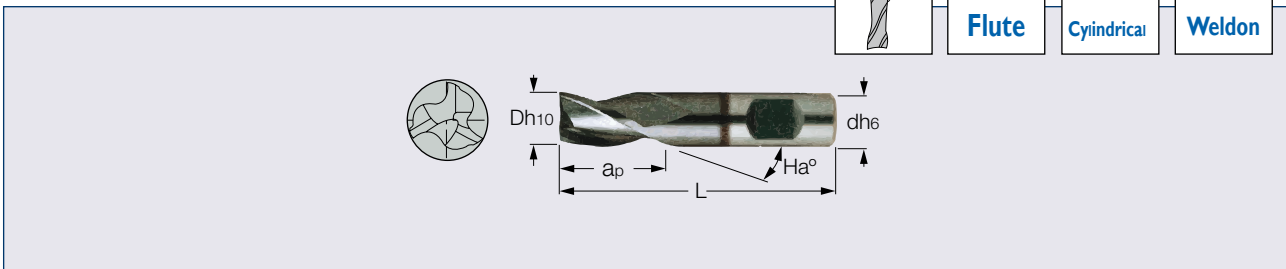
Designation									Recommended Machining Data	MC08	MC98
	D	d	a _p	L	Flute	H _a °	R _d °	Shank	f _z (mm/t)		
MRC-A2 03-30C03E75	3.00	3.00	30.00	75.00	2	30.0	5.0	C	0.01-0.04	●	●
MRC-A2 04-30C04E75	4.00	4.00	30.00	75.00	2	30.0	5.0	C	0.02-0.05	●	●
MRC-A2 05-40C05E100	5.00	5.00	40.00	100.00	2	30.0	5.0	C	0.02-0.06	●	●
MRC-A2 06-50C06E150	6.00	6.00	50.00	150.00	2	30.0	5.0	C	0.03-0.07	●	●
MRC-A2 08-50C08E150	8.00	8.00	50.00	150.00	2	30.0	5.0	C	0.03-0.09	●	●
MRC-A2 10-60C10E150	10.00	10.00	60.00	150.00	2	30.0	5.0	C	0.03-0.10	●	●
MRC-A2 12-75C12E150	12.00	12.00	75.00	150.00	2	30.0	5.0	C	0.04-0.11	●	●
MRC-A2 14-65C14E150	14.00	14.00	65.00	150.00	2	30.0	5.0	C	0.04-0.12	●	●
MRC-A2 16-65C16E150	16.00	16.00	65.00	150.00	2	30.0	5.0	C	0.05-0.13	●	●
MRC-A2 18-65C18E150	18.00	18.00	65.00	150.00	2	30.0	5.0	C	0.05-0.13	●	●
MRC-A2 20-65C20E150	20.00	20.00	65.00	150.00	2	30.0	5.0	C	0.05-0.13	●	●

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-A3/E3 (economical-short)

Economical Type 3 Flute, 30° and 38° Helix Center Cutting Short
Solid Carbide Endmills



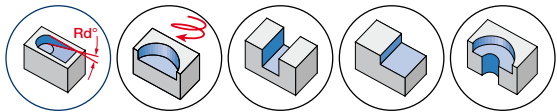
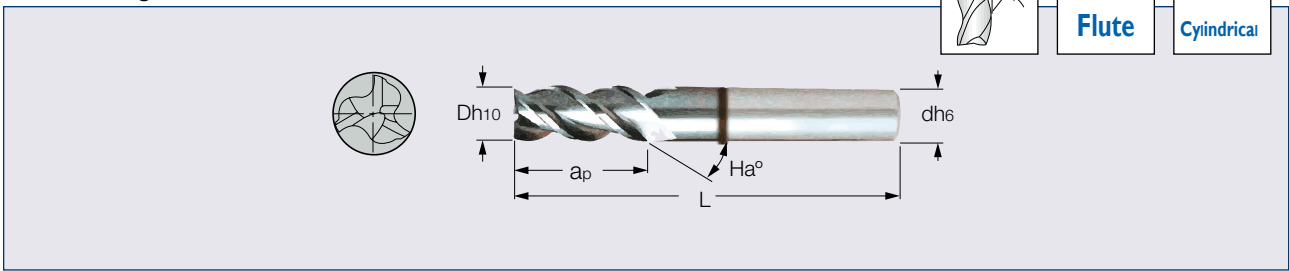
Designation									Recommended Machining Data	MC08	MC98
	D	d	ap	L	Flute	Ha°	Rd°	Shank	fz (mm/t)		
MRC-A3 005-015C03E38	0.50	3.00	1.50	38.00	3	30.0	5.0	C	0.00-0.01	●	●
MRC-A3 006-015C03E38	0.60	3.00	1.50	38.00	3	30.0	5.0	C	0.00-0.01	●	●
MRC-A3 008-02C03E38	0.80	3.00	2.00	38.00	3	30.0	5.0	C	0.00-0.01	●	●
MRC-A3 01-02C03E38	1.00	3.00	2.00	38.00	3	30.0	5.0	C	0.00-0.01	●	●
MRC-A3 012-02C03E38	1.20	3.00	2.00	38.00	3	30.0	5.0	C	0.00-0.01	●	●
MRC-A3 015-02C03E38	1.50	3.00	2.00	38.00	3	30.0	5.0	C	0.00-0.02	●	●
MRC-A3 018-02C03E38	1.80	3.00	2.00	38.00	3	30.0	5.0	C	0.01-0.03	●	●
MRC-E3 02-04C06E35	2.00	6.00	4.00	35.00	3	38.0	5.0	C	0.01-0.03	●	●
MRC-E3 025-05C06E36	2.50	6.00	5.00	36.00	3	38.0	5.0	C	0.01-0.03	●	●
MRC-E3 03-05C06E36	3.00	6.00	5.00	36.00	3	38.0	5.0	C	0.01-0.04	●	●
MRC-A3 035-06V06E37	3.50	6.00	6.00	37.00	3	30.0	5.0	W	0.01-0.04	●	●
MRC-E3 04-07C06E39	4.00	6.00	7.00	38.00	3	38.0	5.0	C	0.02-0.05	●	●
MRC-A3 045-08W06E38	4.50	6.00	8.00	38.00	3	30.0	5.0	W	0.02-0.05	●	●
MRC-A3 05-08W06E39	5.00	6.00	8.00	39.00	3	30.0	5.0	W	0.02-0.06	●	●
MRC-E3 05-08C06E39	5.00	6.00	8.00	39.00	3	30.0	5.0	C	0.02-0.06	●	●
MRC-A3 055-08W06E39	5.50	6.00	8.00	39.00	3	30.0	5.0	W	0.02-0.06	●	●
MRC-E3 06-08C06E39	6.00	6.00	8.00	39.00	3	38.0	5.0	C	0.03-0.07	●	●
MRC-A3 0675-10V08E42	6.75	8.00	10.00	42.00	3	30.0	5.0	W	0.03-0.07	●	●
MRC-A3 07-10V08E42	7.00	8.00	10.00	42.00	3	30.0	5.0	W	0.03-0.08	●	●
MRC-A3 0775-10W08E42	7.75	8.00	10.00	42.00	3	30.0	5.0	W	0.03-0.08	●	●
MRC-E3 08-11C08E43	8.00	8.00	11.00	43.00	3	38.0	5.0	C	0.03-0.09	●	●
MRC-A3 087-11W10E48	8.70	10.00	11.00	48.00	3	30.0	5.0	W	0.03-0.09	●	●
MRC-A3 09-11W10E48	9.00	10.00	11.00	48.00	3	30.0	5.0	W	0.03-0.09	●	●
MRC-A3 097-11W10E48	9.70	10.00	11.00	48.00	3	30.0	5.0	W	0.03-0.09	●	●
MRC-E3 10-13C10E50	10.00	10.00	13.00	50.00	3	38.0	5.0	C	0.03-0.10	●	●
MRC-E3 12-15C12E55	12.00	12.00	15.00	55.00	3	30.0	5.0	C	0.04-0.11	●	●
MRC-A3 16-18W16E62	16.00	16.00	18.00	62.00	3	30.0	5.0	W	0.05-0.13	●	●
MRC-A3 18-20W18E70	18.00	18.00	20.00	70.00	3	30.0	5.0	W	0.05-0.13	●	●
MRC-A3 20-22W20E75	20.00	20.00	22.00	75.00	3	30.0	5.0	W	0.05-0.13	●	●

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-A3/E3 (economical-medium)

Economical Type 3 Flute, 30° and 38° Helix, Center Cutting,
Medium Length Solid Carbide Endmills



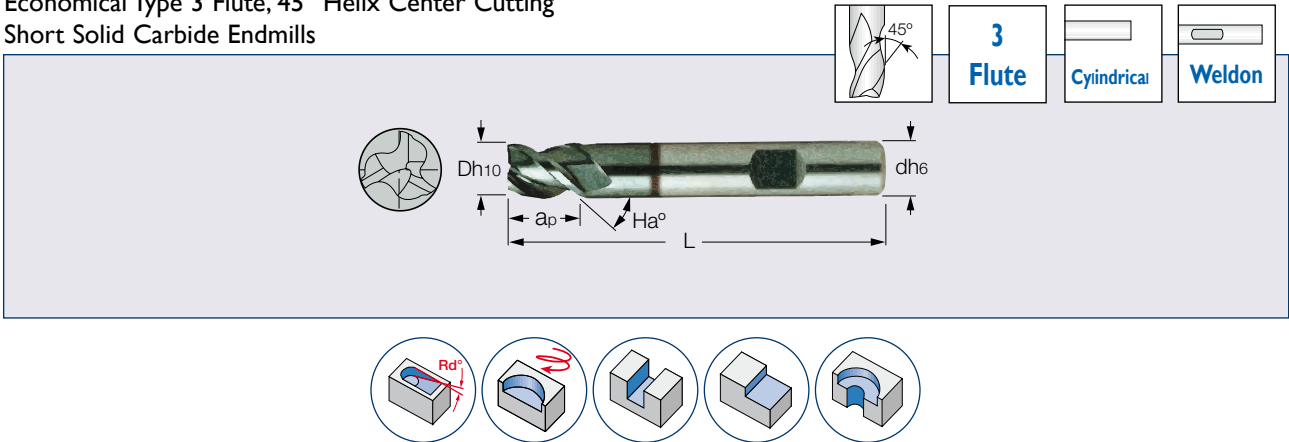
Designation									Recommended Machining Data	MC08	MC98
	D	d	a _p	L	Flute	H _a °	R _d °	Shank	f _z (mm/t)		
MRC-E3 02-08C02E32	2.00	2.00	8.00	32.00	3	38.0	5.0	C	0.01-0.03	●	●
MRC-E3 025-08C025E32	2.50	2.50	8.00	32.00	3	38.0	5.0	C	0.01-0.03	●	●
MRC-E3 03-12C03E38	3.00	3.00	12.00	38.00	3	38.0	5.0	C	0.01-0.04	●	●
MRC-A3 035-12C035E32	3.50	3.50	12.00	32.00	3	30.0	5.0	C	0.01-0.04	●	●
MRC-E3 04-12C04E50	4.00	4.00	12.00	50.00	3	38.0	5.0	C	0.02-0.05	●	●
MRC-A3 045-14C045E50	4.50	4.50	14.00	50.00	3	30.0	5.0	C	0.02-0.05	●	●
MRC-E3 05-14C05E50	5.00	5.00	14.00	50.00	3	38.0	5.0	C	0.02-0.06	●	●
MRC-A3 055-16C055E50	5.50	5.50	16.00	50.00	3	30.0	5.0	C	0.02-0.06	●	●
MRC-E3 06-16C06E50	6.00	6.00	16.00	50.00	3	38.0	5.0	C	0.03-0.07	●	●
MRC-E3 07-20C07E60	7.00	7.00	20.00	60.00	3	30.0	5.0	C	0.03-0.08	●	●
MRC-E3 08-20C08E63	8.00	8.00	20.00	63.00	3	38.0	5.0	C	0.03-0.09	●	●
MRC-A3 09-20C09E60	9.00	9.00	20.00	60.00	3	30.0	5.0	C	0.03-0.09	●	●
MRC-E3 10-22C10E72	10.00	10.00	22.00	72.00	3	38.0	5.0	C	0.03-0.10	●	●
MRC-E3 12-22C12E73	12.00	12.00	22.00	73.00	3	38.0	5.0	C	0.04-0.11	●	●
MRC-A3 14-25C14E75	14.00	14.00	25.00	75.00	3	30.0	5.0	C	0.04-0.12	●	●
MRC-A3 16-25C16E75	16.00	16.00	25.00	75.00	3	30.0	5.0	C	0.05-0.13	●	●
MRC-E3 20-32C20E104	20.00	20.00	32.00	104.00	3	38.0	5.0	C	0.05-0.13	●	●

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-B3 (economical-short)

Economical Type 3 Flute, 45° Helix Center Cutting
Short Solid Carbide Endmills



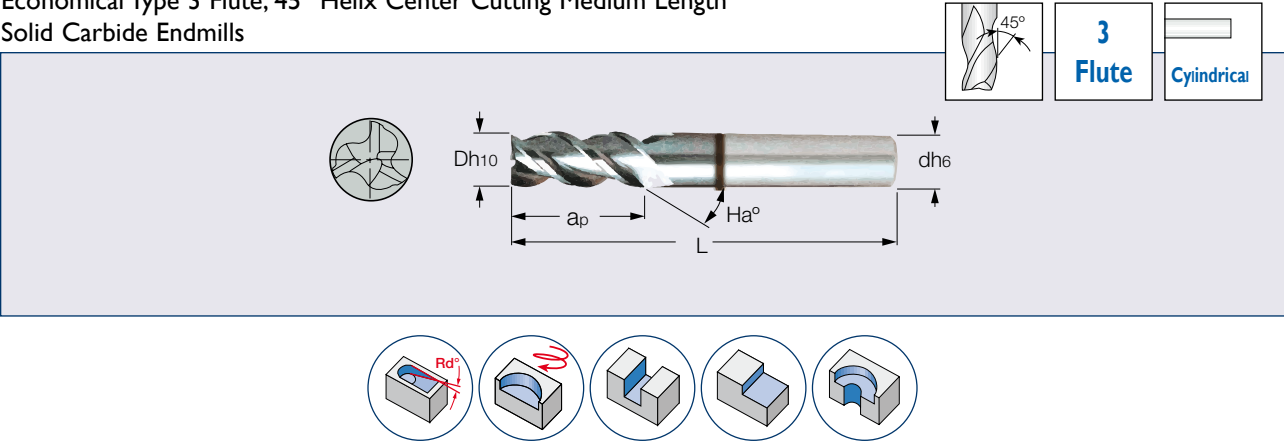
Designation									Recommended Machining Data	MC08	MC98
	D	d	a _p	L	Flute	H _a °	R _d °	Shank	f _z (mm/t)		
MRC-B3 015-03C03E38	1.50	3.00	3.00	38.00	3	45.0	5.0	C	0.00-0.02	●	●
MRC-B3 02-03W06E50	2.00	6.00	3.00	50.00	3	45.0	5.0	W	0.01-0.03	●	●
MRC-B3 03-04W06E50	3.00	6.00	4.00	50.00	3	45.0	5.0	W	0.01-0.04	●	●
MRC-B3 035-04W06E50	3.50	6.00	4.00	50.00	3	45.0	5.0	W	0.01-0.04	●	●
MRC-B3 04-05W06E54	4.00	6.00	5.00	54.00	3	45.0	5.0	W	0.02-0.05	●	●
MRC-B3 045-05W06E54	4.50	6.00	5.00	54.00	3	45.0	5.0	W	0.02-0.05	●	●
MRC-B3 05-06C06E57	5.00	6.00	6.00	54.00	3	45.0	5.0	C	0.02-0.06	●	●
MRC-B3 06-07W06E54	6.00	6.00	7.00	54.00	3	45.0	5.0	W	0.03-0.07	●	●
MRC-B3 07-08W08E58	7.00	8.00	8.00	58.00	3	45.0	5.0	W	0.03-0.08	●	●
MRC-B3 08-09W08E58	8.00	8.00	9.00	58.00	3	45.0	5.0	W	0.03-0.09	●	●
MRC-B3 09-10W10E66	9.00	10.00	10.00	66.00	3	45.0	5.0	W	0.03-0.09	●	●
MRC-B3 10-11W10E66	10.00	10.00	11.00	66.00	3	45.0	5.0	W	0.03-0.10	●	●
MRC-B3 12-12W12E73	12.00	12.00	12.00	73.00	3	45.0	5.0	W	0.04-0.11	●	●
MRC-B3 14-14W14E75	14.00	14.00	14.00	75.00	3	45.0	5.0	W	0.04-0.12	●	●
MRC-B3 16-16W16E82	16.00	16.00	16.00	82.00	3	45.0	5.0	W	0.05-0.13	●	●
MRC-B3 18-18W18E84	18.00	18.00	18.00	84.00	3	45.0	5.0	W	0.05-0.13	●	●
MRC-B3 20-20W20E92	20.00	20.00	20.00	92.00	3	45.0	5.0	W	0.05-0.13	●	●

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-B3 (economical-medium)

Economical Type 3 Flute, 45° Helix Center Cutting Medium Length
Solid Carbide Endmills



Designation									Recommended Machining Data
	D	d	ap	L	Flute	Ha°	Rd°	Shank	fz (mm/t)
MRC-B3 03-08C06E50	3.00	6.00	8.00	50.00	3	45.0	5.0	C	0.01-0.04
MRC-B3 04-11C06E50	4.00	6.00	11.00	50.00	3	45.0	5.0	C	0.02-0.05
MRC-B3 05-13C06E50	5.00	6.00	13.00	50.00	3	45.0	5.0	C	0.02-0.06
MRC-B3 06-13C06E50	6.00	6.00	13.00	50.00	3	45.0	5.0	C	0.03-0.07
MRC-B3 08-19C08E63	8.00	8.00	19.00	63.00	3	45.0	5.0	C	0.03-0.09
MRC-B3 10-22C10E72	10.00	10.00	22.00	72.00	3	45.0	5.0	C	0.03-0.10
MRC-B3 12-26C12E73	12.00	12.00	26.00	73.00	3	45.0	5.0	C	0.04-0.11
MRC-B3 14-26C14E75	14.00	14.00	26.00	75.00	3	45.0	5.0	C	0.04-0.12
MRC-B3 16-25C16E75	16.00	16.00	25.00	75.00	3	45.0	5.0	C	0.05-0.13
MRC-B3 20-32C20E100	20.00	20.00	32.00	100.00	3	45.0	5.0	C	0.05-0.13

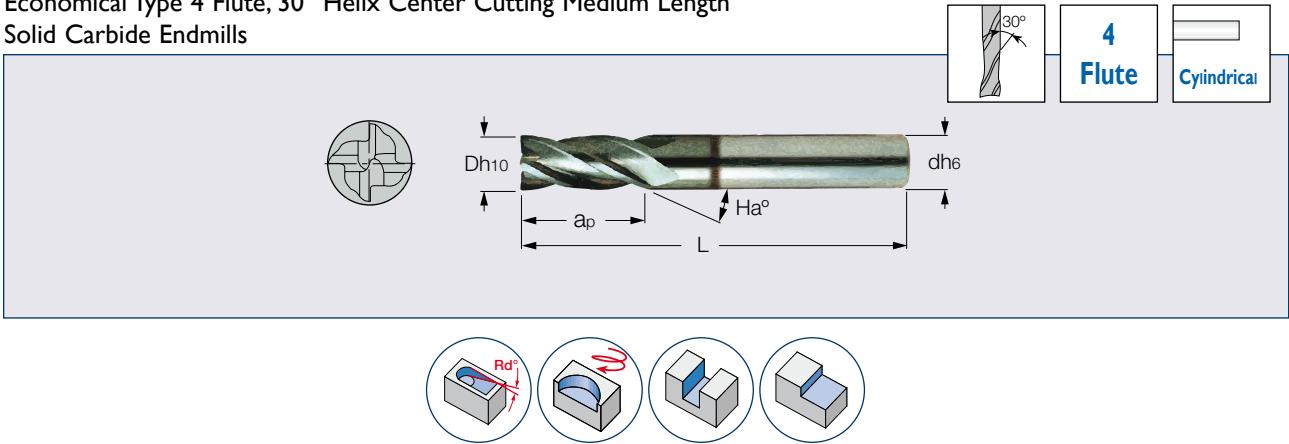
Available grade: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-A4 (economical-medium)

Economical Type 4 Flute, 30° Helix Center Cutting Medium Length
Solid Carbide Endmills



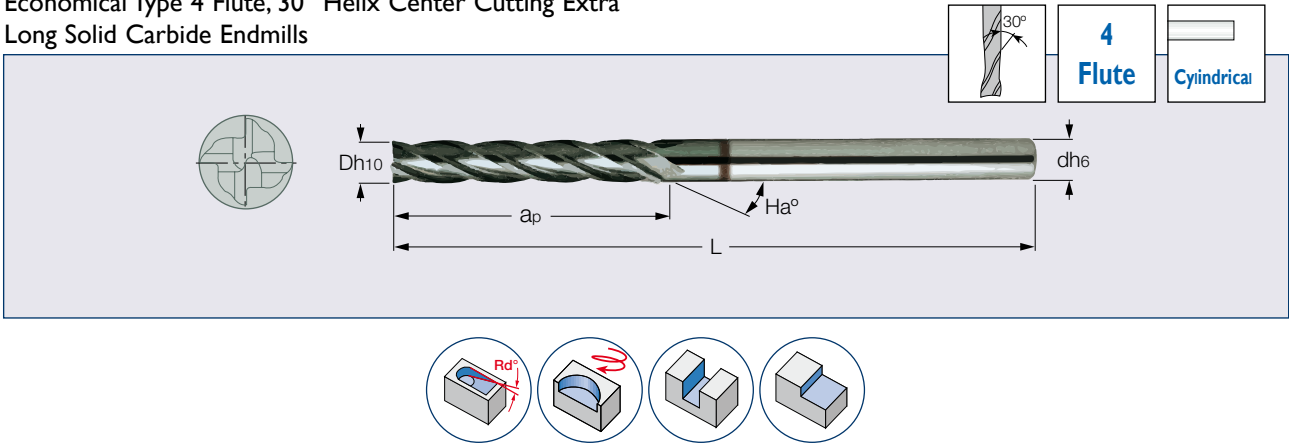
Designation									Recommended Machining Data	MC08	MC98
	D	d	a _p	L	Flute	H _a °	R _d °	Shank	f _z (mm/t)		
MRC-A4 02-08C02E32	2.00	2.00	8.00	32.00	4	30.0	5.0	C	0.01-0.03	●	●
MRC-A4 025-08C025E32	2.50	2.50	8.00	32.00	4	30.0	5.0	C	0.01-0.03	●	●
MRC-A4 03-12C03E38	3.00	3.00	12.00	38.00	4	30.0	5.0	C	0.01-0.04	●	●
MRC-A4 035-12C035E32	3.50	3.50	12.00	32.00	4	30.0	5.0	C	0.01-0.04	●	●
MRC-A4 04-12C04E50	4.00	4.00	12.00	50.00	4	30.0	5.0	C	0.02-0.05	●	●
MRC-A4 045-14C045E50	4.50	4.50	14.00	50.00	4	30.0	5.0	C	0.02-0.05	●	●
MRC-A4 05-14C05E50	5.00	5.00	14.00	50.00	4	30.0	5.0	C	0.02-0.06	●	●
MRC-A4 055-16C055E50	5.50	5.50	16.00	50.00	4	30.0	5.0	C	0.02-0.06	●	●
MRC-A4 06-16C06E50	6.00	6.00	16.00	50.00	4	30.0	5.0	C	0.03-0.07	●	●
MRC-A4 07-20C07E60	7.00	7.00	20.00	60.00	4	30.0	5.0	C	0.03-0.08	●	●
MRC-A4 08-20C08E63	8.00	8.00	20.00	63.00	4	30.0	5.0	C	0.03-0.09	●	●
MRC-A4 09-20C09E60	9.00	9.00	20.00	60.00	4	30.0	5.0	C	0.03-0.09	●	●
MRC-A4 10-22C10E72	10.00	10.00	22.00	72.00	4	30.0	5.0	C	0.03-0.10	●	●
MRC-A4 12-22C12E73	12.00	12.00	22.00	73.00	4	30.0	5.0	C	0.04-0.11	●	●
MRC-A4 14-25C14E83	14.00	14.00	25.00	83.00	4	30.0	5.0	C	0.04-0.12	●	●
MRC-A4 16-25C16E82	16.00	16.00	25.00	82.00	4	30.0	5.0	C	0.05-0.13	●	●
MRC-A4 20-32C20E104	20.00	20.00	32.00	104.00	4	30.0	5.0	C	0.05-0.13	●	●

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRC-A4 (economical-extra long)

Economical Type 4 Flute, 30° Helix Center Cutting Extra Long Solid Carbide Endmills



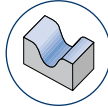
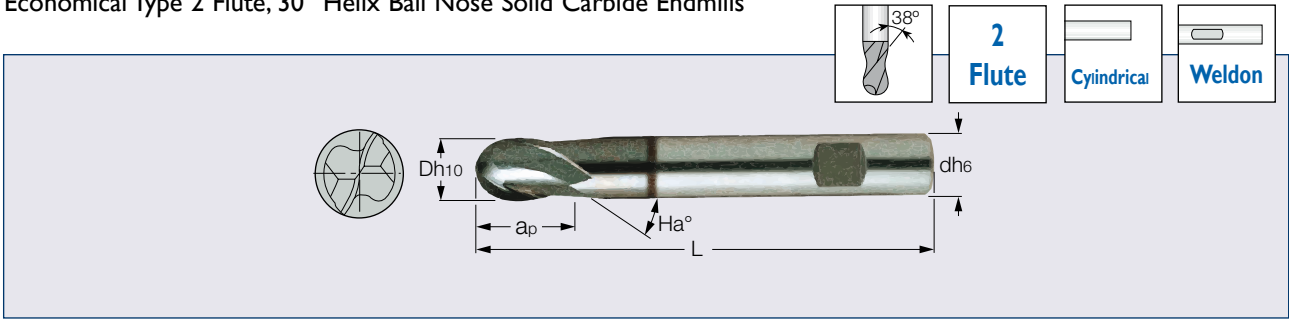
Designation									Recommended Machining Data	MC08	MC98
	D	d	ap	L	Flute	Ha°	Rd°	Shank	fz (mm/t)		
MRC-A4 03-30C03E75	3.00	3.00	30.00	75.00	4	30.0	5.0	C	0.01-0.04	●	●
MRC-A4 04-30C04E75	4.00	4.00	30.00	75.00	4	30.0	5.0	C	0.02-0.05	●	●
MRC-A4 05-40C05E100	5.00	5.00	40.00	100.00	4	30.0	5.0	C	0.02-0.06	●	●
MRC-A4 06-50C06E150	6.00	6.00	50.00	150.00	4	30.0	5.0	C	0.03-0.07	●	●
MRC-A4 08-50C08E150	8.00	8.00	50.00	150.00	4	30.0	5.0	C	0.03-0.09	●	●
MRC-A4 10-60C10E150	10.00	10.00	60.00	150.00	4	30.0	5.0	C	0.03-0.10	●	●
MRC-A4 12-75C12E150	12.00	12.00	75.00	150.00	4	30.0	5.0	C	0.04-0.11	●	●
MRC-A4 14-65C14E150	14.00	14.00	65.00	150.00	4	30.0	5.0	C	0.04-0.12	●	●
MRC-A4 16-65C16E150	16.00	16.00	65.00	150.00	4	30.0	5.0	C	0.05-0.13	●	●
MRC-A4 18-65C18E150	18.00	18.00	65.00	150.00	4	30.0	5.0	C	0.05-0.13	●	●
MRC-A4 20-65C20E150	20.00	20.00	65.00	150.00	4	30.0	5.0	C	0.05-0.13	●	●

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRB-A2 (economical)

Economical Type 2 Flute, 30° Helix Ball Nose Solid Carbide Endmills



Designation	D	d	ap	L	Flute	Ha°	Shank
MRB-A2 02-06C03E38	2.00	3.00	6.00	38.00	2	30.0	C
MRB-A2 02-04C06E48	2.00	6.00	4.00	48.00	2	30.0	C
MRB-A2 025-04C06E48	2.50	6.00	4.00	48.00	2	30.0	C
MRB-A2 03-04C06E48	3.00	6.00	4.00	48.00	2	30.0	C
MRB-A2 03-07W06E57	3.00	6.00	7.00	57.00	2	30.0	W
MRB-A2 04-06C06E50	4.00	6.00	6.00	50.00	2	30.0	C
MRB-A2 04-08W06E57	4.00	6.00	8.00	57.00	2	30.0	W
MRB-A2 05-07C06E51	5.00	6.00	7.00	51.00	2	30.0	C
MRB-A2 05-10W06E57	5.00	6.00	10.00	57.00	2	30.0	W
MRB-A2 06-07C06E51	6.00	6.00	7.00	51.00	2	30.0	C
MRB-A2 06-10W06E57	6.00	6.00	10.00	57.00	2	30.0	W
MRB-A2 08-09C08E59	8.00	8.00	9.00	59.00	2	30.0	C
MRB-A2 08-16W08E63	8.00	8.00	16.00	63.00	2	30.0	W
MRB-A2 10-10C10E60	10.00	10.00	10.00	60.00	2	30.0	C
MRB-A2 10-19W10E72	10.00	10.00	19.00	72.00	2	30.0	W
MRB-A2 12-14C12E71	12.00	12.00	14.00	71.00	2	30.0	C
MRB-A2 12-22W12E83	12.00	12.00	22.00	83.00	2	30.0	W
MRB-A2 14-14C14E71	14.00	14.00	14.00	71.00	2	30.0	C
MRB-A2 16-16C16E76	16.00	16.00	16.00	76.00	2	30.0	C
MRB-A2 16-26W16E92	16.00	16.00	26.00	92.00	2	30.0	W
MRB-A2 18-18C18E76	18.00	18.00	18.00	76.00	2	30.0	C
MRB-A2 18-26W18E92	18.00	18.00	26.00	92.00	2	30.0	W
MRB-A2 20-20C20E82	20.00	20.00	20.00	82.00	2	30.0	C
MRB-A2 20-32W20E104	20.00	20.00	32.00	104.00	2	30.0	W

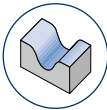
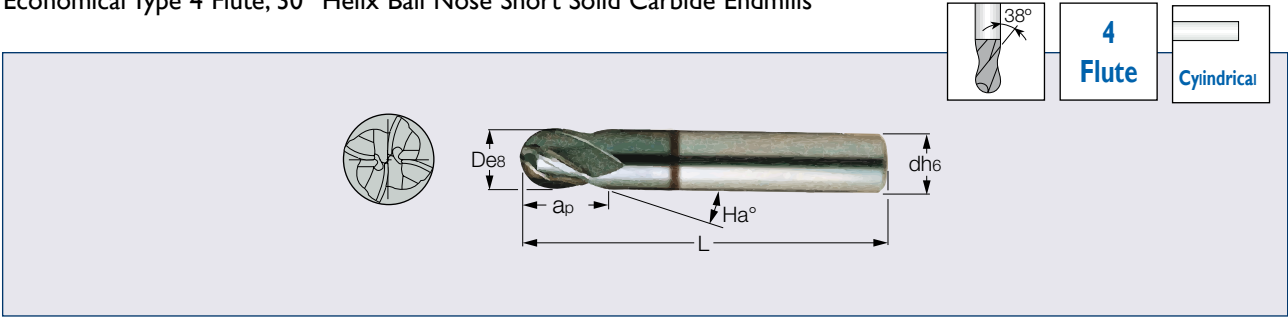
Available grade: MC98

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRB-A4 (economical-short)

Economical Type 4 Flute, 30° Helix Ball Nose Short Solid Carbide Endmills



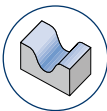
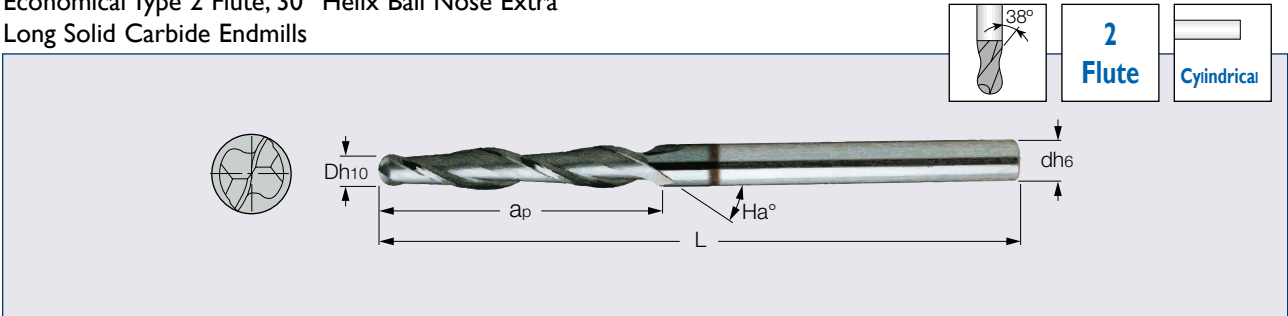
Designation	D	d	ap	L	Flute	Ha°	Shank
MRB-A4 02-04C06E48	2.00	6.00	4.00	48.00	4	30.0	C
MRB-A4 03-04C06E48	3.00	6.00	4.00	48.00	4	30.0	C
MRB-A4 04-06C06E50	4.00	6.00	6.00	50.00	4	30.0	C
MRB-A4 05-07C06E51	5.00	6.00	7.00	51.00	4	30.0	C
MRB-A4 06-07C06E51	6.00	6.00	7.00	51.00	4	30.0	C
MRB-A4 08-09C08E59	8.00	8.00	9.00	59.00	4	30.0	C
MRB-A4 10-10C10E60	10.00	10.00	10.00	60.00	4	30.0	C
MRB-A4 12-14C12E71	12.00	12.00	14.00	71.00	4	30.0	C
MRB-A4 14-14C14E71	14.00	14.00	14.00	71.00	4	30.0	C
MRB-A4 16-16C16E76	16.00	16.00	16.00	76.00	4	30.0	C
MRB-A4 18-18C18E76	18.00	18.00	18.00	76.00	4	30.0	C
MRB-A4 20-20C20E82	20.00	20.00	20.00	82.00	4	30.0	C

Available grade: MC98

For user guide, see pages 106-114

MRB-A2 (economical-extra long)

Economical Type 2 Flute, 30° Helix Ball Nose Extra Long Solid Carbide Endmills



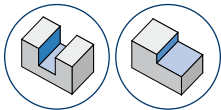
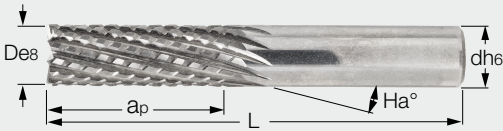
Designation	D	d	ap	L	Flute	Ha°	Shank	Tough ↔ Hard	
								MC08	MC98
MRB-A2 03-30C03E75	3.00	3.00	30.00	75.00	2	30.0	C	●	●
MRB-A2 04-30C04E75	4.00	4.00	30.00	75.00	2	30.0	C	●	●
MRB-A2 05-40C05E100	5.00	5.00	40.00	100.00	2	30.0	C	●	●
MRB-A2 06-50C06E150	6.00	6.00	50.00	150.00	2	30.0	C	●	●
MRB-A2 08-50C08E150	8.00	8.00	50.00	150.00	2	30.0	C	●	●
MRB-A2 10-60C10E150	10.00	10.00	60.00	150.00	2	30.0	C	●	●
MRB-A2 12-75C12E150	12.00	12.00	75.00	150.00	2	30.0	C	●	●
MRB-A2 14-75C14E150	14.00	14.00	75.00	150.00	2	30.0	C	●	●
MRB-A2 16-75C16E150	16.00	16.00	75.00	150.00	2	30.0	C	●	●
MRB-A2 18-75C18E150	18.00	18.00	75.00	150.00	2	30.0	C	●	●
MRB-A2 20-75C20E150	20.00	20.00	75.00	150.00	2	30.0	C	●	●

For user guide, see pages 106-114

SOLID CARBIDE ENDMILLS

MRN-F

Solid Endmills with a Special-Edge Configuration for Machining Honeycomb and Other CFRP Composite Parts

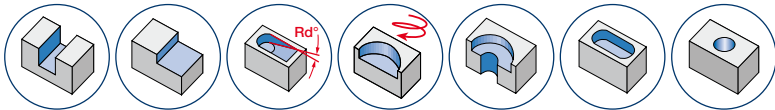
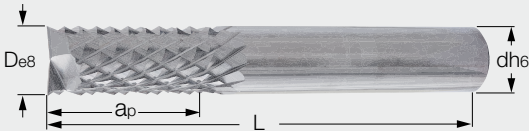


Designation	D	d	ap	L	Flute	Ha°	Recommended Machining Data fz (mm/t)
MRN-F10 03-12C03F55	3.00	3.00	12.00	55.00	10	15.0	0.01-0.02
MRN-F10 04-16C04F55	4.00	4.00	16.00	55.00	10	15.0	0.01-0.02
MRN-F10 06-19C06F57	6.00	6.00	19.00	57.00	10	15.0	0.02-0.05
MRN-F12 08-25C08F63	8.00	8.00	25.00	63.00	12	15.0	0.02-0.08
MRN-F12 10-25C10F72	10.00	10.00	25.00	72.00	12	15.0	0.00-0.02
MRN-F12 12-25C12F83	12.00	12.00	25.00	83.00	12	15.0	0.00-0.02

Available grade: MC02 *Diamond coating available up to 6 weeks on request

MRNC

Solid Endmills for Drilling and Contouring on CFRP Materials at High Stock Removal Rates. Enables application of High Feed and Speed Due to Excellent Chip and Heat Dispersal



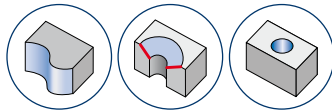
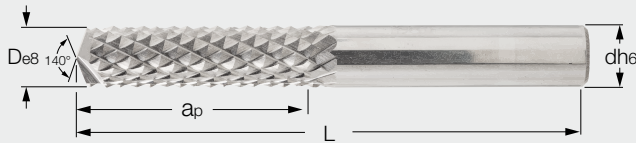
Designation	D	d	ap	L	Flute	Recommended Machining Data fz (mm/t)
MRNC-C10 08-25C08F63	8.00	8.00	25.00	63.00	10	0.02-0.08
MRNC-C10 10-25C10F72	10.00	10.00	25.00	72.00	10	0.02-0.08
MRNC-C10 12-25C12F83	12.00	12.00	25.00	83.00	10	0.02-0.08

Available grade: MC02 *Diamond coating available up to 6 weeks on request

SOLID CARBIDE ENDMILLS

MRND

Solid Endmills for Drilling and Contouring on CFRP Materials at High Stock Removal Rates.
Enables application of High Feed and Speed Due to Excellent Chip and Heat Dispersal

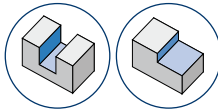
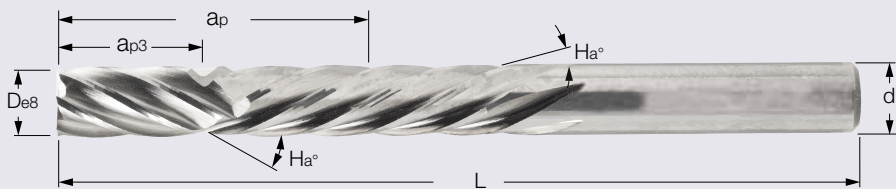


Designation	D	d	ap	L	Flute	Recommended Machining Data fz (mm/t)
MRND-C6 016-5C03F55	1.60	3.00	5.00	55.00	6	0.01-0.01
MRND-C6 024-10C03F55	2.40	3.00	10.00	55.00	6	0.01-0.01
MRND-C8 03-12C03F55	3.00	3.00	12.00	55.00	8	0.01-0.02
MRND-C8 04-16C04F60	4.00	4.00	16.00	60.00	8	0.01-0.02
MRND-C10 06-19C06F65	6.00	6.00	19.00	65.00	10	0.02-0.08
MRND-C10 08-25C08F63	8.00	8.00	25.00	63.00	10	0.02-0.08
MRND-C10 10-25C10F72	10.00	10.00	25.00	72.00	10	0.02-0.08
MRND-C10 12-25C12F83	12.00	12.00	25.00	83.00	10	0.02-0.08

Available grade: MC02 *Diamond coating available up to 6 weeks on request

MRX

Solid Endmills with Right- and Left-Hand Helix Flutes, Changing Direction at Mid-Cutting Height, for Machining CFRP Parts



Important: for best results the intersection of flute directions (ap3) should be positioned in the middle of the workpiece height

Designation	D	d	ap	ap3	L	Flute	Ha°	Recommended Machining Data fz (mm/t)
MRX-F6 06-12C06F57	6.00	6.00	12.00	5.30	57.00	6	30.0	0.02-0.06
MRX-F6 08-16C08F63	8.00	8.00	16.00	6.60	63.00	6	30.0	0.02-0.06
MRX-F6 10-20C10F72	10.00	10.00	20.00	8.70	72.00	6	30.0	0.02-0.06
MRX-F8 12-24C12F83	12.00	12.00	24.00	10.60	83.00	8	30.0	0.02-0.06

Available grade: MC02 (Uncoated)

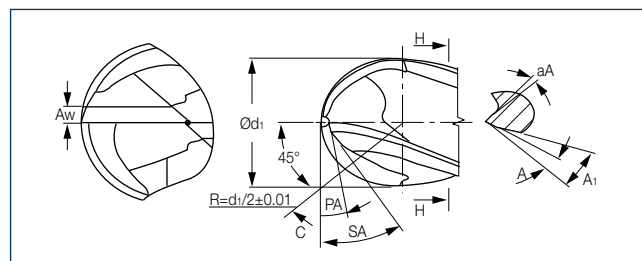
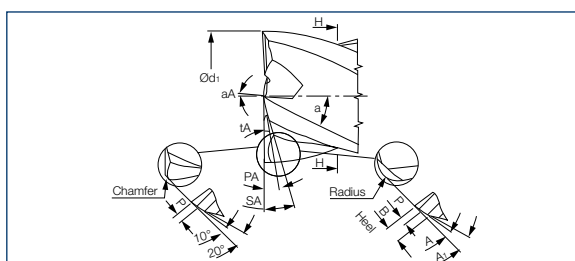
Machining Data for Solid Carbide Endmills

ISO	Material		Condition	Tensie Strength [N/mm ²]	Hardness HB	Material ⁽¹⁾ No.
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1
		>= 0.25 %C	Annealed	650	190	2
		< 0.55 %C	Quenched and tempered	850	250	3
		>= 0.55 %C	Annealed	750	220	4
		>= 0.55 %C	Quenched and tempered	1000	300	5
	Low alloy steel and cast steel (less than 5% all elements)		Annealed	600	200	6
			Quenched and tempered	930	275	7
				1000	300	8
				1200	350	9
	High alloy steel, cast steel and tool steel		Annealed	680	200	10
			Quenched and tempered	1100	325	11
M	Stainless steel and cast steel	Ferritic/martensitic	680	200	12	
		Martensitic	820	240	13	
		Austenitic	600	180	14	
K	Grey cast iron	Pearitic/ferritic		180	15	
		Pearitic/martensitic		260	16	
	Ductile cast iron (nodular)	Ferritic		160	17	
		Pearitic		250	18	
	Malleable cast iron	Ferritic		130	19	
		Pearitic		230	20	
N	Aluminum-wrought alloy	Not cureable		60	21	
		Cured		100	22	
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23
			Cured		90	24
		>12% Si	High temperature		130	25
	Copper alloys	>1% Pb	Free cutting		110	26
			Brass		90	27
			Electroitic copper		100	28
	Non-metallic		Duoplastics, fiber pastics			29
			Hard rubber			30
	S	High temp. alloys	Fe based	Anneaied		200
Cured					280	32
Ni or Co based			Anneaied		250	33
			Cured		350	34
			Cast		320	35
Titanium and Ti alloys			RM 400		36	
		Alpha+beta alloys cured	RM 1050		37	
H	Hardened steel	Hardened		55 HRc	38	
		Hardened		60 HRc	39	
	Chilled cast iron	Cast		400	40	
	Cast iron	Hardened		55 HRc	41	

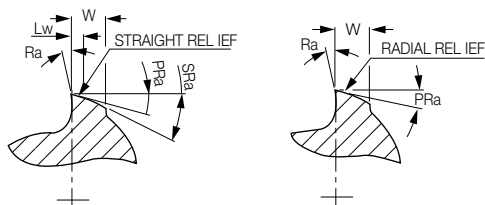
Solid Carbide Endmills Vc - mm/min				
No.	MC98	MC92/93/62/72	MC38	MC08
1	260 - 280	260 - 280	210 - 220	
2	200 - 230	200 - 230	160 - 180	
3	160 - 220	160 - 220	130 - 180	
4	160 - 220	160 - 220	130 - 180	
5	140 - 180	140 - 180	110 - 140	
6	160 - 220	160 - 220	130 - 180	
7	120 - 180	120 - 180	100 - 140	
8	130 - 180	130 - 180	100 - 140	
9	140 - 180	140 - 180	110 - 140	
10	130 - 180	130 - 180	100 - 140	
11	70 - 120	70 - 120	60 - 100	
12	80 - 160	80 - 160	60 - 130	
13	60 - 150	60 - 150	50 - 120	
14	60 - 120	60 - 120	50 - 100	
15	80 - 260	80 - 250	60 - 210	
16	130 - 240	130 - 240	100 - 190	
17	150 - 280	150 - 270	120 - 220	
18	90 - 280	90 - 270	70 - 220	
19	150 - 280	150 - 270	120 - 220	
20	140 - 240	140 - 240	110 - 190	
21				800 - 900
22				700 - 800
23				800 - 900
24				750 - 850
25				400 - 450
26				500 - 550
27				500 - 550
28				350 - 380
29				
30				
31	20 - 40	20 - 40	20 - 30	
32	20 - 40	20 - 30	20 - 20	
33	20 - 50	20 - 30	20 - 20	
34	20 - 70	20 - 30	20 - 20	
35	30 - 70	30 - 80	20 - 60	
36	30 - 70	30 - 80	20 - 60	
37	30 - 70	30 - 80	20 - 60	
38	30 - 50	30 - 60	20 - 40	
39	30 - 40	30 - 40	20 - 30	
40	60 - 80	70 - 90	50 - 60	
41	30 - 50	30 - 60	20 - 40	

Regrinding Instructions for Solid Carbide Endmills

	d1 [μ m]	d1 [μ in]	**a	*Ra	*Pra/Rra	*SRa	**ta	*aA	*PA
Square End *									
2 Flute * General Use	< 7	< .3	30	10	10	-	2	7	8
	> 7	> .3	30	8	10	-	2	7	8
3 Flute * General Use	< 7	< .3	38-45	9	10	-	2	5	7
	> 7	> .3	38-45	7	10	-	2	5	7
4 Flute * General Use	< 7	< .3	30-45	7	10	-	1.5	5	7
	> 7	> .3	30-45	7	10	-	1.5	5	7
6 Flute MRCH... * General Use	< 7	< .3	45	8	10	-	1.5	6	7
	> 7	> .3	45	7	9	-	1.5	5	7
6 Flute MRC-D6 Hard Material*	-	-	50	-12	10	-	1	-2	7
Ball End									
2 Flute * General Use	< 7	< .3	30	7	11	24	-	3	13
	> 7	> .3	30	7	11	24	-	3	13
3 Flute * General Use	< 7	< .3	30	7	11	24	-	3	11
	> 7	> .3	30	7	11	24	-	3	11
4 Flute General Use	< 7	< .3	30	7	11	24	-	3	13
	> 7	> .3	30	7	11	24	-	3	13
Square End + Radius *									
3 Flute * General Use	< 7	< .3	38-45	9	12	25	3	6	12
	> 7	> .3	38-45	7	12	24	3	5	12
4 Flute * General Use	< 7	< .3	30-45	8	12	26	3	5	12
	> 7	> .3	30-45	7	12	24	4	5	12
6 Flute * General Use	< 7	< .3	45	8	12	22	4	5	12
	> 7	> .3	45	7	11	22	4	5	11
10 Flute * (MM) General Use	-	-	30	7	10	16	4	3	10
Roughers *									
MRF-A/E-3,4,6 * General Use *	< 7	< .3	30-38	9	8	-	2.5	6	7
	> 7	> .3	30-38	8	8	-	2.5	6	7
MRBRF-T * General Use	< 7	< .3	20	6	8	-	-	3	12
	> 7	> .3	20	6	8	-	-	3	12
MRR-B-M/MRR-B-M...R * Stainless Steel/General Use	< 7	< .3	45	9	7.5	-	3	5	7
	> 7	> .3	45	8	8	-	3	5	7
MRR-T-M * PH /General Use	< 7	< .3	20	9	7.5	-	2	5	7
	> 7	> .3	20	8	7.5	-	2	5	7
MRF-A/E-3,4,6 * Aluminum	< 7	< .3	38	16	10	-	2	10	10
	> 7	> .3	38	16	11	-	2	10	10
MRR-B3-R 3 Flute Aluminum*	-	-	45	16	11	-	4	10	10
Aluminum *									
MRCA-B-2 * 2 Flute Aluminum	< 7	< .3	45-55	16	11	25	5	10	11
	> 7	> .3	45-55	16	11	25	5	10	11
MRCA-B-3 * 3 Flute Aluminum	< 7	< .3	45	16	10	-	4	10	10
	> 7	> .3	45	16	10	-	4	10	10
Chip Splitters									
MRCP-E3/4 * Stainless Steel/Gen Use	< 7	< .3	38	8	8	-	3	6	7
	> 7	> .3	38	8	8	-	3	6	7
Finishing Endmills									
MRFS-B44 * General Use ***	< 7	< .3	45	3	7.5	-	1.5	2	7
	> 7	> .3	45	3	7.5	-	1.5	2	7
VIBRATION FREE									
MRC-E4L-VF * General Use	< 7	< .3	38	4	3	9****	3	2	7
	> 7	> .3	38	4	3	8****	3	2	7
VIBRATION FREE									
MRC-H4M-VFR * General Use	< 7	< .3	38	7	8	-	3	2	7
	> 7	> .3	38	6	8	-	3	2	7



*S _A	W	*A	*A _I	L _w	A _w	P	B	Radius
17	0.18*dI	12.0	-	-	0.10*dI	-	-	-
17	0.175*dI	12.0	-	-	0.10*dI	-	-	-
17	0.175*dI	12.0	-	-	0.10*dI	-	-	-
17	0.16*dI	12.0	-	-	0.10*dI	-	-	-
16	0.17*dI	12.0	-	-	0.10*dI	-	-	-
16	0.16*dI	12.0	-	-	0.10*dI	-	-	-
17	0.14*dI	-	-	-	0.08*dI	-	-	-
17	0.13*dI	-	-	-	0.08*dI	-	-	-
-	0.19*dI	-	-	-	-	-	-	-
24	0.175*dI	12.0	24	0.06*dI	0.06*dI	0.06*dI	0.22*dI	-
24	0.165*dI	12.0	24	0.05*dI	0.05*dI	0.05*dI	0.17*dI	-
24	0.175*dI	11.0	24	0.06*dI	0.06*dI	0.08*dI	0.165*dI	-
24	0.165*dI	11.0	24	0.05*dI	0.05*dI	0.05*dI	0.170*dI	-
24	0.175*dI	12.0	24	0.06*dI	0.06*dI	0.06*dI	0.165*dI	-
24	0.165*dI	12.0	24	0.05*dI	0.05*dI	0.05*dI	0.170*dI	-
22	0.175*dI	12.0	23.5	0.06*dI	0.10*dI	0.08*dI	0.157*dI	-
22	0.165*dI	12.0	23	0.05*dI	0.10*dI	0.075*dI	0.148*dI	-
22	0.175*dI	12.0	24	0.06*dI	0.10*dI	0.08*dI	0.157*dI	-
22	0.165*dI	12.0	23	0.05*dI	0.10*dI	0.075*dI	0.148*dI	-
22	0.14*dI	12.0	22	0.06*dI	0.10*dI	0.08*dI	0.126*dI	-
22	0.13*dI	11.0	22	0.05*dI	0.10*dI	0.075*dI	0.117*dI	-
16	0.10*dI	10.0	16	0.04*dI	0.045*dI	0.04*dI	-	R
17	0.21*dI	-	-	-	0.10*dI	-	-	-
17	0.21*dI	-	-	-	0.08*dI	-	-	-
26	0.19*dI	12.0	26	0.06*dI	0.06*dI	0.06*dI	0.18*dI	-
25	0.22*dI	12.0	25	0.053*dI	0.053*dI	0.053*dI	0.25*dI	-
17	0.22*dI	13.0	-	-	0.10*dI	-	-	-
16	0.24/0.20/0.14*dI	12.0	-	-	0.08*dI	-	-	-
16	0.32*dI	12.0	-	-	0.09*dI	-	-	-
16	0.3*dI	11.0	-	-	0.09*dI	-	-	-
22	0.2*dI	-	-	-	0.10*dI	-	-	-
22	0.2*dI	-	-	-	0.09*dI	-	-	-
22	0.24*dI	10.0	-	-	0.10*dI	-	-	R0.2
24	0.17*dI	-	-	0.06*dI	0.10*dI	0.08*dI	0.153*dI	-
24	0.19*dI	-	-	0.05*dI	0.10*dI	0.075*dI	0.171*dI	-
22	0.26*dI	10.0	-	-	0.10*dI	-	-	R0.2
22	0.24*dI	10.0	-	-	0.10*dI	-	-	R0.2
17	0.27*dI	14.0	-	-	0.10*dI	-	-	-
17	0.27*dI	12.0	-	-	0.10*dI	-	-	-
16	0.27*dI	12.0	-	-	0.10*dI	-	-	-
16	0.27*dI	12.0	-	-	0.10*dI	-	-	-
17	0.17*dI/0.23*dI	13.0	-	0.008*dI/0.04*dI	0.075*dI	-	-	-
17	0.15*dI/0.23*dI	13.0	-	0.006*dI/0.04*dI	0.075*dI	-	-	-
16	0.17*dI/0.21*dI	12.0	-	-	0.085*dI	-	-	-
16	0.17*dI/0.21*dI	12.0	-	-	0.08*dI	-	-	-



Regrinding Instructions for Solid Carbide Endmills (continued)

Base Distance for Rake Angle Measurement



Tool Diameter		Base Distance	
mm	in	mm	in
0.5<d1≤0.7	.02<d1≤.03	0.03	.001181
0.7<d1≤0.8	.03<d1≤.032	0.04	.001574
0.8<d1≤1.0	.032<d1≤.04	0.05	.001968
1.0<d1≤1.2	.04<d1≤.05	0.065	.002559
1.2<d1≤1.4	.05<d1≤.055	0.075	.002952
1.4<d1≤1.6	.055<d1≤.063	0.085	.003346
1.6<d1≤2	.063<d1≤.08	0.1	.003937
2<d1≤4	.08<d1≤.158	0.2	.007874
4<d1≤6.35	.158<d1≤.25	0.3	.01181
6.35<d1≤8	.25<d1≤.315	0.4	.01574
8<d1≤13	.315<d1≤.512	0.5	.01968
13<d1≤21	.512<d1≤.827	0.6	.02362
21<d1≤27	.827<d1≤1.063	0.7	.02755
27<d1≤	1.063<d1	0.8	.03149



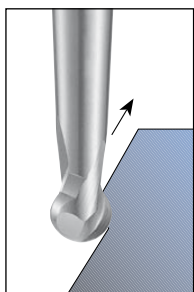
Ball Nose Type Endmills

- For die & mold making, turbine manufacturing and aircraft industry, etc.
- Useful for intricate-shaped surfaces
- Profiling of up to 70 HRC high hardened steels and alloy steels, nickel based alloys, titanium alloys
- Ultra-fine grain carbide which increases both toughness and hardness
- Suitable for dry and high speed cutting
- Special sphere-shaped tool geometry provides increased tool life and enables higher speed and feed operations

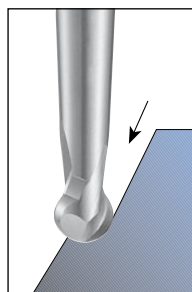
Milling Features

Operating angle 208-212°

- Excellent surface roughness and high milling process
- Enables milling with high speed and feed in back milling mode



Favorable Back Milling ✓

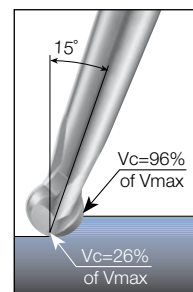


Unfavorable Steep Ramping

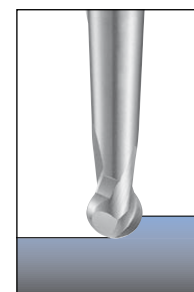
Operating Recommendations

It is recommended to machine with the tool inclined at a 15° angle. This technique eliminates cutting at nearly zero speed at the tool axis. Cutting is more efficient, and tool life substantially improves.

- Decreased cutting force
- Excellent surface roughness and brightness



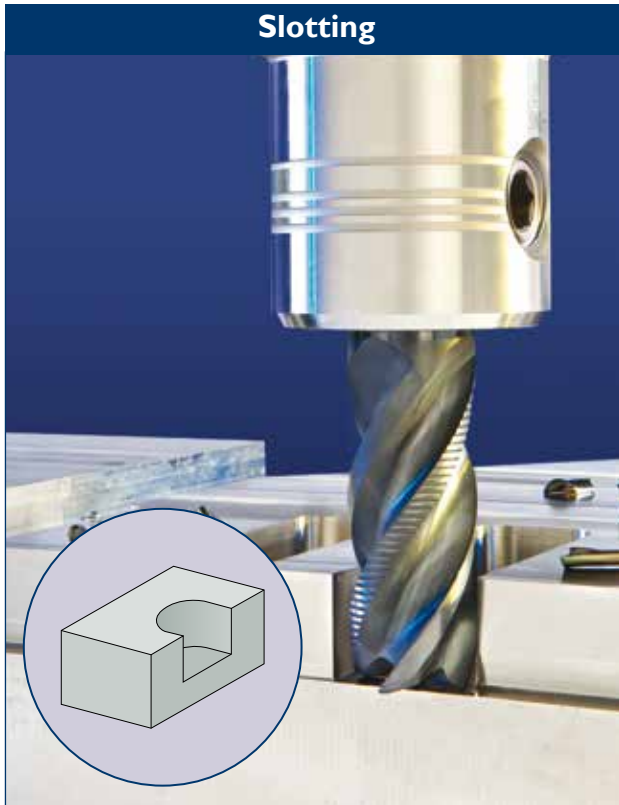
Favorable Profiling ✓



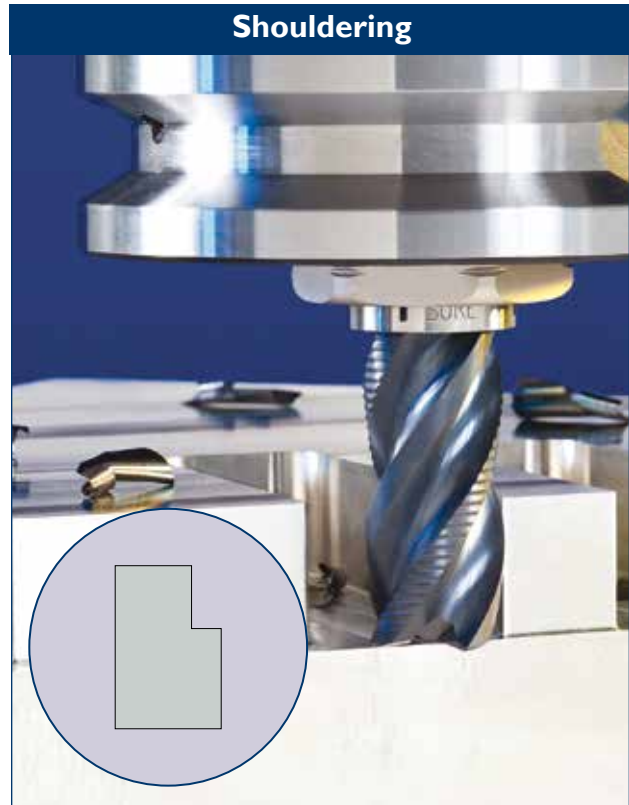
Unfavorable Profiling

Popular Endmill Applications

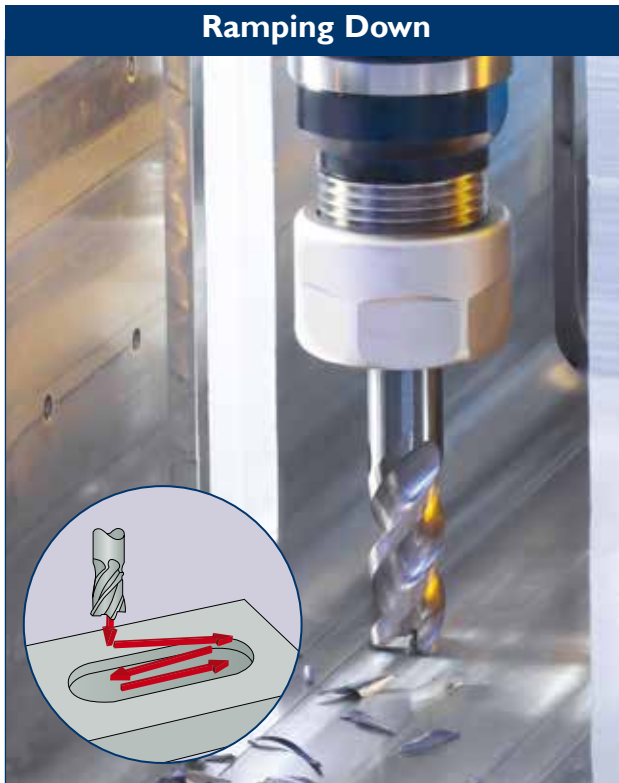
Slotting



Shouldering



Ramping Down



Helical Interpolation



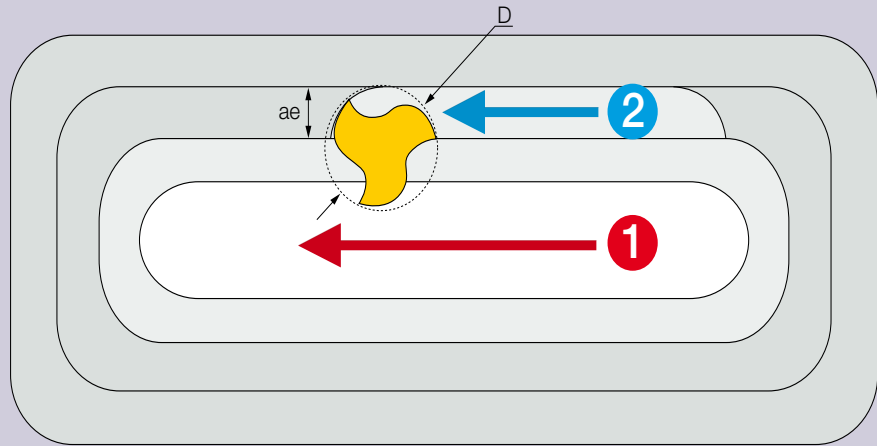
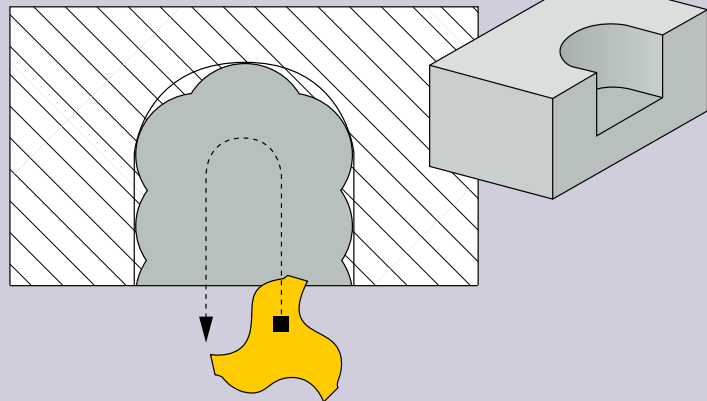
Pocket Milling

1 Recommended Method
Open the pocket in the middle

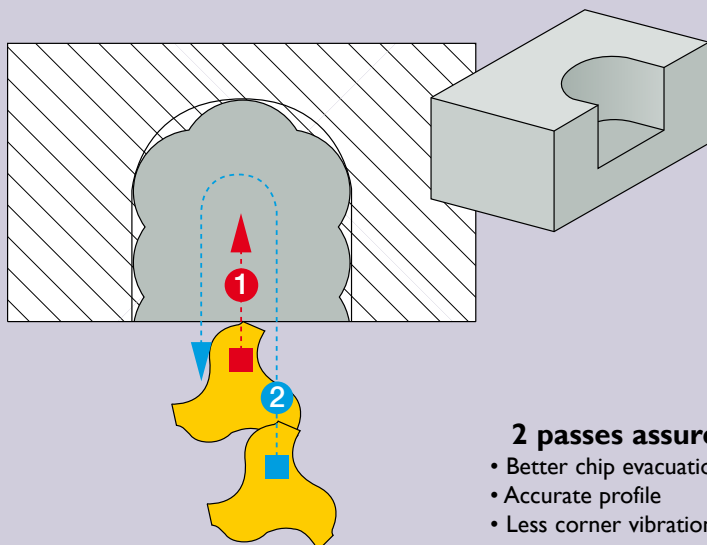
2 Proceed with shoulder milling
Width of cut $ae = 40-60\% \times D$

Features

- Better chip evacuation
- No mismatch in the corners
- Constant operation
- Less vibration
- Longer tool life


Roughing Side Pockets
Conventional Method


- Poor chip evacuation
- May cause chipping

Alternative Recommended Method

2 passes assure:

- Better chip evacuation
- Accurate profile
- Less corner vibration

Recommendations for Popular Applications

Recommended Rampdown Angle

A

$D \leq 10 \text{ mm}$
 $a = 5^{\circ} - 10^{\circ}$

B

$D > 10 \text{ mm}$
 $a = 3^{\circ} - 7^{\circ}$

Helical Milling

Recommended for
Faster and Better Chip Evacuation

$D_{min} = d + 1 \text{ mm}$
 $D_{max} = (d \times 2) - 1 \text{ mm}$

Influence of Tool Diameter on Chip Removal Rate

When using the same or similar cutting parameters, higher metal removal rates can be achieved with the smallest tool diameter, compared with a larger tool diameter.
Therefore, when selecting an endmill diameter, it is

recommended to choose the smallest tool diameter suitable for the required application.

Following are two machining examples demonstrating the above recommendation:

Roughing

44% Higher Table Feed

Designation		MRFS-B44 20-42C20-104	MRFS-B44 12-26C12-83
Diameter	D (mm)	20	12
Depth of cut	ap (mm)	12	12
Width of cut	ae (mm)	5	5
No. of teeth	z	6	4
Feed per tooth	fz (mm)	0.05	0.065
Cutting speed	Vc (m/min)	50	50
Table feed	Vf (mm/min)	239	345

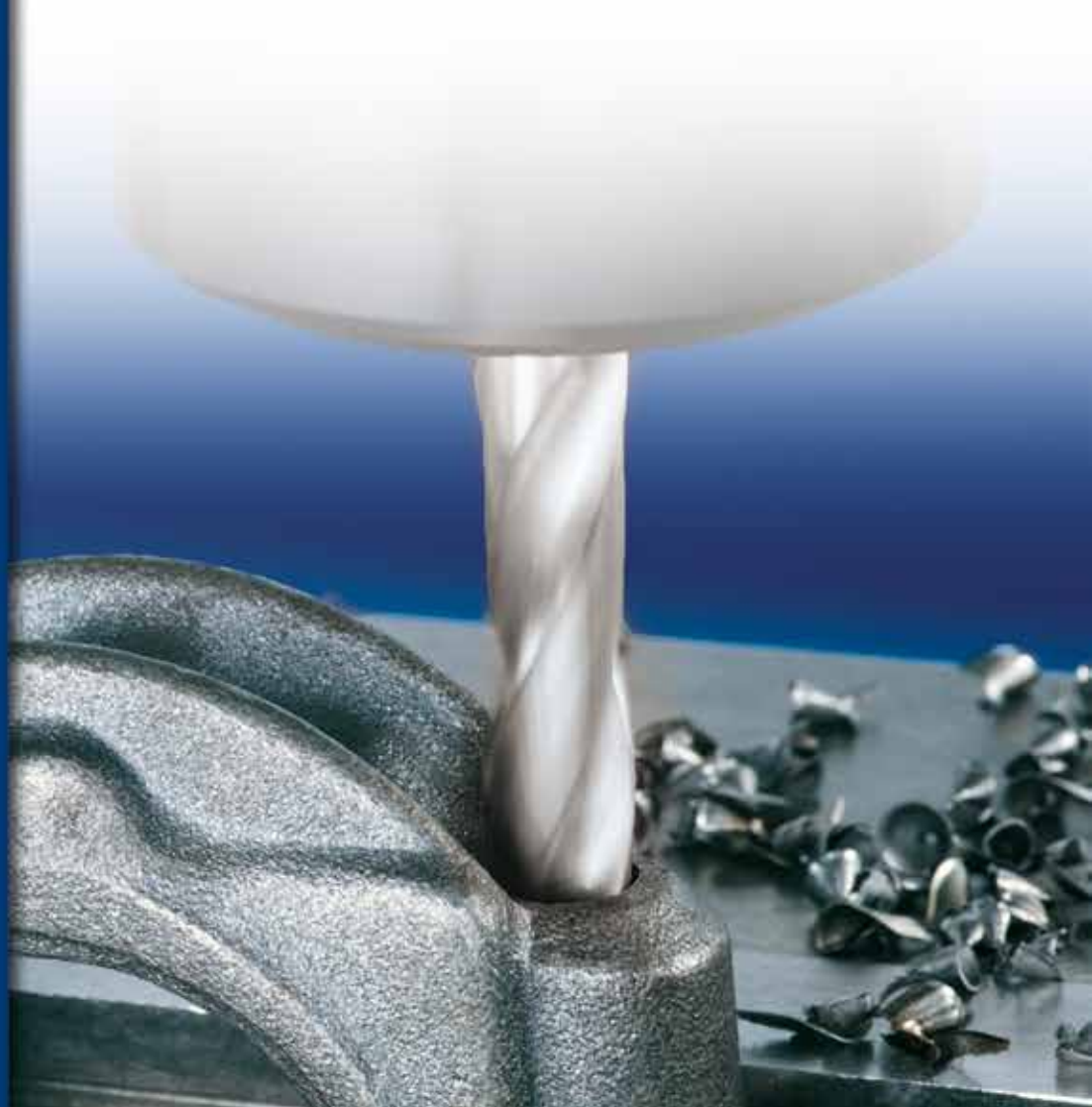
Finishing

50% Higher Table Feed

Designation		MRC200B38-4C20	MRC100B40-4C10
Diameter	D (mm)	20	10
Depth of cut	ap (mm)	30	30
Width of cut	ae (mm)	0.5	0.5
No. of teeth	z	4	4
Feed per tooth	fz (mm)	0.07	0.07
Cutting speed	Vc (m/min)	100	100
Table feed	Vf (mm/min)	445	890



SOLID CARBIDE DRILLS



Solid Carbide Drills

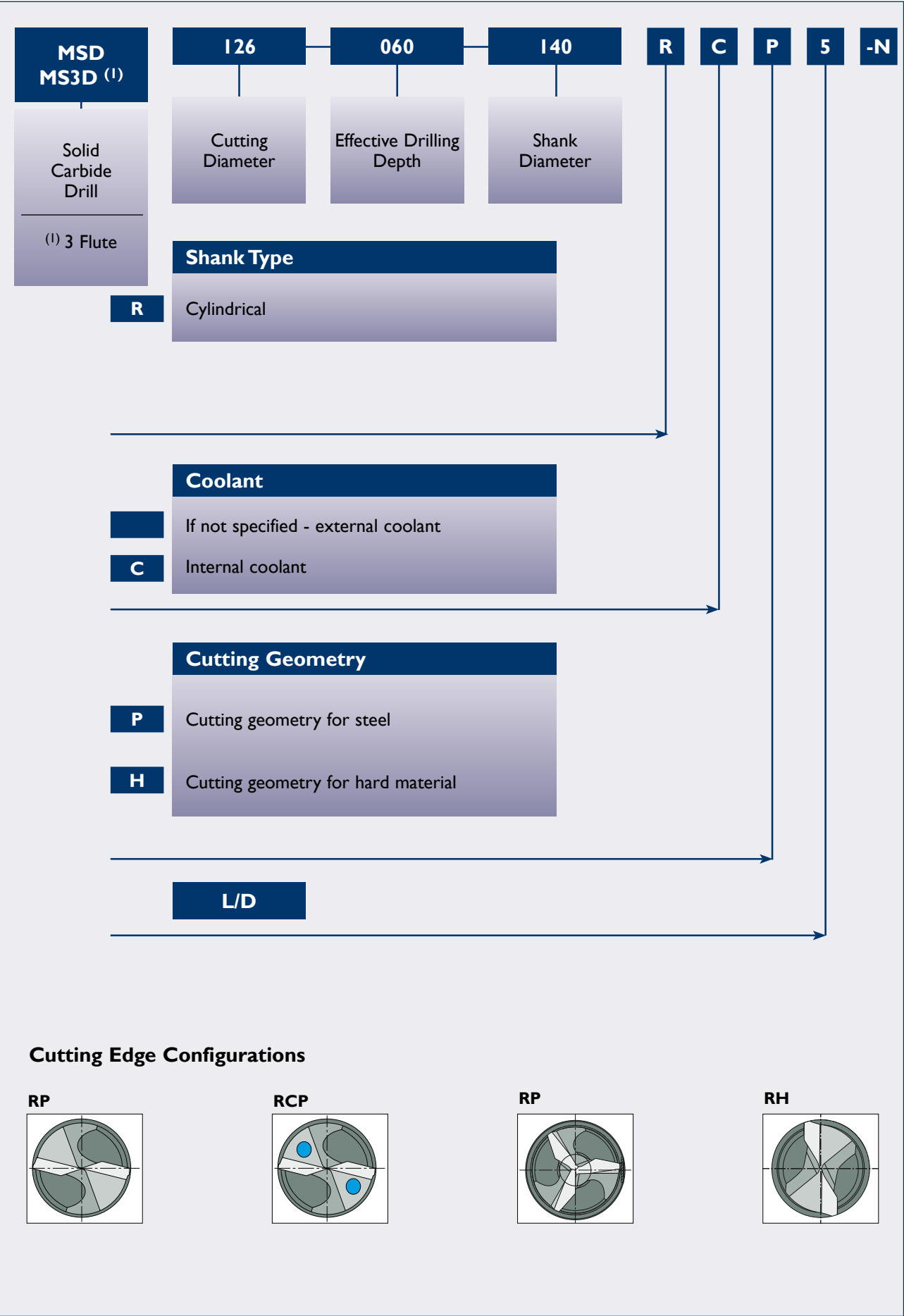
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SOLID CARBIDE DRILLS

Identification System



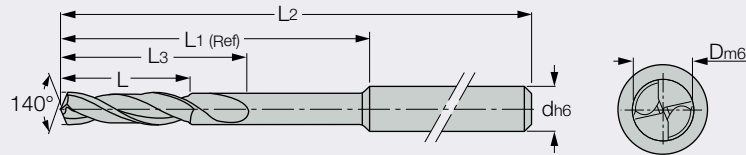
SOLID CARBIDE DRILLS

MSD-RP4 (4xD)

Solid Carbide Drills without Coolant Holes, Drilling Depth 4xD, DIN 6537



D	Tolerance m6
0.8-2.9	0.002-0.008



Designation	D	d	L	L3	L1	L2	Th(I)
MSD 008-003-030 RP4	0.80	3.00	3.2	4.8	8.8	46.0	-
MSD 009-003-030 RP4	0.90	3.00	3.6	5.4	9.4	46.0	-
MSD 010-004-030 RP4	1.00	3.00	4.0	6.0	10.0	46.0	-
MSD 011-004-030 RP4	1.10	3.00	4.4	6.6	10.6	46.0	M1.4
MSD 012-004-030 RP4	1.20	3.00	4.8	7.2	11.2	46.0	-
MSD 013-005-030 RP4	1.30	3.00	5.2	7.8	11.8	46.0	-
MSD 014-005-030 RP4	1.40	3.00	5.6	8.4	12.4	46.0	-
MSD 015-006-030 RP4	1.50	3.00	6.0	9.0	13.0	46.0	-
MSD 016-006-030 RP4	1.60	3.00	6.4	9.6	13.6	46.0	M2
MSD 017-006-030 RP4	1.70	3.00	6.8	10.2	14.2	46.0	-
MSD 018-007-030 RP4	1.80	3.00	7.2	10.8	14.8	46.0	-
MSD 019-007-030 RP4	1.90	3.00	7.6	11.4	15.4	46.0	-
MSD 020-008-030 RP4	2.00	3.00	8.0	12.0	16.0	60.0	-
MSD 021-008-030 RP4	2.10	3.00	8.4	12.6	16.6	60.0	-
MSD 022-008-030 RP4	2.20	3.00	8.8	13.2	17.2	60.0	-
MSD 023-009-030 RP4	2.30	3.00	9.2	13.8	17.8	60.0	-
MSD 024-009-030 RP4	2.40	3.00	9.6	14.4	18.4	60.0	-
MSD 025-010-030 RP4	2.50	3.00	10.0	15.0	19.0	60.0	M3
MSD 026-010-030 RP4	2.60	3.00	10.4	15.6	19.6	60.0	-
MSD 027-010-030 RP4	2.70	3.00	10.8	16.2	20.2	60.0	-
MSD 028-011-030 RP4	2.80	3.00	11.2	16.8	20.8	60.0	-
MSD 029-011-030 RP4	2.90	3.00	11.6	17.4	21.4	60.0	M3.5

(1) Used for standard thread size.

Available grade MC98
for user guide, see pages 136-152

MSD-RP6 (6xD)

Solid Carbide Drills without Coolant Holes, Drilling Depth 6xD, DIN 6537

Designation	D	d	L	L3	L1	L2	Th(I)
MSD 008-004-030 RP6	0.80	3.00	4.8	6.4	10.7	46.0	-
MSD 009-005-030 RP6	0.90	3.00	5.4	7.2	11.5	46.0	-
MSD 010-006-030 RP6	1.00	3.00	6.0	8.0	12.2	46.0	-
MSD 011-006-030 RP6	1.10	3.00	6.6	8.8	13.0	46.0	M1.4
MSD 012-007-030 RP6	1.20	3.00	7.2	9.6	13.7	46.0	-
MSD 013-007-030 RP6	1.30	3.00	7.8	10.4	14.5	46.0	-
MSD 015-009-030 RP6	1.50	3.00	9.0	12.0	16.0	46.0	-
MSD 016-009-030 RP6	1.60	3.00	9.6	12.8	16.7	46.0	M2
MSD 017-010-030 RP6	1.70	3.00	10.2	13.6	17.5	60.0	-
MSD 018-010-030 RP6	1.80	3.00	10.8	14.4	18.2	60.0	-
MSD 019-011-030 RP6	1.90	3.00	11.4	15.2	18.9	60.0	-
MSD 020-012-030 RP6	2.00	3.00	12.0	16.0	19.7	60.0	-
MSD 021-012-030 RP6	2.10	3.00	12.6	16.8	20.4	60.0	-
MSD 022-013-030 RP6	2.20	3.00	13.2	17.6	21.1	60.0	-
MSD 023-013-030 RP6	2.30	3.00	13.8	18.4	21.8	60.0	-
MSD 024-014-030 RP6	2.40	3.00	14.4	19.2	22.5	60.0	-
MSD 025-015-030 RP6	2.50	3.00	15.0	20.0	23.2	60.0	M3
MSD 026-015-030 RP6	2.60	3.00	15.6	20.8	23.9	60.0	-
MSD 027-016-030 RP6	2.70	3.00	16.2	21.6	24.5	60.0	-
MSD 028-016-030 RP6	2.80	3.00	16.8	22.4	25.2	60.0	-
MSD 029-017-030 RP6	2.90	3.00	17.4	23.2	25.7	60.0	M3.5

(1) Used for standard thread size. Available grade MC98

for user guide, see pages 136-152

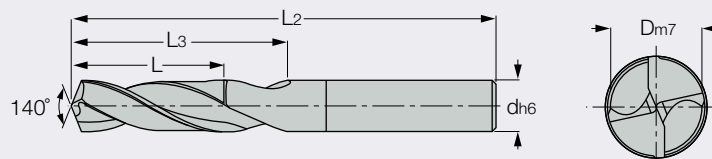
SOLID CARBIDE DRILLS

MSD-RP3 (3xD)

Solid Carbide Drills without Coolant Holes, Drilling Depth 3xD, DIN 6537



D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	D	d	L	L ₃	L ₂	T _h ⁽¹⁾
MSD030-014-060RP3-N MC98	3.00	6.00	14.0	20.0	62.00	-
MSD031-014-060RP3-N MC98	3.10	6.00	14.0	20.0	62.00	-
MSD032-014-060RP3-N MC98	3.20	6.00	14.0	20.0	62.00	-
MSD033-014-060RP3-N MC98	3.30	6.00	14.0	20.0	62.00	M4
MSD034-014-060RP3-N MC98	3.40	6.00	14.0	20.0	62.00	-
MSD035-014-060RP3-N MC98	3.50	6.00	14.0	20.0	62.00	-
MSD036-014-060RP3-N MC98	3.60	6.00	14.0	20.0	62.00	-
MSD037-014-060RP3-N MC98	3.70	6.00	14.0	20.0	62.00	-
MSD038-017-060RP3-N MC98	3.80	6.00	17.0	24.0	66.00	-
MSD039-017-060RP3-N MC98	3.90	6.00	17.0	24.0	66.00	-
MSD040-017-060RP3-N MC98	4.00	6.00	17.0	24.0	66.00	-
MSD041-017-060RP3-N MC98	4.10	6.00	17.0	24.0	66.00	-
MSD042-017-060RP3-N MC98	4.20	6.00	17.0	24.0	66.00	M5
MSD043-017-060RP3-N MC98	4.30	6.00	17.0	24.0	66.00	-
MSD044-017-060RP3-N MC98	4.40	6.00	17.0	24.0	66.00	-
MSD045-017-060RP3-N MC98	4.50	6.00	17.0	24.0	66.00	-
MSD046-017-060RP3-N MC98	4.60	6.00	17.0	24.0	66.00	-
MSD047-017-060RP3-N MC98	4.70	6.00	17.0	24.0	66.00	-
MSD048-020-060RP3-N MC98	4.80	6.00	20.0	28.0	66.00	-
MSD049-020-060RP3-N MC98	4.90	6.00	20.0	28.0	66.00	-
MSD050-020-060RP3-N MC98	5.00	6.00	20.0	28.0	66.00	M6
MSD051-020-060RP3-N MC98	5.10	6.00	20.0	28.0	66.00	-
MSD052-020-060RP3-N MC98	5.20	6.00	20.0	28.0	66.00	-
MSD053-020-060RP3-N MC98	5.30	6.00	20.0	28.0	66.00	-
MSD054-020-060RP3-N MC98	5.40	6.00	20.0	28.0	66.00	-
MSD055-020-060RP3-N MC98	5.50	6.00	20.0	28.0	66.00	-
MSD056-020-060RP3-N MC98	5.60	6.00	20.0	28.0	66.00	-
MSD057-020-060RP3-N MC98	5.70	6.00	20.0	28.0	66.00	-
MSD058-020-060RP3-N MC98	5.80	6.00	20.0	28.0	66.00	-
MSD059-020-060RP3-N MC98	5.90	6.00	20.0	28.0	66.00	-
MSD060-020-060RP3-N MC98	6.00	6.00	20.0	28.0	66.00	M7
MSD061-024-080RP3-N MC98	6.10	8.00	24.0	34.0	79.00	-
MSD062-024-080RP3-N MC98	6.20	8.00	24.0	34.0	79.00	-
MSD063-024-080RP3-N MC98	6.30	8.00	24.0	34.0	79.00	-
MSD064-024-080RP3-N MC98	6.40	8.00	24.0	34.0	79.00	-
MSD065-024-080RP3-N MC98	6.50	8.00	24.0	34.0	79.00	-
MSD066-024-080RP3-N MC98	6.60	8.00	24.0	34.0	79.00	-
MSD067-024-080RP3-N MC98	6.70	8.00	24.0	34.0	79.00	-
MSD068-024-080RP3-N MC98	6.80	8.00	24.0	34.0	79.00	M8
MSD069-024-080RP3-N MC98	6.90	8.00	24.0	34.0	79.00	-
MSD070-024-080RP3-N MC98	7.00	8.00	24.0	34.0	79.00	-
MSD071-029-080RP3-N MC98	7.10	8.00	29.0	41.0	79.00	-
MSD072-029-080RP3-N MC98	7.20	8.00	29.0	41.0	79.00	-
MSD073-029-080RP3-N MC98	7.30	8.00	29.0	41.0	79.00	-
MSD074-029-080RP3-N MC98	7.40	8.00	29.0	41.0	79.00	-
MSD075-029-080RP3-N MC98	7.50	8.00	29.0	41.0	79.00	-
MSD076-029-080RP3-N MC98	7.60	8.00	29.0	41.0	79.00	-
MSD077-029-080RP3-N MC98	7.70	8.00	29.0	41.0	79.00	-
MSD078-029-080RP3-N MC98	7.80	8.00	29.0	41.0	79.00	M9

⁽¹⁾ Used for standard thread size.

Available grade MC98

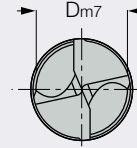
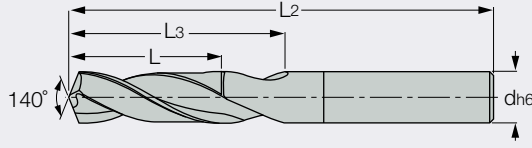
for user guide, see pages 136-152

SOLID CARBIDE DRILLS

MSD-RP3 (3xD) (continued)

Solid Carbide Drills without Coolant Holes, Drilling Depth 3xD, DIN 6537

D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	D	d	L	L ₃	L ₂	T _h ⁽¹⁾
MSD079-029-080RP3-N MC98	7.90	8.00	29.0	41.0	79.00	-
MSD080-029-080RP3-N MC98	8.00	8.00	29.0	41.0	79.00	-
MSD081-035-100RP3-N MC98	8.10	10.00	35.0	47.0	89.00	-
MSD082-035-100RP3-N MC98	8.20	10.00	35.0	47.0	89.00	-
MSD083-035-100RP3-N MC98	8.30	10.00	35.0	47.0	89.00	-
MSD084-035-100RP3-N MC98	8.40	10.00	35.0	47.0	89.00	-
MSD085-035-100RP3-N MC98	8.50	10.00	35.0	47.0	89.00	M10
MSD086-035-100RP3-N MC98	8.60	10.00	35.0	47.0	89.00	-
MSD087-035-100RP3-N MC98	8.70	10.00	35.0	47.0	89.00	-
MSD088-035-100RP3-N MC98	8.80	10.00	35.0	47.0	89.00	-
MSD089-035-100RP3-N MC98	8.90	10.00	35.0	47.0	89.00	-
MSD090-035-100RP3-N MC98	9.00	10.00	35.0	47.0	89.00	-
MSD091-035-100RP3-N MC98	9.10	10.00	35.0	47.0	89.00	-
MSD092-035-100RP3-N MC98	9.20	10.00	35.0	47.0	89.00	-
MSD093-035-100RP3-N MC98	9.30	10.00	35.0	47.0	89.00	-
MSD094-035-100RP3-N MC98	9.40	10.00	35.0	47.0	89.00	-
MSD095-035-100RP3-N MC98	9.50	10.00	35.0	47.0	89.00	M11
MSD096-035-100RP3-N MC98	9.60	10.00	35.0	47.0	89.00	-
MSD097-035-100RP3-N MC98	9.70	10.00	35.0	47.0	89.00	-
MSD098-035-100RP3-N MC98	9.80	10.00	35.0	47.0	89.00	-
MSD099-035-100RP3-N MC98	9.90	10.00	35.0	47.0	89.00	-
MSD100-035-100RP3-N MC98	10.00	10.00	35.0	47.0	89.00	-
MSD101-040-120RP3-N MC98	10.10	12.00	40.0	55.0	101.00	-
MSD102-040-120RP3-N MC98	10.20	12.00	40.0	55.0	101.00	M12
MSD103-040-120RP3-N MC98	10.30	12.00	40.0	55.0	101.00	-
MSD104-040-120RP3-N MC98	10.40	12.00	40.0	55.0	101.00	-
MSD105-040-120RP3-N MC98	10.50	12.00	40.0	55.0	101.00	-
MSD106-040-120RP3-N MC98	10.60	12.00	40.0	55.0	101.00	-
MSD107-040-120RP3-N MC98	10.70	12.00	40.0	55.0	101.00	-
MSD108-040-120RP3-N MC98	10.80	12.00	40.0	55.0	101.00	-
MSD109-040-120RP3-N MC98	10.90	12.00	40.0	55.0	101.00	-
MSD110-040-120RP3-N MC98	11.00	12.00	40.0	55.0	101.00	-
MSD111-040-120RP3-N MC98	11.10	12.00	40.0	55.0	101.00	-
MSD112-040-120RP3-N MC98	11.20	12.00	40.0	55.0	101.00	-
MSD113-040-120RP3-N MC98	11.30	12.00	40.0	55.0	101.00	-
MSD114-040-120RP3-N MC98	11.40	12.00	40.0	55.0	101.00	-
MSD115-040-120RP3-N MC98	11.50	12.00	40.0	55.0	101.00	-
MSD116-040-120RP3-N MC98	11.60	12.00	40.0	55.0	101.00	-
MSD117-040-120RP3-N MC98	11.70	12.00	40.0	55.0	101.00	-
MSD118-040-120RP3-N MC98	11.80	12.00	40.0	55.0	101.00	-
MSD119-040-120RP3-N MC98	11.90	12.00	40.0	55.0	101.00	-
MSD120-040-120RP3-N MC98	12.00	12.00	40.0	55.0	101.00	M14

⁽¹⁾ Used for standard thread size.

Available grade MC98

for user guide, see pages 136-152

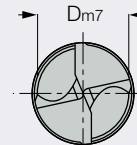
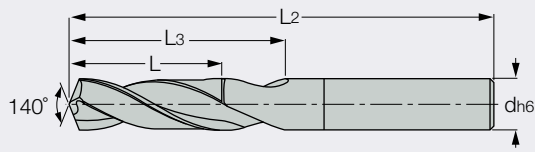
SOLID CARBIDE DRILLS

MSD-RP3 (3xD) (continued)

Solid Carbide Drills without Coolant Holes, Drilling Depth 3xD, DIN 6537



D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	D	d	L	L ₃	L ₂	T _h ⁽¹⁾
MSD121-043-I40 RP3	12.10	14.00	43.0	60.0	107.0	-
MSD122-043-I40 RP3	12.20	14.00	43.0	60.0	107.0	-
MSD123-043-I40 RP3	12.30	14.00	43.0	60.0	107.0	-
MSD124-043-I40 RP3	12.40	14.00	43.0	60.0	107.0	-
MSD125-043-I40 RP3	12.50	14.00	43.0	60.0	107.0	-
MSD126-043-I40 RP3	12.60	14.00	43.0	60.0	107.0	-
MSD127-043-I40 RP3	12.70	14.00	43.0	60.0	107.0	-
MSD128-043-I40 RP3	12.80	14.00	43.0	60.0	107.0	-
MSD129-043-I40 RP3	12.90	14.00	43.0	60.0	107.0	-
MSD130-043-I40 RP3	13.00	14.00	43.0	60.0	107.0	-
MSD131-043-I40 RP3	13.10	14.00	43.0	60.0	107.0	-
MSD132-043-I40 RP3	13.20	14.00	43.0	60.0	107.0	-
MSD133-043-I40 RP3	13.30	14.00	43.0	60.0	107.0	-
MSD134-043-I40 RP3	13.40	14.00	43.0	60.0	107.0	-
MSD135-043-I40 RP3	13.50	14.00	43.0	60.0	107.0	-
MSD136-043-I40 RP3	13.60	14.00	43.0	60.0	107.0	-
MSD137-043-I40 RP3	13.70	14.00	43.0	60.0	107.0	-
MSD138-043-I40 RP3	13.80	14.00	43.0	60.0	107.0	-
MSD139-043-I40 RP3	13.90	14.00	43.0	60.0	107.0	-
MSD140-043-I40 RP3	14.00	14.00	43.0	60.0	107.0	M16
MSD141-045-I60 RP3	14.10	16.00	45.0	65.0	115.0	-
MSD142-045-I60 RP3	14.20	16.00	45.0	65.0	115.0	-
MSD143-045-I60 RP3	14.30	16.00	45.0	65.0	115.0	-
MSD144-045-I60 RP3	14.40	16.00	45.0	65.0	115.0	-
MSD145-045-I60 RP3	14.50	16.00	45.0	65.0	115.0	-
MSD146-045-I60 RP3	14.60	16.00	45.0	65.0	115.0	-
MSD147-045-I60 RP3	14.70	16.00	45.0	65.0	115.0	-
MSD148-045-I60 RP3	14.80	16.00	45.0	65.0	115.0	-
MSD149-045-I60 RP3	14.90	16.00	45.0	65.0	115.0	-
MSD150-045-I60 RP3	15.00	16.00	45.0	65.0	115.0	-
MSD151-045-I60 RP3	15.10	16.00	45.0	65.0	115.0	-
MSD152-045-I60 RP3	15.20	16.00	45.0	65.0	115.0	-
MSD153-045-I60 RP3	15.30	16.00	45.0	65.0	115.0	-
MSD154-045-I60 RP3	15.40	16.00	45.0	65.0	115.0	-
MSD155-045-I60 RP3	15.50	16.00	45.0	65.0	115.0	M18
MSD156-045-I60 RP3	15.60	16.00	45.0	65.0	115.0	-
MSD157-045-I60 RP3	15.70	16.00	45.0	65.0	115.0	-
MSD158-045-I60 RP3	15.80	16.00	45.0	65.0	115.0	-
MSD159-045-I60 RP3	15.90	16.00	45.0	65.0	115.0	-
MSD160-045-I60 RP3	16.00	16.00	45.0	65.0	115.0	-
MSD161-051-I80 RP3	16.10	18.00	51.0	73.0	123.0	-
MSD162-051-I80 RP3	16.20	18.00	51.0	73.0	123.0	-
MSD164-051-I80 RP3	16.40	18.00	51.0	73.0	123.0	-
MSD165-051-I80 RP3	16.50	18.00	51.0	73.0	123.0	-
MSD166-051-I80 RP3	16.60	18.00	51.0	73.0	123.0	-
MSD167-051-I80 RP3	16.70	18.00	51.0	73.0	123.0	-
MSD168-051-I80 RP3	16.80	18.00	51.0	73.0	123.0	-
MSD169-051-I80 RP3	16.90	18.00	51.0	73.0	123.0	-
MSD170-051-I80 RP3	17.00	18.00	51.0	73.0	123.0	-
MSD171-051-I80 RP3	17.10	18.00	51.0	73.0	123.0	-

⁽¹⁾ Used for standard thread size.

Available grade MC98

for user guide, see pages 136-152

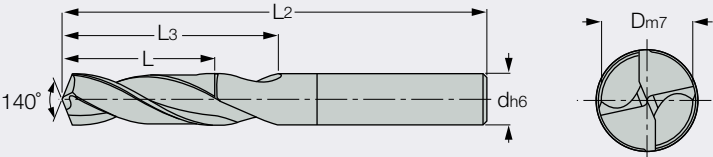
SOLID CARBIDE DRILLS

MSD-RP3 (3xD) (continued)

Solid Carbide Drills without Coolant Holes, Drilling Depth 3xD, DIN 6537



D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	D	d	L	L ₃	L ₂	T _h ⁽¹⁾
MSD172-051-180 RP3	17.20	18.00	51.0	73.0	123.0	-
MSD173-051-180 RP3	17.30	18.00	51.0	73.0	123.0	-
MSD174-051-180 RP3	17.40	18.00	51.0	73.0	123.0	-
MSD175-051-180 RP3	17.50	18.00	51.0	73.0	123.0	M20
MSD176-051-180 RP3	17.60	18.00	51.0	73.0	123.0	-
MSD177-051-180 RP3	17.70	18.00	51.0	73.0	123.0	-
MSD178-051-180 RP3	17.80	18.00	51.0	73.0	123.0	-
MSD179-051-180 RP3	17.90	18.00	51.0	73.0	123.0	-
MSD180-051-180 RP3	18.00	18.00	51.0	73.0	123.0	-
MSD181-055-200 RP3	18.10	20.00	55.0	79.0	131.0	-
MSD182-055-200 RP3	18.20	20.00	55.0	79.0	131.0	-
MSD183-055-200 RP3	18.30	20.00	55.0	79.0	131.0	-
MSD184-055-200 RP3	18.40	20.00	55.0	79.0	131.0	-
MSD185-055-200 RP3	18.50	20.00	55.0	79.0	131.0	-
MSD186-055-200 RP3	18.60	20.00	55.0	79.0	131.0	-
MSD187-055-200 RP3	18.70	20.00	55.0	79.0	131.0	-
MSD188-055-200 RP3	18.80	20.00	55.0	79.0	131.0	-
MSD189-055-200 RP3	18.90	20.00	55.0	79.0	131.0	-
MSD190-055-200 RP3	19.00	20.00	55.0	79.0	131.0	-
MSD191-055-200 RP3	19.10	20.00	55.0	79.0	131.0	-
MSD192-055-200 RP3	19.20	20.00	55.0	79.0	131.0	-
MSD193-055-200 RP3	19.30	20.00	55.0	79.0	131.0	-
MSD194-055-200 RP3	19.40	20.00	55.0	79.0	131.0	-
MSD195-055-200 RP3	19.50	20.00	55.0	79.0	131.0	M22
MSD196-055-200 RP3	19.60	20.00	55.0	79.0	131.0	-
MSD197-055-200 RP3	19.70	20.00	55.0	79.0	131.0	-
MSD198-055-200 RP3	19.80	20.00	55.0	79.0	131.0	-
MSD199-055-200 RP3	19.90	20.00	55.0	79.0	131.0	-
MSD200-055-200 RP3	20.00	20.00	55.0	79.0	131.0	-

⁽¹⁾ Used for standard thread size.

Available grade MC98

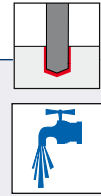
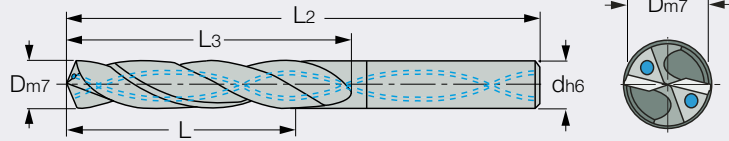
for user guide, see pages 136-152

SOLID CARBIDE DRILLS

MSD-RCP3-N (3xD)

Solid Carbide Drills with Coolant Holes, Drilling Depth 3xD, DIN 6537

D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	D	d	L	L ₃	L ₂	T _h ⁽¹⁾
MSD030-014-060RCP3-N MC98	3.00	6.00	14.0	20.0	62.00	-
MSD031-014-060RCP3-N MC98	3.10	6.00	14.0	20.0	62.00	-
MSD032-014-060RCP3-N MC98	3.20	6.00	14.0	20.0	62.00	-
MSD033-014-060RCP3-N MC98	3.30	6.00	14.0	20.0	62.00	M4
MSD034-014-060RCP3-N MC98	3.40	6.00	14.0	20.0	62.00	-
MSD035-014-060RCP3-N MC98	3.50	6.00	14.0	20.0	62.00	-
MSD036-014-060RCP3-N MC98	3.60	6.00	14.0	20.0	62.00	-
MSD037-014-060RCP3-N MC98	3.70	6.00	14.0	20.0	62.00	-
MSD038-017-060RCP3-N MC98	3.80	6.00	17.0	24.0	66.00	-
MSD039-017-060RCP3-N MC98	3.90	6.00	17.0	24.0	66.00	-
MSD040-017-060RCP3-N MC98	4.00	6.00	17.0	24.0	66.00	-
MSD041-017-060RCP3-N MC98	4.10	6.00	17.0	24.0	66.00	-
MSD042-017-060RCP3-N MC98	4.20	6.00	17.0	24.0	66.00	M5
MSD043-017-060RCP3-N MC98	4.30	6.00	17.0	24.0	66.00	-
MSD044-017-060RCP3-N MC98	4.40	6.00	17.0	24.0	66.00	-
MSD045-017-060RCP3-N MC98	4.50	6.00	17.0	24.0	66.00	-
MSD046-017-060RCP3-N MC98	4.60	6.00	17.0	24.0	66.00	-
MSD047-017-060RCP3-N MC98	4.70	6.00	17.0	24.0	66.00	-
MSD048-020-060RCP3-N MC98	4.80	6.00	20.0	28.0	66.00	-
MSD049-020-060RCP3-N MC98	4.90	6.00	20.0	28.0	66.00	-
MSD050-020-060RCP3-N MC98	5.00	6.00	20.0	28.0	66.00	M6
MSD051-020-060RCP3-N MC98	5.10	6.00	20.0	28.0	66.00	-
MSD052-020-060RCP3-N MC98	5.20	6.00	20.0	28.0	66.00	-
MSD053-020-060RCP3-N MC98	5.30	6.00	20.0	28.0	66.00	-
MSD054-020-060RCP3-N MC98	5.40	6.00	20.0	28.0	66.00	-
MSD055-020-060RCP3-N MC98	5.50	6.00	20.0	28.0	66.00	-
MSD056-020-060RCP3-N MC98	5.60	6.00	20.0	28.0	66.00	-
MSD057-020-060RCP3-N MC98	5.70	6.00	20.0	28.0	66.00	-
MSD058-020-060RCP3-N MC98	5.80	6.00	20.0	28.0	66.00	-
MSD059-020-060RCP3-N MC98	5.90	6.00	20.0	28.0	66.00	-
MSD060-020-060RCP3-N MC98	6.00	6.00	20.0	28.0	66.00	M7
MSD061-024-080RCP3-N MC98	6.10	8.00	24.0	34.0	79.00	-
MSD062-024-080RCP3-N MC98	6.20	8.00	24.0	34.0	79.00	-
MSD063-024-080RCP3-N MC98	6.30	8.00	24.0	34.0	79.00	-
MSD064-024-080RCP3-N MC98	6.40	8.00	24.0	34.0	79.00	-
MSD065-024-080RCP3-N MC98	6.50	8.00	24.0	34.0	79.00	-
MSD066-024-080RCP3-N MC98	6.60	8.00	24.0	34.0	79.00	-
MSD067-024-080RCP3-N MC98	6.70	8.00	24.0	34.0	79.00	-
MSD068-024-080RCP3-N MC98	6.80	8.00	24.0	34.0	79.00	M8
MSD069-024-080RCP3-N MC98	6.90	8.00	24.0	34.0	79.00	-
MSD070-024-080RCP3-N MC98	7.00	8.00	24.0	34.0	79.00	-
MSD071-029-080RCP3-N MC98	7.10	8.00	29.0	41.0	79.00	-
MSD072-029-080RCP3-N MC98	7.20	8.00	29.0	41.0	79.00	-
MSD073-029-080RCP3-N MC98	7.30	8.00	29.0	41.0	79.00	-
MSD074-029-080RCP3-N MC98	7.40	8.00	29.0	41.0	79.00	-
MSD075-029-080RCP3-N MC98	7.50	8.00	29.0	41.0	79.00	-
MSD076-029-080RCP3-N MC98	7.60	8.00	29.0	41.0	79.00	-
MSD077-029-080RCP3-N MC98	7.70	8.00	29.0	41.0	79.00	-
MSD078-029-080RCP3-N MC98	7.80	8.00	29.0	41.0	79.00	M9

⁽¹⁾ Used for standard thread size.

Available grade MC98

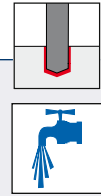
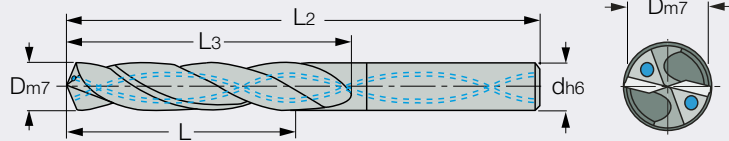
for user guide, see pages 136-152

SOLID CARBIDE DRILLS

MSD-RCP3-N (3xD) (continued)

Solid Carbide Drills with Coolant Holes, Drilling Depth 3xD, DIN 6537

D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	D	d	L	L ₃	L ₂	T _h ⁽¹⁾
MSD079-029-080RCP3-N MC98	7.90	8.00	29.0	41.0	79.00	-
MSD080-029-080RCP3-N MC98	8.00	8.00	29.0	41.0	79.00	-
MSD081-035-100RCP3-N MC98	8.10	10.00	35.0	47.0	89.00	-
MSD082-035-100RCP3-N MC98	8.20	10.00	35.0	47.0	89.00	-
MSD083-035-100RCP3-N MC98	8.30	10.00	35.0	47.0	89.00	-
MSD084-035-100RCP3-N MC98	8.40	10.00	35.0	47.0	89.00	-
MSD085-035-100RCP3-N MC98	8.50	10.00	35.0	47.0	89.00	M10
MSD086-035-100RCP3-N MC98	8.60	10.00	35.0	47.0	89.00	-
MSD087-035-100RCP3-N MC98	8.70	10.00	35.0	47.0	89.00	-
MSD088-035-100RCP3-N MC98	8.80	10.00	35.0	47.0	89.00	-
MSD089-035-100RCP3-N MC98	8.90	10.00	35.0	47.0	89.00	-
MSD090-035-100RCP3-N MC98	9.00	10.00	35.0	47.0	89.00	-
MSD091-035-100RCP3-N MC98	9.10	10.00	35.0	47.0	89.00	-
MSD092-035-100RCP3-N MC98	9.20	10.00	35.0	47.0	89.00	-
MSD093-035-100RCP3-N MC98	9.30	10.00	35.0	47.0	89.00	-
MSD094-035-100RCP3-N MC98	9.40	10.00	35.0	47.0	89.00	-
MSD095-035-100RCP3-N MC98	9.50	10.00	35.0	47.0	89.00	M11
MSD096-035-100RCP3-N MC98	9.60	10.00	35.0	47.0	89.00	-
MSD097-035-100RCP3-N MC98	9.70	10.00	35.0	47.0	89.00	-
MSD098-035-100RCP3-N MC98	9.80	10.00	35.0	47.0	89.00	-
MSD099-035-100RCP3-N MC98	9.90	10.00	35.0	47.0	89.00	-
MSD100-035-100RCP3-N MC98	10.00	10.00	35.0	47.0	89.00	-
MSD101-040-120RCP3-N MC98	10.10	12.00	40.0	55.0	102.00	-
MSD102-040-120RCP3-N MC98	10.20	12.00	40.0	55.0	102.00	M12
MSD103-040-120RCP3-N MC98	10.30	12.00	40.0	55.0	102.00	-
MSD104-040-120RCP3-N MC98	10.40	12.00	40.0	55.0	102.00	-
MSD105-040-120RCP3-N MC98	10.50	12.00	40.0	55.0	102.00	-
MSD106-040-120RCP3-N MC98	10.60	12.00	40.0	55.0	102.00	-
MSD107-040-120RCP3-N MC98	10.70	12.00	40.0	55.0	102.00	-
MSD108-040-120RCP3-N MC98	10.80	12.00	40.0	55.0	102.00	-
MSD109-040-120RCP3-N MC98	10.90	12.00	40.0	55.0	102.00	-
MSD110-040-120RCP3-N MC98	11.00	12.00	40.0	55.0	102.00	-
MSD111-040-120RCP3-N MC98	11.10	12.00	40.0	55.0	102.00	-
MSD112-040-120RCP3-N MC98	11.20	12.00	40.0	55.0	102.00	-
MSD113-040-120RCP3-N MC98	11.30	12.00	40.0	55.0	102.00	-
MSD114-040-120RCP3-N MC98	11.40	12.00	40.0	55.0	102.00	-
MSD115-040-120RCP3-N MC98	11.50	12.00	40.0	55.0	102.00	-
MSD116-040-120RCP3-N MC98	11.60	12.00	40.0	55.0	102.00	-
MSD117-040-120RCP3-N MC98	11.70	12.00	40.0	55.0	102.00	-
MSD118-040-120RCP3-N MC98	11.80	12.00	40.0	55.0	102.00	-
MSD119-040-120RCP3-N MC98	11.90	12.00	40.0	55.0	102.00	-
MSD120-040-120RCP3-N MC98	12.00	12.00	40.0	55.0	102.00	M14

⁽¹⁾ Used for standard thread size.

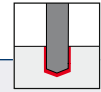
Available grade MC98

for user guide, see pages 136-152

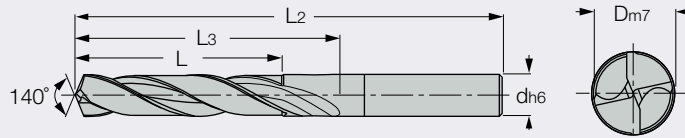
SOLID CARBIDE DRILLS

MSD-RP5 (5xD)

Solid Carbide Drills without Coolant Holes, Drilling Depth 5xD



D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	D	d	L	L ₃	L ₂	T _h ⁽¹⁾
MSD030-023-060RP5-N MC98	3.00	6.00	23.0	28.0	66.00	-
MSD031-023-060RP5-N MC98	3.10	6.00	23.0	28.0	66.00	-
MSD032-023-060RP5-N MC98	3.20	6.00	23.0	28.0	66.00	-
MSD033-023-060RP5-N MC98	3.30	6.00	23.0	28.0	66.00	M4
MSD034-023-060RP5-N MC98	3.40	6.00	23.0	28.0	66.00	-
MSD035-023-060RP5-N MC98	3.50	6.00	23.0	28.0	66.00	-
MSD036-023-060RP5-N MC98	3.60	6.00	23.0	28.0	66.00	-
MSD037-023-060RP5-N MC98	3.70	6.00	23.0	28.0	66.00	-
MSD038-029-060RP5-N MC98	3.80	6.00	29.0	36.0	74.00	-
MSD039-029-060RP5-N MC98	3.90	6.00	29.0	36.0	74.00	-
MSD040-029-060RP5-N MC98	4.00	6.00	29.0	36.0	74.00	-
MSD041-029-060RP5-N MC98	4.10	6.00	29.0	36.0	74.00	-
MSD042-029-060RP5-N MC98	4.20	6.00	29.0	36.0	74.00	M5
MSD043-029-060RP5-N MC98	4.30	6.00	29.0	36.0	74.00	-
MSD044-029-060RP5-N MC98	4.40	6.00	29.0	36.0	74.00	-
MSD045-029-060RP5-N MC98	4.50	6.00	29.0	36.0	74.00	-
MSD046-029-060RP5-N MC98	4.60	6.00	29.0	36.0	74.00	-
MSD047-029-060RP5-N MC98	4.70	6.00	29.0	36.0	74.00	-
MSD048-035-060RP5-N MC98	4.80	6.00	35.0	44.0	74.00	-
MSD049-035-060RP5-N MC98	4.90	6.00	35.0	44.0	82.00	-
MSD050-035-060RP5-N MC98	5.00	6.00	35.0	44.0	82.00	M6
MSD051-035-060RP5-N MC98	5.10	6.00	35.0	44.0	82.00	-
MSD052-035-060RP5-N MC98	5.20	6.00	35.0	44.0	82.00	-
MSD053-035-060RP5-N MC98	5.30	6.00	35.0	44.0	82.00	-
MSD054-035-060RP5-N MC98	5.40	6.00	35.0	44.0	82.00	-
MSD055-035-060RP5-N MC98	5.50	6.00	35.0	44.0	82.00	-
MSD056-035-060RP5-N MC98	5.60	6.00	35.0	44.0	82.00	-
MSD057-035-060RP5-N MC98	5.70	6.00	35.0	44.0	82.00	-
MSD058-035-060RP5-N MC98	5.80	6.00	35.0	44.0	82.00	-
MSD059-035-060RP5-N MC98	5.90	6.00	35.0	44.0	82.00	-
MSD060-035-060RP5-N MC98	6.00	6.00	35.0	44.0	82.00	M7
MSD061-043-080RP5-N MC98	6.10	8.00	43.0	53.0	91.00	-
MSD062-043-080RP5-N MC98	6.20	8.00	43.0	53.0	91.00	-
MSD063-043-080RP5-N MC98	6.30	8.00	43.0	53.0	91.00	-
MSD064-043-080RP5-N MC98	6.40	8.00	43.0	53.0	91.00	-
MSD065-043-080RP5-N MC98	6.50	8.00	43.0	53.0	91.00	-
MSD066-043-080RP5-N MC98	6.60	8.00	43.0	53.0	91.00	-
MSD067-043-080RP5-N MC98	6.70	8.00	43.0	53.0	91.00	-
MSD068-043-080RP5-N MC98	6.80	8.00	43.0	53.0	91.00	M8
MSD069-043-080RP5-N MC98	6.90	8.00	43.0	53.0	91.00	-
MSD070-043-080RP5-N MC98	7.00	8.00	43.0	53.0	91.00	-
MSD071-043-080RP5-N MC98	7.10	8.00	43.0	53.0	91.00	-
MSD072-043-080RP5-N MC98	7.20	8.00	43.0	53.0	91.00	-
MSD073-043-080RP5-N MC98	7.30	8.00	43.0	53.0	91.00	-
MSD074-043-080RP5-N MC98	7.40	8.00	43.0	53.0	91.00	-
MSD075-043-080RP5-N MC98	7.50	8.00	43.0	53.0	91.00	-
MSD076-043-080RP5-N MC98	7.60	8.00	43.0	53.0	91.00	-
MSD077-043-080RP5-N MC98	7.70	8.00	43.0	53.0	91.00	-

⁽¹⁾ Used for standard thread size.

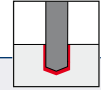
Available grade MC98

for user guide, see pages 136-152

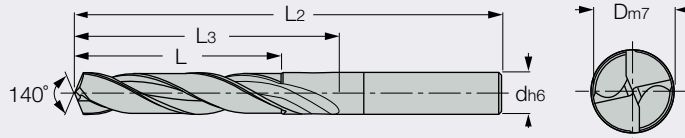
SOLID CARBIDE DRILLS

MSD-RP5 (5xD) (continued)

Solid Carbide Drills without Coolant Holes, Drilling Depth 5xD



D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	D	d	L	L ₃	L ₂	T _h ⁽¹⁾
MSD078-043-080RP5-N MC98	7.80	8.00	43.0	53.0	91.00	M9
MSD079-043-080RP5-N MC98	7.90	8.00	43.0	53.0	91.00	-
MSD080-043-080RP5-N MC98	8.00	8.00	43.0	53.0	91.00	-
MSD081-049-100RP5-N MC98	8.10	10.00	49.0	61.0	103.00	-
MSD082-049-100RP5-N MC98	8.20	10.00	49.0	61.0	103.00	-
MSD083-049-100RP5-N MC98	8.30	10.00	49.0	61.0	103.00	-
MSD084-049-100RP5-N MC98	8.40	10.00	49.0	61.0	103.00	-
MSD085-049-100RP5-N MC98	8.50	10.00	49.0	61.0	103.00	M10
MSD086-049-100RP5-N MC98	8.60	10.00	49.0	61.0	103.00	-
MSD087-049-100RP5-N MC98	8.70	10.00	49.0	61.0	103.00	-
MSD088-049-100RP5-N MC98	8.80	10.00	49.0	61.0	103.00	-
MSD089-049-100RP5-N MC98	8.90	10.00	49.0	61.0	103.00	-
MSD090-049-100RP5-N MC98	9.00	10.00	49.0	61.0	103.00	-
MSD091-049-100RP5-N MC98	9.10	10.00	49.0	61.0	103.00	-
MSD092-049-100RP5-N MC98	9.20	10.00	49.0	61.0	103.00	-
MSD093-049-100RP5-N MC98	9.30	10.00	49.0	61.0	103.00	-
MSD094-049-100RP5-N MC98	9.40	10.00	49.0	61.0	103.00	-
MSD095-049-100RP5-N MC98	9.50	10.00	49.0	61.0	103.00	M11
MSD096-049-100RP5-N MC98	9.60	10.00	49.0	61.0	103.00	-
MSD097-049-100RP5-N MC98	9.70	10.00	49.0	61.0	103.00	-
MSD098-049-100RP5-N MC98	9.80	10.00	49.0	61.0	103.00	-
MSD099-049-100RP5-N MC98	9.90	10.00	49.0	61.0	103.00	-
MSD100-049-100RP5-N MC98	10.00	10.00	49.0	61.0	103.00	-
MSD101-056-120RP5-N MC98	10.10	12.00	56.0	71.0	118.00	-
MSD102-056-120RP5-N MC98	10.20	12.00	56.0	71.0	118.00	M12
MSD103-056-120RP5-N MC98	10.30	12.00	56.0	71.0	118.00	-
MSD104-056-120RP5-N MC98	10.40	12.00	56.0	71.0	118.00	-
MSD105-056-120RP5-N MC98	10.50	12.00	56.0	71.0	118.00	-
MSD106-056-120RP5-N MC98	10.60	12.00	56.0	71.0	118.00	-
MSD107-056-120RP5-N MC98	10.70	12.00	56.0	71.0	118.00	-
MSD108-056-120RP5-N MC98	10.80	12.00	56.0	71.0	118.00	-
MSD109-056-120RP5-N MC98	10.90	12.00	56.0	71.0	118.00	-
MSD110-056-120RP5-N MC98	11.00	12.00	56.0	71.0	118.00	-
MSD111-056-120RP5-N MC98	11.10	12.00	56.0	71.0	118.00	-
MSD112-056-120RP5-N MC98	11.20	12.00	56.0	71.0	118.00	-
MSD113-056-120RP5-N MC98	11.30	12.00	56.0	71.0	118.00	-
MSD114-056-120RP5-N MC98	11.40	12.00	56.0	71.0	118.00	-
MSD115-056-120RP5-N MC98	11.50	12.00	56.0	71.0	118.00	-
MSD116-056-120RP5-N MC98	11.60	12.00	56.0	71.0	118.00	-
MSD117-056-120RP5-N MC98	11.70	12.00	56.0	71.0	118.00	-
MSD118-056-120RP5-N MC98	11.80	12.00	56.0	71.0	118.00	-
MSD119-056-120RP5-N MC98	11.90	12.00	56.0	71.0	118.00	-
MSD120-056-120RP5-N MC98	12.00	12.00	56.0	71.0	118.00	M14

⁽¹⁾ Used for standard thread size.

Available grade MC98

for user guide, see pages 136-152

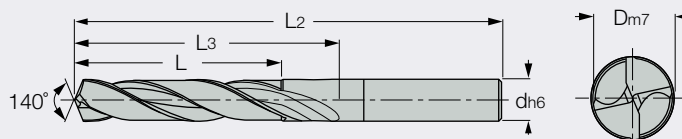
SOLID CARBIDE DRILLS

MSD-RP5 (5xD) (continued)

Solid Carbide Drills without Coolant Holes, Drilling Depth 5xD



D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	D	d	L	L3	L2	Th(I)
MSD 121-060-140 RP5	12.10	14.00	60.0	77.0	124.0	-
MSD 122-060-140 RP5	12.20	14.00	60.0	77.0	124.0	-
MSD 123-060-140 RP5	12.30	14.00	60.0	77.0	124.0	-
MSD 124-060-140 RP5	12.40	14.00	60.0	77.0	124.0	-
MSD 125-060-140 RP5	12.50	14.00	60.0	77.0	124.0	-
MSD 126-060-140 RP5	12.60	14.00	60.0	77.0	124.0	-
MSD 127-060-140 RP5	12.70	14.00	60.0	77.0	124.0	-
MSD 128-060-140 RP5	12.80	14.00	60.0	77.0	124.0	-
MSD 129-060-140 RP5	12.90	14.00	60.0	77.0	124.0	-
MSD 130-060-140 RP5	13.00	14.00	60.0	77.0	124.0	-
MSD 131-060-140 RP5	13.10	14.00	60.0	77.0	124.0	-
MSD 132-060-140 RP5	13.20	14.00	60.0	77.0	124.0	-
MSD 133-060-140 RP5	13.30	14.00	60.0	77.0	124.0	-
MSD 134-060-140 RP5	13.40	14.00	60.0	77.0	124.0	-
MSD 135-060-140 RP5	13.50	14.00	60.0	77.0	124.0	-
MSD 136-060-140 RP5	13.60	14.00	60.0	77.0	124.0	-
MSD 137-060-140 RP5	13.70	14.00	60.0	77.0	124.0	-
MSD 138-060-140 RP5	13.80	14.00	60.0	77.0	124.0	-
MSD 139-060-140 RP5	13.90	14.00	60.0	77.0	124.0	-
MSD 140-060-140 RP5	14.00	14.00	60.0	77.0	124.0	M16
MSD 141-063-160 RP5	14.10	16.00	63.0	83.0	133.0	-
MSD 142-063-160 RP5	14.20	16.00	63.0	83.0	133.0	-
MSD 143-063-160 RP5	14.30	16.00	63.0	83.0	133.0	-
MSD 144-063-160 RP5	14.40	16.00	63.0	83.0	133.0	-
MSD 145-063-160 RP5	14.50	16.00	63.0	83.0	133.0	-
MSD 146-063-160 RP5	14.60	16.00	63.0	83.0	133.0	-
MSD 147-063-160 RP5	14.70	16.00	63.0	83.0	133.0	-
MSD 148-063-160 RP5	14.80	16.00	63.0	83.0	133.0	-
MSD 149-063-160 RP5	14.90	16.00	63.0	83.0	133.0	-
MSD 150-063-160 RP5	15.00	16.00	63.0	83.0	133.0	-
MSD 151-063-160 RP5	15.10	16.00	63.0	83.0	133.0	-
MSD 152-063-160 RP5	15.20	16.00	63.0	83.0	133.0	-
MSD 153-063-160 RP5	15.30	16.00	63.0	83.0	133.0	-
MSD 154-063-160 RP5	15.40	16.00	63.0	83.0	133.0	-
MSD 155-063-160 RP5	15.50	16.00	63.0	83.0	133.0	M18
MSD 156-063-160 RP5	15.60	16.00	63.0	83.0	133.0	-
MSD 157-063-160 RP5	15.70	16.00	63.0	83.0	133.0	-
MSD 158-063-160 RP5	15.80	16.00	63.0	83.0	133.0	-
MSD 159-063-160 RP5	15.90	16.00	63.0	83.0	133.0	-
MSD 160-063-160 RP5	16.00	16.00	63.0	83.0	133.0	-
MSD 161-071-180 RP5	16.10	18.00	71.0	93.0	143.0	-
MSD 162-071-180 RP5	16.20	18.00	71.0	93.0	143.0	-
MSD 163-071-180 RP5	16.30	18.00	71.0	93.0	143.0	-
MSD 164-071-180 RP5	16.40	18.00	71.0	93.0	143.0	-
MSD 165-071-180 RP5	16.50	18.00	71.0	93.0	143.0	-
MSD 166-071-180 RP5	16.60	18.00	71.0	93.0	143.0	-
MSD 167-071-180 RP5	16.70	18.00	71.0	93.0	143.0	-
MSD 168-071-180 RP5	16.80	18.00	71.0	93.0	143.0	-
MSD 169-071-180 RP5	16.90	18.00	71.0	93.0	143.0	-

(1) Used for standard thread size.

Available grade MC98

for user guide, see pages 136-152

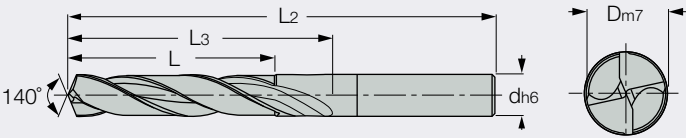
SOLID CARBIDE DRILLS

MSD-RP5 (5xD)(continued)

Solid Carbide Drills without Coolant Holes, Drilling Depth 5xD



D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	D	d	L	L3	L2	Th(l)
MSD 170-071-180 RP5	17.00	18.00	71.0	93.0	143.0	-
MSD 171-071-180 RP5	17.10	18.00	71.0	93.0	143.0	-
MSD 172-071-180 RP5	17.20	18.00	71.0	93.0	143.0	-
MSD 173-071-180 RP5	17.30	18.00	71.0	93.0	143.0	-
MSD 174-071-180 RP5	17.40	18.00	71.0	93.0	143.0	-
MSD 175-071-180 RP5	17.50	18.00	71.0	93.0	143.0	M20
MSD 176-071-180 RP5	17.60	18.00	71.0	93.0	143.0	-
MSD 177-071-180 RP5	17.70	18.00	71.0	93.0	143.0	-
MSD 178-071-180 RP5	17.80	18.00	71.0	93.0	143.0	-
MSD 179-071-180 RP5	17.90	18.00	71.0	93.0	143.0	-
MSD 180-071-180 RP5	18.00	18.00	71.0	93.0	143.0	-
MSD 181-077-200 RP5	18.10	20.00	77.0	101.0	153.0	-
MSD 182-077-200 RP5	18.20	20.00	77.0	101.0	153.0	-
MSD 183-077-200 RP5	18.30	20.00	77.0	101.0	153.0	-
MSD 184-077-200 RP5	18.40	20.00	77.0	101.0	153.0	-
MSD 185-077-200 RP5	18.50	20.00	77.0	101.0	153.0	-
MSD 186-077-200 RP5	18.60	20.00	77.0	101.0	153.0	-
MSD 187-077-200 RP5	18.70	20.00	77.0	101.0	153.0	-
MSD 188-077-200 RP5	18.80	20.00	77.0	101.0	153.0	-
MSD 189-077-200 RP5	18.90	20.00	77.0	101.0	153.0	-
MSD 190-077-200 RP5	19.00	20.00	77.0	101.0	153.0	-
MSD 191-077-200 RP5	19.10	20.00	77.0	101.0	153.0	-
MSD 192-077-200 RP5	19.20	20.00	77.0	101.0	153.0	-
MSD 193-077-200 RP5	19.30	20.00	77.0	101.0	153.0	-
MSD 194-077-200 RP5	19.40	20.00	77.0	101.0	153.0	-
MSD 195-077-200 RP5	19.50	20.00	77.0	101.0	153.0	M22
MSD 196-077-200 RP5	19.60	20.00	77.0	101.0	153.0	-
MSD 197-077-200 RP5	19.70	20.00	77.0	101.0	153.0	-
MSD 198-077-200 RP5	19.80	20.00	77.0	101.0	153.0	-
MSD 199-077-200 RP5	19.90	20.00	77.0	101.0	153.0	-
MSD 200-077-200 RP5	20.00	20.00	77.0	101.0	153.0	-

(1) Used for standard thread size.

Available grade MC98

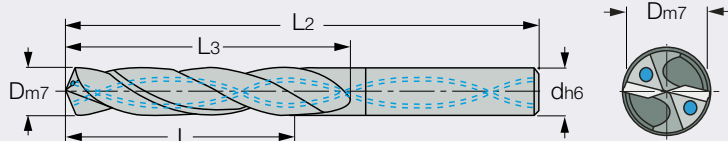
for user guide, see pages 136-152

SOLID CARBIDE DRILLS

MSD-RCP5-N (5xD)

Solid Carbide Drills with Coolant Holes, Drilling Depth 5xD

D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	D	d	L	L ₃	L ₂	T _h ⁽¹⁾
MSD030-023-060RCP5-N MC98	3.00	6.00	23.0	28.0	66.00	-
MSD031-023-060RCP5-N MC98	3.10	6.00	23.0	28.0	66.00	-
MSD032-023-060RCP5-N MC98	3.20	6.00	23.0	28.0	66.00	-
MSD033-023-060RCP5-N MC98	3.30	6.00	23.0	28.0	66.00	M4
MSD034-023-060RCP5-N MC98	3.40	6.00	23.0	28.0	66.00	-
MSD035-023-060RCP5-N MC98	3.50	6.00	23.0	28.0	66.00	-
MSD036-023-060RCP5-N MC98	3.60	6.00	23.0	28.0	66.00	-
MSD037-023-060RCP5-N MC98	3.70	6.00	23.0	28.0	66.00	-
MSD038-029-060RCP5-N MC98	3.80	6.00	29.0	36.0	74.00	-
MSD039-029-060RCP5-N MC98	3.90	6.00	29.0	36.0	74.00	-
MSD040-029-060RCP5-N MC98	4.00	6.00	29.0	36.0	74.00	-
MSD041-029-060RCP5-N MC98	4.10	6.00	29.0	36.0	74.00	-
MSD042-029-060RCP5-N MC98	4.20	6.00	29.0	36.0	74.00	M5
MSD043-029-060RCP5-N MC98	4.30	6.00	29.0	36.0	74.00	-
MSD044-029-060RCP5-N MC98	4.40	6.00	29.0	36.0	74.00	-
MSD045-029-060RCP5-N MC98	4.50	6.00	29.0	36.0	74.00	-
MSD046-029-060RCP5-N MC98	4.60	6.00	29.0	36.0	74.00	-
MSD047-029-060RCP5-N MC98	4.70	6.00	29.0	36.0	74.00	-
MSD048-035-060RCP5-N MC98	4.80	6.00	35.0	44.0	74.00	-
MSD049-035-060RCP5-N MC98	4.90	6.00	35.0	44.0	82.00	-
MSD050-035-060RCP5-N MC98	5.00	6.00	35.0	44.0	82.00	M6
MSD051-035-060RCP5-N MC98	5.10	6.00	35.0	44.0	82.00	-
MSD052-035-060RCP5-N MC98	5.20	6.00	35.0	44.0	82.00	-
MSD053-035-060RCP5-N MC98	5.30	6.00	35.0	44.0	82.00	-
MSD054-035-060RCP5-N MC98	5.40	6.00	35.0	44.0	82.00	-
MSD055-035-060RCP5-N MC98	5.50	6.00	35.0	44.0	82.00	-
MSD056-035-060RCP5-N MC98	5.60	6.00	35.0	44.0	82.00	-
MSD057-035-060RCP5-N MC98	5.70	6.00	35.0	44.0	82.00	-
MSD058-035-060RCP5-N MC98	5.80	6.00	35.0	44.0	82.00	-
MSD059-035-060RCP5-N MC98	5.90	6.00	35.0	44.0	82.00	-
MSD060-035-060RCP5-N MC98	6.00	6.00	35.0	44.0	82.00	M7
MSD061-043-080RCP5-N MC98	6.10	8.00	43.0	53.0	91.00	-
MSD062-043-080RCP5-N MC98	6.20	8.00	43.0	53.0	91.00	-
MSD063-043-080RCP5-N MC98	6.30	8.00	43.0	53.0	91.00	-
MSD064-043-080RCP5-N MC98	6.40	8.00	43.0	53.0	91.00	-
MSD065-043-080RCP5-N MC98	6.50	8.00	43.0	53.0	91.00	-
MSD066-043-080RCP5-N MC98	6.60	8.00	43.0	53.0	91.00	-
MSD067-043-080RCP5-N MC98	6.70	8.00	43.0	53.0	91.00	-
MSD068-043-080RCP5-N MC98	6.80	8.00	43.0	53.0	91.00	M8
MSD069-043-080RCP5-N MC98	6.90	8.00	43.0	53.0	91.00	-
MSD070-043-080RCP5-N MC98	7.00	8.00	43.0	53.0	91.00	-
MSD071-043-080RCP5-N MC98	7.10	8.00	43.0	53.0	91.00	-
MSD072-043-080RCP5-N MC98	7.20	8.00	43.0	53.0	91.00	-
MSD073-043-080RCP5-N MC98	7.30	8.00	43.0	53.0	91.00	-
MSD074-043-080RCP5-N MC98	7.40	8.00	43.0	53.0	91.00	-
MSD075-043-080RCP5-N MC98	7.50	8.00	43.0	53.0	91.00	-
MSD076-043-080RCP5-N MC98	7.60	8.00	43.0	53.0	91.00	-
MSD077-043-080RCP5-N MC98	7.70	8.00	43.0	53.0	91.00	-
MSD078-043-080RCP5-N MC98	7.80	8.00	43.0	53.0	91.00	M9

⁽¹⁾ Used for standard thread size.

Available grade MC98

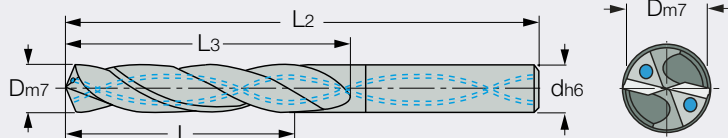
for user guide, see pages 136-152

SOLID CARBIDE DRILLS

MSD-RCP5-N (5xD) (continued)

Solid Carbide Drills with Coolant Holes, Drilling Depth 5xD

D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	D	d	L	L ₃	L ₂	T _h ⁽¹⁾
MSD079-043-080RCP5-N MC98	7.90	8.00	43.0	53.0	91.00	-
MSD080-043-080RCP5-N MC98	8.00	8.00	43.0	53.0	91.00	-
MSD081-049-100RCP5-N MC98	8.10	10.00	49.0	61.0	103.00	-
MSD082-049-100RCP5-N MC98	8.20	10.00	49.0	61.0	103.00	-
MSD083-049-100RCP5-N MC98	8.30	10.00	49.0	61.0	103.00	-
MSD084-049-100RCP5-N MC98	8.40	10.00	49.0	61.0	103.00	-
MSD085-049-100RCP5-N MC98	8.50	10.00	49.0	61.0	103.00	M10
MSD086-049-100RCP5-N MC98	8.60	10.00	49.0	61.0	103.00	-
MSD087-049-100RCP5-N MC98	8.70	10.00	49.0	61.0	103.00	-
MSD088-049-100RCP5-N MC98	8.80	10.00	49.0	61.0	103.00	-
MSD089-049-100RCP5-N MC98	8.90	10.00	49.0	61.0	103.00	-
MSD090-049-100RCP5-N MC98	9.00	10.00	49.0	61.0	103.00	-
MSD091-049-100RCP5-N MC98	9.10	10.00	49.0	61.0	103.00	-
MSD092-049-100RCP5-N MC98	9.20	10.00	49.0	61.0	103.00	-
MSD093-049-100RCP5-N MC98	9.30	10.00	49.0	61.0	103.00	-
MSD094-049-100RCP5-N MC98	9.40	10.00	49.0	61.0	103.00	-
MSD095-049-100RCP5-N MC98	9.50	10.00	49.0	61.0	103.00	M11
MSD096-049-100RCP5-N MC98	9.60	10.00	49.0	61.0	103.00	-
MSD097-049-100RCP5-N MC98	9.70	10.00	49.0	61.0	103.00	-
MSD098-049-100RCP5-N MC98	9.80	10.00	49.0	61.0	103.00	-
MSD099-049-100RCP5-N MC98	9.90	10.00	49.0	61.0	103.00	-
MSD100-049-100RCP5-N MC98	10.00	10.00	49.0	61.0	103.00	-
MSD101-056-120RCP5-N MC98	10.10	12.00	56.0	71.0	118.00	-
MSD102-056-120RCP5-N MC98	10.20	12.00	56.0	71.0	118.00	M12
MSD103-056-120RCP5-N MC98	10.30	12.00	56.0	71.0	118.00	-
MSD104-056-120RCP5-N MC98	10.40	12.00	56.0	71.0	118.00	-
MSD105-056-120RCP5-N MC98	10.50	12.00	56.0	71.0	118.00	-
MSD106-056-120RCP5-N MC98	10.60	12.00	56.0	71.0	118.00	-
MSD107-056-120RCP5-N MC98	10.70	12.00	56.0	71.0	118.00	-
MSD108-056-120RCP5-N MC98	10.80	12.00	56.0	71.0	118.00	-
MSD109-056-120RCP5-N MC98	10.90	12.00	56.0	71.0	118.00	-
MSD110-056-120RCP5-N MC98	11.00	12.00	56.0	71.0	118.00	-
MSD111-056-120RCP5-N MC98	11.10	12.00	56.0	71.0	118.00	-
MSD112-056-120RCP5-N MC98	11.20	12.00	56.0	71.0	118.00	-
MSD113-056-120RCP5-N MC98	11.30	12.00	56.0	71.0	118.00	-
MSD114-056-120RCP5-N MC98	11.40	12.00	56.0	71.0	118.00	-
MSD115-056-120RCP5-N MC98	11.50	12.00	56.0	71.0	118.00	-
MSD116-056-120RCP5-N MC98	11.60	12.00	56.0	71.0	118.00	-
MSD117-056-120RCP5-N MC98	11.70	12.00	56.0	71.0	118.00	-
MSD118-056-120RCP5-N MC98	11.80	12.00	56.0	71.0	118.00	-
MSD119-056-120RCP5-N MC98	11.90	12.00	56.0	71.0	118.00	-
MSD120-056-120RCP5-N MC98	12.00	12.00	56.0	71.0	118.00	M14

⁽¹⁾ Used for standard thread size.

Available grade MC98

for user guide, see pages 136-152

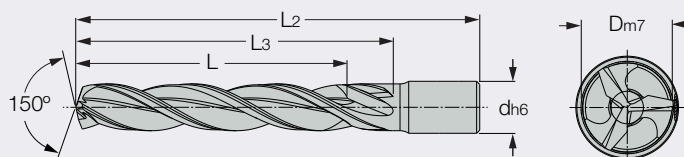
SOLID CARBIDE DRILLS

MS3D-RP5

3 Flute Solid Carbide Drills without Coolant Holes, Drilling Depth 5xD, DIN 6537



D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	D	d	L	L3	L2	Th ⁽¹⁾
MS3D 030-023-060 RP5	3.00	6.00	23.0	28.0	66.0	-
MS3D 031-023-060 RP5	3.10	6.00	23.0	28.0	66.0	-
MS3D 032-023-060 RP5	3.20	6.00	23.0	28.0	66.0	-
MS3D 033-023-060 RP5	3.30	6.00	23.0	28.0	66.0	M4
MS3D 035-023-060 RP5	3.50	6.00	23.0	28.0	66.0	-
MS3D 037-023-060 RP5	3.70	6.00	23.0	28.0	66.0	-
MS3D 038-029-060 RP5	3.80	6.00	29.0	36.0	74.0	-
MS3D 040-029-060 RP5	4.00	6.00	29.0	36.0	74.0	-
MS3D 041-029-060 RP5	4.10	6.00	29.0	36.0	74.0	-
MS3D 042-029-060 RP5	4.20	6.00	29.0	36.0	74.0	M5
MS3D 043-029-060 RP5	4.30	6.00	29.0	36.0	74.0	-
MS3D 045-029-060 RP5	4.50	6.00	29.0	36.0	74.0	-
MS3D 046-029-060 RP5	4.60	6.00	29.0	36.0	74.0	-
MS3D 047-029-060 RP5	4.70	6.00	29.0	47.0	74.0	-
MS3D 050-035-060 RP5	5.00	6.00	35.0	44.0	82.0	M6
MS3D 051-035-060 RP5	5.10	6.00	35.0	44.0	82.0	-
MS3D 052-035-060 RP5	5.20	6.00	35.0	44.0	82.0	-
MS3D 055-035-060 RP5	5.50	6.00	35.0	44.0	82.0	-
MS3D 056-035-060 RP5	5.60	6.00	35.0	44.0	82.0	-
MS3D 057-035-060 RP5	5.70	6.00	35.0	44.0	82.0	-
MS3D 058-035-060 RP5	5.80	6.00	35.0	44.0	82.0	-
MS3D 059-035-060 RP5	5.90	6.00	35.0	44.0	82.0	-
MS3D 060-035-060 RP5	6.00	6.00	35.0	44.0	82.0	M7
MS3D 061-043-080 RP5	6.10	8.00	43.0	53.0	91.0	-
MS3D 063-043-080 RP5	6.30	8.00	43.0	53.0	91.0	-
MS3D 064-043-080 RP5	6.40	8.00	43.0	53.0	91.0	-
MS3D 065-043-080 RP5	6.50	8.00	43.0	53.0	91.0	-
MS3D 066-043-080 RP5	6.60	8.00	43.0	53.0	91.0	-
MS3D 067-043-080 RP5	6.70	8.00	43.0	53.0	91.0	-
MS3D 068-043-080 RP5	6.80	8.00	43.0	53.0	91.0	M8
MS3D 069-043-080 RP5	6.90	8.00	43.0	53.0	91.0	-
MS3D 070-043-080 RP5	7.00	8.00	43.0	53.0	91.0	-
MS3D 071-043-080 RP5	7.10	8.00	43.0	53.0	91.0	-
MS3D 074-043-080 RP5	7.40	8.00	43.0	53.0	91.0	-
MS3D 075-043-080 RP5	7.50	8.00	43.0	53.0	91.0	-
MS3D 076-043-080 RP5	7.60	8.00	43.0	53.0	91.0	-
MS3D 078-043-080 RP5	7.80	8.00	43.0	53.0	91.0	M9
MS3D 080-043-080 RP5	8.00	8.00	43.0	43.0	91.0	-
MS3D 081-049-100 RP5	8.10	10.00	49.0	61.0	103.0	-
MS3D 082-049-100 RP5	8.20	10.00	49.0	61.0	103.0	-
MS3D 083-049-100 RP5	8.30	10.00	49.0	61.0	103.0	-
MS3D 084-049-100 RP5	8.40	10.00	49.0	61.0	103.0	-
MS3D 085-049-100 RP5	8.50	10.00	49.0	61.0	103.0	M10
MS3D 086-049-100 RP5	8.60	10.00	49.0	61.0	103.0	-
MS3D 087-049-100 RP5	8.70	10.00	49.0	61.0	103.0	-
MS3D 088-049-100 RP5	8.80	10.00	49.0	61.0	103.0	-
MS3D 090-049-100 RP5	9.00	10.00	49.0	61.0	103.0	-
MS3D 091-049-100 RP5	9.10	10.00	49.0	61.0	103.0	-
MS3D 093-049-100 RP5	9.30	10.00	49.0	61.0	103.0	-
MS3D 095-049-100 RP5	9.50	10.00	49.0	61.0	103.0	M11
MS3D 096-049-100 RP5	9.60	10.00	49.0	61.0	103.0	-

⁽¹⁾ Used for standard thread size.

Available grade MC98

for user guide, see pages 136-152

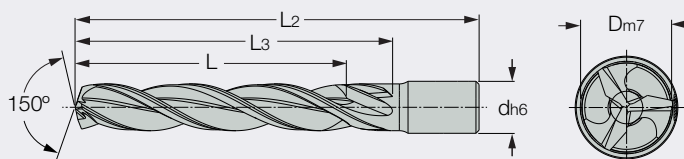
SOLID CARBIDE DRILLS

MS3D-RP5 (continued)

3 Flute Solid Carbide Drills without Coolant Holes, Drilling Depth 5xD, DIN 6537



D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	D	d	L	L3	L2	T _h ⁽¹⁾
MS3D 097-049-100 RP5	9.70	10.00	49.0	61.0	103.0	-
MS3D 098-049-100 RP5	9.80	10.00	49.0	61.0	103.0	-
MS3D 100-049-100 RP5	10.00	10.00	49.0	61.0	103.0	-
MS3D 101-056-120 RP5	10.10	12.00	56.0	71.0	118.0	-
MS3D 102-056-120 RP5	10.20	12.00	56.0	71.0	118.0	M12
MS3D 103-056-120 RP5	10.30	12.00	56.0	71.0	118.0	-
MS3D 105-056-120 RP5	10.50	12.00	56.0	71.0	118.0	-
MS3D 107-056-120 RP5	10.70	12.00	56.0	71.0	118.0	-
MS3D 108-056-120 RP5	10.80	12.00	56.0	71.0	118.0	-
MS3D 110-056-120 RP5	11.00	12.00	56.0	71.0	118.0	-
MS3D 111-056-120 RP5	11.10	12.00	56.0	71.0	118.0	-
MS3D 112-056-120 RP5	11.20	12.00	56.0	71.0	118.0	-
MS3D 115-056-120 RP5	11.50	12.00	56.0	71.0	118.0	-
MS3D 117-056-120 RP5	11.70	12.00	56.0	71.0	118.0	-
MS3D 118-056-120 RP5	11.80	12.00	56.0	71.0	118.0	-
MS3D 120-056-120 RP5	12.00	12.00	56.0	71.0	118.0	M14
MS3D 121-060-140 RP5	12.10	14.00	60.0	77.0	124.0	-
MS3D 125-060-140 RP5	12.50	14.00	60.0	77.0	124.0	-
MS3D 127-060-140 RP5	12.70	14.00	60.0	77.0	124.0	-
MS3D 128-060-140 RP5	12.80	14.00	60.0	77.0	124.0	-
MS3D 130-060-140 RP5	13.00	14.00	60.0	77.0	124.0	-
MS3D 131-060-140 RP5	13.10	14.00	60.0	77.0	124.0	-
MS3D 135-060-140 RP5	13.50	14.00	60.0	77.0	124.0	-
MS3D 138-060-140 RP5	13.80	14.00	60.0	77.0	124.0	-
MS3D 140-060-140 RP5	14.00	14.00	60.0	77.0	124.0	M16
MS3D 142-063-160 RP5	14.20	16.00	63.0	83.0	133.0	-
MS3D 145-063-160 RP5	14.50	16.00	63.0	83.0	133.0	-
MS3D 150-063-160 RP5	15.00	16.00	63.0	83.0	133.0	-
MS3D 151-063-160 RP5	15.10	16.00	63.0	83.0	133.0	-
MS3D 155-063-160 RP5	15.50	16.00	63.0	83.0	133.0	M18
MS3D 158-063-160 RP5	15.80	16.00	63.0	83.0	133.0	-
MS3D 160-063-160 RP5	16.00	16.00	63.0	83.0	133.0	-
MS3D 165-071-180 RP5	16.50	18.00	71.0	93.0	143.0	-
MS3D 169-071-180 RP5	16.90	18.00	71.0	93.0	143.0	-
MS3D 170-071-180 RP5	17.00	18.00	71.0	93.0	143.0	-
MS3D 175-071-180 RP5	17.50	18.00	71.0	93.0	143.0	M20
MS3D 177-071-180 RP5	17.70	18.00	71.0	93.0	143.0	-
MS3D 180-071-180 RP5	18.00	18.00	71.0	93.0	143.0	-
MS3D 185-077-200 RP5	18.50	20.00	77.0	101.0	153.0	-
MS3D 190-077-200 RP5	19.00	20.00	77.0	101.0	153.0	-
MS3D 195-077-200 RP5	19.50	20.00	77.0	101.0	153.0	M22
MS3D 200-077-200 RP5	20.00	20.00	77.0	101.0	153.0	-

⁽¹⁾ Used for standard thread size.

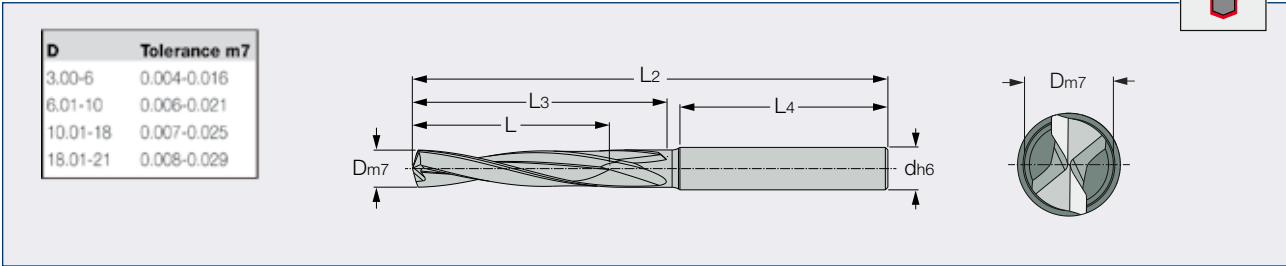
Available grade MC98

for user guide, see pages 136-152

SOLID CARBIDE DRILLS

MSD-RH5 (5xD)

Solid Carbide Drills for Hard Materials, Drilling Depth 5xD



Designation	D	L	L3	d	L4	L2	T _h ⁽¹⁾
MSD 030-015-060 RH5	3.00	15.0	26.0	6.00	35.0	66.0	M4
MSD 033-017-060 RH5	3.30	16.5	26.0	6.00	35.0	66.0	-
MSD 035-018-060 RH5	3.50	17.5	26.0	6.00	35.0	66.0	-
MSD 040-020-060 RH5	4.00	20.0	29.0	6.00	32.0	66.0	-
MSD 042-021-060 RH5	4.20	21.0	32.0	6.00	46.0	82.0	M5
MSD 044-022-060 RH5	4.40	22.0	32.0	6.00	46.0	82.0	-
MSD 045-023-060 RH5	4.50	22.5	32.0	6.00	46.0	82.0	-
MSD 050-025-060 RH5	5.00	25.0	37.0	6.00	41.0	82.0	M6
MSD 053-027-060 RH5	5.30	26.5	39.0	6.00	37.0	82.0	-
MSD 055-028-060 RH5	5.50	27.5	39.0	6.00	37.0	82.0	-
MSD 060-030-060 RH5	6.00	30.0	43.0	6.00	37.0	82.0	M7
MSD 068-034-080 RH5	6.80	34.0	49.0	8.00	39.0	91.0	M8
MSD 070-035-080 RH5	7.00	35.0	49.0	8.00	39.0	91.0	-
MSD 075-038-080 RH5	7.50	37.5	52.0	8.00	34.0	91.0	-
MSD 078-039-080 RH5	7.80	42.0	55.0	8.00	34.0	91.0	M9
MSD 080-040-080 RH5	8.00	40.0	55.0	8.00	34.0	91.0	-
MSD 085-043-100 RH5	8.50	42.5	59.0	10.00	46.0	112.0	-
MSD 088-044-100 RH5	8.80	44.0	63.0	10.00	46.0	112.0	M10
MSD 090-045-100 RH5	9.00	45.0	63.0	10.00	46.0	112.0	-
MSD 095-048-100 RH5	9.50	47.5	66.0	10.00	39.0	112.0	M11
MSD 100-050-100 RH5	10.00	50.0	70.0	10.00	39.0	112.0	-
MSD 105-053-120 RH5	10.50	52.5	71.0	12.00	45.0	122.0	-
MSD 110-055-120 RH5	11.00	55.0	74.0	12.00	45.0	122.0	-
MSD 115-058-120 RH5	11.50	57.5	77.0	12.00	40.0	122.0	-

⁽¹⁾ Used for standard thread size.

Available grade MC93

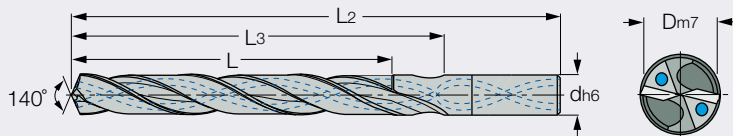
for user guide, see pages 136-152

SOLID CARBIDE DRILLS

MSD-RCP8 (8xD)

Solid Carbide Drills with Coolant Holes, Drilling Depth 8xD

D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	D	d	L	L3	L2	Th
MSD 048-048-060 RCP8	4.8	6	48	57	95	-
MSD 049-048-060 RCP8	4.9	6	48	57	95	-
MSD 050-048-060 RCP8	5	6	48	57	95	M6
MSD 051-048-060 RCP8	5.1	6	48	57	95	-
MSD 052-048-060 RCP8	5.2	6	48	57	95	-
MSD 053-048-060 RCP8	5.3	6	48	57	95	-
MSD 054-048-060 RCP8	5.4	6	48	57	95	-
MSD 055-048-060 RCP8	5.5	6	48	57	95	-
MSD 056-048-060 RCP8	5.6	6	48	57	95	-
MSD 057-048-060 RCP8	5.7	6	48	57	95	-
MSD 058-048-060 RCP8	5.8	6	48	57	95	-
MSD 059-048-060 RCP8	5.9	6	48	57	95	-
MSD 060-048-060 RCP8	6	6	48	57	95	M7
MSD 061-064-080 RCP8	6.1	8	64	76	114	-
MSD 062-064-080 RCP8	6.2	8	64	76	114	-
MSD 063-064-080 RCP8	6.3	8	64	76	114	-
MSD 064-064-080 RCP8	6.4	8	64	76	114	-
MSD 065-064-080 RCP8	6.5	8	64	76	114	-
MSD 066-064-080 RCP8	6.6	8	64	76	114	-
MSD 067-064-080 RCP8	6.7	8	64	76	114	-
MSD 068-064-080 RCP8	6.8	8	64	76	114	M8
MSD 069-064-080 RCP8	6.9	8	64	76	114	-
MSD 070-064-080 RCP8	7	8	64	76	114	-
MSD 071-064-080 RCP8	7.1	8	64	76	114	-
MSD 072-064-080 RCP8	7.2	8	64	76	114	-
MSD 073-064-080 RCP8	7.3	8	64	76	114	-
MSD 074-064-080 RCP8	7.4	8	64	76	114	-
MSD 075-064-080 RCP8	7.5	8	64	76	114	-
MSD 076-064-080 RCP8	7.6	8	64	76	114	-
MSD 077-064-080 RCP8	7.7	8	64	76	114	-
MSD 078-064-080 RCP8	7.8	8	64	76	114	M9
MSD 079-064-080 RCP8	7.9	8	64	76	114	-
MSD 080-064-080 RCP8	8	8	64	76	114	-
MSD 081-080-100 RCP8	8.1	10	80	95	142	-
MSD 082-080-100 RCP8	8.2	10	80	95	142	-
MSD 083-080-100 RCP8	8.3	10	80	95	142	-
MSD 084-080-100 RCP8	8.4	10	80	95	142	-
MSD 085-080-100 RCP8	8.5	10	80	95	142	M10
MSD 086-080-100 RCP8	8.6	10	80	95	142	-
MSD 087-080-100 RCP8	8.7	10	80	95	142	-
MSD 088-080-100 RCP8	8.8	10	80	95	142	-
MSD 089-080-100 RCP8	8.9	10	80	95	142	-
MSD 090-080-100 RCP8	9	10	80	95	142	-
MSD 091-080-100 RCP8	9.1	10	80	95	142	-
MSD 092-080-100 RCP8	9.2	10	80	95	142	-
MSD 093-080-100 RCP8	9.3	10	80	95	142	-
MSD 094-080-100 RCP8	9.4	10	80	95	142	-
MSD 095-080-100 RCP8	9.5	10	80	95	142	M11
MSD 096-080-100 RCP8	9.6	10	80	95	142	-
MSD 097-080-100 RCP8	9.7	10	80	95	142	-
MSD 098-080-100 RCP8	9.8	10	80	95	142	-
MSD 099-080-100 RCP8	9.9	10	80	95	142	-
MSD 100-080-100 RCP8	10	10	80	95	142	-

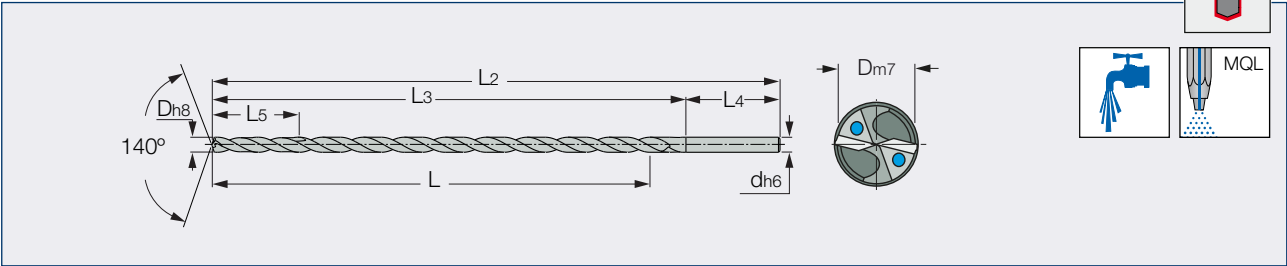
Available grade MC98

for user guide, see pages 136-152

SOLID CARBIDE DRILLS

MSD-RCP20 (20xD)

Solid Carbide Drills with Coolant Holes, Drilling Depth 20xD



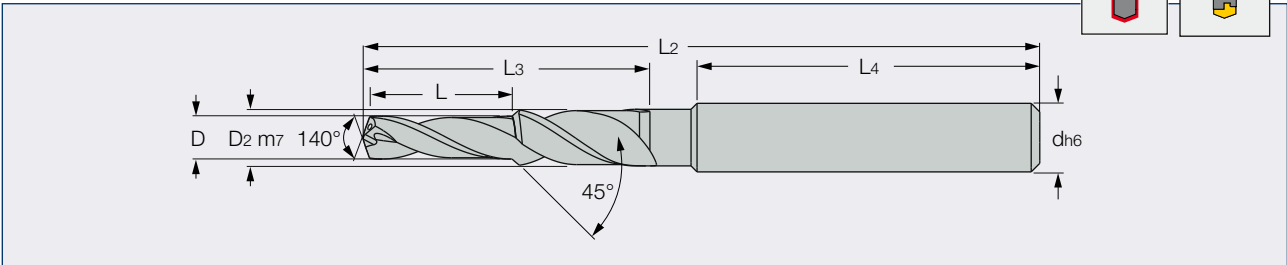
Designation	D	L	L3	L2	L4	L5	d
MSD 050-100-050RCP20	5	100	115	165	50	40	5
MSD 060-120-060RCP20	6	120	140	190	50	40	6
MSD 070-140-070RCP20	7	140	160	210	50	55	7
MSD 080-160-080RCP20	8	160	180	230	50	55	8
MSD 090-180-090RCP20	9	180	205	265	60	55	9
MSD 100-200-100RCP20	10	200	225	285	60	55	10

Available grade MC98

for user guide, see pages 136-152

MSDT

Pre-Thread Solid Carbide Drills with Coolant Holes



Designation	Th	D	D2	L2	L	L3	d	L4
MSDT 025-009-060-M3	M3	2.5	4	62	8.8	20	6	36
MSDT 033-011-060-M4	M4	3.3	4.5	62	11.4	24	6	36
MSDT 042-014-060-M5	M5	4.2	5.5	66	13.6	28	6	36
MSDT 050-017-080-M6	M6	5	6.6	79	16.5	34	8	40
MSDT 068-021-100-M8	M8	6.8	9	89	21	47	10	40
MSDT 085-026-120-M10	M10	8.5	11	102	25.5	55	12	40

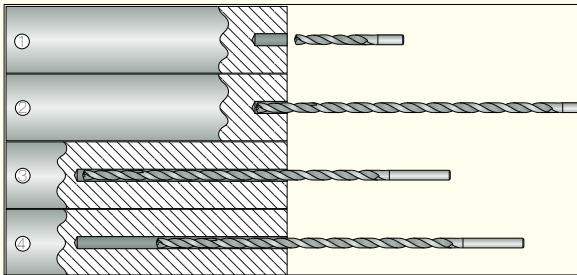
Available grade MC98

for user guide, see pages 136-152

SOLID CARBIDE DRILLS USER GUIDE

Recommended Drilling Procedure for Deep Hole Drilling (20xD)

1. Drill a pilot hole 1-2*D deep with a short drill. The pilot drill should be 0.03-0.05 mm larger than the long drill and its point angle should also be larger (over 140°).
2. Enter the pre-hole using low speed and feed until it engages the material.
3. Increase cutting speed and feed to recommended conditions – **no pecking is required!**
4. After having reached the required depth, reduce speed by more than 50% while retracting from the hole.



Recommended Drilling Conditions for Solid Carbide 20xD Drills

Drill Dia. (mm)	Carbon Steel (30 HRc)		Alloy Steel (45 HRc)		Stainless Steel		Cast Iron (GG25)		Ductile Cast Iron (GG45)	
	V(m/min)	f(mm/rev)	V(m/min)	f(mm/rev)	V(m/min)	f(mm/rev)	V(m/min)	f(mm/rev)	V(m/min)	f(mm/rev)
5	60-120	0.12-0.25	50-100	0.1-0.20	30-60	0.08-0.15	60-120	0.15-0.30	40-80	0.15-0.25
6	60-120	0.14-0.25	50-100	0.14-0.25	30-60	0.10-0.18	60-120	0.14-0.25	40-80	0.14-0.25
7-8	60-120	0.16-0.30	50-100	0.16-0.30	30-60	0.10-0.20	60-120	0.16-0.30	40-80	0.16-0.30
9-10	60-120	0.16-0.30	50-100	0.10-0.20	30-60	0.08-0.115	60-120	0.20-0.35	40-80	0.20-0.35

General Recommendations

- It is mostly recommended to use an external coolant jet at a minimum pressure of 10 to 15 bar during drilling for prolonged tool life and to facilitate chip evacuation.
- When machining alloy and stainless steel, it is mostly recommended to use ER JET 2 collet to prolong tool life and prevent built-up edge.
- Semi-synthetic or emulsion lubricants should be used to extend tool life.
- Drilling stainless steel or high temperature alloys requires high oil pressure and 7-15% mineral or vegetable based oil emulsion for prolonged tool life. Dry machining may badly affect hole quality and drill tool life.
- In case of chip evacuation problems or when poor surface finish is obtained, it is most recommended to use pecking cycle.
- For optimal performance, it is recommended to use the 3 flute, 5xD solid carbide drills in rotating or stationary applications with a maximum of 0.02 mm runout. Larger runout will reduce drill performance and badly affect hole quality.
- The solid drills can be clamped into any of MORSE's tooling systems such as:
 1. Collet chucks
 2. Thermal shrink chucks
 3. MAXIN power chucks
- It is recommended to use the solid drills in SHORTIN adapters with AA super precision collets to obtain a high level of hole quality and prolonged drill tool life. Balanceable adapters should be used for applications above 10,000 RPM in order to minimize vibrations and gain a reliable and prolonged cutting edge life.
- Interrupted cut applications reduce hole accuracy, quality and drill life.

Advantages

The drills provide higher hole cylindricity, roundness, straightness, concentricity and surface finish when compared to 2 flute solid carbide drills.

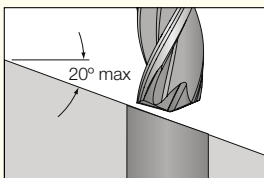
The 3 flute solid carbide drills with a 150° point head can serve as centering drills for CHAMDRILL/SUMOCHAM or CHAMGUN if necessary.

- Solid carbide drills can be used on a wide range of materials and different cutting conditions with high reliability and performance repeatability. This can reduce tool inventory and logistic costs.

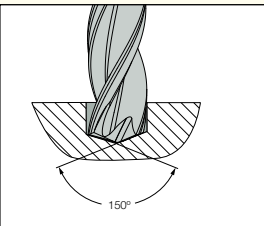
3 Flute Solid Carbide Drills

Three flute drills are used extensively on nonferrous metals because of their excellent performance on these materials. These solid carbide drills were designed with a special cutting edge geometry that can be used on a broad spectrum of materials including steel, stainless steel, high temperature alloys, cast iron and nonferrous materials. Their dimensions are according to DIN 6537 standard. The MS3D drills are manufactured in m7 diameter tolerance, with cylindrical shanks according to DIN 6535 HA standard, 30° spiral flute helix, 150° head point angle and a reinforced web taper.

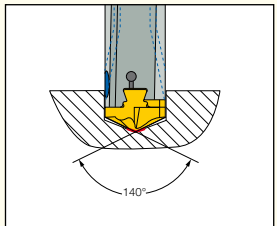
The drills can be used on surface applications of up to 20° sloped entry/exit. (In this case, the drill should be held in a thermal shrink collet or a MAXIN power chuck). The 3 flute solid carbide drills cannot be used on radial drill adjustment diameter devices such as our FITBORE adapter.



3 Flute Centering Drill



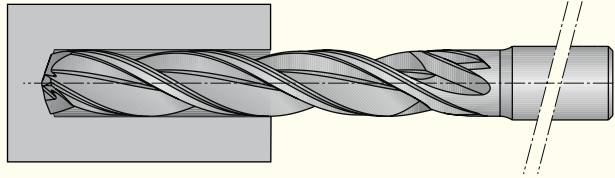
Followed by a CHAMDRILL SUMOCHAM/CHAMGUN



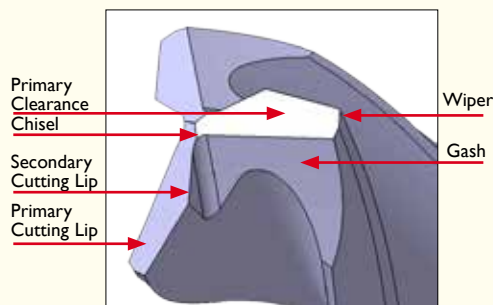
SOLID CARBIDE DRILLS USER GUIDE

3 Flute Solid Carbide Drills

3 flute drill, drilling a pre-hole
(drill diameter $+0.02$ mm)



- The solid carbide drills can be re-sharpened and re-coated at least 10 times (see re-grinding instructions on page 595).
- The 3 flute drills feature high dynamic stability and reduced vibrations, which enable high speed drilling on nonferrous materials. (It is recommended to use balanceable adapters when exceeding 10,000 RPM).
- 3 flute, solid carbide drills can be used with minimal quantity lubrication or emulsion spray (MMS or MQL systems) or even dry machining for nonferrous materials.
- The 3 flute solid carbide drill has a unique



cutting edge and gash geometry, producing an optimal chip on all kinds of materials, providing excellent chip evacuation.

- Excellent performance on low carbon steel or other gummy materials, when compared to any other 3 flute solid carbide drills which are usually not recommended to be used on such materials.
- Higher cutting edge life, when compared to 2 flute solid carbide drills without internal coolant holes. (The load is divided among three cutting edges, versus two).

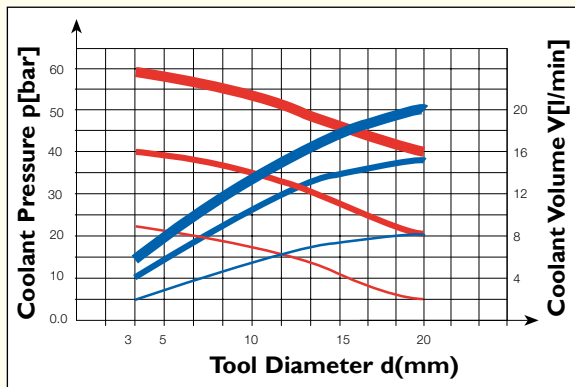
When compared to 2 flute solid carbide drills:

- Prolonged cutting edge life increases productivity, due to decrease in drill change and setup time.
- Less torque per cutting edge, therefore, can be used at higher feed rates or used to reduce torque on machines with limited torque
- The 3 flute solid carbide drills can be used on any CNC machining center, lathe machine, or drilling machine (which usually provides better and more stable conditions).



SOLID CARBIDE DRILLS USER GUIDE

Coolant Pressure and Volume Recommendations



Required Coolant Pressure

- Optimum pressure
- Good pressure
- Minimum pressure

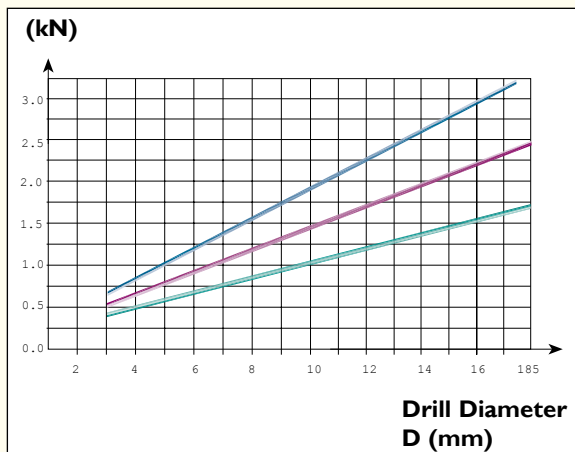
Required Coolant Volume

- Optimum volume
- Good volume
- Minimum volume

Required coolant pressure and volume for SCD drills with internal coolant spiral nozzles.

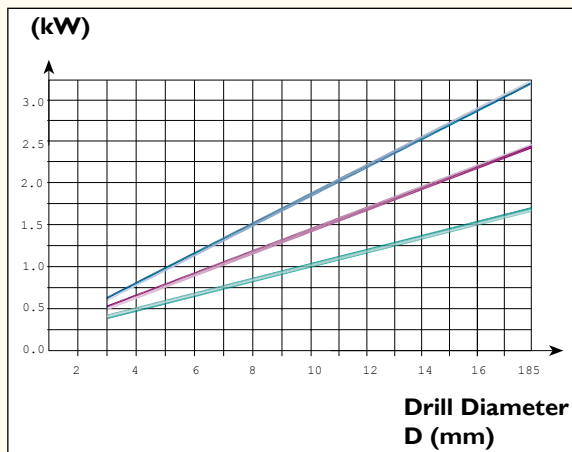
Force and Power Characteristics

Feed Force



- f=0.30 mm/rev
- f=0.25 mm/rev
- f=0.20 mm/rev

Net Power Consumption



- f=0.30 mm/rev
- f=0.25 mm/rev
- f=0.20 mm/rev

Material: SAE 4340
Speed: 100 m/min

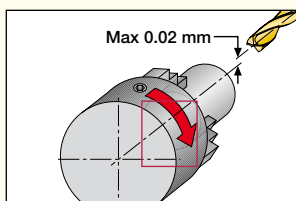
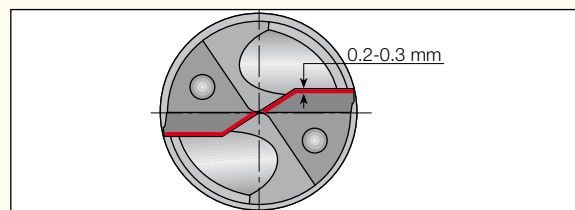
Values may change for different materials and drilling conditions.

Stability

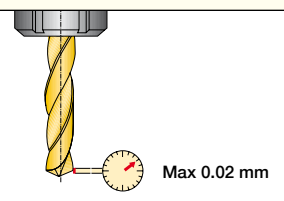
The stability of the application volume is important in order to obtain the very best tool life and hole accuracy. Check the condition of the machine spindle, fixture and fixturing of the component to secure maximum stability and rigidity. Unstable conditions can cause tool breakage.

Tool Life

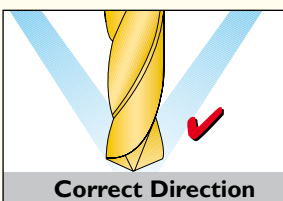
Drills should not be used with flank wear exceeding 0.2-0.3 mm.



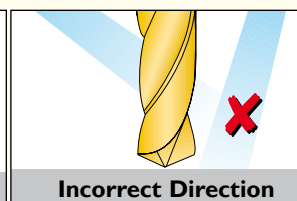
Stationary Drill



Rotating Drill



Correct Direction



Incorrect Direction

External Coolant

External Coolant

SOLID CARBIDE DRILLS USER GUIDE

General - Calculations

Spindle Speed (min ⁻¹)		Power Requirement (kW)	
$n = \frac{vc \cdot 1000}{\pi \cdot D}$		$P_c = \frac{Q}{60.000 \cdot \eta} \cdot k_c \cdot \sin k$	
Cutting Speed (m/min)		Torque (Nm)	
$vc = \frac{\pi \cdot D \cdot n}{1000}$		$M_c = \frac{f \cdot k_c}{1000} \cdot \frac{D^2}{8} \cdot \sin k \cdot k_m$	
Table Feed (mm/min)		Feed Force (approx.) (N)	
$vf = f \cdot n$		$F_f = 0.63 \cdot \frac{D}{2} \cdot f \cdot k_c \cdot \sin k \cdot k_f$	
Material Removal Rate (cm ³ /min)		Machining Time (min/piece)	
$Q = \frac{vf \cdot \pi \cdot D^2}{4000}$		$T_c = \frac{L+h}{vf}$	
		Machining Cost (\$/piece)	
		$C_c = \frac{C_{Mh}}{60} \cdot T_c$	

Example

Drill DR 220-044-25-07-2D-N (Ø22 mm) k=90°; sin k=1
Material No. 4 k_c=2200 N/mm² C_{Mh}=50 \$/h η=0.75
vc=200 m/min f=0.15 mm/rev L=25 mm h=10 mm
k_m=1 k_f=1

$n = \frac{vc \cdot 1000}{\pi \cdot D} = \frac{200 \cdot 1000}{\pi \cdot 22} = 2894 \text{ min}^{-1}$

$vf = f \cdot n = 0.15 \cdot 2894 = 434 \text{ mm/min}$

$Q = \frac{vf \cdot \pi \cdot D^2}{4000} = \frac{434 \cdot 3.14 \cdot (22)^2}{4000} = 165 \text{ cm}^3/\text{min}$

$P_c = \frac{Q}{60.000 \cdot \eta} \cdot k_c \cdot \sin k = \frac{165}{60.000 \cdot 0.75} \cdot 2200 \cdot 1 = 8.06 \text{ kW}$

$M_c = \frac{f \cdot k_c}{1000} \cdot \frac{D^2}{8} \cdot \sin k = \frac{0.15 \cdot 2200}{1000} \cdot \frac{22^2}{8} \cdot 1 = 20 \text{ Nm}$

$F_f = 0.63 \cdot \frac{D}{2} \cdot f \cdot k_c \cdot \sin k = 0.63 \cdot \frac{22}{2} \cdot 0.15 \cdot 2200 \cdot 1 = 2286 \text{ N}$

$T_c = \frac{L+h}{vf} = \frac{25+10}{434} = 0.08 \text{ min/piece}$

$C_c = \frac{C_{Mh}}{60} \cdot T_c = \frac{50 \cdot 0.08}{60} = 0.067 \text{ \$/piece}$

Drill Geometry Coefficient

	DCM	DCN	SCD
k _m	1	0.85	0.85
k _f	1	0.85	0.85

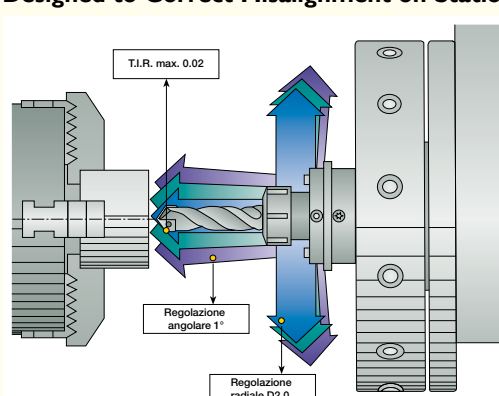
k_c Values

Material Group	k _c Value
1	2000
2	2100
3	2150
4	2200
5	2200
6	2100
7	2100
8	2100
9	2100
10	2500
11	3250
12	2300
13	2800
14	2600
15	1100
16	1300
17	1100
18	1800
19	900
20	1000
21	500
22	800
23	800
26	700
27	700
28	1700
31	3000
32	3100
33	3300
34	3300
35	3200
36	1700
37	1700
38	4600
39	4700
40	4600
41	4500

For material groups, see pages 1008-1043

GYRO Auxiliary Devices for Lathe Machines

Designed to Correct Misalignment on Stationary Operation



- Drills can be used on sloped surfaces up to 6°. When drilling sloped surfaces of more than 6°, reduce feed by 30-50% during penetration of up to 5 mm depth; or use a spot or pre-hole drill to avoid drill deviation or poor drill performance.

SOLID CARBIDE DRILLS USER GUIDE

Machining Data for Solid Carbide Drills -MC98 D=0.8-2.9 mm

ISO	Material	Condition	Tensile Strength [N/mm ²]	Hardness HB	Material No.
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C Annealed	420	125	1
		>= 0.25 %C Annealed	650	190	2
		< 0.55 %C Quenched and tempered	850	250	3
		>= 0.55 %C Annealed	750	220	4
		Quenched and tempered	1000	300	5
	Low alloy steel and cast steel (less than 5% of alloying elements)	Annealed	600	200	6
		Quenched and tempered	930	275	7
			1000	300	8
			1200	350	9
	High alloyed steel, cast steel, and tool steel	Annealed	680	200	10
		Quenched and tempered	1100	325	11
	Stainless steel and cast steel	Ferritic/martensitic	680	200	12
		Martensitic	820	240	13
M	Stainless steel	Austenitic	600	180	14
K	Grey cast iron (GG)	Ferritic/pearlitic		180	15
		Pearlitic		260	16
	Nodular cast iron (GGG)	Ferritic		160	17
		Pearlitic		250	18
	Malleable cast iron	Ferritic		130	19
		Pearlitic		230	20
N	Aluminum-wrought alloy	Not cureable		60	21
		Cured		100	22
	Aluminum-cast, alloyed	<=12% Si Not cureable		75	23
		Cured		90	24
		>12% Si High temperature		130	25
	Copper alloys	>1% Pb Free cutting		110	26
		Brass		90	27
		Electrolitic copper		100	28
	Non-metallic	Duroplastics, fiber plastics			29
		Hard rubber			30
S	Fe based	Annealed		200	31
		Cured		280	32
	High temp. alloys	Ni or Co based Annealed		250	33
		Cured		350	34
		Cast		320	35
	Titanium Ti alloys		RM 400		36
		Alpha+beta alloys cured	RM 1050		37
H	Hardened steel	Hardened		55 HRC	38
		Hardened		60 HRC	39
	Chilled cast iron	Cast		400	40
	Cast iron	Hardened		55 HRC	41

- For drill with length to diameter ratio larger than 6xD, reduce feed by 20%
- If the RPM exceeds 10,000, a dynamic balance should be done to the system
- Maximal radial and axial runout should not exceed 0.01 mm

SOLID CARBIDE DRILLS USER GUIDE

Mtl. No. ⁽¹⁾	Cutting Speed V _c (m/min)	Feed (mm/rev) vs. Drill Diameter			
		Ø0.8-1.4	Ø1.5-1.9	Ø2-2.4	Ø2.5-2.9
1	50-100	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
2	40-100	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
3	40-85	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
4	40-85	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
5	40-85	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
6	40-75	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
7	40-60	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
8	40-60	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
9	40-60	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
10	30-50	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
11	30-50	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
12	20-35	0.03-0.06	0.04-0.08	0.05-0.10	0.06-0.10
13	20-35	0.03-0.06	0.04-0.08	0.05-0.10	0.06-0.10
14	20-35	0.03-0.06	0.04-0.08	0.05-0.10	0.06-0.10
15	40-80	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
16	40-70	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
17	40-95	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
18	50-95	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
19	40-80	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
20	40-80	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
21	80-150	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
22	80-150	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
23	80-150	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
24	80-150	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
25	80-150	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
26	80-150	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
27	50-150	0.05-0.12	0.07-0.15	0.08-0.18	0.09-0.18
28	60-160	0.05-0.15	0.07-0.18	0.08-0.20	0.09-0.22
29					
30					
31	10-20	0.02-0.04	0.03-0.06	0.04-0.07	0.04-0.08
32	10-20	0.02-0.04	0.03-0.06	0.04-0.07	0.04-0.08
33	10-20	0.02-0.04	0.03-0.06	0.04-0.07	0.04-0.08
34	10-20	0.02-0.04	0.03-0.06	0.04-0.07	0.04-0.08
35	10-20	0.02-0.04	0.03-0.06	0.04-0.07	0.04-0.08
36	10-20	0.02-0.03	0.02-0.03	0.03-0.04	0.03-0.04
37	10-20	0.02-0.03	0.02-0.03	0.03-0.04	0.03-0.04
38	10-20	0.01-0.02	0.01-0.02	0.02-0.03	0.02-0.03
39	10-20	0.01-0.02	0.01-0.02	0.02-0.03	0.02-0.03
40	10-20	0.01-0.02	0.01-0.02	0.02-0.03	0.02-0.03
41	10-20	0.01-0.02	0.01-0.02	0.02-0.03	0.02-0.03

As a starting value, the middle of the recommended machining range should be used.
Then, (according to wear results), conditions can be changed in order to optimize performance.

SOLID CARBIDE DRILLS USER GUIDE

Machining Data for Solid Carbide Drills - MC98 D=3.0-20.0 mm

ISO	Material	Condition	Tensile Strength [N/mm ²]	Hardness HB	Material No.
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C Annealed	420	125	1
		>= 0.25 %C Annealed	650	190	2
		< 0.55 %C Quenched and tempered	850	250	3
		>= 0.55 %C Annealed	750	220	4
		Quenched and tempered	1000	300	5
	Low alloy steel and cast steel (less than 5% of alloying elements)	Annealed	600	200	6
		Quenched and tempered	930	275	7
			1000	300	8
			1200	350	9
	High alloyed steel, cast steel, and tool steel	Annealed	680	200	10
		Quenched and tempered	1100	325	11
	Stainless steel and cast steel	Ferritic/martensitic	680	200	12
		Martensitic	820	240	13
M	Stainless steel	Austenitic	600	180	14
K	Grey cast iron (GG)	Ferritic/pearlitic		180	15
		Pearlitic		260	16
	Nodular cast iron (GGG)	Ferritic		160	17
		Pearlitic		250	18
	Malleable cast iron	Ferritic		130	19
		Pearlitic		230	20
N	Aluminum-wrought alloy	Not cureable		60	21
		Cured		100	22
	Aluminum-cast, alloyed	<=12% Si Not cureable		75	23
		Cured		90	24
		>12% Si High temperature		130	25
	Copper alloys	>1% Pb Free cutting		110	26
		Brass		90	27
		Electrolitic copper		100	28
	Non-metallic	Duroplastics, fiber plastics			29
		Hard rubber			30
S	High temp. alloys	Fe based Annealed		200	31
		Cured		280	32
		Ni or Co based Annealed		250	33
		Cured		350	34
		Cast		320	35
	Titanium Ti alloys		RM 400		36
		Alpha+beta alloys cured	RM 1050		37
H	Hardened steel	Hardened		55 HRC	38
		Hardened		60 HRC	39
	Chilled cast iron	Cast		400	40
	Cast iron	Hardened		55 HRC	41

- When using external coolant supply only, reduce cutting speed by 10%
- Use internal coolant supply when machining austenitic stainless steel

SOLID CARBIDE DRILLS USER GUIDE

Mtl. No.(I)	Cutting Speed Vc m/min	Feed (mm/rev) vs. Drill Diameter				
		Ø3-5	Ø5.1-8	Ø8.1-12	Ø12.1-16	Ø16.1-20
1	80-120	0.10-0.18	0.15-0.25	0.2-0.30	0.20-0.35	0.25-0.40
2	80-110	0.10-0.18	0.15-0.25	0.2-0.30	0.20-0.35	0.25-0.40
3	70-100	0.10-0.20	0.15-0.28	0.2-0.35	0.20-0.38	0.25-0.42
4						
5						
6	70-90	0.10-0.18	0.15-0.25	0.2-0.30	0.20-0.35	0.25-0.40
7						
8						
9	60-80	0.10-0.18	0.15-0.25	0.2-0.30	0.20-0.35	0.25-0.40
10	50-70	0.10-0.20	0.15-0.28	0.2-0.35	0.20-0.38	0.25-0.42
11	60-80	0.10-0.20	0.15-0.28	0.18-0.35	0.20-0.38	0.25-0.42
12	50-70	0.10-0.15	0.12-0.20	0.14-0.25	0.16-0.30	0.18-0.32
13	25-75	0.04-0.10	0.05-0.15	0.05-0.18	0.08-0.20	0.10-0.20
14	25-75	0.04-0.10	0.05-0.15	0.05-0.18	0.08-0.20	0.10-0.20
15	85-105	0.15-0.25	0.20-0.35	0.25-0.45	0.30-0.50	0.35-0.55
16	75-90	0.15-0.25	0.20-0.35	0.25-0.45	0.30-0.50	0.35-0.55
17	65-80	0.12-0.20	0.15-0.25	0.20-0.35	0.25-0.40	0.30-0.45
18						
19						
20						
21	70-300	0.10-0.25	0.15-0.35	0.25-0.45	0.30-0.50	0.35-0.55
22						
23						
24	70-200	0.07-0.18	0.12-0.25	0.20-0.35	0.25-0.45	0.30-0.50
25						
26						
27						
28						
29						
30						
31	15-35	0.02-0.07	0.04-0.10	0.06-0.12	0.08-0.15	0.08-0.18
32						
33						
34						
35						
36						
37						
38	40-70	0.06-0.10	0.08-0.12	0.10-0.14	0.12-0.16	0.14-0.18
39						
40						
41						

As a starting value, the middle of the recommended machining range should be used.
Then, (according to wear results), conditions can be changed in order to optimize performance.

SOLID CARBIDE DRILLS USER GUIDE

Cutting Recommendations for 3 Flute Solid Carbide Drills - MC98

ISO	Material	Condition	Tensile Strength [N/mm²]	Hardness HB	Material No.
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C Annealed	420	125	1
		>= 0.25 %C Annealed	650	190	2
		< 0.55 %C Quenched and tempered	850	250	3
		>= 0.55 %C Annealed	750	220	4
		Quenched and tempered	1000	300	5
	Low alloy steel and cast steel (less than 5% of alloying elements)	Annealed	600	200	6
		Quenched and tempered	930	275	7
			1000	300	8
			1200	350	9
	High alloyed steel, cast steel, and tool steel	Annealed	680	200	10
		Quenched and tempered	1100	325	11
	Stainless steel and cast steel	Ferritic/martensitic	680	200	12
		Martensitic	820	240	13
M	Stainless steel	Austenitic	600	180	14
K	Grey cast iron (GG)	Ferritic/pearlitic		180	15
		Pearlitic		260	16
	Nodular cast iron (GGG)	Ferritic		160	17
		Pearlitic		250	18
	Malleable cast iron	Ferritic		130	19
		Pearlitic		230	20
N	Aluminum-wrought alloy	Not cureable		60	21
		Cured		100	22
	Aluminum-cast, alloyed	<=12% Si Not cureable		75	23
		Cured		90	24
		>12% Si High temperature		130	25
	Copper alloys	>1% Pb Free cutting		110	26
		Brass		90	27
		Electrolitic copper		100	28
	Non-metallic	Duroplastics, fiber plastics			29
		Hard rubber			30
S	Fe based	Annealed		200	31
		Cured		280	32
	High temp. alloys	Ni or Co based Annealed		250	33
		Cured		350	34
		Cast		320	35
	Titanium Ti alloys		RM 400		36
		Alpha+beta alloys cured	RM 1050		37
H	Hardened steel	Hardened		55 HRC	38
		Hardened		60 HRC	39
	Chilled cast iron	Cast		400	40
	Cast iron	Hardened		55 HRC	41

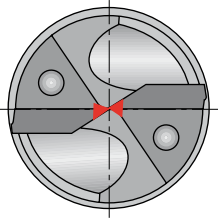
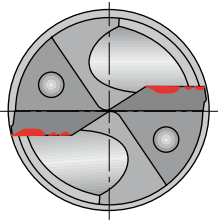
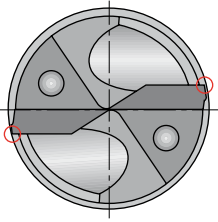
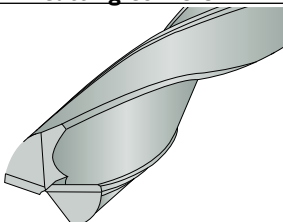
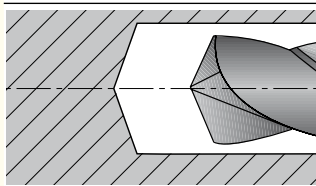
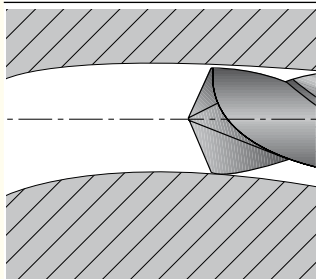
SOLID CARBIDE DRILLS USER GUIDE

Mtl. No. ⁽¹⁾	Cutting speed vc m/min	Feed (mm/rev) vs. Drill Diameter				
		3-5	5.1-8	8.1-12	12.1-16	16.1-20
1	60-120	0.08-0.15	0.12-0.2	0.15-0.22	0.18-0.3	0.24-0.38
2	60-120					
3	70-100	0.08-0.16	0.12-0.23	0.15-0.28	0.2-0.34	0.25-0.40
4	70-110					
5	70-90					
6	60-120	0.08-0.15	0.12-0.2	0.15-0.22	0.16-0.28	0.2-0.32
7	70-110					
8	60-90					
9	50-80	0.08-0.16	0.12-0.23	0.15-0.28	0.15-0.31	0.2-0.34
10	60-120	0.08-0.16	0.12-0.23	0.15-0.28	0.15-0.31	0.2-0.34
11	40-70	0.08-0.12	0.1-0.16	0.11-0.2	0.13-0.24	0.15-0.26
12	25-80	0.03-0.08	0.04-0.12	0.04-0.15	0.065-0.16	0.08-0.18
13						
14	25-80	0.03-0.08	0.04-0.12	0.04-0.15	0.065-0.16	0.08-0.18
15	60-110	0.1-0.2	0.14-0.24	0.18-0.32	0.22-0.38	0.26-0.4
16	60-110					
17	80-150	0.12-0.24	0.16-0.28	0.2-0.36	0.24-0.45	0.28-0.48
18	80-150					
19	90-115					
20	90-115					
21	100-300	0.14-0.25	0.18-0.35	0.25-0.45	0.3-0.5	0.35-0.55
22						
23						
24						
25	100-200	0.1-0.18	0.12-0.25	0.2-0.34	0.24-0.42	0.26-0.5
26						
27						
28						
29						
30						
31	15-40	0.03-0.06	0.04-0.08	0.05-0.1	0.06-0.12	0.08-0.15
32						
33	15-25 ⁽¹⁾					
34						
35						
36	15-40					
37						
38	20-50	0.03-0.06	0.04-0.08	0.05-0.1	0.06-0.12	0.08-0.15
39						
40						
41						

⁽¹⁾For workpiece materials list, see pages 1008-1043

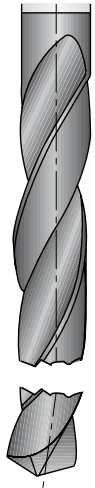
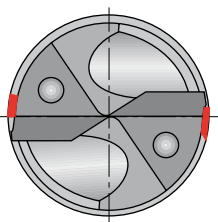
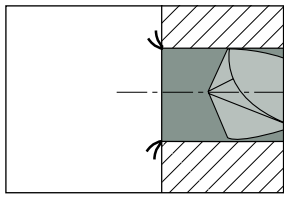
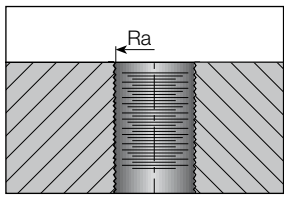
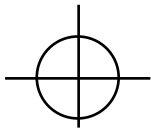
SOLID CARBIDE DRILLS USER GUIDE

Troubleshooting

Problem	Cause	Solution
 Chipping on the chisel edge	• Poor clamping of the chuck • Unsuitable cutting conditions • Chisel runout • Workpiece movement	• Check the clamping. Use hydraulic clamping chuck, maxin power chuck or a shrink system. • Decrease feed, increase coolant pressure. • Check or replace the clamping adaptation. • Increase workpiece chucking force.
 Chipping on the cutting edges / built-up edge	• Poor clamping of the chuck • Unsuitable cutting conditions • Insufficient coolant • Rough application	• Check the clamping. Use hydraulic clamping chuck, maxin power chuck or a shrink system. • Increase cutting speed, reduce feed rate. • Check cooling lubricant. Increase coolant pressure. In the case of external coolant supply, improve jet direction and add cooling jets. • Reduce feed rate by 30-50% during entry and exiting.
 Excessive wear on the cutting corners	• Insufficient coolant • Large runout • Unsuitable cutting conditions • Rough application • Poor clamping of the chuck	• Check cooling lubricant. Increase coolant pressure. In the case of external coolant supply, improve jet direction and add coolant jets. • Check if the runout is within 0.02 mm T.I.R. (radial & axial) • Reduce cutting speed, increase feed. • Reduce feed rate by 30-50% during entry and exit. • Check the clamping. Use hydraulic clamping chuck, maxin power chuck or a shrink system.
 Chipping on the lands	• Workpiece movement • Insufficient coolant • Wrong drill • Unsuitable cutting conditions	• Increase workpiece chucking force. • Check cooling lubricant. Increase coolant pressure. In the case of external coolant supply, improve jet direction and add coolant jets. • Check drill type, drilling depth, cooling system and workpiece material. • Increase feed. When spot drilling, reduce feed.
 Hole diameter out of tolerance	• Unsuitable cutting conditions • Poor clamping of the chuck • Large runout • Worn out center point (chisel)	• If hole size is too large, increase cutting speed or reduce feed. If hole size is too small, reduce cutting speed or increase feed. • Check the clamping. Use hydraulic clamping chuck, maxin power chuck or a shrink system. • Make sure that the drill's runout is within 0.02 mm (radial & axial). • Regrind cutting edge or replace the drill.
 Hole not straight	• Insufficient chip evacuation • Poor clamping of the chuck • Workpiece rigidity • Worn out drill center point (chisel) • Unsuitable cutting conditions	• Use pecking cycle. • Check the clamping. Use hydraulic clamping chuck, maxin power chuck or a shrink system. • Increase workpiece chucking force. • Regrind cutting edge. • Increase feed. When spot drilling, reduce feed.

SOLID CARBIDE DRILLS USER GUIDE

Troubleshooting

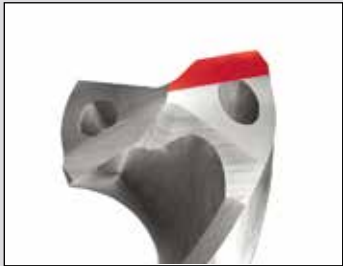
Problem	Cause	Solution
 Drill breakage	• Poor clamping of the chuck • Workpiece movement • Wrong drill • Insufficient coolant • Unsuitable cutting conditions • Worn out drill center point (chisel) • Insufficient chip evacuation	• Check the clamping. Use hydraulic clamping chuck, maxin power chuck or a shrink system. • Increase workpiece chucking force. • Check drill type and drilling depth, cooling system and workpiece material. • Check cooling lubricant. Increase coolant pressure. In the case of external coolant supply, improve jet direction and add cooling jets. • Reduce feed. • Regrind cutting edge. • Use pecking cycle.
 Chipping on the cutting corners	• Poor clamping of the chuck • Workpiece movement • Wrong drill • Insufficient coolant • Unsuitable cutting conditions • Worn out or broken cutting corner	• Check the clamping and adaptation. Use hydraulic clamping chuck, maxin power chuck or a shrink system. • Increase workpiece chucking force. • Check drill type and drilling depth, cooling system and workpiece material. Possibly use longer drill. • Check cooling lubricant. Increase coolant pressure. In the case of external coolant supply, improve jet direction and add cooling jets. • Check cutting parameters, and possibly reduce feed. • Replace drill or regrind cutting edge.
Problem	Cause	Solution
 Burrs on exit	• Unsuitable cutting conditions • Worn out drill	• Reduce feed by 30-50% during exit. • Replace drill.
 Rough surface finish	• Unsuitable cutting conditions • Large runout • Chip jamming	• Adjust feed to improve chip flow. • Make sure that the drill's runout is within 0.02 mm (radial & axial). • Reduce cutting speed. • Increase coolant pressure. • Apply pecking procedure.
 Deviation of hole position	• Large runout • Poor stability • Rough application	• Make sure that the drill runout is within 0.02 mm (radial & axial). • Check and improve drill and workpiece clamping rigidity. • When drilling hard materials or sloped surfaces, reduce feed by 30-50% during entrance. • Use a short pilot drill with 140° point angle.

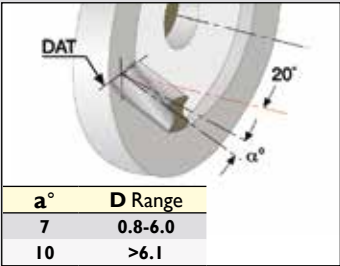
SOLID CARBIDE DRILLS USER GUIDE

Regrinding Instructions for AP and ACP Geometries

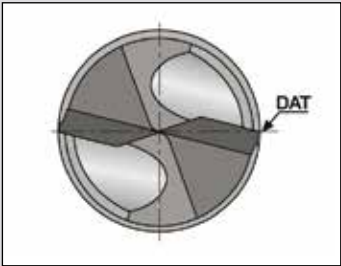
For each grinding operation, rotate the drill 180° and repeat the grinding procedure.

1





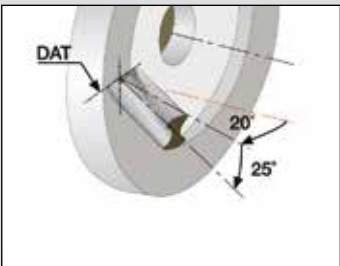
α°	D Range
7	0.8-6.0
10	>6.1

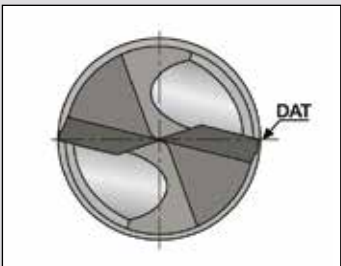


Primary Clearance

2



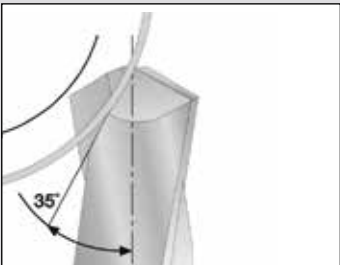


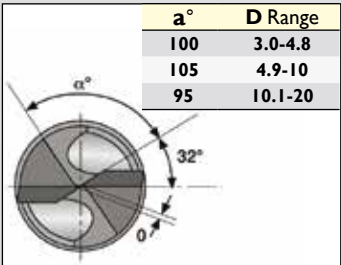


Secondary Clearance

3





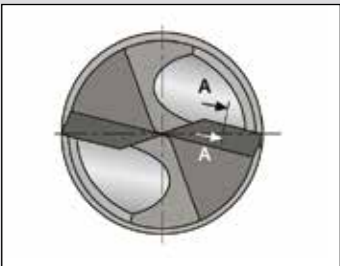


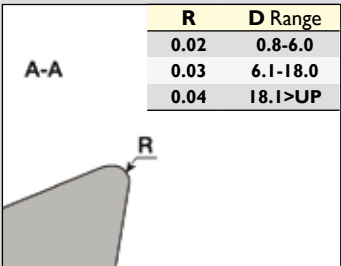
α°	D Range
100	3.0-4.8
105	4.9-10
95	10.1-20

Chisel

4







R	D Range
0.02	0.8-6.0
0.03	6.1-18.0
0.04	18.1>UP

Edge Preparation

Grinding Wheel Recommended Specifications:

1. Diameter grinding wheel: GA2
2. Grinding wheel bond: synthetic resin

3. Grit size: 325/400 mesh (45/38 μ)
4. Diamond concentration: C-75 (3.3 carat/cm³)
5. Cutting fluid emulsion 3%

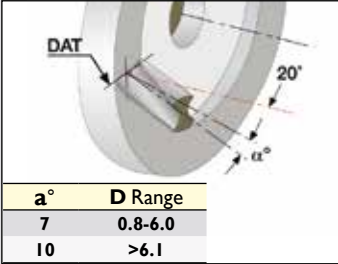
SOLID CARBIDE DRILLS USER GUIDE

Regrinding Instructions for AG and ACG Geometries

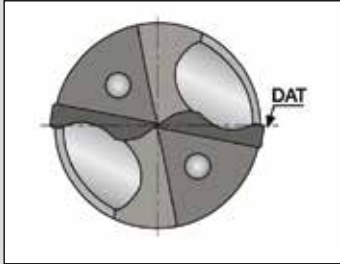
For each grinding operation, rotate the drill 180° and repeat the grinding procedure.

1





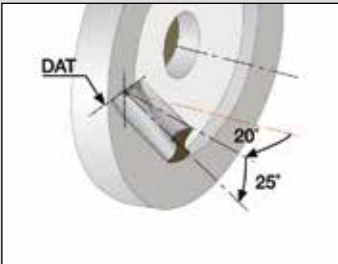
α°	D Range
7	0.8-6.0
10	>6.1

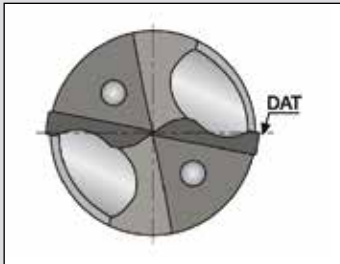


Primary Clearance

2



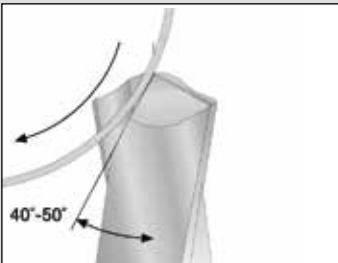


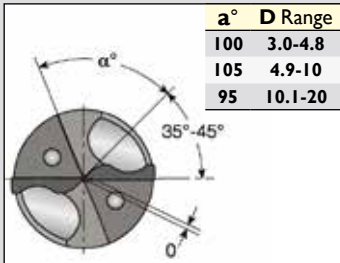


Secondary Clearance

3





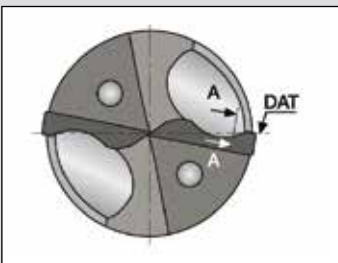


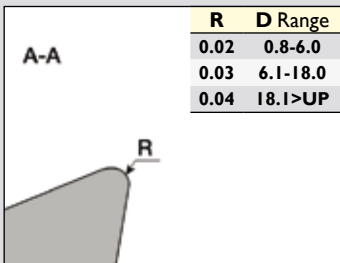
α°	D Range
100	3.0-4.8
105	4.9-10
95	10.1-20

Chisel

4







R	D Range
0.02	0.8-6.0
0.03	6.1-18.0
0.04	18.1>UP

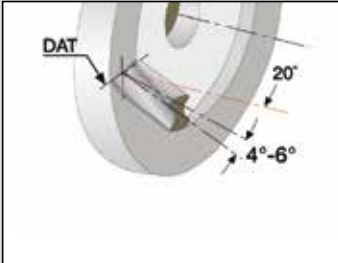
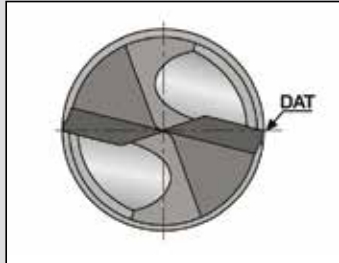
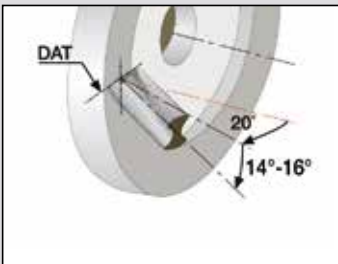
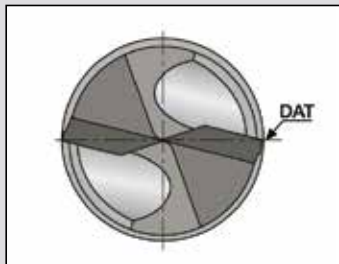
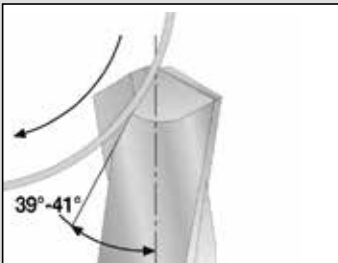
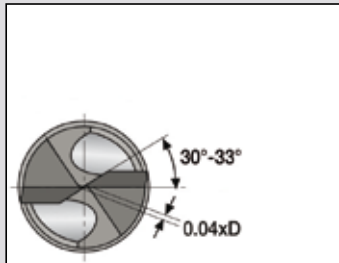
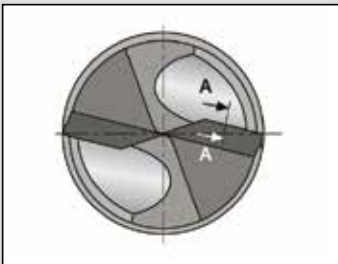
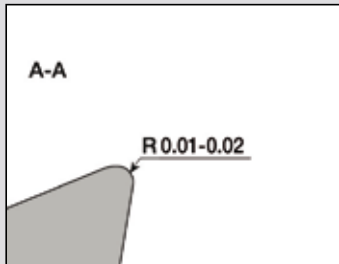
Edge Preparation

- Grinding Wheel Recommended Specifications:**
1. Diameter grinding wheel: GA2
 2. Grinding wheel bond: synthetic resin
 3. Grit size: 325/400 mesh (45/38 μ)
 4. Diamond concentration: C-75 (3.3 carat/cm³)
 5. Cutting fluid emulsion 3%

SOLID CARBIDE DRILLS USER GUIDE

Regrinding Instructions for AH Geometry

For each grinding operation, rotate the drill 180° and repeat the grinding procedure.

1  Primary Clearance		
2  Secondary Clearance		
3  Chisel		
4  Edge Preparation		

Grinding Wheel Recommended Specifications:

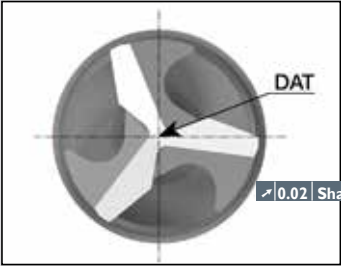
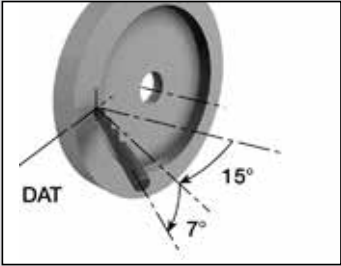
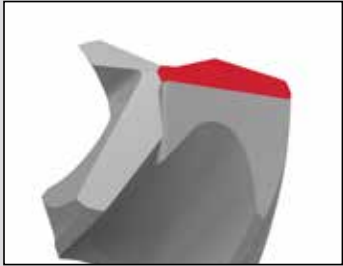
1. Diameter grinding wheel: GA2
2. Grinding wheel bond: synthetic resin
3. Grit size: 325/400 mesh (45/38 μ)
4. Diamond concentration: C-75 (3.3 carat/cm³)
5. Cutting fluid emulsion 3%

SOLID CARBIDE DRILLS USER GUIDE

Regrinding Instructions for 3 Flute SCCD Drills

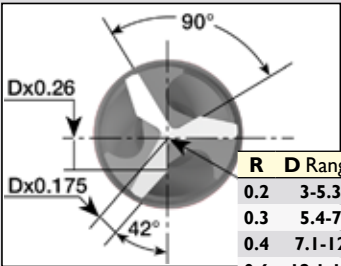
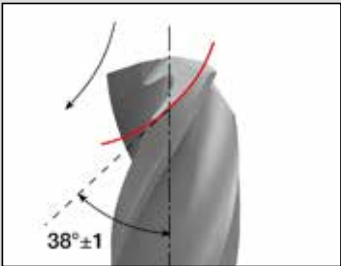
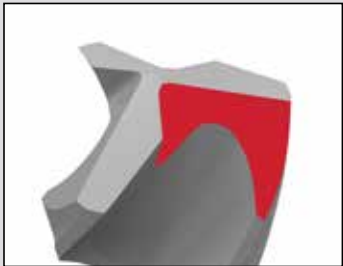
For each grinding operation, rotate the drill 120° and repeat the grinding procedure.

1



Primary Clearance

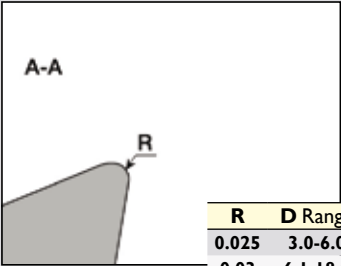
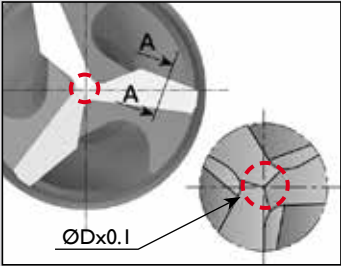
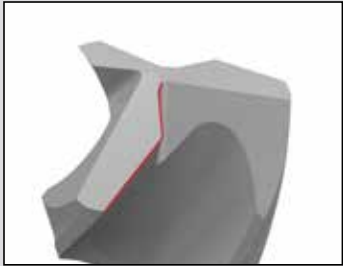
2



Chisel

R	D Range
0.2	3-5.3
0.3	5.4-7
0.4	7.1-12
0.6	12.1-16
0.8	16.1-20

3



Edge Preparation

R	D Range
0.025	3.0-6.0
0.03	6.1-18.0
0.04	18.1-20.0

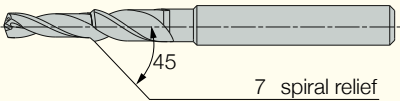
Grinding Wheel Recommended Specifications:

1. Diameter grinding wheel: GA2
2. Grinding wheel bond: synthetic resin
3. Grit size: 325/400 mesh (45/38μ)
4. Diamond concentration: C-75 (3.3 carat/cm3)
5. Cutting fluid emulsion 3%

SOLID CARBIDE DRILLS USER GUIDE

Regrinding Instructions for SCDT Pre-Thread Solid Drills

For each grinding operation, rotate the drill 180° and repeat the grinding procedure.



1

Primary Clearance

a°	D Range
7	0.8-6.0
10	>6.1

2

Secondary Clearance

3

Chisel

a°	D Range
100	3.0-4.8
105	4.9-10
95	10.1-20

4

Edge Preparation

R	D Range
0.02	0.8-6.0
0.03	6.1-18.0
0.04	18.1>UP

Grinding Wheel Recommended Specifications:

1. Diameter grinding wheel: GA2

2. Grinding wheel bond: synthetic resin

3. Grit size: 325/400 mesh (45/38μ)

4. Diamond concentration: C-75 (3.3 carat/cm3)

5. Cutting fluid emulsion 3%



THREAD MILLING



MTEC

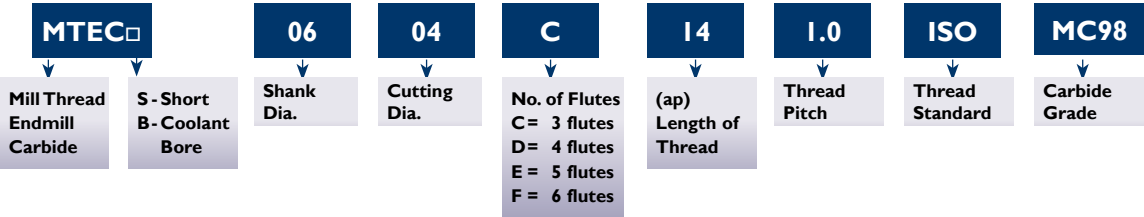
ISO	155-161
UN	162-166
W	167-168
BSF-BSP	168
MJ	169
UNJ	169
BSPFT	170
NPT	170-171
NPTF	171-172
MTECI-A60	173
User Guide.....	174-179



MILL THREAD

SOLID CARBIDE

MORSE THREAD - Solid Carbide Endmills Designation Code Key

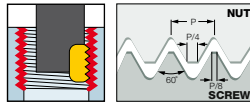
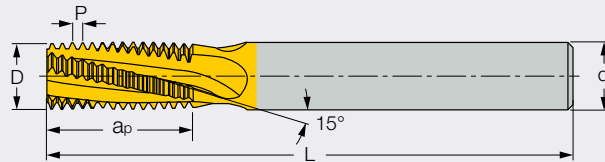


MTEC-ISO

Solid Carbide Internal Threading Endmills for ISO Thread Profile

**3-6
Flute**

Cylindrical



Designation	Pitch	M Coarse	M Fine	d	D	Flute	ap	L	shank
MTEC 06038C10 0.5ISO	0.50	-	≥5	6.00	3.80	3	10.30	58.00	C
MTEC 06022C5 0.5ISO	0.50	M3	≥4	6.00	2.20	3	5.30	58.00	C
MTEC 06031C7 0.7ISO	0.70	M4	≥5	6.00	3.10	3	7.40	58.00	C
MTEC 06045C10 0.75ISO	0.75	-	≥6	6.00	4.50	3	10.00	58.00	C
MTEC 06036C9 0.8ISO	0.80	M5	≥6	6.00	3.60	3	9.20	58.00	C
MTEC 0606C12 1.0ISO	1.00	-	≥9	6.00	6.00	3	12.50	58.00	C
MTEC 0808D16 1.0ISO	1.00	-	≥10	8.00	8.00	4	16.50	64.00	C
MTEC 0604C10 1.0ISO	1.00	M6	≥7	6.00	4.00	3	10.50	58.00	C
MTEC 0604C14 1.0ISO	1.00	M6	≥7	6.00	4.00	3	14.50	58.00	C
MTEC 0605C14 1.25ISO	1.25	M8	≥10	6.00	5.00	3	14.40	58.00	C
MTEC 0605C19 1.25ISO	1.25	M8	≥10	6.00	5.00	3	19.40	58.00	C
MTEC 1010D21 1.5ISO	1.50	-	≥14	10.00	10.00	4	21.80	73.00	C
MTEC 1616F33 1.5ISO	1.50	-	≥20	16.00	16.00	6	33.80	105.00	C
MTEC 0807C17 1.5ISO	1.50	M10	≥12	8.00	7.00	3	17.30	64.00	C
MTEC 0807C24 1.5ISO	1.50	M10	≥12	8.00	7.00	3	24.80	76.00	C
MTEC 0808C20 1.75ISO	1.75	M12	≥14	8.00	8.00	3	20.10	64.00	C
MTEC 0808C28 1.75ISO	1.75	M12	≥14	8.00	8.00	3	28.90	76.00	C
MTEC 1212D27 2.0ISO	2.00	-	≥18	12.00	12.00	4	27.00	84.00	C
MTEC 2020F41 2.0ISO	2.00	-	≥26	20.00	20.00	6	41.00	105.00	C
MTEC 1010C27 2.0ISO	2.00	M16	≥17	10.00	10.00	3	27.00	73.00	C
MTEC 1010C39 2.0ISO	2.00	M16	≥17	10.00	10.00	3	39.00	105.00	C
MTEC 1414D33 2.5ISO	2.50	M20	≥22	14.00	14.00	4	33.80	84.00	C
MTEC 1414D48 2.5ISO	2.50	M20	≥22	14.00	14.00	4	48.80	105.00	C
MTEC 1616C40 3.0ISO	3.00	M24	≥25	16.00	16.00	3	40.50	105.00	C
MTEC 1616C58 3.0ISO	3.00	M24	≥25	16.00	16.00	3	58.50	120.00	C

Available grade: MC98
for user guide, see pages 174-178

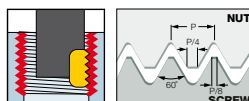
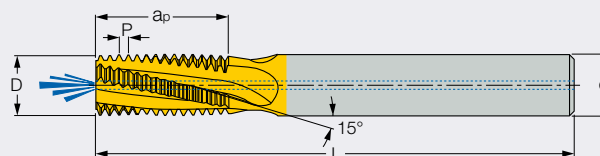
SOLID CARBIDE

MTECB-ISO

Solid Carbide Internal Threading Endmills with Coolant Holes for ISO Thread Profile

3-6
Flute

Cylindrical



Designation	Pitch	M Coarse	M Fine	d	D	Flute	ap	L	Shank
MTECB 06038C10 0.5ISO	0.50	-	≥5	6.00	3.80	3	10.30	58.00	C
MTECB 06031C7 0.7ISO	0.70	M4	≥5	6.00	3.10	3	7.40	58.00	C
MTECB 06045C10 0.75ISO	0.75	-	≥6	6.00	4.50	3	10.10	58.00	C
MTECB 1010D24 0.75ISO	0.75	-	≥12	10.00	10.00	4	24.40	73.00	C
MTECB 06038C9 0.8ISO	0.80	M5	≥6	6.00	3.80	3	9.20	58.00	C
MTECB 0606C12 1.0ISO	1.00	-	≥9	6.00	6.00	3	12.50	58.00	C
MTECB 0808D16 1.0ISO	1.00	-	≥10	8.00	8.00	4	16.50	64.00	C
MTECB 1010D24 1.0ISO	1.00	-	≥12	10.00	10.00	4	24.50	73.00	C
MTECB 06046C10 1.0ISO	1.00	M6	≥7	6.00	4.60	3	10.50	58.00	C
MTECB 06046C14 1.0ISO	1.00	M6	≥6	6.00	4.60	3	14.50	58.00	C
MTECB 0606C14 1.25ISO	1.25	M8	≥10	6.00	6.00	3	14.40	58.00	C
MTECB 0606C19 1.25ISO	1.25	M8	≥10	6.00	6.00	3	19.40	58.00	C
MTECB 1010D21 1.5ISO	1.50	-	≥14	10.00	10.00	4	21.80	73.00	C
MTECB 1616F33 1.5ISO	1.50	-	≥20	16.00	16.00	6	33.80	105.00	C
MTECB 1212D26 1.5ISO	1.50	-	≥16	12.00	12.00	4	26.30	84.00	C
MTECB 08078C17 1.5ISO	1.50	M10	≥12	8.00	7.80	3	17.00	64.00	C
MTECB 08078C24 1.5ISO	1.50	M10	≥12	8.00	7.80	3	24.80	76.00	C
MTECB 1009C20 1.75ISO	1.75	M12	≥12	10.00	9.00	3	20.10	73.00	C
MTECB 1009C28 1.75ISO	1.75	M12	≥12	10.00	9.00	3	28.90	73.00	C
MTECB 1010C27 2.0ISO	2.00	M14	≥15	10.00	10.00	3	27.00	73.00	C
MTECB 12118D27 2.0ISO	2.00	M16	≥17	12.00	11.80	4	27.00	84.00	C
MTECB 12118D39 2.0ISO	2.00	M16	≥17	12.00	11.80	4	39.00	105.00	C
MTECB 1615E33 2.5ISO	2.50	M20	≥22	16.00	15.00	5	33.80	105.00	C
MTECB 1615E48 2.5ISO	2.50	M20	≥22	16.00	15.00	5	48.80	105.00	C
MTECB 2018D58 3.0ISO	3.00	M24	≥25	20.00	18.00	4	58.50	120.00	C

Available grade: MC98
for user guide, see pages 174-178

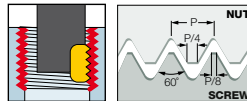
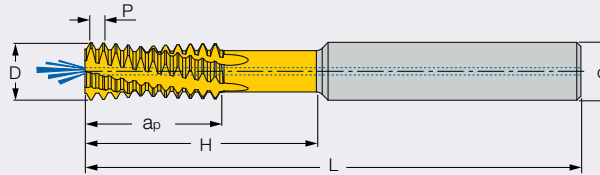
SOLID CARBIDE

MTECQ-ISO

Solid Carbide Threading Endmills with Internal Coolant Holes and a Reduced Diameter Neck for Deep Internal ISO Profile

4, 6
Flute

Cylindrical



Designation	Pitch	M Fine	d	D	Flute	ap	H	L	Shank
MTECQ 1212D38 1.0ISO	1.00	≥14	12.00	12.00	4	21.00	38.0	84.00	C
MTECQ 1010D30 1.5ISO	1.50	≥13	10.00	10.00	4	18.00	30.0	73.00	C
MTECQ 2020F56 2.0ISO	2.00	≥24	20.00	20.00	6	34.00	56.0	105.00	C
MTECQ 2020D45 3.5ISO	3.50	≥26	20.00	20.00	4	28.00	45.5	105.00	C

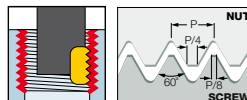
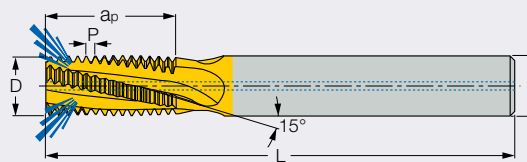
Available grade: MC98
for user guide, see pages 174-178

MTECZ-ISO

Solid Carbide Internal Threading Endmills with Coolant Holes Located in the Flutes

3-5
Flute

Cylindrical



Designation	Dimensions								
	Pitch	M Coarse	M Fine	d	D	Flute	ap	L	Shank
MTECZ 0808D16 1.0ISO	1.00	-	≥10	8.00	8.00	4	16.50	64.00	C
MTECZ 06048C10 1.0ISO	1.00	M6	≥7	6.00	4.80	3	10.50	58.00	C
MTECZ 0606C14 1.25ISO	1.25	M8	≥10	6.00	6.00	3	14.40	58.00	C
MTECZ 0606C19 1.25ISO	1.25	M8	≥10	6.00	6.00	3	19.40	58.00	C
MTECZ 1010D21 1.5ISO	1.50	-	≥14	10.00	10.00	4	21.80	73.00	C
MTECZ 1212D26 1.5ISO	1.50	-	≥16	12.00	12.00	4	26.30	84.00	C
MTECZ 1616E33 1.5ISO	1.50	-	≥20	16.00	16.00	5	33.80	101.00	C
MTECZ 08078C17 1.5ISO	1.50	M10	≥12	8.00	7.80	3	17.00	64.00	C
MTECZ 1009C28 1.75ISO	1.75	M12	≥12	10.00	9.00	3	28.90	73.00	C
MTECZ 1010C27 2.0ISO	2.00	M14	≥15	10.00	10.00	3	27.00	73.00	C
MTECZ 12118D27 2.0ISO	2.00	M16	≥17	12.00	11.80	4	27.00	84.00	C

Available grade: MC98
for user guide, see pages 174-178

SOLID CARBIDE

MTEC E-ISO

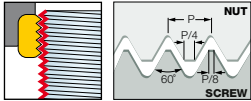
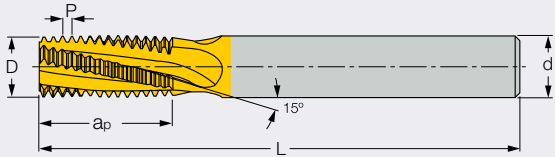
Solid Carbide External Threading Endmills for ISO Thread Profile

4

Flute



Cylindrical



Designation	Pitch	d	D	Flute	ap	L	Shank
MTEC E 1010D16 1.0ISO	1.00	10.00	10.00	4	16.50	73.00	C
MTEC E 1010D16 1.25ISO	1.25	10.00	10.00	4	16.90	73.00	C
MTEC E 1010D15 1.5ISO	1.50	10.00	10.00	4	15.80	73.00	C
MTEC E 1212D20 1.5ISO	1.50	12.00	12.00	4	20.30	84.00	C
MTEC E 1212D20 1.75ISO	1.75	12.00	12.00	4	20.10	84.00	C
MTEC E 1212D21 2.0ISO	2.00	12.00	12.00	4	21.00	84.00	C

Available grade: MC98
for user guide, see pages 174-178

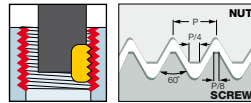
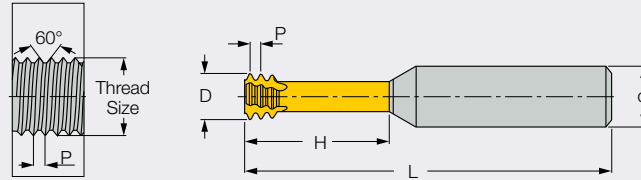
SOLID CARBIDE

MTECS-ISO

Small Diameter Solid Carbide Threading Endmills for Internal ISO Profile

3-5
Flute

Cylindrical



Designation	Pitch	D	T _h	d	Flute	H	L	Shank ⁽³⁾
MTECS 03007C2 0.25ISO	0.25	0.72	M1	3.00	3	2.5	39.00	C
MTECS 03009C3 0.25ISO	0.25	0.90	M1.2	3.00	3	3.0	39.00	C
MTECS 03011C4 0.3ISO	0.30	1.05	M1.4	3.00	3	4.0	39.00	C
MTECS 03012C5 0.35ISO	0.35	1.20	M1.6	3.00	3	4.8	39.00	C
MTECS 03016C6 0.4ISO	0.40	1.53	M2	3.00	3	6.0	39.00	C
MTECS 06016C4 0.4ISO	0.40	1.53	M2	6.00	3	4.5	58.00	C
MTECS 03017C7 0.45ISO	0.45	1.65	M2.2	3.00	3	7.0	39.00	C
MTECS 06017C5 0.45ISO	0.45	1.65	M2.2	6.00	3	5.0	58.00	C
MTECS 0602C5 0.45ISO	0.45	1.95	M2.5	6.00	3	5.5	58.00	C
MTECS 0602C7 0.45ISO	0.45	1.95	M2.5	6.00	3	7.5	58.00	C
MTECS 06024C6 0.5ISO	0.50	2.37	M3	6.00	3	6.5	58.00	C
MTECS 06024C9 0.5ISO	0.50	2.37	M3	6.00	3	9.5	58.00	C
MTECS 06024C9 0.5ISO-L	0.50	2.37	M3	6.00	3	9.5	105.00	C
MTECS 03024C12 0.5ISO	0.50	2.40	M3	3.00	3	12.5	39.00	C
MTECS 03024C15 0.5ISO	0.50	2.40	M3	3.00	3	15.5	39.00	C
MTECS 06054D20 0.5ISO	0.50	5.35	M6	6.00	4	20.0	58.00	C
MTECS 06028C10 0.6ISO	0.60	2.75	M3.5	6.00	3	10.5	58.00	C
MTECS 06028C7 0.6ISO	0.60	2.75	M3.5	6.00	3	7.5	58.00	C
MTECS 06031C12 0.7ISO	0.70	3.10	M4	6.00	3	12.5	58.00	C
MTECS 06031C120.7ISO-L	0.70	3.10	M4	6.00	3	12.5	105.00	C
MTECS 06031C16 0.7ISO	0.70	3.10	M4	6.00	3	16.7	58.00	C
MTECS 06031C9 0.7ISO	0.70	3.10	M4	6.00	3	9.0	58.00	C
MTECS 0808D25 0.75ISO	0.75	8.00	M10	8.00	4	25.0	64.00	C
MTECS 06038C12 0.8ISO	0.80	3.80	M5	6.00	3	12.5	58.00	C
MTECS 06038C16 0.8ISO	0.80	3.80	M5	6.00	3	16.0	58.00	C
MTECS 06038C160.8ISO-L	0.80	3.80	M5	6.00	3	16.0	105.00	C
MTECS 06047C14 1.0ISO	1.00	4.65	M6	6.00	3	14.0	58.00	C
MTECS 06047C20 1.0ISO	1.00	4.65	M6	6.00	3	20.0	58.00	C
MTECS 06047C201.0ISO-L	1.00	4.65	M6	6.00	3	20.0	105.00	C
MTECS 0606C18 1.25ISO	1.25	6.00	M8	6.00	3	18.0	58.00	C
MTECS 0606C24 1.25ISO	1.25	6.00	M8	6.00	3	24.0	58.00	C
MTECS 08078C23 1.5ISO	1.50	7.80	M10	8.00	3	23.0	64.00	C
MTECS 08078C31 1.5ISO	1.50	7.80	M10	8.00	3	31.5	64.00	C
MTECS 1009C26 1.75ISO	1.75	9.00	M12	10.00	3	26.0	73.00	C
MTECS 12118D35 2.0ISO	2.00	11.80	M16	12.00	4	35.0	84.00	C
MTECS 12118D50 2.0ISO	2.00	11.80	M16	12.00	4	50.0	105.00	C
MTECS 1615E43 2.5ISO	2.50	15.00	M20	16.00	5	43.0	100.00	C

Available grade: MC98
for user guide, see pages 174-178

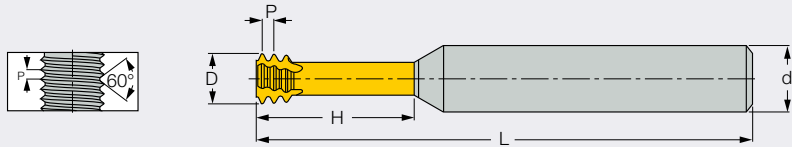
SOLID CARBIDE

MTECSH-ISO

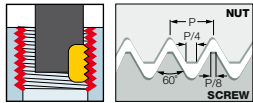
Small Diameter Short Left-Hand Cut Solid Carbide Internal
ISO Profile Threading Endmills for Hardened Steel

3-4
Flute

Cylindrical



Left-hand tools (CNC code M04)



Designation	Pitch	T _h	d	D	Flute	H	L	Shank
MTECSH 03012C5 0.35ISO	0.35	M1.6	3.00	1.20	3	4.8	39.00	C
MTECSH 03016C6 0.4ISO	0.40	M2	3.00	1.55	3	6.0	39.00	C
MTECSH 06016C4 0.4ISO	0.40	M2	6.00	1.55	3	4.5	58.00	C
MTECSH 06017C5 0.45ISO	0.45	M2.2	6.00	1.65	3	5.0	58.00	C
MTECSH 0602C5 0.45ISO	0.45	M2.5	6.00	1.95	3	5.5	58.00	C
MTECSH 0602C7 0.45ISO	0.45	M2.5	6.00	1.95	3	7.5	58.00	C
MTECSH 06024C6 0.5ISO	0.50	M3	6.00	2.35	3	6.5	58.00	C
MTECSH 06024C9 0.5ISO	0.50	M3	6.00	2.35	3	9.5	58.00	C
MTECSH 06028C7 0.6ISO	0.60	M3.5	6.00	2.75	3	7.5	58.00	C
MTECSH 06031C12 0.7ISO	0.70	M4	6.00	3.10	3	12.5	58.00	C
MTECSH 06038C12 0.8ISO	0.80	M5	6.00	3.80	3	12.5	58.00	C
MTECSH 06038C16 0.8ISO	0.80	M5	6.00	3.80	3	16.0	58.00	C
MTECSH 06047C14 1.0ISO	1.00	M6	6.00	4.65	3	14.0	58.00	C
MTECSH 06047C20 1.0ISO	1.00	M6	6.00	4.65	3	20.0	58.00	C
MTECSH 0606C18 1.25ISO	1.25	M8	6.00	5.95	3	18.0	58.00	C
MTECSH 0606C24 1.25ISO	1.25	M8	6.00	5.95	3	24.0	58.00	C
MTECSH 08078C23 1.5ISO	1.50	M10	8.00	7.80	3	23.0	64.00	C
MTECSH 1009C26 1.75ISO	1.75	M12	10.00	9.00	3	26.0	73.00	C
MTECSH 12118D35 2.0ISO	2.00	M16	12.00	11.80	4	35.0	84.00	C

Available grade: MC93
for user guide, see pages 174-178

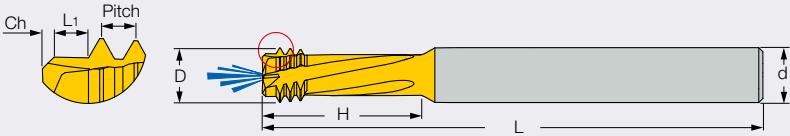
SOLID CARBIDE

MTECD-ISO

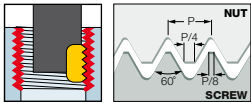
Small Diameter Short Left-Hand Cut Thread Milling for Internal ISO Profile Drilling, Threading and Chamfering

3-4
Flute


Cylindrical



Left-hand tools (CNC code M04)



Designation	Pitch	T _h	d	D	Flute	H	L	Ch	L ₁	Shank	
MTECD 06032C11 0.7ISO	0.70	M4	6.00	3.15	3	11.6	58.00	0.2	0.7	C	N
MTECD 0604C14 0.8ISO	0.80	M5	6.00	4.00	3	14.4	58.00	0.3	0.8	C	N
MTECD 08047C14 1.0ISO	1.00	M6-M9	8.00	4.70	3	14.0	64.00	0.4	1.0	C	Y
MTECD 08061D18 1.25ISO	1.25	M8-M12	8.00	6.10	4	18.0	64.00	0.5	1.3	C	Y
MTECD 08078D23 1.5ISO	1.50	M10-M15	8.00	7.80	4	23.0	64.00	0.6	1.5	C	Y
MTECD 1009D26 1.75ISO	1.75	M12	10.00	9.00	4	26.0	73.00	0.6	1.8	C	Y
MTECD 12118D35 2.0ISO	2.00	M16-M23	12.00	11.80	4	35.0	84.00	0.6	2.0	C	Y

Available grade: MC98
for user guide, see pages 174-178
• Thread hole, thread and chamfer are made by circular interpolation

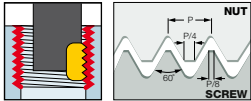
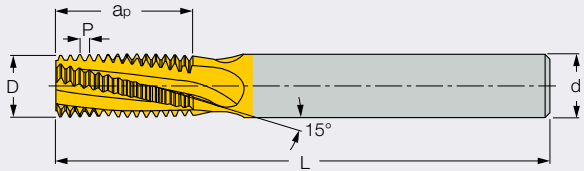
SOLID CARBIDE

MTEC-UN

Solid Carbide Threading Endmills for Internal UN Thread Profile

3-5
Flute

Cylindrical



Designation	Dimensions										
	TPI	UNC	UNF	UNEF	d	D	Flute	ap	L	Shank	THFT ⁽¹⁾
MTEC 06032C6 32UN	32.0	8	10	12	6.00	3.20	3	6.80	58.00	C	UN60
MTEC 0604C11 28UN	28.0	-	7/16,1/2	-	6.00	4.00	3	11.30	58.00	C	UN60
MTEC 0606C14 28UN	28.0	-	-	7/16,1/2	6.00	6.00	3	14.50	58.00	C	UN60
MTEC 0605C14 24UN	24.0	-	5/16	-	6.00	5.00	3	14.30	58.00	C	UN60
MTEC 0807C21 24UN	24.0	-	3/8	9/16,5/8	8.00	7.00	3	20.00	64.00	C	UN60
MTEC 06045C12 20UN	20.0	1/4	-	-	6.00	4.50	3	12.10	58.00	C	UN60
MTEC 0807C21 20UN	20.0	-	7/16,1/2	-	8.00	7.00	3	20.00	64.00	C	UN60
MTEC 1212E27 20UN	20.0	-	-	3/4,1	12.00	12.00	5	27.30	84.00	C	UN60
MTEC 0605C14 18UN	18.0	5/16	-	-	6.00	5.00	3	14.80	58.00	C	UN60
MTEC 1010D26 18UN	18.0	-	9/16,5/8	1-1/8,1-5/8	10.00	10.00	4	26.10	73.00	C	UN60
MTEC 0606C16 16UN	16.0	3/8	-	-	6.00	6.00	3	16.70	58.00	C	UN60
MTEC 1212D31 16UN	16.0	-	3/4	-	12.00	12.00	4	30.00	84.00	C	UN60
MTEC 1615E37 14UN	14.0	-	7/8	-	16.00	15.00	5	37.20	105.00	C	UN60
MTEC 0808C22 13UN	13.0	1/2	-	-	8.00	8.00	3	22.50	64.00	C	UN60
MTEC 1010C26 12UN	12.0	9/16	-	-	10.00	10.00	3	26.50	73.00	C	UN60
MTEC 1616E41 12UN	12.0	-	1,1-1/2	-	16.00	16.00	5	41.30	105.00	C	UN60
MTEC 1010C28 11UN	11.0	5/8	-	-	10.00	10.00	3	28.90	73.00	C	UN60
MTEC 1212C34 10UN	10.0	3/4	-	-	12.00	12.00	3	34.30	84.00	C	UN60
MTEC 1615C38 9UN	9.0	7/8	-	-	16.00	15.00	3	38.10	105.00	C	UN60
MTEC 1616C42 8UN	8.0	1.0	-	-	16.00	16.00	3	42.90	105.00	C	UN60

Available grade: MC98
for user guide, see pages 174-178
(1) Thread form type

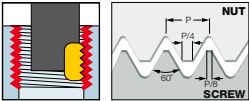
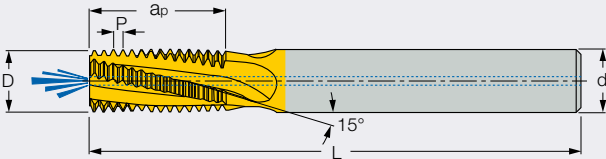
SOLID CARBIDE

MTECB-UN

Solid Carbide Threading Endmills with Coolant Holes for Internal UN Thread Profile

3-5
Flute


Cylindrical



Designation	TPI	UNC	UNF	UNEF	d	D	Flute	ap	L	Shank
MTECB 06032C6 32UN	32.0	8	10	12	6.00	3.20	3	6.80	58.00	C
MTECB 0606C14 32UN	32.0	-	-	7/16-1/2	6.00	6.00	3	16.00	58.00	C
MTECB 0605C11 28UN	28.0	-	1/4	-	6.00	5.00	3	11.30	58.00	C
MTECB 08066C14 24UN	24.0	-	5/16	-	8.00	6.60	3	14.30	64.00	C
MTECB 0808D21 24UN	24.0	-	-	9/16-5/8	8.00	8.00	4	20.60	64.00	C
MTECB 0808C21 20UN	20.0	-	7/16	-	8.00	8.00	3	21.00	64.00	C
MTECB 1010D22 20UN	20.0	-	1/2	-	10.00	10.00	4	22.30	73.00	C
MTECB 06056C14 18UN	18.0	5/16	-	-	6.00	5.60	3	14.80	58.00	C
MTECB 12113D26 18UN	18.0	-	9/16-5/8	1-1/8_1-5/8	12.00	11.30	4	26.10	84.00	C
MTECB 08067C16 16UN	16.0	3/8	-	-	8.00	6.70	3	16.70	64.00	C
MTECB 1212D31 16UN	16.0	-	3/4	-	12.00	12.00	4	31.00	84.00	C
MTECB 1616E37 14UN	14.0	-	7/8	-	16.00	16.00	5	37.20	105.00	C
MTECB 10092C22 13UN	13.0	1/2	-	-	10.00	9.20	3	22.50	73.00	C
MTECB 12114C28 11UN	11.0	5/8	-	-	12.00	11.40	3	28.90	84.00	C
MTECB 16144D34 10UN	10.0	3/4	-	-	16.00	14.40	4	34.30	105.00	C
MTECB 20195D42 8UN	8.0	1	-	-	20.00	19.50	4	42.90	105.00	C

Available grade: MC98
for user guide, see pages 174-178

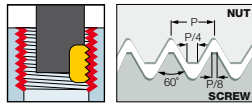
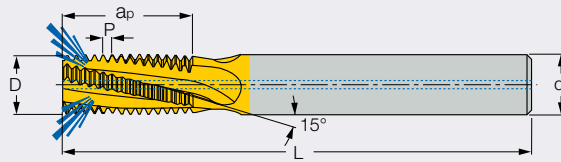
SOLID CARBIDE

MTECZ-UN

Solid Carbide Threading Endmills with Coolant Holes
Located in the Flutes for Internal UN Thread Profile

3-4
Flute

Cyindrical



Designation	TPI	UNC	UNF	UNEF	d	D	Flute	ap	L	Shank
MTECZ 1010D22 20UN	20.0	-	1/2	-	10.00	10.00	4	22.30	73.00	C
MTECZ 12113D26 18UN	18.0	-	9/16-5/8	1_1/8-1_5/8	12.00	11.30	4	26.10	84.00	C
MTECZ 08067C16 16UN	16.0	3/8	-	-	8.00	6.70	3	16.70	64.00	C
MTECZ 16144D34 10UN	10.0	3/4	-	-	16.00	14.40	4	34.30	101.00	C

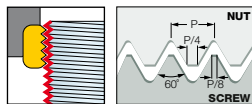
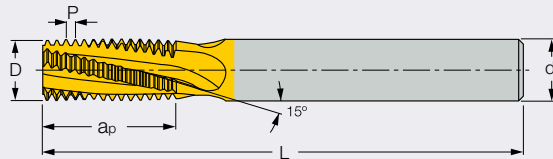
Available grade: MC98
for user guide, see pages 174-178
• With internal coolant hole

MTEC E-UN

Solid Carbide Threading Endmills with UN Form for External Threading

4-5
Flute

Cyindrical



Designation	TPI	d	D	Flute	ap	L	Shank
MTEC E 1010D16 24UN	24.0	10.00	10.00	4	16.40	73.00	C
MTEC E 1212E21 20UN	20.0	12.00	12.00	5	21.00	84.00	C

Available grade: MC98
for user guide, see pages 174-178

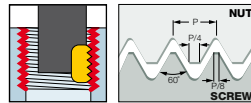
SOLID CARBIDE

MTECS-UN

Small Diameter Solid Carbide UN Profile Threading Endmills for Steel

3-4
Flute

Cylindrical



Designation	TPI	UNC	UNF	d	D	Flute	H	L	Shank
MTECS 03012C8 80UN	80.0	-	0	3.00	1.15	3	8.0	39.00	C
MTECS 03015C6 72UN ⁽¹⁾	72.0	-	1	3.00	1.45	3	6.0	39.00	C
MTECS 06016C4 56UN	56.0	2	3	6.00	1.65	3	4.4	58.00	C
MTECS 06016C6 56UN	56.0	2	3	6.00	1.65	3	6.6	58.00	C
MTECS 06019C5 48UN	48.0	3	4	6.00	1.90	3	5.2	58.00	C
MTECS 03021C12 40UN	40.0	4	-	3.00	2.10	3	12.0	39.00	C
MTECS 06021C8 40UN	40.0	4	-	6.00	2.10	3	8.0	58.00	C
MTECS 06024C9 40UN	40.0	5	6	6.00	2.45	3	9.6	58.00	C
MTECS 06021C6 40UN	40.0	4	-	6.00	2.10	3	6.3	58.00	C
MTECS 06033C9 36UN	36.0	-	8	6.00	3.30	3	9.0	58.00	C
MTECS 06025C7 32UN	32.0	6	-	6.00	2.55	3	7.1	58.00	C
MTECS 06025C10 32UN	32.0	6	-	6.00	2.55	3	10.5	58.00	C
MTECS 06032C9 32UN	32.0	8	10	6.00	3.20	3	9.5	58.00	C
MTECS 06032C12 32UN	32.0	8	10	6.00	3.20	3	12.5	58.00	C
MTECS 06037C10 32UN	32.0	-	10	6.00	3.70	3	10.5	58.00	C
MTECS 06037C15 32UN	32.0	-	10	6.00	3.70	3	15.0	58.00	C
MTECS 0605C14 28UN	28.0	-	1/4	6.00	5.00	3	14.5	58.00	C
MTECS 0605C19 28UN	28.0	-	1/4	6.00	5.00	3	19.0	58.00	C
MTECS 08066C17 24UN	24.0	-	5/16	8.00	6.60	3	17.0	64.00	C
MTECS 08066C24 24UN	24.0	-	5/16	8.00	6.60	3	24.0	64.00	C
MTECS 06047C14 20UN	20.0	1/4	-	6.00	4.75	3	14.0	58.00	C
MTECS 06047C19 20UN	20.0	1/4	-	6.00	4.75	3	19.0	58.00	C
MTECS 06047C19 20UN-L	20.0	1/4	-	6.00	4.75	3	19.0	105.00	C
MTECS 0808C25 20UN	20.0	-	7/16	8.00	8.00	3	25.0	64.00	C
MTECS 0606C17 18UN	18.0	5/16	-	6.00	6.00	3	17.0	58.00	C
MTECS 0606C23 18UN	18.0	5/16	-	6.00	6.00	3	23.0	58.00	C
MTECS 1212D35 18UN	18.0	-	5/8	12.00	12.00	4	35.0	84.00	C
MTECS 08067C22 16UN	16.0	3/8	-	8.00	6.70	3	22.0	64.00	C
MTECS 08067C30 16UN	16.0	3/8	-	8.00	6.70	3	30.2	64.00	C
MTECS 08077C25 14UN	14.0	7/16	-	8.00	7.70	3	25.0	64.00	C
MTECS 10092C27 13UN	13.0	1/2	-	10.00	9.20	3	27.5	73.00	C
MTECS 12114C34 11UN	11.0	5/8	-	12.00	11.40	3	34.5	84.00	C
MTECS 12114C50 11UN	11.0	5/8	-	12.00	11.40	3	50.0	105.00	C

Available grade: MC98

for user guide, see pages 174-178

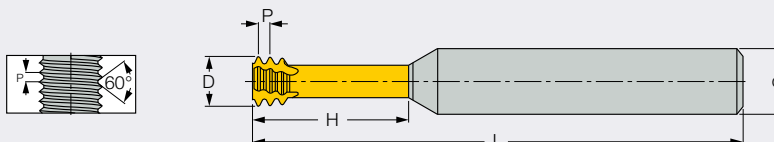
⁽¹⁾ Specially designed for the production of dental implants

SOLID CARBIDE

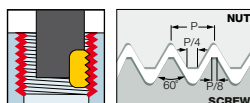
MTECSH-UN

Small Diameter Short Left-Hand Cut Solid Carbide
UN Profile Threading Endmills for Hardened Steel

3
Flute



Left-hand tools (CNC code M04)



Designation	TPI	UNC	UNF	d	D	Flute	L	H	Shank
MTECSH 06012C4 80UN	80.0	-	0	6.00	1.15	3	58.00	4.0	C
MTECSH 06016C6 56UN	56.0	2	3	6.00	1.65	3	58.00	6.6	C
MTECSH 06019C5 48UN	48.0	3	4	6.00	1.90	3	58.00	5.2	C
MTECSH 06021C6 40UN	40.0	4	-	6.00	2.10	3	58.00	6.3	C
MTECSH 06024C7 40UN	40.0	5	6	6.00	2.45	3	58.00	7.0	C
MTECSH 06021C8 40UN	40.0	4	-	6.00	2.10	3	58.00	8.0	C
MTECSH 06024C9 40UN	40.0	5	6	6.00	2.45	3	58.00	9.6	C
MTECSH 06025C10 32UN	32.0	6	-	6.00	2.55	3	58.00	10.5	C
MTECSH 06032C9 32UN	32.0	8	-	6.00	3.20	3	58.00	9.5	C
MTECSH 06037C10 32UN	32.0	-	10	6.00	3.70	3	58.00	10.5	C
MTECSH 06037C15 32UN	32.0	-	10	6.00	3.70	3	58.00	15.0	C
MTECSH 06042C11 28UN	28.0	-	12	6.00	4.20	3	58.00	11.0	C
MTECSH 0605C14 28UN	28.0	-	1/4	6.00	5.00	3	58.00	14.5	C
MTECSH 06035C10 24UN	24.0	10,12	-	6.00	3.50	3	58.00	10.6	C
MTECSH 08066C17 24UN	24.0	-	5/16	8.00	6.60	3	64.00	17.0	C
MTECSH 08066C24 24UN	24.0	-	5/16	8.00	6.60	3	64.00	24.0	C
MTECSH 06047C19 20UN	20.0	1/4	-	6.00	4.75	3	58.00	19.0	C
MTECSH 0808C25 20UN	20.0	-	7/16	8.00	8.00	3	64.00	25.0	C
MTECSH 0606C17 18UN	18.0	5/16	-	6.00	6.00	3	58.00	17.0	C
MTECSH 0606C23 18UN	18.0	5/16	-	6.00	6.00	3	58.00	23.0	C
MTECSH 08067C22 16UN	16.0	3/8	-	8.00	6.70	3	64.00	22.0	C
MTECSH 08077C25 14UN	14.0	7/16	-	8.00	7.70	3	64.00	25.0	C
MTECSH 10092C27 13UN	13.0	1/2	-	10.00	9.20	3	73.00	27.5	C
MTECSH 12114C34 11UN	11.0	5/8	-	12.00	11.40	3	84.00	34.5	C

Available grade: MC93

for user guide, see pages 174-178

(1) Specially designed for the production of dental implants

Cutting Data for Hardened Steel

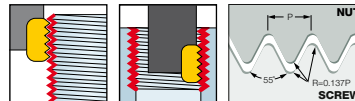
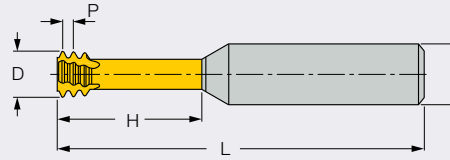
ISO	Material	Hardness HRC	Cutting Speed m/min	Feed (mm/tooth) for Cutting Diameter (mm)								
				1.5	2	3	4	5	6	7	8	9
H	Hardened Steels	45-50	60-70	0.04	0.04	0.05	0.05	0.06	0.06	0.07	0.07	0.08
		51-55	50-60	0.03	0.03	0.04	0.04	0.05	0.05	0.06	0.06	0.07
		56-62	40-50	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.05	0.06

SOLID CARBIDE

MTECS-W

Short Solid Carbide Threading Endmills for Internal or External BSP and BSF Thread Profiles

3-4
Flute



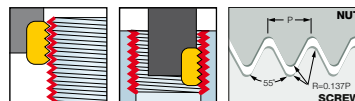
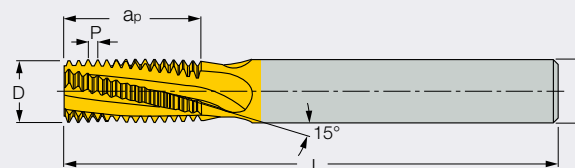
Designation	TPI	BSP	d	D	Flute	H	L	Shank
MTECS 08078C19 28W	28.0	G 1/8	8.00	7.80	3	19.5	64.00	C
MTECS 1010D30 19W	19.0	G 1/4-3/8	10.00	10.00	4	30.0	73.00	C
MTECS 1212D37 14W	14.0	G 1/2-7/8	12.00	12.00	4	37.0	84.00	C

Available grade: MC98
for user guide, see pages 174-178

MTEC-W

Solid Carbide Threading Endmills for Internal or External BSP Thread Profile

3-4
Flute



Designation	TPI	BSP	d	D	Flute	ap	L	Shank
MTEC 0606C9 28W	28.0	G1/8	6.00	6.00	3	9.50	58.00	C
MTEC 0808C14 19W	19.0	G1/4,G3/8	8.00	8.00	3	14.00	64.00	C
MTEC 1212D19 14W	14.0	G1/2,G7/8	12.00	12.00	4	19.30	84.00	C
MTEC 1212D26 14W	14.0	G1/2,G7/8	12.00	12.00	4	26.30	84.00	C
MTEC 1212C24 11W	11.0	G1,G1-1/2	12.00	12.00	3	24.20	84.00	C
MTEC 1616D38 11W	11.0	G1,G3	16.00	16.00	4	38.10	105.00	C

Available grade: MC98
for user guide, see pages 174-178

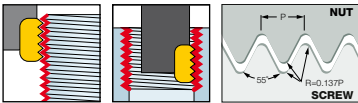
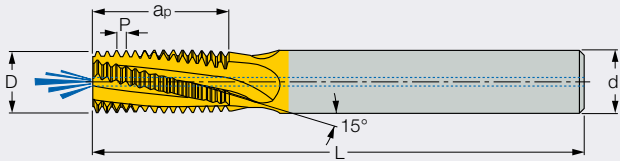
SOLID CARBIDE

MTECB-W

Solid Carbide Internal or External Threading Endmills with Coolant Holes for BSP Thread Profile

3-5
Flute

Cyindrical



Designation	TPI	BSP	d	D	Flute	ap	L	Shank
MTECB 08078C14 28W	28.0	G1/8	8.00	7.80	3	14.10	64.00	C
MTECB 1010D16 19W	19.0	G1/4-3/8	10.00	10.00	4	16.70	73.00	C
MTECB 1616E26 14W	14.0	G1/2-7/8	16.00	16.00	5	26.30	105.00	C
MTECB 1616D38 11W	11.0	G>1	16.00	16.00	4	38.10	105.00	C
MTECB 2020E47 11W	11.0	G>1	20.00	20.00	5	47.30	105.00	C

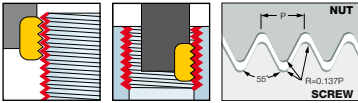
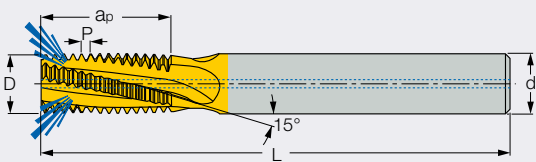
Available grade: MC98
for user guide, see pages 174-178

MTECZ-BSF/BSP

Solid Carbide Threading Endmills with Coolant Holes Located in the Flutes for Internal or External BSF/

3-5
Flute

Cyindrical



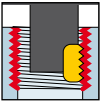
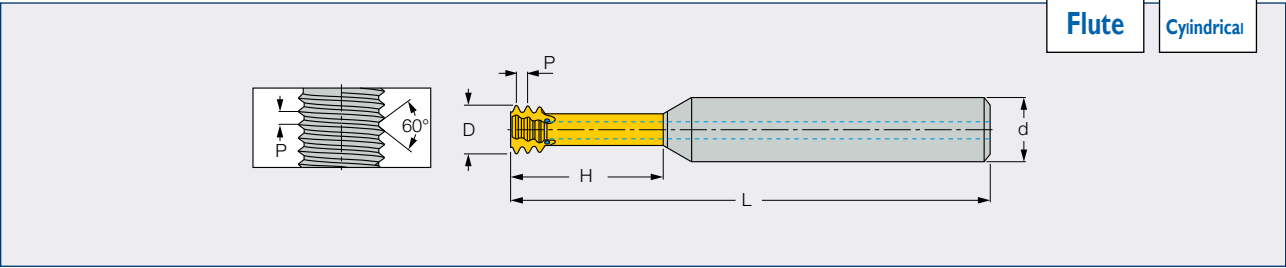
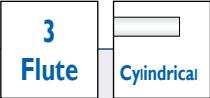
Designation	TPI	BSP	d	D	Flute	ap	L	Shank
MTECZ 08078C14 28W	28.0	G1/8	8.00	7.80	3	14.10	64.00	C
MTECZ 1010D16 19W	19.0	G1/4-3/8	10.00	10.00	4	16.70	73.00	C
MTECZ 1616E26 14W	14.0	G1/2-7/8	16.00	16.00	5	26.30	101.00	C

Available grade: MC98
for user guide, see pages 174-178
• With internal coolant hole

SOLID CARBIDE

MTECS-MJ

Small Diameter Short Solid Carbide MJ-Type Profile Threading Endmills

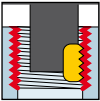
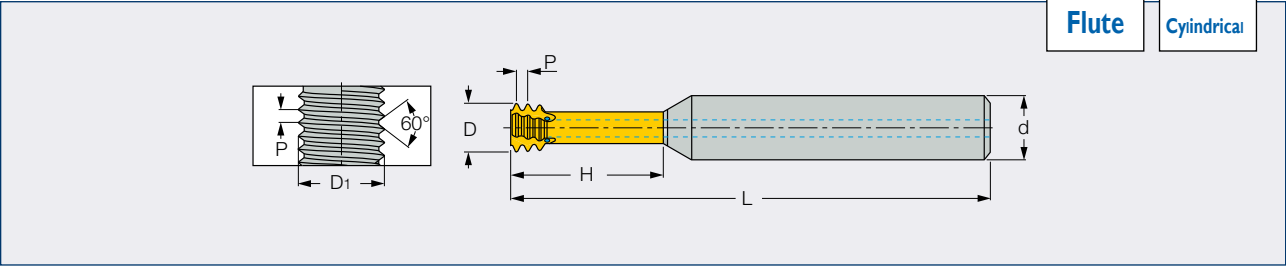
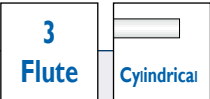


Designation	Pitch	MJ size	d	D	Flute	H	L	Shank
MTECS 06032C10 0.7MJ	0.70	MJ4	6.00	3.20	3	10.0	58.00	C
MTECS 06039C12 0.8MJ	0.80	MJ5	6.00	3.90	3	12.5	58.00	C
MTECS 06048C15 1.0MJ	1.00	MJ6	6.00	4.80	3	15.0	58.00	C
MTECS 08061C20 1.25MJ	1.25	MJ8	8.00	6.10	3	20.0	64.00	C
MTECS 10092C30 1.75MJ	1.75	MJ12	10.00	9.20	3	30.0	73.00	C

Available grade: MC98
for user guide, see pages 174-178(
1) Without coolant holes

MTECS-UNJ

Small Diameter Short Solid Carbide UNJ-Type Profile Threading Endmills



Designation	TPI	UNJC	UNJF	d	D	Flute	H	L	Shank
MTECS 06033C10 32UNJ	32.0	8	10	6.00	3.30	3	10.5	58.00	C
MTECS 08051C16 28UNJ	28.0	-	1/4	8.00	5.10	3	16.0	64.00	C
MTECS 08067C20 24UNJ	24.0	-	5/16, 3/8	8.00	6.70	3	20.0	64.00	C
MTECS 06049C16 20UNJ	20.0	1/4	-	6.00	4.90	3	16.0	58.00	C
MTECS 0808C28 20UNJ	20.0	-	7/16	8.00	8.00	3	28.0	64.00	C
MTECS 08061C20 18UNJ	18.0	5/16	-	8.00	6.15	3	20.0	64.00	C
MTECS 08069C24 16UNJ	16.0	3/8	-	8.00	6.90	3	24.0	64.00	C
MTECS 10094C27 13UNJ	13.0	1/2	-	10.00	9.40	3	27.5	73.00	C

Available grade: MC98
for user guide, see pages 174-178
(1) Without coolant holes

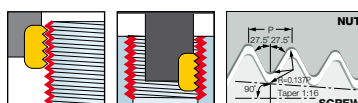
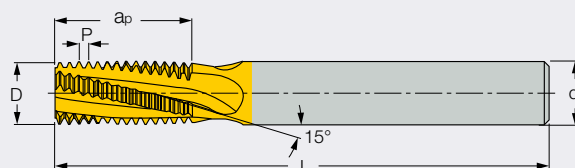
SOLID CARBIDE

MTEC-BSPT

Solid Carbide Threading Endmills for External or Internal BSPT Thread Profile

3-4
Flute

Cylindrical



Designation	Technical Specifications							
	TPI	BSPT	d	D	Flute	a _p	L	Shank
MTEC 0606C9 28BSPT	28.0	RC1/8	6.00	6.00	3	9.50	58.00	C
MTEC 0808C14 19BSPT	19.0	RC1/4,RC3/8	8.00	8.00	3	14.00	64.00	C
MTEC 1212D19 14BSPT	14.0	RC1/2,RC7/8	12.00	12.00	4	19.10	84.00	C
MTEC 1616D28 11BSPT	11.0	RC1,RC2	16.00	16.00	4	28.90	105.00	C

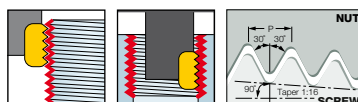
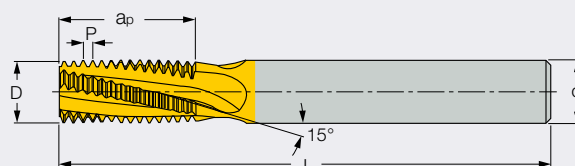
Available grade: MC98
for user guide, see pages 174-178

MTEC-NPT

Solid Carbide Threading Endmills for External or Internal NPT Thread Profile

3-4
Flute

Cylindrical



Designation	Technical Specifications							
	TPI	NPT	d	D	Flute	a _p	L	Shank
MTEC 0606C9 27NPT	27.0	1/16, 1/8	6.00	6.00	3	9.90	58.00	C
MTEC 0808C14 18NPT	18.0	1/4, 3/8	8.00	8.00	3	14.80	64.00	C
MTEC 1212D20 14NPT	14.0	1/2, 3/4	12.00	12.00	4	20.90	84.00	C
MTEC 1616D27 11.5NPT	11.5	1, 2	16.00	16.00	4	27.60	105.00	C
MTEC 2020D39 8NPT	8.0	≥2-1/2	20.00	20.00	4	39.70	105.00	C

Available grade: MC98
for user guide, see pages 174-178

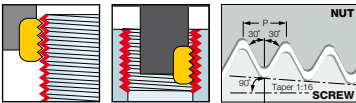
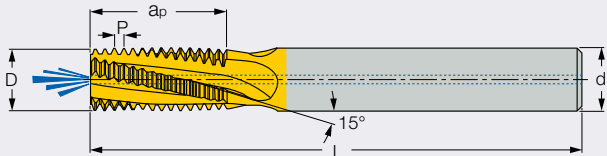
SOLID CARBIDE

MTECB-NPT

Solid Carbide Threading Endmills with Coolant Holes
for External or Internal NPT Thread Profile

3-4
Flute

Cylindrical



Designation	TPI	NPT	d	D	Flute	ap	L	Shank
MTECB 08076C10 27NPT	27.0	1/8	8.00	7.60	3	10.80	64.00	C
MTECB 1010D16 18NPT	18.0	1/4,3/8	10.00	10.00	4	16.20	73.00	C
MTECB 16155D22 14NPT	14.0	1/2,3/4	16.00	15.50	4	22.70	105.00	C

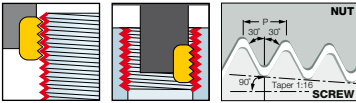
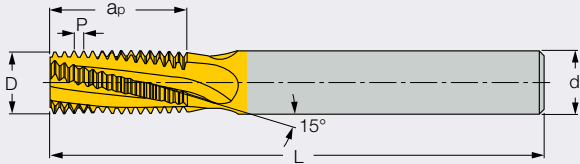
Available grade: MC98
for user guide, see pages 174-178

MTEC-NPTF

Solid Carbide Threading Endmills for External or
Internal NPTF Thread Profile

3-4
Flute

Cylindrical



Designation	TPI	NPTF	d	D	Flute	ap	L	Shank
MTEC 0606C9 27NPTF	27.0	1/16,1/8	6.00	6.00	3	9.90	58.00	C
MTEC 0808C14 18NPTF	18.0	1/4,3/8	8.00	8.00	3	14.80	64.00	C
MTEC 1212D20 14NPTF	14.0	1/2,3/4	12.00	12.00	4	20.90	84.00	C

Available grade: MC98
for user guide, see pages 174-178

MILL THREAD

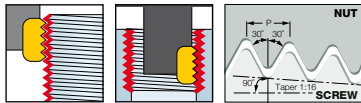
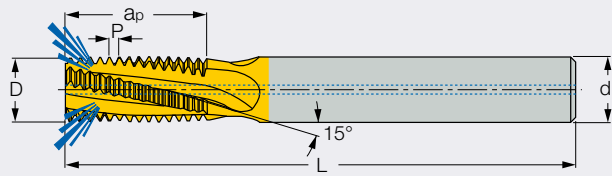
SOLID CARBIDE

MTECZ-NPTF

Solid Carbide Threading Endmills with Coolant Holes
Located in the Flutes for Internal or External NPTF

3-4
Flute

Cylindrical



Designation	TPI	NPTF	d	D	Flute	ap	L	Shank
MTECZ 08076C10 27NPTF	27.0	1/8	8.00	7.60	3	10.80	64.00	C
MTECZ 1010D16 18NPTF	18.0	1/4-3/8	10.00	10.00	4	16.20	73.00	C

Available grade: MC98
for user guide, see pages 174-178

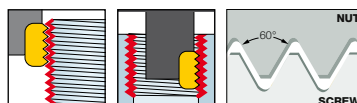
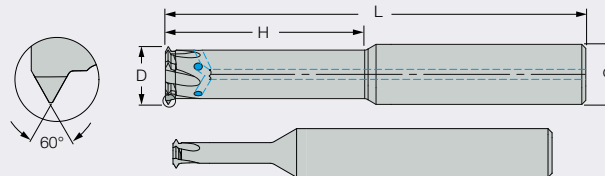
SOLID CARBIDE

MTECI-A60

60° Partial Profile Solid Carbide Thread Mills for
Internal and External Threads

3-5
Flute

Cylindrical



Designation	Pitch In	Pitch Ex	TPI Int	TPI Ext	T _h	d	D	Flute	H	L	Shank	
MTECI 03019C5 A60	0.35-0.60	-	72-40	-	(a)	3.00	1.90	3	5.2	39.00	C	N
MTECI 06032C9 A60	0.50-1.00	-	48-24	-	(a)	6.00	3.20	3	9.5	39.00	C	N
MTECI 0604C12 A60	0.50-1.00	-	48-24	-	(a)	6.00	4.00	3	12.5	58.00	C	N
MTECI 0605D20 A60	0.50-0.80	0.4-0.8	56-28	64-32	≥6	6.00	5.00	4	20.0	58.00	C	Y
MTECI 0808D28 A60	0.50-0.80	0.4-0.8	56-28	64-32	≥9	8.00	8.00	4	28.0	64.00	C	Y
MTECI 0808D30 A60	1.00-1.75	0.8-1.5	28-14	32-16	≥10	8.00	8.00	4	30.0	64.00	C	Y
MTECI 1010D35 A60	1.00-1.75	0.8-1.5	28-14	32-16	≥12	10.00	10.00	4	35.0	73.00	C	Y
MTECI 1212E39 A60	1.00-1.75	0.8-1.5	28-14	32-16	≥14	12.00	12.00	5	39.0	84.00	C	Y
MTECI 1212E40 A60	2.0-3.0	1.75-2.5	13-8	15-10	≥16	12.00	12.00	5	40.0	84.00	C	Y
MTECI 1616E50 A60	2.0-3.0	1.75-2.5	13-8	15-10	≥20	16.00	16.00	5	50.0	101.00	C	Y

Available grade: MC92
for user guide, see pages 174-178
• (a) See table below

Designation	Possible Thread Sizes		
	M Coarse	M Fine	UN, UNC, UNS, UNF, UNEF
MTECI 03012C3 A60	M1.6x0.35	M1.6x0.25, M1.8x0.25, M2x0.25	0-80UNF
MTECI 03014C4 A60	M2x0.4, M2.2x0.45	M2x0.35, M2.2x0.35,	1-64unc, 1-72unf, 2-56unc, 2-64unf
MTECI 03019C5 A60	M2.5x0.45	M2.5x0.35, M3x0.35,	3-48UNC, 3-56UNF, 4-40UNC, 4-48UNF
MTECI 03024C7 A60	M3x0.5 M3.5x0.6	M3.5x0.5	5-40UNC, 5-44UNF, 6-32UNC, 6-40UNF
MTECI 06032C9 A60	M4x0.7 M4.5x0.75	M4x0.5	8-32UNC, 8-36UNF, 10-24UNC, 10-28UNS, 10-32UNF
MTECI 0604C12 A60	M5x0.8 M6x1.0	M5x0.5, M5.5x0.5, M5x0.75	10-36UNS, 10-40UNS, 10-48UNS, 12-24UNC, 12-28UNF

Machining Data for Solid Carbide Threading Endmills

ISO	Material	Condition	Tensile Strength [N/mm ²]	Hardness HB	Material No.
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C Annealed	420	125	1
		≥ 0.25 %C Annealed	650	190	2
		< 0.55 %C Quenched and tempered	850	250	3
		≥ 0.55 %C Annealed	750	220	4
		Quenched and tempered	1000	300	5
	Low alloy steel and cast steel (less than 5% of alloying elements)	Annealed	600	200	6
		Quenched and tempered	930	275	7
			1000	300	8
			1200	350	9
	High alloyed steel, cast steel, and tool steel	Annealed	680	200	10
		Quenched and tempered	1100	325	11
	Stainless steel and cast steel	Ferritic/martensitic	680	200	12
		Martensitic	820	240	13
M	Stainless steel	Austenitic	600	180	14
K	Cast iron nodular (GGG)	Ferritic/pearlitic		180	15
		Pearlitic		260	16
	Grey cast iron (GG)	Ferritic		160	17
		Pearlitic		250	18
	Malleable cast iron	Ferritic		130	19
		Pearlitic		230	20
N	Aluminum-wrought alloy	Not cureable		60	21
		Cured		100	22
	Aluminum-cast, alloyed	=<12% Si Not cureable		75	23
		Cured		90	24
		>12% Si High temperature		130	25
	Copper alloys	>1% Pb Free cutting		110	26
		Brass		90	27
		Electrolitic copper		100	28
	Non-metallic	Duroplastics, fiber plastics			29
		Hard rubber			30
S	Fe based	Annealed		200	31
		Cured		280	32
	High temp. alloys	Ni or Co based Annealed		250	33
		Cured		350	34
		Cast		320	35
	Titanium Ti alloys		RM 400		36
		Alpha+beta alloys cured	RM 1050		37
H	Hardened steel	Hardened		55 HRC	38
		Hardened		60 HRC	39
	Chilled cast iron	Cast		400	40
	Cast iron	Hardened		55 HRC	41

MILL THREAD USER GUIDE

Material No.	Cutting Speed (m/min)	Cutting Diameter											
		Feed (mm/tooth)											
		2	3	4	6	8	10	12	14	16	20	25	30
1	100-250	0.03	0.04	0.04	0.06	0.07	0.08	0.09	0.11	0.12	0.15	0.18	0.21
2	80-210	0.03	0.04	0.04	0.06	0.07	0.08	0.09	0.11	0.12	0.15	0.18	0.21
3	65-170												
4	110-180	0.02	0.03	0.03	0.05	0.06	0.07	0.08	0.09	0.1	0.12	0.15	0.18
5	95-160	0.02	0.03	0.03	0.05	0.06	0.07	0.08	0.09	0.1	0.12	0.15	0.18
6	90-160	0.02	0.02	0.03	0.03	0.04	0.05	0.05	0.06	0.07	0.08	0.1	0.11
7	65-200	0.02	0.02	0.03	0.03	0.04	0.05	0.05	0.06	0.07	0.08	0.1	0.11
8	70-210	0.02	0.02	0.03	0.03	0.04	0.05	0.05	0.06	0.07	0.08	0.1	0.11
9	95-160	0.02	0.02	0.03	0.03	0.04	0.05	0.05	0.06	0.07	0.08	0.1	0.11
10	130-170	0.02	0.02	0.03	0.03	0.04	0.05	0.05	0.06	0.07	0.08	0.1	0.11
11	75-100	0.02	0.02	0.03	0.03	0.04	0.05	0.05	0.06	0.07	0.08	0.1	0.11
12	110-170	0.02	0.02	0.03	0.03	0.04	0.05	0.05	0.06	0.07	0.08	0.1	0.11
13	70-155	0.02	0.02	0.03	0.03	0.04	0.05	0.05	0.06	0.07	0.08	0.1	0.11
14	85-100	0.02	0.02	0.03	0.03	0.04	0.05	0.05	0.06	0.07	0.08	0.1	0.11
15	120-160	0.03	0.04	0.04	0.06	0.07	0.08	0.09	0.11	0.12	0.15	0.18	0.21
16	75-160	0.03	0.04	0.04	0.06	0.07	0.08	0.09	0.11	0.12	0.15	0.18	0.21
17	70-150	0.03	0.04	0.04	0.06	0.07	0.08	0.09	0.11	0.12	0.15	0.18	0.21
18	110-140	0.03	0.04	0.04	0.06	0.07	0.08	0.09	0.11	0.12	0.15	0.18	0.21
19	120-160	0.03	0.04	0.04	0.06	0.07	0.08	0.09	0.11	0.12	0.15	0.18	0.21
20	110-140	0.03	0.04	0.04	0.06	0.07	0.08	0.09	0.11	0.21	0.15	0.18	0.21
21	160-300	0.03	0.04	0.04	0.06	0.07	0.08	0.09	0.11	0.12	0.15	0.18	0.21
22													
23	150-350	0.03	0.04	0.04	0.06	0.07	0.08	0.09	0.11	0.12	0.15	0.18	0.21
24													
25	100-250	0.02	0.02	0.03	0.03	0.04	0.05	0.05	0.06	0.07	0.08	0.10	0.12
26													
27													
28													
29	100-400	0.05	0.06	0.07	0.09	0.1	0.11	0.12	0.13	0.15	0.18	0.22	0.25
30													
31													
32													
33	20-80	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.05	0.05
34													
35													
36													
37	20-80	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.05	0.05
38	55-65												
39	45-55												
40	90-105												
41	55-65												

* For cutters with long cutting flute, reduce feed rate by 40%.

Thread Milling CNC Program for Internal Thread

Right-hand thread (climb milling) from bottom up.

Program is based on tool center.

This method of programming needs no tool radius compensation value, other than an offset for wear.

$$A = \frac{D_o - D}{2}$$

A = Radius of tool path
D_o = Major thread diameter
D = Cutting diameter

General Program

```
G90 G00 G54 G43 H1X0 Y0 Z10 S...  
G00 Z-(to thread depth)  
G01 G91 G41 D1 X(A/2) Y-(A/2) Z0 F...  
G03 X(A/2) Y(A/2) R(A/2) Z(1/8 pitch)  
G03 X0 Y0 I-(A) J0 Z(pitch)  
G03 X-(A/2) Y(A/2) R(A/2) Z(1/8 pitch)  
G01 G40 X-(A/2) Y-(A/2) Z0  
G90 X0 Y0 Z0
```

Internal Thread

Example: M 48x2.0 IN-RH (Thread depth 25 mm)

Toolholder: MTSR0029 J30

(Cutting dia. 29 mm)

Insert: MT30 I2.0ISO

$A = (D_o - D) / 2 = (48 - 29) / 2 = 9.5$

$A/2 = 4.75$

(Tool compensation of radius=0)

```
G90 G0 G54 G43 G17 H1X0 Y0 Z10 S1320
```

```
G0 Z-25
```

```
G01 G91 G41 D1 X 4.75 Y-4.75 Z0 F41
```

```
G03 X4.75 Y4.75 R4.75 Z0.25
```

```
G03 X0 Y0 I-9.5 J0 Z2.0
```

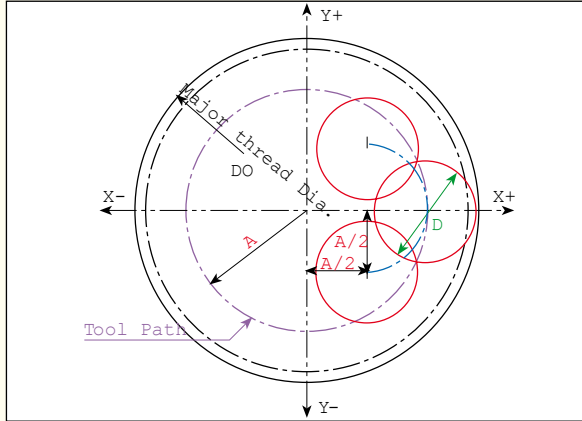
```
G03 X-4.75 Y4.75 R4.75 Z0.25
```

```
G01 G40 X-4.75 Y-4.75 Z0
```

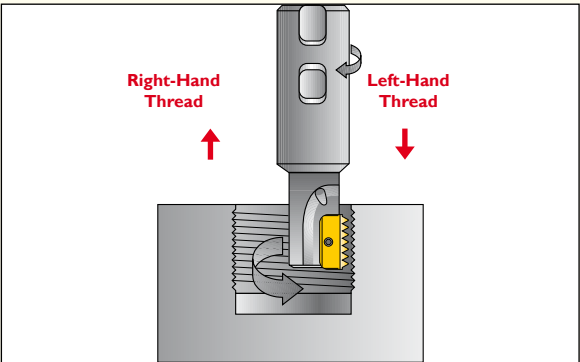
```
G90 G0 X0 Y0 Z0
```

```
M30
```

```
%
```

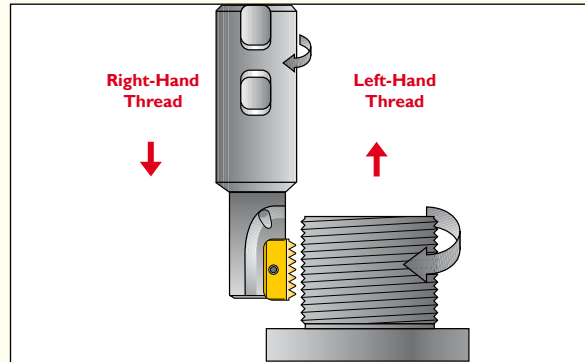


Internal Thread



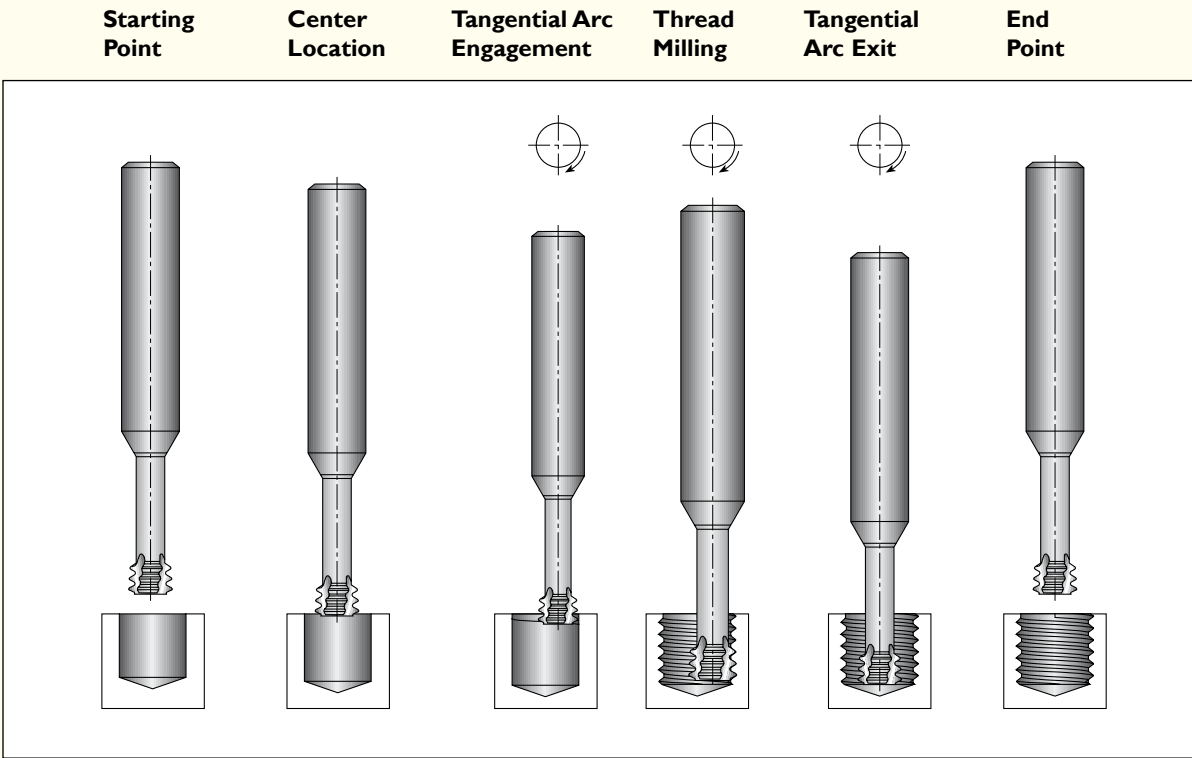
A thread milling operation is applicable for thread cutting in non-symmetrical parts utilizing the advantage of helical interpolation programs on modern machining centers.

External Thread



MTECS Small Diameter, Short Solid Carbide Thread Mills

Thread Milling - Recommended Procedure



Cutting Data

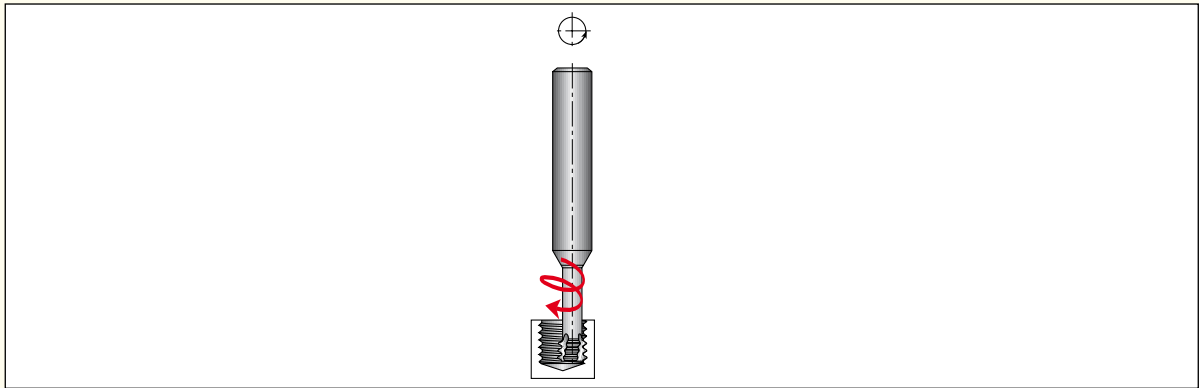
ISO	Materials	Cutting Speed, m/min	Feed (mm/tooth) for Diameter (mm)													
			Ø1.5	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	Ø9	Ø10	Ø12	Ø14	Ø15	
P	Low & medium carbon steels	60-120	0.05	0.05	0.07	0.09	0.11	0.13	0.14	0.15	0.16	0.16	0.17	0.18	0.18	
	High carbon steels	60-90	0.04	0.05	0.06	0.08	0.09	0.1	0.12	0.13	0.14	0.14	0.16	0.17	0.18	
	Alloy steels, treated steels	50-80	0.04	0.04	0.05	0.05	0.06	0.07	0.07	0.08	0.09	0.1	0.12	0.13	0.14	
	Cast steels	70-90	0.04	0.04	0.05	0.05	0.06	0.07	0.07	0.08	0.09	0.1	0.12	0.13	0.14	
M	Stainless steels	60-90	0.03	0.03	0.04	0.05	0.06	0.06	0.07	0.08	0.09	0.1	0.11	0.12	0.13	
S	Nickel alloys, titanium alloys	20-40	0.03	0.03	0.04	0.04	0.05	0.06	0.06	0.06	0.07	0.07	0.07	0.08	0.08	
K	Cast iron	40-80	0.05	0.05	0.07	0.09	0.11	0.13	0.14	0.15	0.16	0.16	0.17	0.18	0.18	
N	Aluminum	80-150	0.05	0.05	0.07	0.09	0.11	0.13	0.14	0.15	0.16	0.16	0.17	0.18	0.18	
	Synthetics, duroplastics, thermoplastics	50-200	0.1	0.11	0.12	0.14	0.16	0.18	0.19	0.19	0.19	0.19	0.19	0.2	0.2	

MILL THREAD USER GUIDE

MTECS Small Diameter, Short Solid Carbide Thread Mills

The MTECS (Mill Thread Endmills Carbide Short) solid carbide thread mills are used for the production of small internal threads. These thread mills feature a short 3-tooth cutting zone with 3 flutes and a released neck between the cutting zone and the shank.

This unique tool design offers very precise profiles and a high performance MC98 submicron carbide grade with PVD titanium aluminum nitride coating. The very short profile exerts a low force which minimizes tool bending. This facilitates parallel and high thread precision for the entire length.



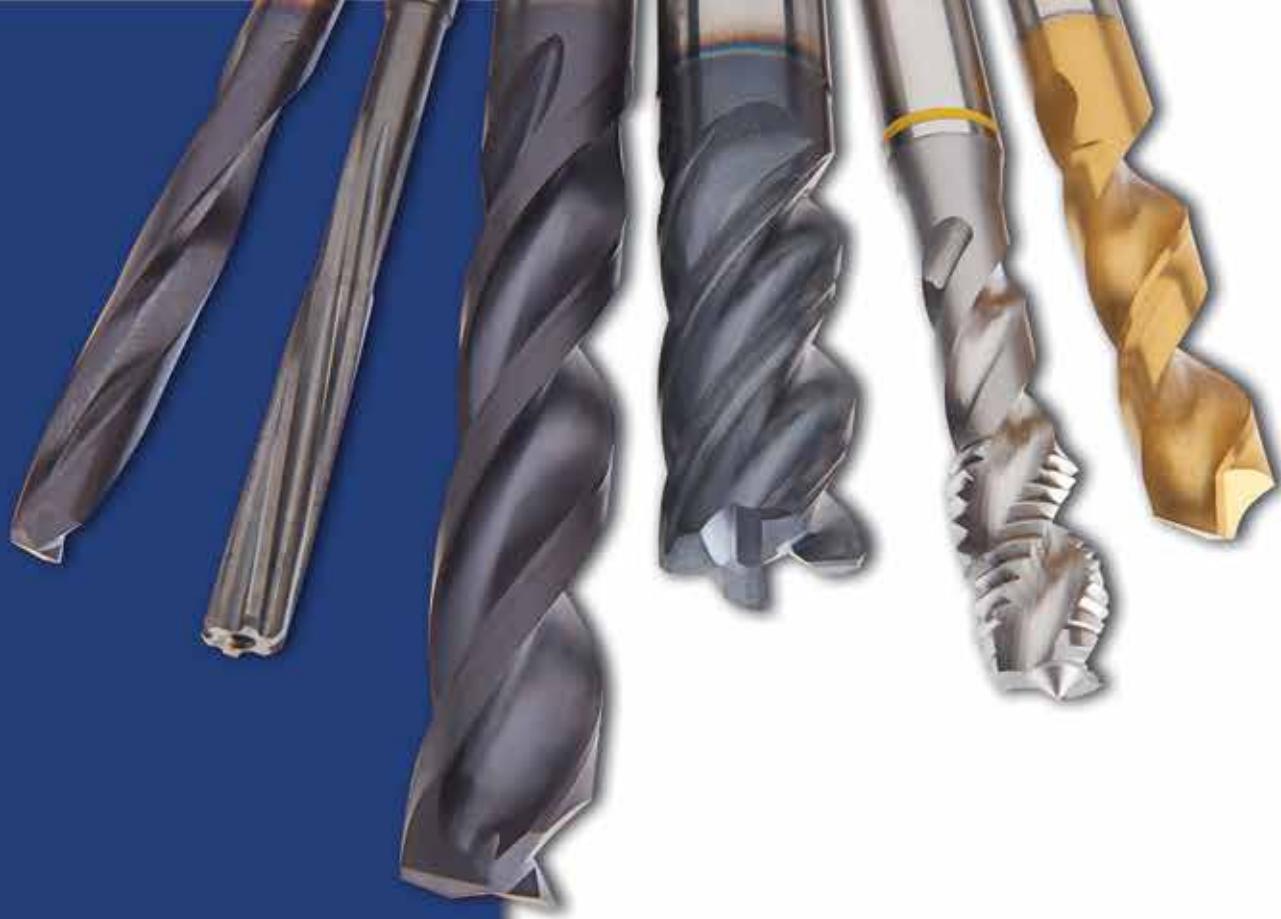
Compared to taps, the SOLIDTHREAD is more accurate, thread machining is substantially faster and there is no danger of a broken tap being stuck in the hole.

Thread Mill vs. Tap

Features	Solid Carbide Thread Mills	Taps
Thread surface quality	High	Medium
Thread geometry	Very accurate	Medium
Thread tolerance	4H, 5H, 6H with std. cutter	6H with standard tap, 4H with special tap
Machining time	Shorter or same as tap	Short
Machining load	Very low	High
Range of thread diameters	Wide range of diameters	Specific tap for each thread size
Right-/Left-hand threading	Same cutter	Specific tap for right- and left-hand
Geometric shape	Full profile	Partial profile

Features

- Minimum thread size: M1.4x0.3 (1.1 mm bore diameter) up to M20x2.50
- 2xD and 3xD threading lengths
- High cutting speeds
- Short cycle time
- Low cutting forces due to the short contact profile, resulting in accurate and parallel thread
- Prevents oval threads near thin walls
- No more dealing with broken taps
- Reliable threading in blind holes
- Excellent performance on hardened steel, high temperature alloys and titanium



HSS TAPS



Tap Selection 181-183

Hand Taps MTPH M 184

VARY TAP

MTPG 185-188

MTPS 189-192

SINGLE TAP

MTPG 193-195

MTPS 196-198

MTPST 199

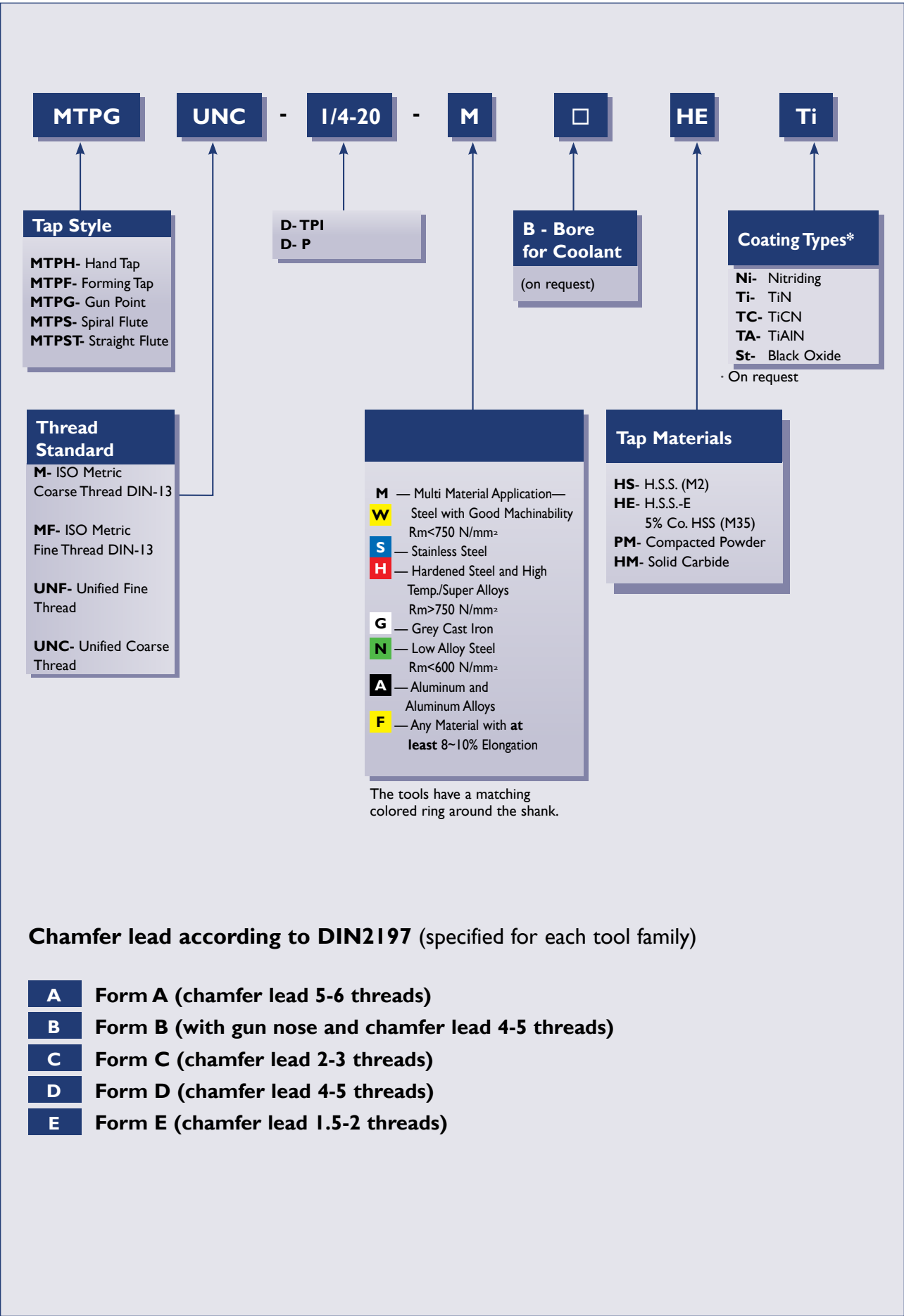
MTPF 200

User Guide 201-227



HSS TAPS

Tap Designation Code Key



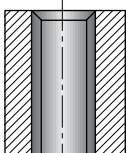
Thread Standards

Cylindrical threads		Taper pipe threads	
UNC	Unified coarse thread series	NPT	Taper pipe threads
UNF	Unified fine thread series	NPTF	Taper pipe threads (dryseal)
UNEF	Unified extra-fine thread series	NPTR	Taper pipe threads for railway equipment
UN	Constant pitch series - threads with constant pitch of T.P.I. 4, 6, 8, 12, 16, 20, 28, 32	PTF-SAE	SHORT taper pipe short threads (dryseal)-SAE
UNS	Selected combinations - threads with special dia. - pitch combinations	PTF-SPL	SHORT taper pipe special threads (dryseal)-SAE
UNJ	Unified threads with constant pitch with radius on minor diameter from 0.15011 pitch to 0.18042 pitch	PTF-SPL	EXTRA SHORT Extra short special threads (dryseal)-SAE
UNJC	Unified coarse thread with radius on minor diameter from 0.15011 pitch to 0.18042 pitch	SPL-PTF	Special taper pipe dryseal threads
UNJEF	Unified extra-fine thread with radius on minor diameter from 0.15011 pitch to 0.18042 pitch	NGT	National American taper pipe threads
UNJF	Unified fine threads with radius on minor diameter from 0.15011 pitch to 0.18042 pitch	SGT	Special taper pipe threads
		API	American Petroleum Institute taper pipe threads
Pipe cylindrical threads		Trapezoidal and saw tooth threads	
NPS	Cylindrical threads for pipe	ACME-C ACME	Self centering threads
NPSC	American Standard for pipe coupling	ACME-G ACME	Generical application
NPSF	American Standard for internal threads on pipe, dryseal	STUB-ACME	ACME flat threads with reduced thread depth
NPSH	American Standard for cylindrical threads for pipes, joints and nipples	60° STUB-ACME	ACME flat threads with 60° flank angle
NPSI	American Standard for internal cylindrical threads on pipe (dryseal)	N BUTT	American National Saw tooth threads
NPSL	American Standard for cylindrical threads on pipes for nuts		
NPSM	American Standard for cylindrical threads on pipes for mechanical joints		
NGO	American National pipe threads for gas exhaust		
NGS	American National pipe threads for gas		
Taper pipe threads		British Standard	
ANPT	Taper pipe threads for Army, Navy and Airforce	BSW	Whitworth British Standard coarse pitch
F-PTE	Taper pipe fine threads (dryseal)	BSF	Whitworth British Standard fine pitch
		WHIT	Whitworth Standard special pitch
		R	British Standard external threading for taper pipe (dryseal) (already BSP-Tr)
		Rc	British Standard internal threading taper thread for pipe (BSP-Tr)
		Rp	British Standard cylindrical thread for pipe (already BSP.PI)
		BA	British Standard Association threads
		BSC	British Standard threads for bicycles
		CEI	British Standard for bicycles

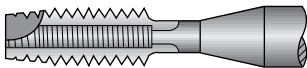
Tap Styles for Hole Types

Type of Hole

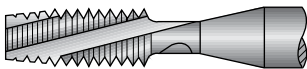
Recommendation of Application



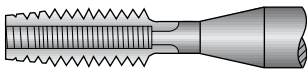
Through hole



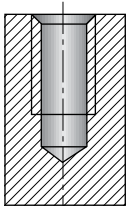
1. Straight fluted tap with spiral point



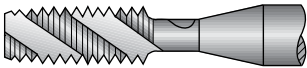
2. Left-hand spiral fluted tap



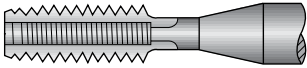
3. Straight fluted tap with long chamfer lead



Blind hole



1. Right-hand spiral fluted tap



2. Straight fluted tap with short chamfer lead

SINGLE TAP

HSS TAPS

MTPH M - W Hand Tap Sets
for ISO Metric Coarse Threads DINI3

First

Second

Bottoming

Hole Type

W

Tap Color Code

HSS

Tap Material

DIN 352

Tap Standard

6H

Tap Tolerance

60°
P

Thread Angle

I / II / III

Chamfer Lead

MTPH M

Designation	D	Pitch	L	ap	d	S	Pre-hole	HS
MTPH M-2X0.4-W	M2	0.4	36	8	2.8	2.1	1.6	●
MTPH M-2.2X0.45-W	M2.2	0.45	36	9	2.8	2.1	1.75	●
MTPH M-2.3X0.4-W ⁽¹⁾	M2.3	0.4	36	9	2.8	2.1	1.9	●
MTPH M-2.5X0.45-W	M2.5	0.45	40	9	2.8	2.1	2.05	●
MTPH M-2.6X0.45-W ⁽¹⁾	M2.6	0.45	40	9	2.8	2.1	2.1	●
MTPH M-3.5X0.6-W	M3	0.5	40	11	3.5	2.7	2.5	●
MTPH M-3X0.5-W	M3.5	0.6	45	13	4	3	2.9	●
MTPH M-4X0.7-W	M4	0.7	45	13	4.5	3.4	3.3	●
MTPH M-4.5X0.75-W	M4.5	0.75	50	16	6	4.9	3.7	●
MTPH M-5X0.8-W	M5	0.8	52	16	6	4.9	4.2	●
MTPH M-5.5X0.9-W	M5.5	0.9	56	18	6	4.9	4.6	●
MTPH M-6X1.0-W	M6	1	56	18	6	4.9	5	●
MTPH M-7X1.0-W	M7	1	56	18	6	4.9	6	●
MTPH M-8X1.25-W	M8	1.25	63	20	6	4.9	6.8	●
MTPH M-9X1.25-W	M9	1.25	63	20	7	5.5	7.8	●
MTPH M-10X1.5-W	M10	1.5	70	22	7	5.5	8.5	●
MTPH M-11X1.5-W	M11	1.5	70	22	8	6.2	9.5	●
MTPH M-12X1.75-W	M12	1.75	80	24	9	7	10.2	●
MTPH M-14X2.0-W	M14	2	80	26	11	9	12	●
MTPH M-16X2.0-W	M16	2	80	27	12	9	14	●
MTPH M-18X2.5-W	M18	2.5	95	30	14	11	15.5	●
MTPH M-20X2.5-W	M20	2.5	95	32	16	12	17.5	●

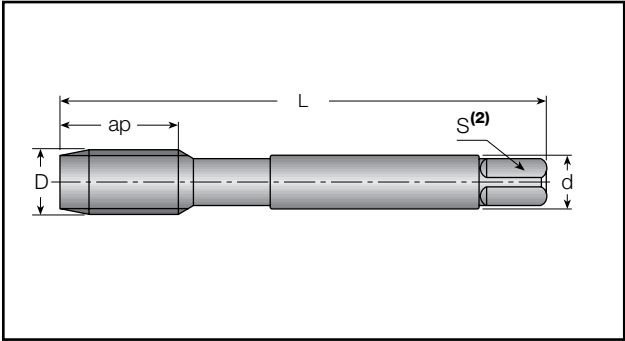
Available in HSS (M2)

⁽¹⁾ DIN profile, not ISO
⁽²⁾ Square Size
 for user guide, see pages 201-227



HSS TAPS

MTPG M Machine Taps for ISO Metric Coarse Threads,
According to DIN 13 for a Wide Range of Materials



M

HSS-E

DIN 371/376

6H

LI

Tap Material

Tap Standard

Tap Tolerance

Thread Angle

Chamfer Lead

MTPG M

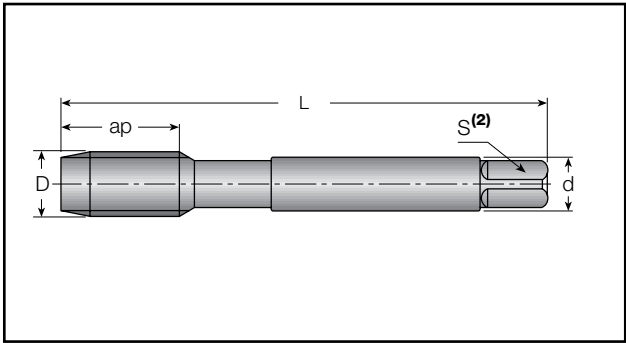
Designation									Tough ↔ Hard		
	D	Pitch	L	ap	d	S	Pre-hole	Standard	HE	HET	HETI
MTPG M-2X0.4-M	M2	0.40	45.00	8.0	2.80	2.10	1.60	DIN 371	●	●	●
MTPG M-2.2X0.45-M	M2.2	0.45	45.00	8.0	2.80	2.10	1.75	DIN 371	●	●	●
MTPG M-2.3X0.4-M ⁽¹⁾	M2.3	0.40	45.00	8.0	2.80	2.10	1.90	DIN 371	●	●	●
MTPG M-2.5X0.45-M	M2.5	0.45	50.00	9.0	2.80	2.10	2.05	DIN 371	●	●	●
MTPG M-2.6X0.45-M ⁽¹⁾	M2.6	0.45	50.00	9.0	2.80	2.10	2.10	DIN 371	●	●	●
MTPG M-3X0.5-M	M3	0.50	56.00	11.0	3.50	2.70	2.50	DIN 371	●	●	●
MTPG M-3.5X0.6-M	M3.5	0.60	56.00	12.0	4.00	3.00	2.90	DIN 371	●	●	●
MTPG M-4X0.7-M	M4	0.70	63.00	13.0	4.50	3.40	3.30	DIN 371	●	●	●
MTPG M-4.5X0.75-M	M4.5	0.75	70.00	14.0	6.00	4.90	3.70	DIN 371	●	●	●
MTPG M-5X0.8-M	M5	0.80	70.00	15.0	6.00	4.90	4.20	DIN 371	●	●	●
MTPG M-6X1.0-M	M6	1.00	80.00	17.0	6.00	4.90	5.00	DIN 371	●	●	●
MTPG M-7X1.0-M	M7	1.00	80.00	17.0	7.00	5.50	6.00	DIN 371	●	●	●
MTPG M-8X1.25-M	M8	1.25	90.00	20.0	8.00	6.20	6.80	DIN 371	●	●	●
MTPG M-9X1.25-M	M9	1.25	90.00	20.0	9.00	7.00	7.80	DIN 371	●	●	●
MTPG M-10X1.5-M	M10	1.50	100.00	22.0	10.00	8.00	8.50	DIN 371	●	●	●
MTPG M-11X1.5-M	M11	1.50	100.00	22.0	8.00	6.20	9.50	DIN 376	●	●	●
MTPG M-12X1.75-M	M12	1.75	110.00	24.0	9.00	7.00	10.20	DIN 376	●	●	●
MTPG M-14X2.0-M	M14	2.00	110.00	26.0	11.00	9.00	12.00	DIN 376	●	●	●
MTPG M-16X2.0-M	M16	2.00	110.00	27.0	12.00	9.00	14.00	DIN 376	●	●	●
MTPG M-18X2.5-M	M18	2.50	125.00	30.0	14.00	11.00	15.50	DIN 376	●	●	●
MTPG M-20X2.5-M	M20	2.50	140.00	32.0	16.00	12.00	17.50	DIN 376	●	●	●
MTPG M-22X2.5-M	M22	2.50	140.00	32.0	18.00	14.50	18.50	DIN 376	●	●	●
MTPG M-24X3.0-M	M24	3.00	160.00	34.0	18.00	14.50	21.00	DIN 376	●	●	●
MTPG M-27X3.0-M	M27	3.00	160.00	36.0	20.00	16.00	24.00	DIN 376	●	●	●
MTPG M-30X3.5-M	M30	3.00	180.00	40.0	22.00	18.00	26.50	DIN 376	●	●	●

⁽¹⁾ DIN profile, not ISO
⁽²⁾ Square size
 for user guide, see pages 201-227



HSS TAPS

MTPG MF Machine Taps for ISO Metric Fine Threads,
According to DIN 13 for a Wide Range of Materials



Hole Type

M

Tap
Material

HSS-E

Tap
Standard

**DIN
374**

Tap
Tolerance

6H

Thread
Angle

Chamfer
Lead

MTPG MF

Designation	D	Pitch	L	ap	d	S	Pre-hole	Standard	Tough ← Hard		
									HE	HET	HETI
MTPG MF-4X0.5-M	M4	0.50	63.00	10.0	2.80	2.10	3.50	DIN 374	●	●	●
MTPG MF-5X0.5-M	M5	0.50	70.00	11.0	3.50	2.70	4.50	DIN 374	●	●	●
MTPG MF-6X0.75-M	M6	0.75	80.00	13.0	4.50	3.40	5.20	DIN 374	●	●	●
MTPG MF-6X0.5-M	M6	0.50	80.00	13.0	4.50	3.40	5.50	DIN 374	●	●	●
MTPG MF-7X0.75-M	M7	0.75	80.00	14.0	5.50	4.30	6.20	DIN 374	●	●	●
MTPG MF-8X1.0-M	M8	1.00	90.00	17.0	6.00	4.90	7.00	DIN 374	●	●	●
MTPG MF-8X0.75-M	M8	0.75	80.00	14.0	6.00	4.90	7.20	DIN 374	●	●	●
MTPG MF-10X1.25-M	M10	1.25	100.00	22.0	7.00	5.50	8.80	DIN 374	●	●	●
MTPG MF-10X1.0-M	M10	1.00	90.00	18.0	7.00	5.50	9.00	DIN 374	●	●	●
MTPG MF-10X0.75-M	M10	0.75	90.00	18.0	7.00	5.50	9.20	DIN 374	●	●	●
MTPG MF-12X1.5-M	M12	1.50	100.00	22.0	9.00	7.00	10.50	DIN 374	●	●	●
MTPG MF-12X1.25-M	M12	1.25	100.00	22.0	9.00	7.00	10.80	DIN 374	●	●	●
MTPG MF-12X1.0-M	M12	1.00	100.00	18.0	9.00	7.00	11.00	DIN 374	●	●	●
MTPG MF-14X1.5-M	M14	1.50	100.00	22.0	11.00	9.00	12.50	DIN 374	●	●	●
MTPG MF-14X1.25-M	M14	1.25	100.00	22.0	11.00	9.00	12.80	DIN 374	●	●	●
MTPG MF-14X1.0-M	M14	1.00	100.00	18.0	11.00	9.00	13.00	DIN 374	●	●	●
MTPG MF-16X1.5-M	M16	1.50	100.00	22.0	12.00	9.00	14.50	DIN 374	●	●	●
MTPG MF-16X1.0-M	M16	1.00	100.00	18.0	12.00	9.00	15.00	DIN 374	●	●	●
MTPG MF-18X1.5-M	M18	1.50	110.00	25.0	14.00	11.00	16.50	DIN 374	●	●	●
MTPG MF-18X1.0-M	M18	1.00	110.00	20.0	14.00	11.00	17.00	DIN 374	●	●	●
MTPG MF-20X1.5-M	M20	1.50	125.00	25.0	16.00	12.00	18.50	DIN 374	●	●	●
MTPG MF-20X1.0-M	M20	1.00	125.00	20.0	16.00	12.00	19.00	DIN 374	●	●	●
MTPG MF-22X1.5-M	M22	1.50	125.00	25.0	18.00	14.50	20.50	DIN 374	●	●	●
MTPG MF-22X1.0-M	M22	1.00	125.00	20.0	18.00	14.50	21.00	DIN 374	●	●	●
MTPG MF-24X2.0-M	M24	2.00	140.00	27.0	18.00	14.50	22.00	DIN 374	●	●	●
MTPG MF-24X1.5-M	M24	1.50	140.00	27.0	18.00	14.50	22.50	DIN 374	●	●	●
MTPG MF-26X1.5-M	M26	1.50	140.00	28.0	18.00	14.50	24.50	DIN 374	●	●	●
MTPG MF-27X2.0-M	M27	2.00	140.00	28.0	20.00	16.00	25.00	DIN 374	●	●	●
MTPG MF-27X1.5-M	M27	1.50	140.00	28.0	20.00	16.00	25.50	DIN 374	●	●	●
MTPG MF-28X1.5-M	M28	1.50	140.00	28.0	20.00	16.00	26.50	DIN 374	●	●	●
TPG MF-30X2.0-M	M30	2.00	150.00	30.0	22.00	18.00	28.00	DIN 374	●	●	●
TPG MF-30X1.5-M	M30	1.50	150.00	30.0	22.00	18.00	28.50	DIN 374	●	●	●

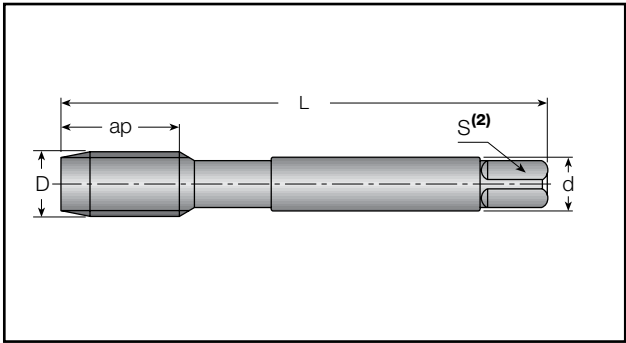
(1) DIN profile, not ISO

(2) Square size

for user guide, see pages 201-227

HSS TAPS

MTPG UNC Machine Taps for Unified Coarse Threads,
According to DIN 13 for a Wide Range of Materials



M

HSS-E

DIN 371/376

2B

Hole Type

Tap Material

Tap Standard

Tap Tolerance

Thread Angle

Chamfer Lead

MTPG UNC

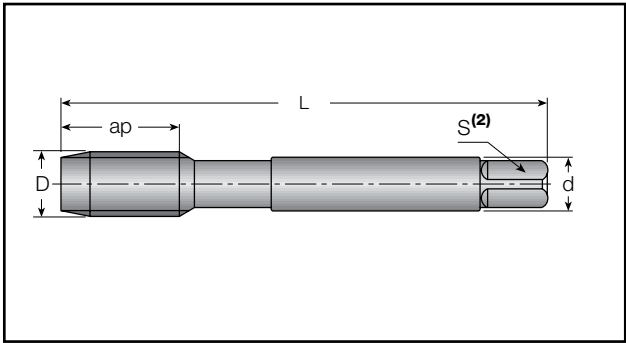
Designation									Tough ←→ Hard		
	D	TPI	L	ap	d	S	Pre-hole	Standard	HE	HET	HETI
MTPG UNC-#4-40-M	#4	40.0	56.00	11.0	3.50	2.70	2.30	DIN 371	●	●	●
MTPG UNC-#5-40-M	#5	40.0	56.00	11.0	3.50	2.70	2.60	DIN 371	●	●	●
MTPG UNC-#6-32-M	#6	32.0	56.00	12.0	4.00	3.00	2.85	DIN 371	●	●	●
MTPG UNC-#8-32-M	#8	32.0	63.00	13.0	4.50	3.40	3.50	DIN 371	●	●	●
MTPG UNC-#10-24-M	#10	24.0	70.00	15.0	6.00	4.90	3.90	DIN 371	●	●	●
MTPG UNC-#12-24-M	#12	24.0	80.00	16.0	6.00	4.90	4.50	DIN 371	●	●	●
MTPG UNC-1/4-20-M	1/4"	20.0	80.00	17.0	7.00	5.50	5.20	DIN 371	●	●	●
MTPG UNC-5/16-18-M	5/16"	18.0	90.00	20.0	8.00	6.20	6.60	DIN 371	●	●	●
MTPG UNC-3/8-16-M	3/8"	16.0	100.00	22.0	9.00	7.00	8.00	DIN 371	●	●	●
MTPG UNC-7/16-14-M	7/16"	14.0	100.00	22.0	8.00	6.20	9.40	DIN 376	●	●	●
MTPG UNC-1/2-13-M	1/2"	13.0	110.00	25.0	9.00	7.00	10.75	DIN 376	●	●	●
MTPG UNC-9/16-12-M	9/16"	12.0	110.00	26.0	11.00	9.00	12.25	DIN 376	●	●	●
MTPG UNC-5/8-11-M	5/8"	11.0	110.00	27.0	12.00	9.00	13.50	DIN 376	●	●	●
MTPG UNC-3/4-10-M	3/4"	10.0	125.00	30.0	14.00	11.00	16.50	DIN 376	●	●	●
MTPG UNC-7/8-9-M	7/8"	9.0	140.00	32.0	18.00	14.50	19.50	DIN 376	●	●	●
MTPG UNC-1-8-M	1"	8.0	160.00	36.0	20.00	16.00	22.25	DIN 376	●	●	●

(1) DIN profile, not ISO
 (2) Square size
 for user guide, see pages 201-227



HSS TAPS

MTPG UNF Machine Taps for Unified Fine Threads,
According to DIN 13 for a Wide Range of Materials



Hole Type

M

HSS-E

DIN 371/376

2B

Thread Angle

Chamfer Lead

Tap Material

Tap Standard

Tap Tolerance

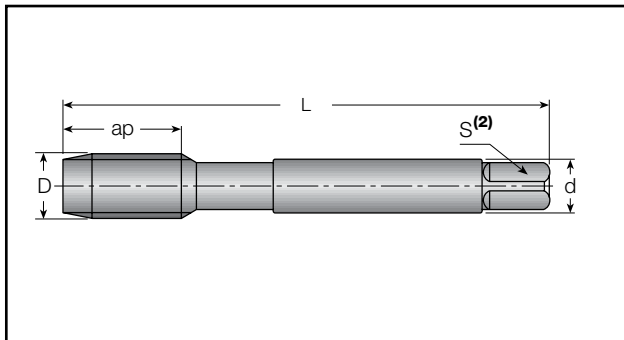
MTPG UNF

Designation									Tough ↔ Hard		
	D	TPI	L	ap	d	S	Pre-hole	Standard	HE	HES	HETI
MTPG UNF-#4-48-M	#4	48.0	56.00	11.0	3.50	2.70	2.40	DIN 371	●	●	●
MTPG UNF-#5-44-M	#5	44.0	56.00	11.0	3.50	2.70	2.70	DIN 371	●	●	●
MTPG UNF-#6-40-M	#6	40.0	56.00	12.0	4.00	3.00	3.00	DIN 371	●	●	●
MTPG UNF-#8-36-M	#8	36.0	63.00	13.0	4.50	3.40	3.50	DIN 371	●	●	●
MTPG UNF-#10-32-M	#10	32.0	70.00	15.0	6.00	4.90	4.10	DIN 371	●	●	●
MTPG UNF-#12-28-M	#12	28.0	80.00	16.0	6.00	4.90	4.70	DIN 371	●	●	●
MTPG UNF-1/4-28-M	1/4"	28.0	80.00	17.0	7.00	5.50	5.50	DIN 371	●	●	●
MTPG UNF-5/16-24-M	5/16"	24.0	90.00	17.0	8.00	6.20	6.90	DIN 371	●	●	●
MTPG UNF-3/8-24-M	3/8"	24.0	100.00	18.0	9.00	7.00	8.50	DIN 371	●	●	●
MTPG UNF-7/16-20-M	7/16"	20.0	100.00	22.0	8.00	6.20	9.90	DIN 374	●	●	●
MTPG UNF-1/2-20-M	1/2"	20.0	100.00	22.0	9.00	7.00	11.50	DIN 374	●	●	●
MTPG UNF-9/16-18-M	9/16"	18.0	100.00	22.0	11.00	9.00	12.90	DIN 374	●	●	●
MTPG UNF-5/8-18-M	5/8"	18.0	100.00	22.0	12.00	9.00	14.50	DIN 374	●	●	●
MTPG UNF-3/4-16-M	3/4"	16.0	110.00	25.0	14.00	11.00	17.50	DIN 374	●	●	●
MTPG UNF-7/8-14-M	7/8"	14.0	125.00	26.0	18.00	14.50	20.50	DIN 374	●	●	●
MTPG UNF-1-12-M	1"	12.0	140.00	28.0	20.00	16.00	23.25	DIN 374	●	●	●

(1) DIN profile, not ISO
 (2) Square size
 for user guide, see pages 201-227

HSS TAPS

MTPS M Spiral Flute Machine Taps for Metric Coarse Threads,
According to DIN 13 for a Wide Range of Materials



M

HSS-E

DIN
371/376

6H

60°
P

C

Tap Material Tap Standard Tap Tolerance Thread Angle Chamfer Lead

MTPS M

Designation	D	Pitch	L	ap	d	S	Pre-hole	Standard	Coolant	Tough ↔ Hard		
										HE	HES	HETI
MTPS M-2X0.4-M	M2	0.40	45.00	8.0	2.80	2.10	1.60	DIN 371	N	●	●	●
MTPS M-2.2X0.45-M	M2.2	0.45	45.00	8.0	2.80	2.10	1.75	DIN 371	N	●	●	●
MTPS M-2.3X0.4-M	M2.3	0.40	45.00	8.0	2.80	2.10	1.90	DIN 371	N	●	●	●
MTPS M-2.5X0.45-M	M2.5	0.45	50.00	9.0	2.80	2.10	2.05	DIN 371	N	●	●	●
MTPS M-2.6X0.45-M	M2.6	0.45	50.00	9.0	2.80	2.10	2.10	DIN 371	N	●	●	●
MTPS M-3X0.5-M	M3	0.50	56.00	6.0	3.50	2.70	2.50	DIN 371	N	●	●	●
MTPS M-3.5X0.6-M	M3.5	0.60	56.00	7.0	4.00	3.00	2.90	DIN 371	N	●	●	●
MTPS M-4X0.7-M	M4	0.70	63.00	7.0	4.50	3.40	3.30	DIN 371	N	●	●	●
MTPS M-4.5X0.75-M	M4.5	0.75	70.00	8.0	6.00	4.90	3.70	DIN 371	N	●	●	●
MTPS M-5X0.8-M	M5	0.80	70.00	8.0	6.00	4.90	4.20	DIN 371	N	●	●	●
MTPS M-6X1.0-M	M6	1.00	80.00	10.0	6.00	4.90	5.00	DIN 371	N	●	●	●
MTPS M-7X1.0-M	M7	1.00	80.00	10.0	7.00	5.50	6.00	DIN 371	N	●	●	●
MTPS M-8X1.25-M	M8	1.25	90.00	13.0	8.00	6.20	6.80	DIN 371	N	●	●	●
MTPS M-9X1.25-M	M9	1.25	90.00	13.0	9.00	7.00	7.80	DIN 371	N	●	●	●
MTPS M-10X1.5-M	M10	1.50	100.00	15.0	10.00	8.00	8.50	DIN 371	N	●	●	●
MTPS M-11X1.5-M	M11	1.50	100.00	17.0	8.00	6.20	9.50	DIN 376	N	●	●	●
MTPS M-12X1.75-M	M12	1.75	110.00	18.0	9.00	7.00	10.20	DIN 376	N	●	●	●
MTPS M-14X2.0-M	M14	2.00	110.00	20.0	11.00	9.00	12.00	DIN 376	N	●	●	●
MTPS M-16X2.0-M	M16	2.00	110.00	20.0	12.00	9.00	14.00	DIN 376	N	●	●	●
MTPS M-16X2.0-M-B	M16	2.00	110.00	20.0	12.00	9.00	14.00	DIN 376	Y	●	●	●
MTPS M-18X2.5-M	M18	2.50	125.00	25.0	14.00	11.00	15.50	DIN 376	N	●	●	●
MTPS M-18X2.5-M-B	M18	2.50	125.00	25.0	14.00	11.00	15.50	DIN 376	Y	●	●	●
MTPS M-20X2.5-M	M20	2.50	140.00	25.0	16.00	12.00	17.50	DIN 376	N	●	●	●
MTPS M-20X2.5-M-B	M20	2.50	140.00	25.0	16.00	12.00	17.50	DIN 376	Y	●	●	●
MTPS M-22X2.5-M	M22	2.50	140.00	25.0	18.00	14.50	19.50	DIN 376	N	●	●	●
MTPS M-22X2.5-M-B	M22	2.50	140.00	25.0	18.00	14.50	19.50	DIN 376	Y	●	●	●
MTPS M-24X3.0-M	M24	3.00	160.00	30.0	18.00	14.50	21.00	DIN 376	N	●	●	●
MTPS M-24X3.0-M-B	M24	3.00	160.00	30.0	18.00	14.50	21.00	DIN 376	Y	●	●	●
MTPS M-27X3.0-M	M27	3.00	160.00	30.0	20.00	16.00	24.00	DIN 376	N	●	●	●
MTPS M-30X3.5-M	M30	3.50	180.00	35.0	22.00	18.00	26.50	DIN 376	N	●	●	●
MTPS M-30X3.5-M-B	M30	3.50	180.00	35.0	22.00	18.00	26.50	DIN 376	Y	●	●	●

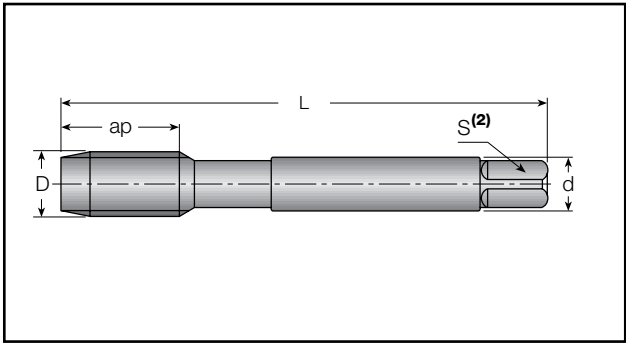
(1) DIN profile, not ISO

(2) Square size

for user guide, see pages 201-227

HSS TAPS

MTPS MF Spiral Flute Machine Taps for Metric Fine Threads,
According to DIN 13 for a Wide Range of Materials



M

HSS-E

DIN 374

6H

Tap Material
Tap Standard
Tap Tolerance
Thread Angle
Chamfer Lead

Hole Type

HE

HEST

HETI

MTPS MF

Designation	D	Pitch	L	ap	d	S	Pre-hole	Standard	Tough ← Hard		
									HE	HEST	HETI
MTPS MF-4X0.5-M	M4	0.50	63.00	5.0	2.80	2.10	3.50	DIN 374	●	●	●
MTPS MF-5X0.5-M	M5	0.50	70.00	5.0	3.50	2.70	4.50	DIN 374	●	●	●
MTPS MF-6X0.75-M	M6	0.75	80.00	8.0	4.50	3.40	5.20	DIN 374	●	●	●
MTPS MF-6X0.5-M	M6	0.50	80.00	5.0	4.50	3.40	5.50	DIN 374	●	●	●
MTPS MF-7X0.75-M	M7	0.75	80.00	10.0	5.50	4.30	6.20	DIN 374	●	●	●
MTPS MF-8X1.0-M	M8	1.00	90.00	10.0	6.00	4.90	7.00	DIN 374	●	●	●
MTPS MF-8X0.75-M	M8	0.75	80.00	8.0	6.00	4.90	7.20	DIN 374	●	●	●
MTPS MF-10X1.25-M	M10	1.25	100.00	16.0	7.00	5.50	8.80	DIN 374	●	●	●
MTPS MF-10X1.0-M	M10	1.00	90.00	10.0	7.00	5.50	9.00	DIN 374	●	●	●
MTPS MF-10X0.75-M	M10	0.75	90.00	10.0	7.00	5.50	9.20	DIN 374	●	●	●
MTPS MF-12X1.5-M	M12	1.50	100.00	15.0	9.00	7.00	10.50	DIN 374	●	●	●
MTPS MF-12X1.25-M	M12	1.25	100.00	15.0	9.00	7.00	10.80	DIN 374	●	●	●
MTPS MF-12X1.0-M	M12	1.00	100.00	11.0	9.00	7.00	11.00	DIN 374	●	●	●
MTPS MF-14X1.5-M	M14	1.50	100.00	15.0	11.00	9.00	12.50	DIN 374	●	●	●
MTPS MF-14X1.25-M	M14	1.25	100.00	15.0	11.00	9.00	12.80	DIN 374	●	●	●
MTPS MF-14X1.0-M	M14	1.00	100.00	11.0	11.00	9.00	13.00	DIN 374	●	●	●
MTPS MF-16X1.5-M	M16	1.50	100.00	15.0	12.00	9.00	14.50	DIN 374	●	●	●
MTPS MF-16X1.0-M	M16	1.00	100.00	12.0	12.00	9.00	15.00	DIN 374	●	●	●
MTPS MF-18X1.5-M	M18	1.50	110.00	17.0	14.00	11.00	16.50	DIN 374	●	●	●
MTPS MF-18X1.0-M	M18	1.00	110.00	13.0	14.00	11.00	17.00	DIN 374	●	●	●
MTPS MF-20X1.5-M	M20	1.50	125.00	17.0	16.00	12.00	18.50	DIN 374	●	●	●
MTPS MF-20X1.0-M	M20	1.00	125.00	14.0	16.00	12.00	19.00	DIN 374	●	●	●
MTPS MF-22X1.5-M	M22	1.50	125.00	17.0	18.00	14.50	20.50	DIN 374	●	●	●
MTPS MF-22X1.0-M	M22	1.00	125.00	14.0	18.00	14.50	21.00	DIN 374	●	●	●
MTPS MF-24X2.0-M	M24	2.00	140.00	20.0	18.00	14.50	22.00	DIN 374	●	●	●
MTPS MF-24X1.5-M	M24	1.50	140.00	20.0	18.00	14.50	22.50	DIN 374	●	●	●
MTPS MF-26X1.5-M	M26	1.50	140.00	20.0	18.00	14.50	24.50	DIN 374	●	●	●
MTPS MF-27X2.0-M	M27	2.00	140.00	20.0	20.00	16.00	25.00	DIN 374	●	●	●
MTPS MF-27X1.5-M	M27	1.50	140.00	20.0	20.00	16.00	25.50	DIN 374	●	●	●
MTPS MF-28X1.5-M	M28	1.50	140.00	20.0	20.00	16.00	26.50	DIN 374	●	●	●
MTPS MF-30X2.0-M	M30	2.00	150.00	22.0	22.00	18.00	28.00	DIN 374	●	●	●
MTPS MF-30X1.5-M	M30	1.50	150.00	22.0	22.00	18.00	28.50	DIN 374	●	●	●

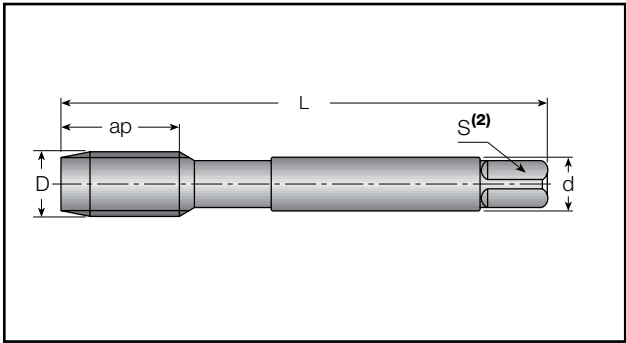
(1) DIN profile, not ISO

(2) Square size

for user guide, see pages 201-227

HSS TAPS

MTPS UNC Spiral Flute Machine Taps for Unified Coarse Threads,
According to DIN 13 for a Wide Range of Materials



Hole Type

M

Tap Material

HSS-E

DIN 371/376

Tap Standard

2B

Tap Tolerance

Thread Angle

Chamfer Lead

MTPS UNC

Designation	D	Pitch	L	ap	d	S	Pre-hole	Standard	Tough ←→ Hard		
									HE	HES	HET
MTPS UNC-#4-40-M	#4	40.0	56.00	6.0	3.50	2.70	2.30	DIN 371	●	●	●
MTPS UNC-#5-40-M	#5	40.0	56.00	7.0	3.50	2.70	2.60	DIN 371	●	●	●
MTPS UNC-#6-32-M	#6	32.0	56.00	7.0	4.00	3.00	2.85	DIN 371	●	●	●
MTPS UNC-#8-32-M	#8	32.0	63.00	8.0	4.50	3.40	3.50	DIN 371	●	●	●
MTPS UNC-#10-24-M	#10	24.0	70.00	10.0	6.00	4.90	3.90	DIN 371	●	●	●
MTPS UNC-#12-24-M	#12	24.0	80.00	10.0	6.00	4.90	4.50	DIN 371	●	●	●
MTPS UNC-1/4-20-M	1/4"	20.0	80.00	13.0	7.00	5.50	5.20	DIN 371	●	●	●
MTPS UNC-5/16-18-M	5/16"	18.0	90.00	14.0	8.00	6.20	6.60	DIN 371	●	●	●
MTPS UNC-3/8-16-M	3/8"	16.0	100.00	16.0	9.00	7.00	8.00	DIN 371	●	●	●
MTPS UNC-7/16-14-M	7/16"	14.0	100.00	17.0	8.00	6.20	9.40	DIN 376	●	●	●
MTPS UNC-1/2-13-M	1/2"	13.0	110.00	20.0	9.00	7.00	10.75	DIN 376	●	●	●
MTPS UNC-9/16-12-M	9/16"	12.0	110.00	20.0	11.00	9.00	12.25	DIN 376	●	●	●
MTPS UNC-5/8-11-M	5/8"	11.0	110.00	22.0	12.00	9.00	13.50	DIN 376	●	●	●
MTPS UNC-3/4-10-M	3/4"	10.0	125.00	25.0	14.00	11.00	16.50	DIN 376	●	●	●
MTPS UNC-7/8-9-M	7/8"	9.0	140.00	27.0	18.00	14.50	19.50	DIN 376	●	●	●
MTPS UNC-1-8-M	1"	8.0	160.00	30.0	20.00	16.00	22.25	DIN 376	●	●	●

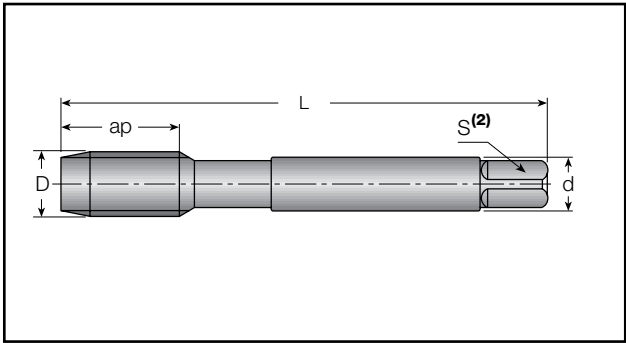
(1) DIN profile, not ISO

(2) Square size

for user guide, see pages 201-227

HSS TAPS

MTPS UNF Spiral Flute Machine Taps for Unified Fine Threads,
According to DIN 13 for a Wide Range of Materials



Hole Type

M

HSS-E

DIN 371/374

2B

Tap Material

Tap Standard

Tap Tolerance

Thread Angle

Chamfer Lead

MTPS UNC

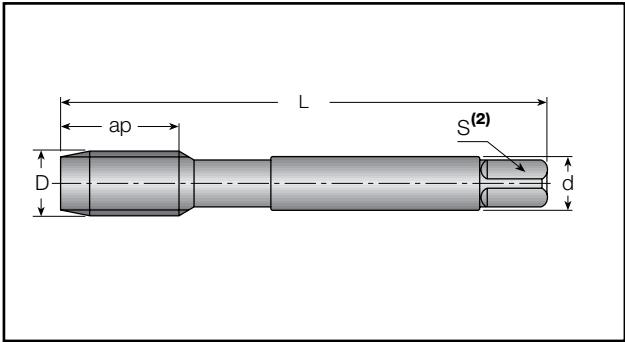
Designation	D	Pitch	L	ap	d	S	Pre-hole	Standard	Tough ↔ Hard		
									HE	HES	HETI
MTPS UNF-#4-48-M	#4	48.0	56.00	6.0	3.50	2.70	2.40	DIN 371	●	●	●
MTPS UNF-#5-44-M	#5	44.0	56.00	7.0	3.50	2.70	2.70	DIN 371	●	●	●
MTPS UNF-#6-40-M	#6	40.0	56.00	7.0	4.00	3.00	3.00	DIN 371	●	●	●
MTPS UNF-#8-36-M	#8	36.0	63.00	8.0	4.50	3.40	3.50	DIN 371	●	●	●
MTPS UNF-#10-32-M	#10	32.0	70.00	10.0	6.00	4.90	4.10	DIN 371	●	●	●
MTPS UNF-#12-28-M	#12	28.0	80.00	10.0	6.00	4.90	4.70	DIN 371	●	●	●
MTPS UNF-1/4-28-M	1/4"	28.0	80.00	10.0	7.00	5.50	5.50	DIN 371	●	●	●
MTPS UNF-5/16-24-M	5/16"	24.0	90.00	10.0	8.00	6.20	6.90	DIN 371	●	●	●
MTPS UNF-3/8-24-M	3/8"	24.0	100.00	10.0	9.00	7.00	8.50	DIN 371	●	●	●
MTPS UNF-7/16-20-M	7/16"	20.0	100.00	13.0	8.00	6.20	9.90	DIN 374	●	●	●
MTPS UNF-1/2-20-M	1/2"	20.0	100.00	13.0	9.00	7.00	11.50	DIN 374	●	●	●
MTPS UNF-9/16-18-M	9/16"	18.0	100.00	15.0	11.00	9.00	12.90	DIN 374	●	●	●
MTPS UNF-5/8-18-M	5/8"	18.0	100.00	15.0	12.00	9.00	14.50	DIN 374	●	●	●
MTPS UNF-3/4-16-M	3/4"	16.0	110.00	17.0	14.00	11.00	17.50	DIN 374	●	●	●
MTPS UNF-7/8-14-M	7/8"	14.0	125.00	17.0	18.00	14.50	20.50	DIN 374	●	●	●
MTPS UNF-1-12-M	1"	12.0	140.00	20.0	20.00	16.00	23.25	DIN 374	●	●	●

(1) DIN profile, not ISO
 (2) Square size
 for user guide, see pages 201-227

SINGLE TAP

HSS TAPS

MTPG M Gun Point Machine Taps
for ISO Metric Coarse Threads DIN13



Hole Type

W

Tap Color Code

HSS-E

Tap Material

DIN 371

Tap Standard

6H

Tap Tolerance

Thread Angle

B

Chamfer Lead

MTPG M

Designation	D	Pitch	L	ap	d	S	Pre-hole	Standard	HE
MTPG M-2.2X0.45-W	M2.2	0.45	45	8	2.8	2.1	1.75	DIN 371	●
MTPG M-2.5X0.45-W	M2.5	0.45	50	9	2.8	2.1	2.05	DIN 371	●
MTPG M-2.6X0.45-W ⁽¹⁾	M2.6	0.45	50	9	2.8	2.1	2.1	DIN 371	●
MTPG M-3X0.5-W	M3.5	0.6	56	12	4	3	2.9	DIN 371	●
MTPG M-4.5X0.75-W	M4.5	0.75	70	14	6	4.9	3.7	DIN 371	●
MTPG M-6X1.0-W	M6	1	80	17	6	4.9	5	DIN 371	●
MTPG M-7X1.0-W	M7	1	80	17	7	5.5	6	DIN 371	●
MTPG M-9X1.25-W	M9	1.25	90	20	9	7	7.8	DIN 371	●
MTPG M-10X1.5-W	M10	1.5	100	22	10	8	8.5	DIN 371	●
MTPG M-11X1.5-W	M11	1.5	100	22	8	6.2	9.5	DIN 376	●
MTPG M-12X1.75-W	M12	1.75	110	24	9	7	10.2	DIN 376	●
MTPG M-14X2.0-W	M14	2	110	26	11	9	12	DIN 376	●
MTPG M-16X2.0-W	M16	2	110	27	12	9	14	DIN 376	●
MTPG M-18X2.5-W	M18	2.5	125	30	14	11	15.5	DIN 376	●
MTPG M-20X2.5-W	M20	2.5	140	32	16	12	17.5	DIN 376	●

Available in HSE - 5% Co HSS-E (M35)

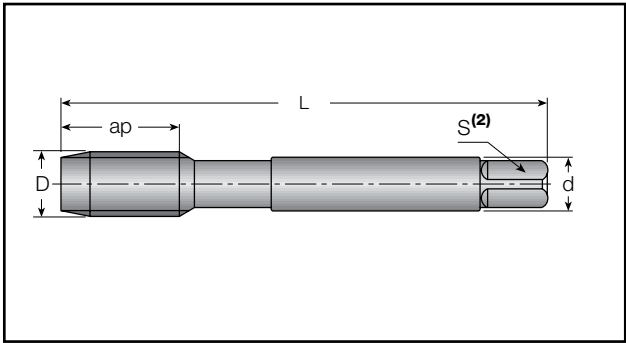
⁽¹⁾ DIN profile, not ISO

⁽²⁾ Square size
for user guide, see pages 201-227

SINGLE TAP

HSS TAPS

MTPG M-S Gun Point Machine Taps
for ISO Metric Coarse Threads DIN13



S

HSS-E

DIN 371/376

6HX

V

Tap Color Code

Tap Material

Tap Standard

Tap Tolerance

Thread Angle

Chamfer Lead

Steam Tempered

Hole Type

MTPG M-S

Designation	D	Pitch	L	ap	d	S	Pre-hole	Standard	HIST
MTPG M-2.2X0.45-S	M2.2	0.45	45	8	2.8	2.1	1.75	DIN 371	●
MTPG M-2.3X0.4-S ⁽¹⁾	M2.3	0.4	45	8	2.8	2.1	1.9	DIN 371	●
MTPG M-2.5X0.45-S	M2.5	0.45	50	9	2.8	2.1	2.05	DIN 371	●
MTPG M-2.6X0.45-S ⁽¹⁾	M2.6	0.45	50	9	2.8	2.1	2.1	DIN 371	●
MTPG M-3X0.5-S	M3	0.5	56	11	3.5	2.7	2.5	DIN 371	●
MTPG M-3.5X0.6-S	M3.5	0.6	56	12	4	3	2.9	DIN 371	●
MTPG M-4X0.7-S	M4	0.7	63	13	4.5	3.4	3.3	DIN 371	●
MTPG M-4.5X0.75-S	M4.5	0.75	70	14	6	4.9	3.7	DIN 371	●
MTPG M-5X0.8-S	M5	0.8	70	15	6	4.9	4.2	DIN 371	●
MTPG M-6X1.0-S	M6	1	80	17	6	4.9	5	DIN 371	●
MTPG M-7X1.0-S	M7	1	80	17	7	5.5	6	DIN 371	●
MTPG M-8X1.25-S	M8	1.25	90	20	8	6.2	6.8	DIN 371	●
MTPG M-9X1.25-S	M9	1.25	90	20	9	7	7.8	DIN 371	●
MTPG M-10X1.5-S	M10	1.5	100	22	10	8	8.5	DIN 371	●
MTPG M-11X1.5-S	M11	1.5	100	22	8	6.2	9.5	DIN 376	●
MTPG M-12X1.75-S	M12	1.75	110	24	9	7	10.2	DIN 376	●
MTPG M-14X2.0-S	M14	2	110	26	11	9	12	DIN 376	●
MTPG M-16X2.0-S	M16	2	110	27	12	9	14	DIN 376	●
MTPG M-18X2.5-S	M18	2.5	125	30	14	11	15.5	DIN 376	●
MTPG M-20X2.5-S	M20	2.5	140	32	16	12	17.5	DIN 376	●

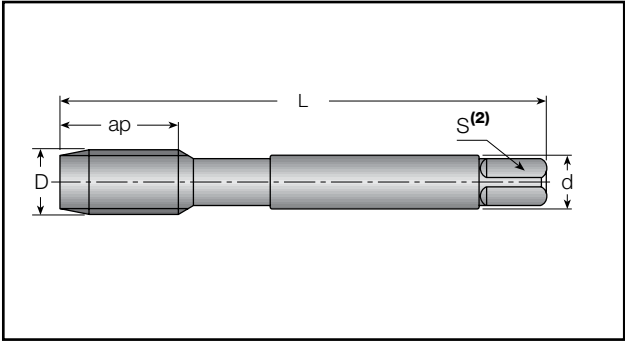
Available in CV5 - 5% Co HSS-E (M35) steam tempered

⁽¹⁾ DIN profile, not ISO
⁽²⁾ Square size
for user guide, see pages 201-227

SINGLE TAP

HSS TAPS

MTPG M-H Gun Point Machine Taps
for ISO Metric Coarse Threads DIN13



Hole Type

Tap Color Code

Tap Material

Tap Standard

Tap Tolerance

Thread Angle

Chamfer Lead

MTPG M-H

Designation	D	Pitch	L	ap	d	S	Pre-hole	Standard	HE
MTPG M-2X0.4-H	M2	0.4	45	8	2.8	2.1	1.6	DIN 371	●
MTPG M-2.2X0.45-H	M2.2	0.45	45	8	2.8	2.1	1.75	DIN 371	●
MTPG M-2.3X0.4-H ⁽¹⁾	M2.3	0.4	45	8	2.8	2.1	1.9	DIN 371	●
MTPG M-2.5X0.45-H	M2.5	0.45	50	9	2.8	2.1	2.05	DIN 371	●
MTPG M-2.6X0.45-H ⁽¹⁾	M2.6	0.45	50	9	2.8	2.1	2.1	DIN 371	●
MTPG M-3X0.5-H	M3	0.5	56	11	3.5	2.7	2.5	DIN 371	●
MTPG M-3.5X0.6-H	M3.5	0.6	56	12	4	3	2.9	DIN 371	●
MTPG M-4X0.7-H	M4	0.7	63	13	4.5	3.4	3.3	DIN 371	●
MTPG M-4.5X0.75-H	M4.5	0.75	70	14	6	4.9	3.7	DIN 371	●
MTPG M-5X0.8-H	M5	0.8	70	15	6	4.9	4.2	DIN 371	●
MTPG M-6X1.0-H	M6	1	80	17	6	4.9	5	DIN 371	●
MTPG M-7X1.0-H	M7	1	80	17	7	5.5	6	DIN 371	●
MTPG M-8X1.25-H	M8	1.25	90	20	8	6.2	6.8	DIN 371	●
MTPG M-9X1.25-H	M9	1.25	90	20	9	7	7.8	DIN 371	●
MTPG M-10X1.5-H	M10	1.5	100	22	10	8	8.5	DIN 371	●
MTPG M-11X1.5-H	M11	1.5	100	22	8	6.2	9.5	DIN 376	●
MTPG M-12X1.75-H	M12	1.75	110	24	9	7	10.2	DIN 376	●
MTPG M-14X2.0-H	M14	2	110	26	11	9	12	DIN 376	●
MTPG M-16X2.0-H	M16	2	110	27	12	9	14	DIN 376	●
MTPG M-18X2.5-H	M18	2.5	125	30	14	11	15.5	DIN 376	●
MTPG M-20X2.5-H	M20	2.5	140	32	16	12	17.5	DIN 376	●

Available in HSE - 5% Co HSS-E (M35)

⁽¹⁾ DIN profile, not ISO

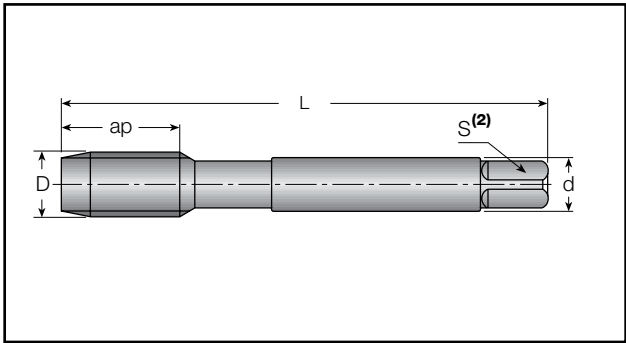
⁽²⁾ Square size

for user guide, see pages 201-227

SINGLE TAP

HSS TAPS

MTPS M-N Right-Hand 40° Spiral Flute Machine Taps
for ISO Metric Coarse Threads DIN13 for Low Alloy Steel



Hole Type
Tap Color Code
Tap Material
Tap Standard
Tap Tolerance
Thread Angle
Chamfer Lead
Steam Tempered

MTPS M-N

Designation	D	Pitch	L	ap	d	S	Pre-hole	Standard	HES
MTPS M-2.2X0.45-N	M2.2	0.45	45	8	2.8	2.1	1.75	DIN 371	●
MTPS M-2.3X0.4-N ⁽¹⁾	M2.3	0.4	45	8	2.8	2.1	1.9	DIN 371	●
MTPS M-2.5X0.45-N	M2.5	0.45	50	9	2.8	2.1	2.05	DIN 371	●
MTPS M-2.6X0.45-N ⁽¹⁾	M2.6	0.45	50	9	2.8	2.1	2.1	DIN 371	●
MTPS M-3X0.5-N	M3	0.5	56	6	3.5	2.7	2.5	DIN 371	●
MTPS M-3.5X0.6-N	M3.5	0.6	56	7	4	3	2.9	DIN 371	●
MTPS M-4X0.7-N	M4	0.7	63	7	4.5	3.4	3.3	DIN 371	●
MTPS M-4.5X0.75-N	M4.5	0.75	70	8	6	4.9	3.7	DIN 371	●
MTPS M-5X0.8-N	M5	0.8	70	8	6	4.9	4.2	DIN 371	●
MTPS M-6X1.0-N	M6	1	80	10	6	4.9	5	DIN 371	●
MTPS M-7X1.0-N	M7	1	80	10	7	5.5	6	DIN 371	●
MTPS M-8X1.25-N	M8	1.25	90	13	8	6.2	6.8	DIN 371	●
MTPS M-9X1.25-N	M9	1.25	90	13	9	7	7.8	DIN 371	●
MTPS M-10X1.5-N	M10	1.5	100	15	10	8	8.5	DIN 371	●
MTPS M-11X1.5-N	M11	1.5	100	17	8	6.2	9.5	DIN 376	●
MTPS M-12X1.75-N	M12	1.75	110	18	9	7	10.2	DIN 376	●
MTPS M-14X2.0-N	M14	2	110	20	11	9	12	DIN 376	●
MTPS M-16X2.0-N	M16	2	110	20	12	9	14	DIN 376	●
MTPS M-18X2.5-N	M18	2.5	125	25	14	11	15.5	DIN 376	●
MTPS M-20X2.5-N	M20	2.5	140	25	16	12	17.5	DIN 376	●

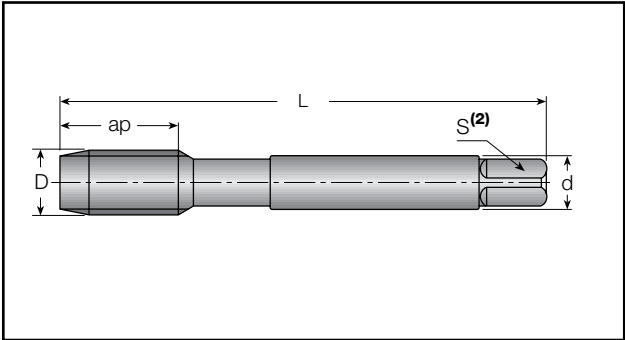
Available in CV5 - 5% Co HSS-E (M35) steam tempered

⁽¹⁾ DIN profile, not ISO
⁽²⁾ Square size
for user guide, see pages 201-227

SINGLE TAP

HSS TAPS

MTPS M-H Right-Hand 40° Spiral Flute Machine Taps
for ISO Metric Coarse Threads DIN13 For High Temperature Alloys



Hole Type
Tap Color Code
Tap Material
Tap Standard
Tap Tolerance
Thread Angle
Chamfer Lead
Steam Tempered

MTPS M-H

Designation	D	Pitch	L	ap	d	S	Pre-hole	Standard	HES
MTPS M-2X0.4-H	M2	0.4	45	8	2.8	2.1	1.6	DIN 371	●
MTPS M-2.2X0.45-H	M2.2	0.45	45	8	2.8	2.1	1.75	DIN 371	●
MTPS M-2.3X0.4-H ⁽¹⁾	M2.3	0.4	45	8	2.8	2.1	1.9	DIN 371	●
MTPS M-2.5X0.45-H	M2.5	0.45	50	9	2.8	2.1	2.05	DIN 371	●
MTPS M-2.6X0.45-H ⁽¹⁾	M2.6	0.45	50	9	2.8	2.1	2.1	DIN 371	●
MTPS M-3X0.5-H	M3	0.5	56	6	3.5	2.7	2.5	DIN 371	●
MTPS M-3.5X0.6-H	M3.5	0.6	56	7	4	3	2.9	DIN 371	●
MTPS M-4X0.7-H	M4	0.7	63	7	4.5	3.4	3.3	DIN 371	●
MTPS M-4.5X0.75-H	M4.5	0.75	70	8	6	4.9	3.7	DIN 371	●
MTPS M-5X0.8-H	M5	0.8	70	8	6	4.9	4.2	DIN 371	●
MTPS M-6X1.0-H	M6	1	80	10	6	4.9	5	DIN 371	●
MTPS M-7X1.0-H	M7	1	80	10	7	5.5	6	DIN 371	●
MTPS M-8X1.25-H	M8	1.25	90	13	8	6.2	6.8	DIN 371	●
MTPS M-9X1.25-H	M9	1.25	90	13	9	7	7.8	DIN 371	●
MTPS M-10X1.5-H	M10	1.5	100	15	10	8	8.5	DIN 371	●
MTPS M-11X1.5-H	M11	1.5	100	17	8	6.2	9.5	DIN 376	●
MTPS M-12X1.75-H	M12	1.75	110	18	9	7	10.2	DIN 376	●
MTPS M-14X2.0-H	M14	2	110	20	11	9	12	DIN 376	●
MTPS M-16X2.0-H	M16	2	110	20	12	9	14	DIN 376	●
MTPS M-18X2.5-H	M18	2.5	125	25	14	11	15.5	DIN 376	●
MTPS M-20X2.5-H	M20	2.5	140	25	16	12	17.5	DIN 376	●

Available in CV5 - 5% Co HSS-E (M35) steam tempered

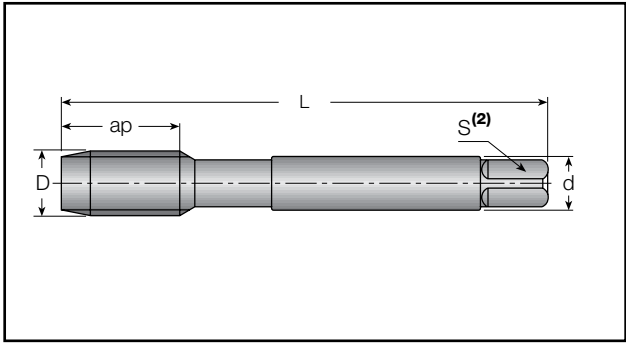
⁽¹⁾ DIN profile, not ISO

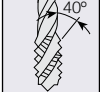
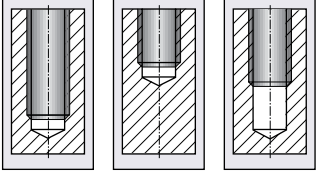
⁽²⁾ Square size
for user guide, see pages 201-227

SINGLE TAP

HSS TAPS

MTPS M -A Right Hand, 45° Spiral Flute, Machine Taps for ISO Metric Coarse Threads DIN13 For Alluminum



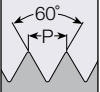


A
Tap Color Code

HSS-E
Tap Material

DIN 371/376
Tap Standard

6H
Tap Tolerance


Thread Angle


Chamfer Lead

MTPS M-A

Designation	D	Pitch	L	ap	d	S	Pre-hole	Standard	HE
MTPS M-2.2X0.45-A	M2.2	0.45	45	8	2.8	2.1	1.75	DIN 371	●
MTPS M-2.3X0.4-A ⁽¹⁾	M2.3	0.4	45	8	2.8	2.1	1.9	DIN 371	●
MTPS M-2.5X0.45-A	M2.5	0.45	50	9	2.8	2.1	2.05	DIN 371	●
MTPS M-2.6X0.45-A ⁽¹⁾	M2.6	0.45	50	9	2.8	2.1	2.1	DIN 371	●
MTPS M-3X0.5-A	M3	0.5	56	6	3.5	2.7	2.5	DIN 371	●
MTPS M-3.5X0.6-A	M3.5	0.6	56	7	4	3	2.9	DIN 371	●
MTPS M-4X0.7-A	M4	0.7	63	7	4.5	3.4	3.3	DIN 371	●
MTPS M-4.5X0.75-A	M4.5	0.75	70	8	6	4.9	3.7	DIN 371	●
MTPS M-5X0.8-A	M5	0.8	70	8	6	4.9	4.2	DIN 371	●
MTPS M-6X1.0-A	M6	1	80	10	6	4.9	5	DIN 371	●
MTPS M-7X1.0-A	M7	1	80	10	7	5.5	6	DIN 371	●
MTPS M-8X1.25-A	M8	1.25	90	13	8	6.2	6.8	DIN 371	●
MTPS M-9X1.25-A	M9	1.25	90	13	9	7	7.8	DIN 371	●
MTPS M-10X1.5-A	M10	1.5	100	15	10	8	8.5	DIN 371	●
MTPS M-11X1.5-A	M11	1.5	100	17	8	6.2	9.5	DIN 376	●
MTPS M-14X2.0-A	M14	2	110	20	11	9	12	DIN 376	●
MTPS M-16X2.0-A	M16	2	110	20	12	9	14	DIN 376	●
MTPS M-18X2.5-A	M18	2.5	125	25	14	11	15.5	DIN 376	●
MTPS M-20X2.5-A	M20	2.5	140	25	16	12	17.5	DIN 376	●

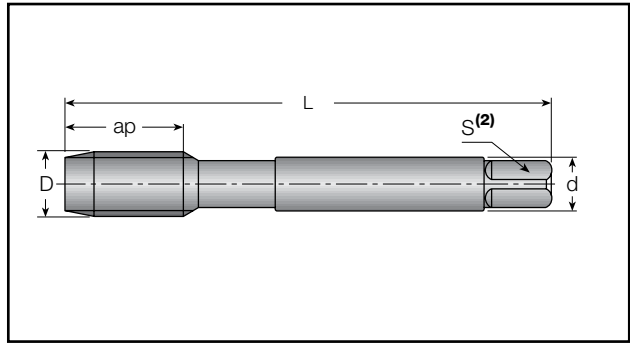
Available in HSE - 5% Co HSS-E (M35)

⁽¹⁾ DIN profile, not ISO
⁽²⁾ Square size
for user guide, see pages 201-227

SINGLE TAP

HSS TAPS

MTPST M-G Straight Flute Machine Taps
for ISO Metric Coarse Threads DINI3 For Gray Cast Iron



Hole Type

G

Tap Color Code

HSS-E

Tap Material

DIN 371/376

Tap Standard

6HX

Tap Tolerance

Thread Angle

Chamfer Lead

MTPST M-G

Designation	D	Pitch	L	ap	d	S	Pre-hole	Standard	HENI
MTPST M-2.2X0.45-G	M2.2	0.45	45	8	2.8	2.1	1.75	DIN 371	●
MTPST M-2.3X0.4-G ⁽¹⁾	M2.3	0.4	45	8	2.8	2.1	1.9	DIN 371	●
MTPST M-2.5X0.45-G	M2.5	0.45	50	9	2.8	2.1	2.05	DIN 371	●
MTPST M-2.6X0.45-G ⁽¹⁾	M2.6	0.45	50	9	2.8	2.1	2.1	DIN 371	●
MTPST M-3X0.5-G	M3	0.5	56	11	3.5	2.7	2.5	DIN 371	●
MTPST M-3.5X0.6-G	M3.5	0.6	56	12	4	3	2.9	DIN 371	●
MTPST M-4X0.7-G	M4	0.7	63	13	4.5	3.4	3.3	DIN 371	●
MTPST M-4.5X0.75-G	M4.5	0.75	70	14	6	4.9	3.7	DIN 371	●
MTPST M-5X0.8-G	M5	0.8	70	15	6	4.9	4.2	DIN 371	●
MTPST M-6X1.0-G	M6	1	80	17	6	4.9	5	DIN 371	●
MTPST M-7X1.0-G	M7	1	80	17	7	5.5	6	DIN 371	●
MTPST M-8X1.25-G	M8	1.25	90	20	8	6.2	6.8	DIN 371	●
MTPST M-9X1.25-G	M9	1.25	90	20	9	7	7.8	DIN 371	●
MTPST M-10X1.5-G	M10	1.5	100	22	10	8	8.5	DIN 371	●
MTPST M-11X1.5-G	M11	1.5	100	22	8	6.2	9.5	DIN 371	●
MTPST M-12X1.75-G	M12	1.75	110	24	9	7	10.2	DIN 376	●
MTPST M-14X2.0-G	M14	2	110	26	11	9	12	DIN 376	●
MTPST M-16X2.0-G	M16	2	110	27	12	9	14	DIN 376	●
MTPST M-18X2.5-G	M18	2.5	125	30	14	11	15.5	DIN 376	●
MTPST M-20X2.5-G	M20	2.5	140	32	16	12	17.5	DIN 376	●

Available in CN5 - 5% Co HSS-E (M35) nitrated

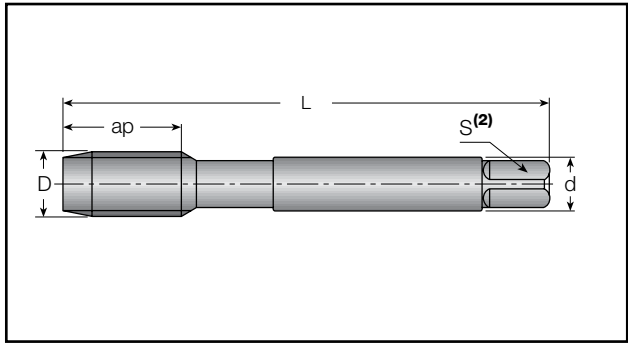
⁽¹⁾ DIN profile, not ISO
⁽²⁾ Square size
for user guide, see pages 201-227



SINGLE TAP

HSS TAPS

MTPF M-F Cold Forming Machine Taps
for ISO Metric Coarse Threads DIN13



Hole Type
Tap Color Code
Tap Material
Tap Standard
Tap Tolerance
Thread Angle
Chamfer Lead
TiN Coating

MTPF M-F

Designation	D	Pitch	L	ap	d	S	Pre-hole	Standard	HETI
MTPF M-2X0.4-F	M2	0.4	45	8	2.8	2.1	1.83	DIN 371	●
MTPF M-2.2X0.45-F	M2.2	0.45	45	8	2.8	2.1	2	DIN 371	●
MTPF M-2.3X0.4-F ⁽¹⁾	M2.3	0.4	45	8	2.8	2.1	2.1	DIN 371	●
MTPF M-2.5X0.45-F	M2.5	0.45	50	9	2.8	2.1	2.3	DIN 371	●
MTPF M-2.6X0.45-F ⁽¹⁾	M2.6	0.45	50	9	2.8	2.1	2.4	DIN 371	●
MTPF M-3X0.5-F	M3	0.5	56	11	3.5	2.7	2.8	DIN 371	●
MTPF M-3.5X0.6-F	M3.5	0.6	56	12	4	3	3.25	DIN 371	●
MTPF M-4X0.7-F	M4	0.7	63	13	4.5	3.4	3.7	DIN 371	●
MTPF M-4.5X0.75-F	M4.5	0.75	70	14	6	4.9	4.15	DIN 371	●
MTPF M-5X0.8-F	M5	0.8	70	15	6	4.9	4.65	DIN 371	●
MTPF M-6X1.0-F	M6	1	80	17	6	4.9	5.55	DIN 371	●
MTPF M-7X1.0-F	M7	1	80	17	7	5.5	6.55	DIN 371	●
MTPF M-8X1.25-F	M8	1.25	90	20	8	6.2	7.4	DIN 371	●
MTPF M-9X1.25-F	M9	1.25	90	20	9	7	8.4	DIN 371	●
MTPF M-10X1.5-F	M10	1.5	100	22	10	8	9.3	DIN 371	●
MTPF M-11X1.5-F	M11	1.5	100	22	8	6.2	10.3	DIN 376	●
MTPF M-12X1.75-F	M12	1.75	110	24	9	7	11.2	DIN 376	●
MTPF M-14X2.0-F	M14	2	110	26	11	9	13	DIN 376	●
MTPF M-16X2.0-F	M16	2	110	27	12	9	15	DIN 376	●
MTPF M-18X2.5-F	M18	2.5	125	30	14	11	16.8	DIN 376	●
MTPF M-20X2.5-F	M20	2.5	140	32	16	12	18.8	DIN 376	●

Available in CT5 - 5% Co HSS-E (M35) TiN coated

⁽¹⁾ DIN profile, not ISO

⁽²⁾ Square size

for user guide, see pages 201-227

Tap Surface Treatments and Coating Types

The high speed steels we use facilitate high wear resistance and toughness. For machining certain materials, various surface treatments are an advantage.

Steam Tempered (ST)

The steam tempered is a Fe_3O_4 -oxyd-coating which **reduces the friction** between the tool and workpiece and **prevents cold welding**.

Nitriding (NI)

Recommended surface treatment **for machining hard wear/abrasive materials** such as **gray cast iron, aluminum alloys with high silicon percentage** (more than 10%).

TiN Coating (TI)

The TiN coating has a hardness of approximately 2,300 HV and is temperature resistant up to approximately 600°C. This is an excellent golden colored coating **for general applications**.

TiCN-COATING – TiCN

TiCN takes place of TiN when the conditions require the coating to have a different hardness and toughness.

The TiCN brings an advantage to machining very difficult steels or cutting interrupted bores.

The TiCN-coating has a hardness of approx. 3,000 HV, but is temperature-resistant up to approx. 400° only. That means TiCN needs excellent cooling for long service life.

Color: Blue-gray coefficient of friction against steel : 0.4

TiAlN-COATING – TiAlN

This is a special coating for machining abrasive materials such as: gray cast iron, alu-alloys with silicon, fiber reinforced plastics, etc., or machining under high temperatures, which means with insufficient cooling, or high speeds $\geq 600\text{m/min}$. TiAlN has a hardness of approx. 3,000 HV and is temperature resistant up to approx. 800°.

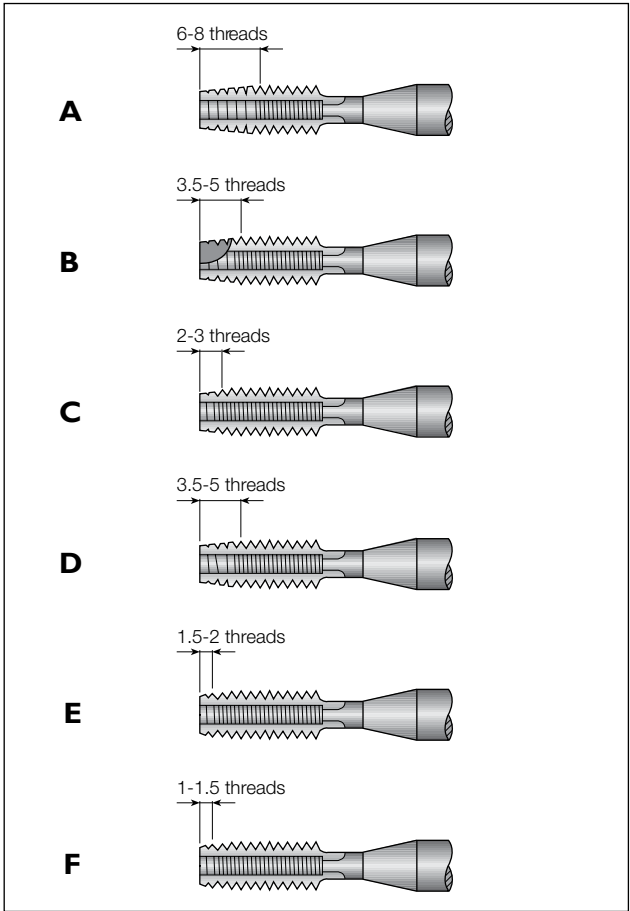
Color: Violet-gray coefficient of friction against steel : 0.4

Hardslick-COATING – Hardslick

Hardslick combines in a novel way the advantages of an extremely hard, thermally stable TiAlN-coating with the sliding and lubricating properties of an outer WC/C (Tungsten carbide/carbon) coating. The hardslick coating has a hardness of approx. 3,000 HV and is temperature-resistant up to approx. 800°.

Color: Violet-gray coefficient of friction against steel : 0.2

Chamfer Lead Forms According to DIN 2197



Form A

Long, 6-8 threads for short through holes.

Form B

Medium, 3.5-5 threads, with spiral point, for all through holes and deep tapping holes.

Form C

Long, 2-3 threads for blind holes and generally for aluminum, gray cast iron and brass.

Form D

Medium, 3.5-5 threads for through and blind holes with sufficient runout.

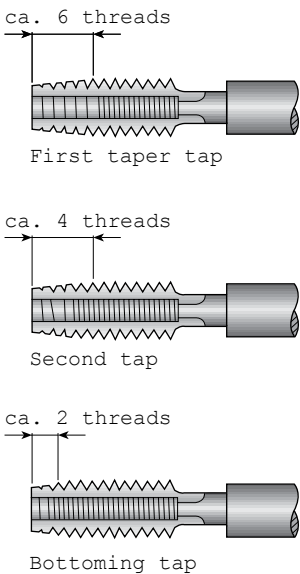
Form E

Extremely short, 1.5-2 threads, for blind holes with little runout depth. Avoid use if possible.

Form F

Extremely short, 1-1.5 threads, for blind holes with little runout depth. Avoid use if possible.

Chamfer Lead Length for Sets of 3 Hand Taps



Tolerances According to DIN EN 22857

For taps with ISO metric threads

The following chart gives a comparison between the new standard DIN EN 22857 and the withdrawn standard DIN 802 part 1. An important change is the re-classification from tap tolerance to tap application class.

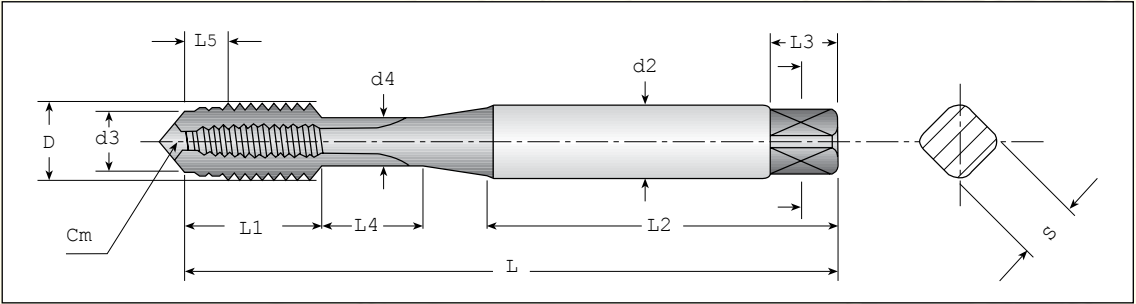
Application class for taps to DIN EN 22857		Tolerance class to withdrawn standard DIN 802 part I	Allotment of the tolerance zones of the nut thread to be cut				
Class 1	ISO 1	4H	4H	5H	-	-	-
Class 2	ISO 2	6H	4G	5G	6H	-	-
Class 3	ISO 3	6G	-	-	6G	7H	8H
-	-	7G	-	-	-	7G	8G

A suitable transition period is to be expected.

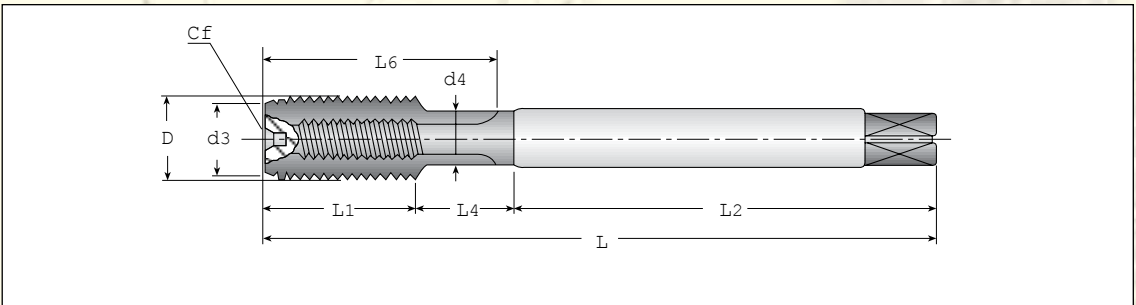
Codes for tolerance classes 7G/8G and <X> tolerance zones have not yet been standardized within DIN EN 22857 and the values from DIN 802 part will continue to be valid.

Tap Nomenclature and Standards

DIN 371



DIN 376



- D** Major diameter

d2 Shank diameter

d3 Chamfer diameter

d4 Neck diameter

L Total length

L1 Thread length

L1 Shank length

L3 Square length

L4 Neck length
- L5** Chamfer length

L6 Flute length

S Square size

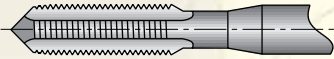
Cm Center male

Cf Center female

Front and End Configurations According to DIN2197

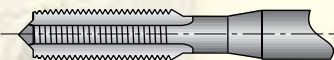
Front End

1



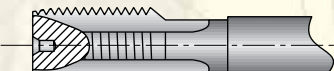
External Center

2



Stepped External Center

3



Internal Center

Shank End

4



External Center

5



Chamfer

6



Internal Center

Thread Dia. Range (mm)	Front End	Shank End	Tap Standard
≤Ø6	1	4 5	DIN352
Ø7	1 2	4 5 6	DIN371
≥Ø8	1 2 3	5 6	DIN376

Pre-Tapping Hole Sizes

ISO Metric Threads Coarse Pitch			
M	Pitch mm	Max. Core Dia. mm	Drill Size mm
1	0.25	0.785	0.75
1,1	0.25	0.885	0.85
1,2	0.25	0.985	0.95
1,4	0.30	1.160	1.10
1,6	0.35	1.321	1.25
1,7	0.35	1.346	1.30
1,8	0.35	1.521	1.45
2	0.40	1.679	1.60
2,2	0.45	1.838	1.75
2,3	0.40	1.920	1.90
2,5	0.45	2.138	2.05
2,6	0.45	2.176	2.10
3	0.50	2.599	2.50
3,5	0.60	3.010	2.90
4	0.70	3.422	3.30
4,5	0.75	3.878	3.70
5	0.80	4.334	4.20
6	1.00	5.153	5.00
7	1.00	6.153	6.00
8	1.25	6.912	6.80
9	1.25	7.912	7.80
10	1.50	8.676	8.50
11	1.50	9.676	9.50
12	1.75	10.441	10.20
14	2.00	12.210	12.00
16	2.00	14.210	14.00
18	2.50	15.744	15.50
20	2.50	17.744	17.50
22	2.50	19.744	19.50
24	3.00	21.252	21.00
27	3.00	24.252	24.00
30	3.50	26.771	26.50
33	3.50	29.771	29.50
36	4.00	32.270	32.00
39	4.00	35.270	35.00
42	4.50	37.799	37.50
45	4.50	40.799	40.50
48	5.00	43.297	43.00
52	5.00	47.297	47.00
56	5.50	50.796	50.50
60	5.50	54.796	54.50
64	6.00	58.305	58.00
68	6.00	62.305	62.00

ISO Metric Threads Fine Pitch			
M _F	Pitch mm	Max. Core Dia. mm	Drill Size mm
2,5	0.35	2.221	2.15
3	0.35	2.271	2.65
3,5	0.35	3.221	3.15
4	0.50	3.599	3.50
4,5	0.50	4.099	4.00
5	0.50	4.599	4.50
5,5	0.50	5.099	5.00
6	0.75	5.378	5.20
7	0.75	6.378	6.20
8	0.75	7.378	7.20
8	1.00	7.153	7.00
9	0.75	8.378	8.20
9	1.00	8.153	8.00
10	0.75	9.378	9.20
10	1.00	9.153	9.00
10	1.25	8.912	8.80
11	0.75	10.378	10.20
11	1.00	10.153	10.00
12	1.00	11.153	11.00
12	1,25	10.912	10.80
12	1,50	10.676	10.50
14	1,00	13.153	13.00
14	1,25	12.912	12.80
14	1,50	12.676	12.50
15	1,00	14.153	14.00
15	1,50	13.676	13.50
16	1,00	15.153	15.00
16	1,50	14.676	14.50
17	1,00	16.153	16.00
17	1,50	15.676	15.50
18	1,00	17.153	17.00
18	1,50	16.676	16.50
18	2,00	16.210	16.00
20	1,00	19.153	19.00
20	1,50	18.676	18.50
20	2,00	18.210	18.00
22	1,00	21.153	21.00
22	1,50	20.676	20.50
22	2,00	20.210	20.00
24	1,00	23.153	23.00
24	1,50	22.676	22.50
24	2,00	22.210	22.00
25	1,00	24.153	24.00
25	1,50	23.676	23.50

ISO Metric Threads Fine Pitch			
M _F	Pitch mm	Max. Core Dia. mm	Drill Size mm
25	2.00	23.210	23.00
26	1.50	24.676	24.50
27	1.00	26.153	26.00
27	1.50	25.676	25.50
27	2.00	25.210	25.00
28	1.00	27.153	27.00
28	1.50	26.676	26.50
28	2.00	26.210	26.00
30	1.00	29.153	29.00
30	1.50	28.676	28.50
30	2.00	28.210	28.00
30	3.00	27.252	27.00
32	1.50	30.675	30.50
32	2.00	30.210	30.00
33	1.50	31.676	31.50
33	2.00	31.210	31.00
33	3.00	30.252	30.00
35	1.50	33.676	33.50
36	1.50	34.676	34.50
36	2.00	34.210	34.00
36	3.00	33.252	33.00
38	1.50	36.676	36.50
39	1.50	37.676	37.50
39	2.00	37.210	37.00
39	3.00	36.252	36.00
40	1,50	38.676	38.50
40	2.00	38.210	38.00
40	3.00	37.252	37.00
42	1,50	40.676	40.50
42	2,00	40.210	40.00
42	3,00	39.252	39.00
45	1,50	43.676	43.50
45	2,00	43.210	43.00
45	3,00	42.252	42.00
48	1,50	46.676	46.50
48	2,00	46.210	46.00
48	3,00	45.252	45.00
50	1,50	48.676	48.50
50	2,00	48.210	48.00
50	3,00	47.252	47.00
52	1,50	50.676	50.50
52	2,00	50.210	50.00
52	3,00	49.252	49.00

Pre-Tapping Hole Sizes - Forming Taps

Recommended Tap Drill Size		
M	Pitch mm	Drill Size mm
1	0.25	0.9
1.1	0.25	1
1.2	0.25	1.1
1.4	0.3	1.28
1.6	0.35	1.47
1.7	0.35	1.57
1.8	0.35	1.67
2	0.4	1.85
2.2	0.45	2.03
2.3	0.4	2.15
2.5	0.45	2.33
2.6	0.45	2.43
3	0.5	2.8
3.5	0.6	3.25
4	0.7	3.7
4.5	0.75	4.2
5	0.8	4.65
6	1	5.1
7	1	5.6
8	1.25	6.6
9	1.25	7.45
10	1.5	8.45
11	1.5	9.35
12	1.75	11.25
14	2	13.1
16	2	15.1
18	2.5	16.85
20	2.5	18.85
22	2.5	20.85
24	3	22.65
27	3	25.65
30	3.5	28.4
33	3.5	31.4
36	4	34.15
39	4	37.15
42	4.5	39.9
45	4.5	42.9
48	5	45.65

Recommended Tap Drill Size		
MF	Pitch mm	Drill Size mm
2.5	0.35	2.37
2.6	0.35	2.47
3	0.35	2.88
3.5	0.35	3.38
4	0.5	3.8
5	0.5	4.8
6	0.5	5.8
6	0.75	5.7
7	0.75	6.7
8	0.75	7.7
8	1	7.6
9	0.75	8.7
9	1	8.6
10	0.75	9.7
10	1	9.6
10	1.25	9.45
11	1	10.6
12	1	11.6
12	1.25	11.45
12	1.5	11.35
14	1	13.6
14	1.25	13.45
14	1.5	13.35
15	1	14.6
15	1.5	14.35
16	1	15.6
16	1.5	15.35
18	1	17.6
18	1.5	17.35
18	2	17.1
20	1	19.6
20	1.5	19.35
20	2	19.1
24	2	23.1
30	2	29.1
36	3	34.65
42	4	40.15
48	3	46.65

Pre-Tapping Hole Sizes - General Taps

American Unified Coarse Threads			
UNC	T.P.I	Max. Core Dia. inch	Drill Size mm
#1	64	1.585	1.5
#2	56	1.872	1.8
#3	48	2.146	2.1
#4	40	2.385	2.3
#5	40	2.697	2.6
#6	32	2.896	2.85
#8	32	3.528	3.5
#10	24	3.95	3.9
#12	24	4.59	4.5
1/4"	20	5.25	5.2
5/16"	18	6.68	6.6
3/8"	16	8.082	8
7/16"	14	9.441	9.4
1/2"	13	10.881	10.75
9/16"	12	12.301	12.25
5/8"	11	13.693	13.5
3/4"	10	16.624	16.5
7/8"	9	19.52	19.5
1"	8	22.344	22.25
1*1/8"	7	25.082	25
1*1/4"	7	28.258	28.25
1*3/8"	6	30.851	30.75
1*1/2"	6	34.026	34
1*3/4"	5	39.56	39.5
2"	4.5	45.367	45.25

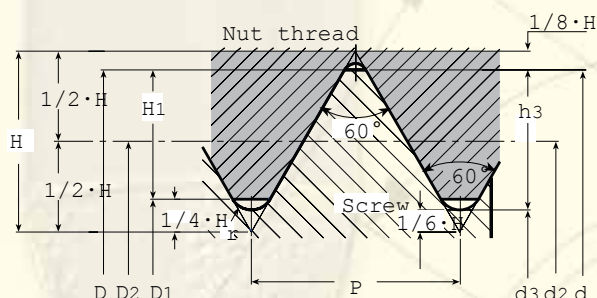
American Unified Fine Threads			
UNF	T.P.I	Max. Core Dia. inch	Drill Size mm
#0	80	1.306	1.3
#1	72	1.613	1.6
#2	64	1.913	1.9
#3	56	2.197	2.1
#4	48	2.459	2.4
#5	44	2.741	2.7
#6	40	3.012	3
#8	36	3.597	3.5
#10	32	4.168	4.1
#12	28	4.717	4.7
1/4"	28	5.563	5.5
5/16"	24	6.995	6.9
3/8"	24	8.565	8.5
7/16"	20	9.947	9.9
1/2"	20	11.524	11.5
9/16"	18	12.969	12.9
5/8"	18	14.554	14.5
3/4"	16	17.546	17.5
7/8"	14	20.493	20.5
1"	12	23.363	23.25
1*1/8"	12	26.538	26.5
1*1/4"	12	29.713	29.5
1*3/8"	12	32.888	32.7
1*1/2"	12	36.063	36

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ISO Metric Thread

Nominal Dimensions According to UNI 4535-64

Tap flank diameter production tolerances for ISO 6H nut threads limit dimensions - nut threads ISO 6H



Coarse Pitch Threads
Dimensions in mm

$$H = 0.86603P$$

$$H_1 = \frac{5}{8} H = 0.54127P$$

$$h_3 = \frac{17}{24} H = 0.61343P$$

$$d_2 = D_2 = d - \frac{3}{4} H = d - 0.64952P$$

$$d_3 = d - 2h_3 = d - 1.22687P$$

$$r = \frac{H}{6} = 0.14434P$$

Nominal Dia. d=D	Pitch P	Flank Dia. d ₂ =D ₂	Minor Diameter		Thread Depth		Radius r	Flank Dia. Tap Tolerance 6H d ₂		Flank Dia. Tap Tolerance 6H	
			Screw d ₃	Nut D ₁	Screw h ₃	Nut H ₁		Min.	Max.	Min.	Max.
M1.6	0.35	1.373	1.171	1.221	0.215	0.189	0.051	1.393	1.407	1.373	1.458
M1.8	0.35	1.573	1.371	1.421	0.215	0.189	0.051	1.593	1.607	1.573	1.658
M2	0.4	1.740	1.509	1.567	0.245	0.217	0.058	1.761	1.776	1.740	1.830
M2.2	0.45	1.908	1.648	1.713	0.276	0.244	0.065	1.931	1.946	1.908	2.003
M2.5	0.45	2.208	1.948	2.013	0.276	0.244	0.065	2.231	2.246	2.208	2.303
M3	0.5	2.675	2.387	2.459	0.307	0.271	0.072	2.699	2.715	2.675	2.775
M3.5	0.6	3.110	2.764	2.850	0.368	0.325	0.087	3.137	3.155	3.110	3.222
M4	0.7	3.545	3.141	3.242	0.429	0.379	0.101	3.574	3.593	3.545	3.663
M4.5	0.75	4.013	3.580	3.688	0.460	0.406	0.108	4.042	4.061	4.013	4.131
M5	0.8	4.480	4.019	4.134	0.491	0.433	0.115	4.510	4.530	4.480	4.605
M6	1	5.350	4.773	4.917	0.613	0.541	0.144	5.385	5.409	5.350	5.500
M7	1	6.350	5.773	5.917	0.613	0.541	0.144	6.385	6.409	6.350	6.500
M8	1.25	7.188	6.466	6.647	0.767	0.677	0.180	7.226	7.251	7.188	7.348
M9	1.25	8.188	7.466	7.647	0.767	0.677	0.180	8.226	8.251	8.188	8.348
M10	1.5	9.026	8.160	8.376	0.920	0.812	0.217	9.068	9.096	9.026	9.206
M11	1.5	10.026	9.160	9.376	0.920	0.812	0.217	10.068	10.096	10.026	10.206
M12	1.75	10.863	9.853	10.106	1.074	0.947	0.253	10.911	10.943	10.863	11.063
M14	2	12.701	11.546	11.835	1.227	1.083	0.289	12.752	12.786	12.701	12.913
M16	2	14.701	13.546	13.835	1.227	1.083	0.289	14.752	14.786	14.701	14.913
M18	2.5	16.376	14.933	15.294	1.534	1.353	0.361	16.430	16.466	16.376	16.600
M20	2.5	18.376	16.933	17.294	1.534	1.353	0.361	18.430	18.466	18.376	18.600
M22	2.5	20.376	18.933	19.294	1.534	1.353	0.361	20.430	20.466	20.376	20.600
M24	3	22.051	20.319	20.752	1.840	1.624	0.433	22.115	22.157	22.051	22.316
M27	3	25.051	23.319	23.752	1.840	1.624	0.433	25.115	25.157	25.051	25.316
M30	3.5	27.727	25.706	26.211	2.147	1.894	0.505	27.794	27.839	27.727	28.007
M33	3.5	30.727	28.706	29.211	2.147	1.894	0.505	30.794	30.839	30.727	31.007
M36	4	33.402	31.093	31.670	2.454	2.165	0.577	33.473	33.520	33.402	33.702
M39	4	36.402	34.093	34.670	2.454	2.165	0.577	36.473	36.520	36.402	36.702
M42	4.5	39.077	36.479	37.129	2.760	2.436	0.650	39.152	39.202	39.077	39.392
M45	4.5	42.077	39.479	40.129	2.760	2.436	0.650	42.152	42.202	42.077	42.392
M48	5	44.752	41.866	42.587	3.067	2.706	0.722	44.832	44.885	44.752	45.087
M52	5	48.752	45.866	46.587	3.067	2.706	0.722	48.832	48.885	48.752	49.087
M56	5.5	52.428	49.252	50.046	3.374	2.977	0.794	52.512	52.568	52.428	52.783
M60	5.5	56.428	53.252	54.046	3.374	2.977	0.794	56.512	56.568	56.428	56.783
M64	6	60.103	56.639	57.505	3.681	3.248	0.866	60.193	60.253	60.103	60.478
M68	6	64.103	60.639	61.505	3.681	3.248	0.866	64.193	64.253	64.103	64.478

Metric Thread MA (old UNI 159 profile)

Nut Tolerance SH8

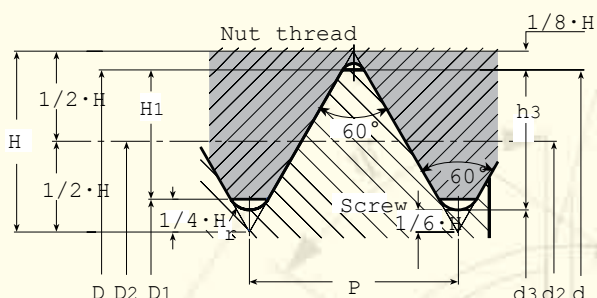
M1.7	0.35	1.473	1.246	1.246	0.227	0.227	0.040	1.493	1.507	1.473	1.529
M2.3	0.4	2.040	1.780	1.780	0.260	0.260	0.040	2.061	2.076	2.040	2.120
M2.6	0.45	2.308	2.016	2.016	0.292	0.292	0.050	2.331	2.346	2.308	2.388

HSS TAPS USER GUIDE

ISO Metric Fine Thread

Nominal Dimensions According to UNI 4535-64

Tap flank diameter production tolerances for ISO 6H nut threads limit dimensions - nut threads ISO 6H



Coarse Pitch Threads
Dimensions in mm

$$H = 0.86603P$$

$$H_1 = \frac{5}{8} H = 0.54127P$$

$$h_3 = \frac{17}{24} H = 0.61343P$$

$$d_2 = D_2 = d - \frac{3}{4} H = d - 0.64952P$$

$$d_3 = d - 2h_3 = d - 1.22687P$$

$$r = \frac{H}{6} = 0.14434P$$

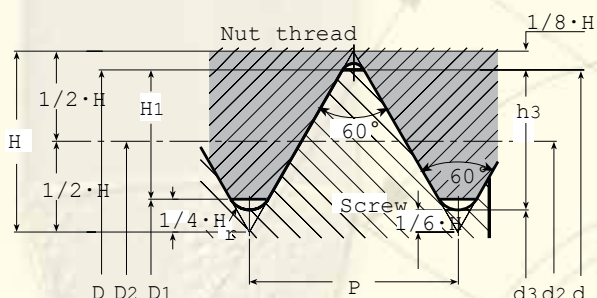
Nominal Dia. d=D	Pitch P	Flank Dia. d2=D2	Minor Diameter		Thread Depth		Radius r	Flank Dia. Tap Tolerance 6H d2		Flank Dia. Tap Tolerance 6H	
			Screw d3	Nut D1	Screw h3	Nut H1		Min.	Max.	Min.	Max.
M 2	0.25	1.838	1.693	1.729	0.153	0.135	0.036	1.844	1.856	1.838	1.886
M 2.5	0.35	2.273	2.701	2.121	0.215	0.189	0.051	2.293	2.307	2.273	2.358
M 3	0.35	2.773	2.571	2.621	0.215	0.189	0.051	2.794	2.809	2.773	2.863
M 3.5	0.35	3.273	3.071	3.121	0.215	0.189	0.051	3.294	3.309	3.273	3.363
M 4	0.5	3.675	3.387	3.459	0.307	0.271	0.072	3.699	3.715	3.675	3.775
M 4.5	0.5	4.175	3.887	3.959	0.307	0.271	0.072	4.199	4.215	4.175	4.275
M 5	0.5	4.675	4.387	4.459	0.307	0.271	0.072	4.699	4.715	4.675	4.775
M 5.5	0.5	5.175	4.887	4.959	0.307	0.271	0.072	5.199	5.215	5.175	5.275
M 6	0.5	5.675	5.387	5.459	0.307	0.271	0.072	5.702	5.72	5.675	5.787
M 6	0.75	5.513	5.08	5.188	0.46	0.406	0.108	5.545	5.566	5.513	5.645
M 7	0.75	6.513	6.08	6.188	0.46	0.406	0.108	6.545	6.566	6.513	6.645
M 8	0.5	7.675	7.387	7.459	0.307	0.271	0.072	7.702	7.72	7.675	7.787
M 8	0.75	7.513	7.08	7.188	0.46	0.406	0.108	7.545	7.566	7.513	7.645
M 8	1	7.35	6.773	6.917	0.613	0.541	0.144	7.835	7.409	7.35	7.5
M 9	0.75	8.513	8.08	8.188	0.46	0.406	0.108	8.545	8.566	8.513	8.645
M 9	1	8.35	7.773	7.917	0.613	0.541	0.144	8.385	8.409	8.35	8.5
M 10	0.5	9.675	9.387	9.459	0.307	0.271	0.072	9.702	9.72	9.675	9.787
M 10	0.75	9.513	9.08	9.188	0.46	0.406	0.108	9.545	9.566	9.513	9.645
M 10	1	9.35	8.773	8.917	0.613	0.541	0.144	9.385	9.409	9.35	9.5
M 10	1.25	9.188	8.466	8.647	0.767	0.677	0.18	9.226	9.251	9.188	9.348
M 11	0.75	10.513	10.08	10.188	0.46	0.406	0.108	10.545	10.566	10.513	10.645
M 11	1	10.35	9.773	9.917	0.613	0.541	0.144	10.385	10.409	10.35	10.5
M 12	0.75	11.513	11.08	11.188	0.46	0.406	0.108	11.547	11.569	11.513	11.653
M 12	1	11.35	10.773	10.917	0.613	0.541	0.144	11.388	11.413	11.35	11.51
M 12	1.25	11.188	10.466	10.647	0.767	0.677	0.18	11.23	11.258	11.188	11.368
M 12	1.5	11.026	10.16	10.376	0.92	0.812	0.217	11.071	11.101	11.026	11.216
M 13	1	12.35	11.773	11.917	0.613	0.541	0.144	12.388	12.413	12.35	12.51
M 14	1	13.35	12.773	12.917	0.613	0.541	0.144	13.388	13.413	13.35	13.51
M 14	1.25	13.188	12.466	12.647	0.767	0.677	0.18	13.23	13.258	13.188	13.368
M 14	1.5	13.026	12.16	12.376	0.92	0.812	0.217	13.071	13.101	13.026	13.216
M 15	1	14.35	13.773	13.917	0.613	0.541	0.144	14.388	14.413	14.35	14.51
M 15	1.5	14.026	13.16	13.376	0.92	0.812	0.217	14.071	14.101	14.026	14.216
M 16	1	15.35	14.773	14.917	0.613	0.541	0.144	15.388	15.413	15.35	15.51
M 16	1.25	15.188	14.466	14.647	0.767	0.677	0.18	15.23	15.258	15.188	15.368
M 16	1.5	15.026	14.16	14.376	0.92	0.812	0.217	15.071	15.101	15.026	15.216
M 17	1	16.35	15.773	15.917	0.613	0.541	0.144	16.388	16.413	16.35	16.51
M 17	1.5	16.026	15.16	15.376	0.92	0.812	0.217	16.071	16.101	16.026	16.216
M 18	1	17.350	16.773	16.917	0.613	0.541	0.144	17.388	17.413	17.35	17.51
M 18	1.5	17.026	16.16	16.376	0.92	0.812	0.217	17.071	17.101	17.026	17.216
M 18	2	16.701	15.546	15.835	1.227	1.083	0.289	16.752	16.786	16.701	16.913

HSS TAPS USER GUIDE

ISO Metric Fine Thread

Nominal Dimensions According to UNI 4535-64

Tap flank diameter production tolerances for ISO 6H nut threads limit dimensions - nut threads ISO 6H



Coarse Pitch Threads
Dimensions in mm

$$H = 0.86603P$$

$$H_1 = \frac{5}{8} H = 0.54127P$$

$$h_3 = \frac{17}{24} H = 0.61343P$$

$$d_2 = D_2 = d - \frac{3}{4} H = d - 0.64952P$$

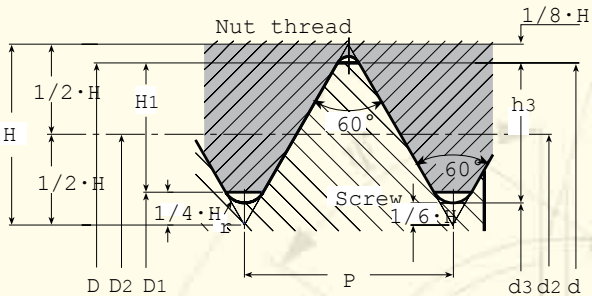
$$d_3 = d - 2h_3 = d - 1.22687P$$

$$r = \frac{H}{6} = 0.14434P$$

Nominal Dia. d=D	Pitch P	Flank Dia. d2=D2	Minor Diameter Screw d3	Minor Diameter Nut D1	Thread Depth Screw h3	Thread Depth Nut H1	Radius r	Flank Dia. Tap Tolerance 6H d2 Min.	Flank Dia. Tap Tolerance 6H d2 Max.	Flank Dia. Tap Tolerance 6H Min.	Flank Dia. Tap Tolerance 6H Max.
M 20	1	19.35	18.773	18.917	0.613	0.541	0.144	19.388	19.413	19.35	19.51
M 20	1.5	19.026	18.16	18.376	0.92	0.812	0.217	19.071	19.101	19.026	19.216
M 20	2	18.701	17.546	17.835	1.227	1.083	0.289	18.752	18.786	18.701	18.913
M 22	1	21.35	20.773	20.917	0.613	0.541	0.144	21.388	21.413	21.35	21.51
M 22	1.5	21.026	20.16	20.376	0.92	0.812	0.217	21.071	21.101	21.026	21.216
M 22	2	20.701	19.546	19.835	1.227	1.083	0.289	20.752	20.786	20.701	20.913
M 24	1	23.350	22.773	22.917	0.613	0.541	0.144	23.390	23.416	23.350	23.520
M 24	1.5	23.026	22.160	22.376	0.920	0.812	0.217	23.074	23.106	23.026	23.226
M 24	2	22.701	21.546	21.835	1.227	1.083	0.289	22.754	22.791	22.701	22.925
M 25	1	24.350	23.773	23.917	0.613	0.541	0.144	24.390	24.416	24.350	24.520
M 25	1.5	24.026	23.160	23.376	0.920	0.812	0.217	24.074	24.106	24.026	24.226
M 25	2	23.701	22.546	22.835	1.227	1.083	0.289	23.754	23.791	23.701	23.925
M 26	1	25.350	24.773	24.917	0.613	0.541	0.144	25.390	25.416	25.350	25.520
M 26	1.5	25.026	24.160	24.376	0.920	0.812	0.217	25.074	25.106	25.026	25.226
M 26	2	24.701	23.546	23.835	1.227	1.083	0.289	24.754	24.791	24.701	24.925
M 27	1	26.350	25.773	25.917	0.613	0.541	0.144	26.390	26.416	26.350	26.520
M 27	1.5	26.026	25.160	25.376	0.920	0.812	0.217	26.074	26.106	26.026	26.226
M 27	2	25.701	24.546	24.835	1.227	1.083	0.289	25.754	25.791	25.701	25.925
M 28	1	27.350	26.773	26.917	0.613	0.541	0.144	27.390	27.416	27.350	27.520
M 28	1.5	27.026	26.160	26.376	0.920	0.812	0.217	27.074	27.106	27.026	27.226
M 28	2	26.701	25.546	25.835	1.227	1.083	0.289	26.754	26.791	26.701	26.925
M 30	1	29.350	28.773	28.917	0.613	0.541	0.144	29.390	29.416	29.350	29.520
M 30	1.5	29.026	28.160	28.376	0.920	0.812	0.217	29.074	29.106	29.026	29.226
M 30	2	28.701	27.546	27.835	1.227	1.083	0.289	28.754	28.791	28.701	28.925
M 30	3	28.051	26.319	26.752	1.840	1.624	0.433	28.115	28.157	28.051	28.316
M 32	1.5	31.026	30.160	30.376	0.920	0.812	0.217	31.074	31.106	31.026	31.226
M 32	2	30.701	29.546	29.835	1.227	1.083	0.289	30.754	30.791	30.701	30.925
M 33	1.5	32.026	31.160	31.376	0.920	0.812	0.217	32.074	32.106	32.026	32.226
M 33	2	31.701	30.546	30.835	1.227	1.083	0.289	31.754	31.791	31.701	31.925
M 33	3	31.051	29.319	29.752	1.840	1.624	0.433	31.115	31.157	31.051	31.316
M 35	1.5	34.026	33.160	33.376	0.920	0.812	0.217	34.074	34.106	34.026	34.226
M 35	2	33.701	32.546	32.835	1.227	1.083	0.289	33.754	33.791	33.701	33.925
M 36	1.5	35.026	34.160	34.376	0.920	0.812	0.217	35.074	35.106	35.026	35.226
M 36	2	34.701	33.546	33.835	1.227	1.083	0.289	34.754	34.791	34.701	34.925
M 36	3	34.051	32.319	32.752	1.840	1.624	0.433	34.115	34.157	34.051	34.316
M 38	1.5	37.026	36.160	36.376	0.920	0.812	0.217	37.074	37.106	37.026	37.226
M 39	1.5	38.026	37.160	37.376	0.920	0.812	0.217	38.074	38.106	38.026	38.226
M 39	2	37.701	36.546	36.835	1.227	1.083	0.289	37.754	37.791	37.701	37.925
M 39	3	37.051	35.319	35.752	1.840	1.624	0.433	37.115	37.157	37.051	37.316
M 40	1.5	39.026	38.160	38.376	0.920	0.812	0.217	39.074	39.106	39.026	39.226

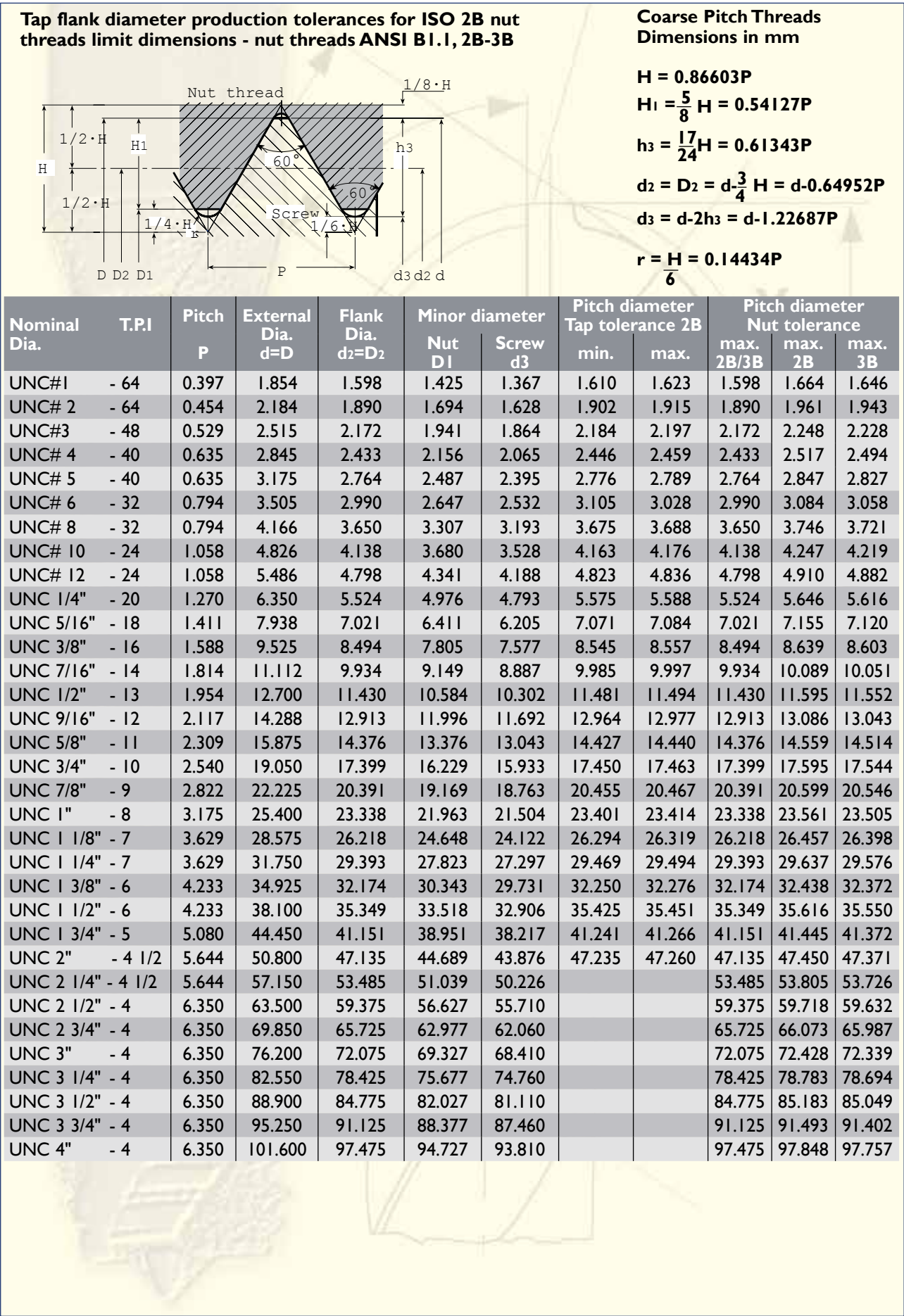
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ISO Metric Fine Thread
Nominal Dimensions According to UNI 4535-64

Tap flank diameter production tolerances for ISO 6H nut threads limit dimensions - nut threads ISO 6H  Coarse Pitch Threads Dimensions in mm $H = 0.86603P$ $H_1 = \frac{5}{8} H = 0.54127P$ $h_3 = \frac{17}{24} H = 0.61343P$ $d_2 = D_2 = d - \frac{3}{4} H = d - 0.64952P$ $d_3 = d - 2h_3 = d - 1.22687P$ $r = \frac{H}{6} = 0.14434P$											
Nominal Dia. d=D	Pitch P	Flank Dia. d2=D2	Minor Diameter		Thread Depth		Radius r	Flank Dia. Tap Tolerance 6H d2		Flank Dia. Tap Tolerance 6H	
			Screw d3	Nut D1	Screw h3	Nut H1		Min.	Max.	Min.	Max.
M 40	2	38.701	37.546	37.835	1.227	1.083	0.289	38.754	38.791	38.701	38.925
M 40	3	38.051	36.319	36.752	1.840	1.624	0.433	38.115	38.157	38.051	38.316
M 42	1.5	41.026	40.160	40.376	0.920	0.812	0.217	41.074	41.106	41.026	41.226
M 42	2	40.701	39.546	39.835	1.227	1.083	0.289	40.754	40.791	40.701	40.925
M 42	3	40.051	38.319	38.752	1.840	1.624	0.433	40.115	40.157	40.051	40.316
M 45	1.5	44.026	43.160	43.376	0.920	0.812	0.217	44.074	44.106	44.026	44.226
M 45	2	43.701	42.546	42.835	1.227	1.083	0.289	43.754	43.791	43.701	43.925
M 45	3	43.051	41.319	41.752	1.840	1.624	0.433	43.115	43.157	43.051	43.316
M 48	1.5	47.026	46.160	46.376	0.920	0.812	0.217	47.077	47.111	47.026	47.238
M 48	2	46.701	45.546	45.835	1.227	1.083	0.289	46.758	46.796	46.701	46.937
M 48	3	46.051	44.319	44.752	1.840	1.624	0.433	46.118	46.163	46.051	46.331
M 50	1.5	49.026	48.160	48.376	0.920	0.812	0.217	49.077	49.111	49.026	49.238
M 50	2	48.701	47.546	47.835	1.227	1.083	0.289	48.758	48.796	48.701	48.937
M 50	3	48.051	46.319	46.752	1.840	1.624	0.433	48.118	48.163	48.051	48.331
M 52	1.5	51.026	50.160	50.376	0.920	0.812	0.217	51.077	51.111	51.026	51.238
M 52	2	50.701	49.546	49.835	1.227	1.083	0.289	50.758	50.796	50.701	50.937
M 52	3	50.051	48.319	48.752	1.840	1.624	0.433	50.118	50.163	50.051	50.331
M 55	1.5	54.026	53.160	53.376	0.920	0.812	0.217	54.077	54.111	54.026	54.238
M 55	2	53.701	52.546	52.835	1.227	1.083	0.289	53.758	53.796	53.701	53.937
M 55	3	53.051	51.319	51.752	1.840	1.624	0.433	53.118	53.163	53.051	53.331
M 56	1.5	55.026	54.160	54.376	0.920	0.812	0.217	55.077	55.111	55.026	55.238
M 56	2	54.701	53.546	53.835	1.227	1.083	0.289	54.758	54.796	54.701	54.937
M 56	3	54.051	52.319	52.752	1.840	1.624	0.433	54.118	54.163	54.051	54.331
M 58	1.5	57.026	56.160	56.376	0.920	0.812	0.217	57.077	57.111	57.026	57.238
M 58	2	56.701	55.546	55.835	1.227	1.083	0.289	56.758	56.796	56.701	56.937
M 58	3	56.051	54.319	54.752	1.840	1.624	0.433	56.118	56.163	56.051	56.331
M 60	1.5	59.026	58.160	58.376	0.920	0.812	0.217	59.077	59.111	59.026	59.238
M 60	2	58.701	57.546	57.835	1.227	1.083	0.289	58.758	58.796	58.701	58.937
M 60	3	58.051	56.319	56.752	1.840	1.624	0.433	58.118	58.163	58.051	58.331
Metric thread MA (old UNI 160 Profile)								Nut Tolerance SH8			
M 2,3	0.25	2.138	1.976	1.976	0.162	0.162	0.03	2.144	2.156	2.138	2.194
M 2,6	0.35	2.373	2.146	2.146	0.227	0.227	0.04	2.393	2.407	2.373	2.429

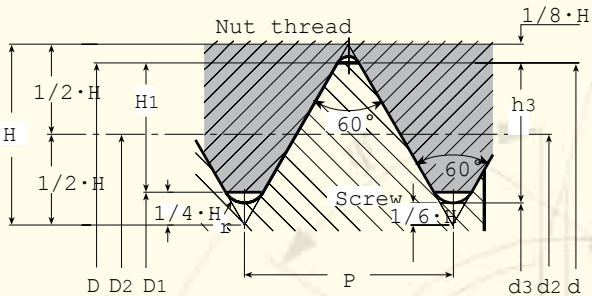
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UNIFIED Coarse Thread
Nominal Dimensions According to ANSI B1.1



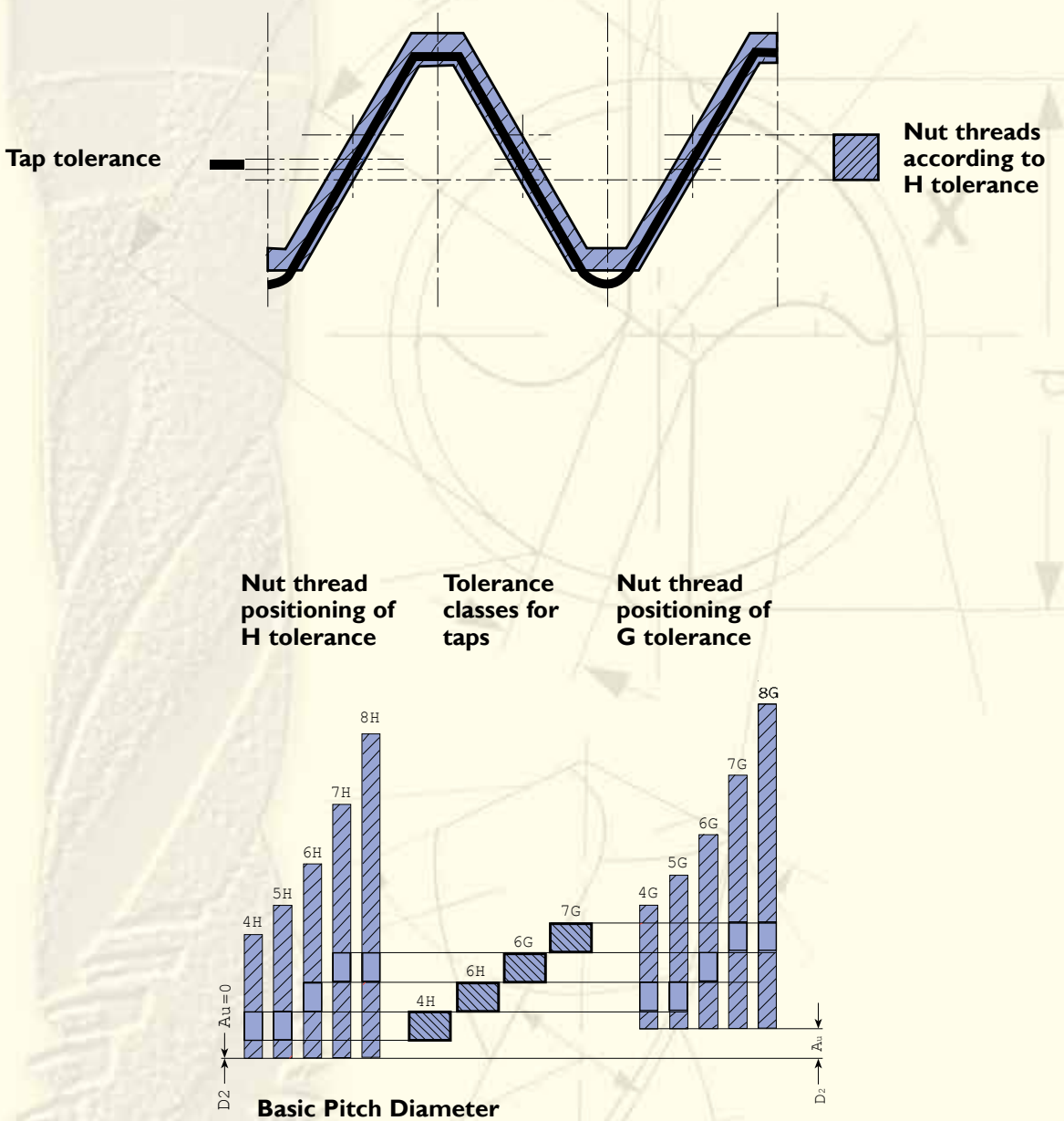
HSS TAPS USER GUIDE

UNIFIED Fine Thread
Nominal Dimensions According to ANSI B1.1

Tap flank diameter production tolerances for ISO 2B nut threads limit dimensions - nut threads ANSI B1.1, 2B-3B 							Coarse Pitch Threads Dimensions in mm $H = 0.86603P$ $H_1 = \frac{5}{8} H = 0.54127P$ $h_3 = \frac{17}{24} H = 0.61343P$ $d_2 = D_2 = d - \frac{3}{4} H = d - 0.64952P$ $d_3 = d - 2h_3 = d - 1.22687P$ $r = \frac{H}{6} = 0.14434P$				
Nominal Dia.	T.P.I	Pitch P	External Dia. d=D	Flank Dia. d2=D2	Minor diameter		Pitch diameter Tap tolerance 2B		Pitch diameter Nut tolerance		
					Nut D1	Screw d3	min.	max.	max. 2B/3B	max. 2B	max. 3B
UNF#0	- 80	0.318	1.524	1.318	1.181	1.135	1.331	1.344	1.318	1.377	1.361
UNF#1	- 72	0.353	1.854	1.626	1.473	1.422	1.638	1.651	1.626	1.689	1.674
UNF#2	- 64	0.397	2.184	1.928	1.755	1.697	1.941	1.953	1.928	1.996	1.979
UNF#3	- 56	0.454	2.515	2.220	2.024	1.958	2.233	2.245	2.220	2.291	2.273
UNF#4	- 48	0.529	2.845	2.502	2.271	2.195	2.515	2.527	2.502	2.581	2.560
UNF#5	- 44	0.577	3.175	2.799	2.550	2.466	2.812	2.824	2.799	2.880	2.860
UNF#6	- 40	0.635	3.505	3.094	2.817	2.725	3.108	3.119	3.094	3.180	3.157
UNF#8	- 36	0.706	4.166	3.708	3.401	3.299	3.721	3.734	3.708	3.800	3.777
UNF#10	- 32	0.794	4.826	4.310	3.967	3.853	4.336	4.348	4.310	4.409	4.384
UNF#12	- 28	0.907	5.486	4.897	4.503	4.374	4.923	4.935	4.897	5.004	4.976
UNF 1/4"	- 28	0.907	6.350	5.761	5.367	5.237	5.799	5.812	5.761	5.870	5.842
UNF 5/16"	- 24	1.058	7.938	7.249	6.792	6.640	7.287	7.300	7.249	7.371	7.341
UNF 3/8"	- 24	1.058	9.525	8.837	8.379	8.227	8.875	8.887	8.837	8.961	8.931
UNF 7/16"	- 20	1.270	11.112	10.287	9.738	9.555	10.338	10.351	10.287	10.424	10.391
UNF 1/2"	- 20	1.270	12.700	11.874	11.326	11.143	11.925	11.938	11.874	12.017	11.981
UNF 9/16"	- 18	1.411	14.288	13.371	12.761	12.555	13.421	13.434	13.371	13.520	13.482
UNF 5/8"	- 18	1.411	15.875	14.958	14.348	14.143	15.009	15.022	14.958	15.110	15.072
UNF 3/4"	- 16	1.588	19.050	18.019	17.330	17.102	18.070	18.082	18.019	18.184	18.143
UNF 7/8"	- 14	1.814	22.225	21.046	20.262	20.000	21.110	21.123	21.046	21.224	21.181
UNF 1"	- 12	2.117	25.400	24.026	23.109	22.804	24.089	24.102	24.026	24.219	24.171
UNF 1*1/8"	- 12	2.117	28.575	27.201	26.284	25.979	27.252	27.277	27.201	27.339	27.351
UNF 1*1/4"	- 12	2.117	31.750	30.376	29.459	29.154	30.427	30.452	30.376	30.579	30.528
UNF 1*3/8"	- 12	2.117	34.925	33.551	32.634	32.329	33.602	33.627	33.551	33.759	33.706
UNF 1*1/2"	- 12	2.117	38.100	36.726	35.809	35.504	36.777	36.802	36.726	36.937	36.886

Tap Tolerances

Tolerance classes of taps and tolerance positions for screw threads as per ISO metric standard.



For optimum tapping conditions, reduced machining times and increased tap life.

Selection of the most suitable tap

As a general rule, materials with deformation capability of at least 10% can be cold-formed.
To decide on the most suitable tap, please refer to the tap recommendation table on pages 226+-227.

Pre-tapping holes

Check that the holes are within the prescribed size range, depending on the application (see table on page 202). The holes should be clean and swarf-free.

Lubrication

Frequently the lubricant content of the coolant used for general machining is too low for tapping.
If it is not possible to increase the lubricant content, following are some possible solutions:

- A separate lubricating unit can be connected to the machine control, to deliver the required quantity of concentrated emulsion into the core hole or onto the tap.
- Tapping in separate operations allows the use of the ideal tapping lubricant.

Tapping speeds

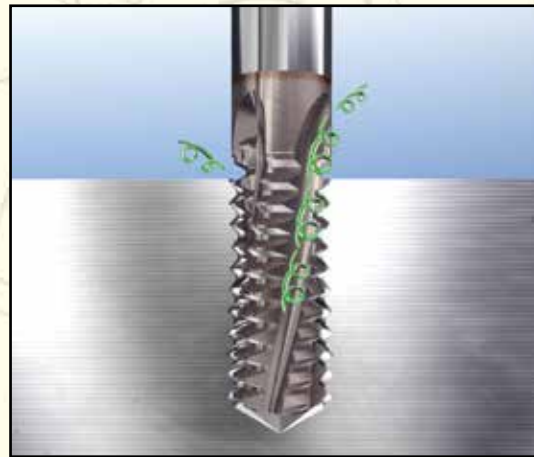
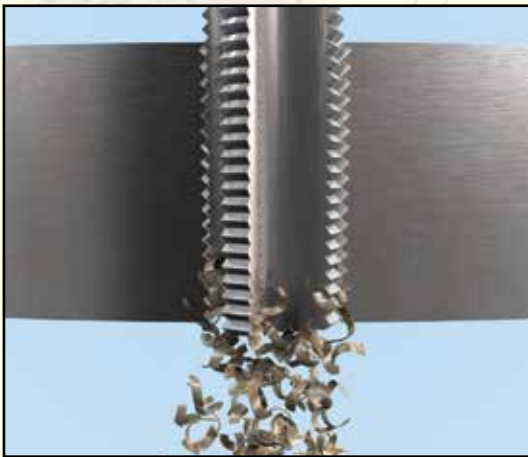
The tapping speed has a great influence on chip flow and the life of the tap.
It is worthwhile to establish the ideal speed by tapping trials.
For recommended initial values, see table on page 226. In addition, the following should be taken into consideration: characteristics of the material, machine and clamping method.

Effects of unsuitable tapping speed

- Forced tapping
- Tap lead chipping caused by overloaded cutting tooth
- Torn threads
- Unsatisfactory tap life
- Rejected threads

Chip Expulsion

Tap selection is also influenced by the type of hole being threaded. Through hole tapping usually requires a tap that pushes the chips out in front of the cutting edge and through the other end of the hole. A bottom hole tap must pull chips up and out of the hole.



Tap Jamming

Some possible causes of tap jamming are:

- Unsuitable tap
- Tap with incorrect cutting geometry
- Unsuitable coolant for material
- Insufficient coolant
- Axial pressure (pull or push) on the tap
- Core hole too small
- Breaks in walls of core hole
- Speed too high or too low
- Swarf trapped in the hole
- Incorrect alignment of tap and core hole
- Tap eccentricity

Results of Tap Jamming

- Torn threads
- Short tap life
- Rejected threads
- Tap breakage
- Scrap workpieces

Tap Mounting

The tap must be mounted on the axis of the core hole.
On non-synchronized machines (feed/speed) we recommend the use of a tapping spindle.

Tapping Heads

With non-synchronized machine spindles (feed/speed) the feed rate should be, as a rule, programmed approximately 5-10% lower than the thread pitch. In these cases a tapping chuck must be used which will compensate the difference between the feed rate and the thread pitch.
It is important that the tension spring in the axial compensation is set to a minimum pressure to avoid axially loading the tap.
The compression spring should be tensioned so the tap starts to cut by compressing the spring up to one-half pitch.

Important

Verify that the correct speed has been selected.
Ensure that ample lubricating coolant is being used.
Machine and equipment stability are essential for optimal performance and results.

Forming Taps

Forming taps (roll forming or cold forming) produce threads by deforming the material near the hole walls, rather than by cutting the material. This method often works well in ductile materials. However, in brittle materials it often results in unsatisfactory threads.
Torque requirements for forming taps are considerably higher than for cutting taps. When forming taps are used, chuck capacity must be decreased by 25%. Forming taps do not produce chips.

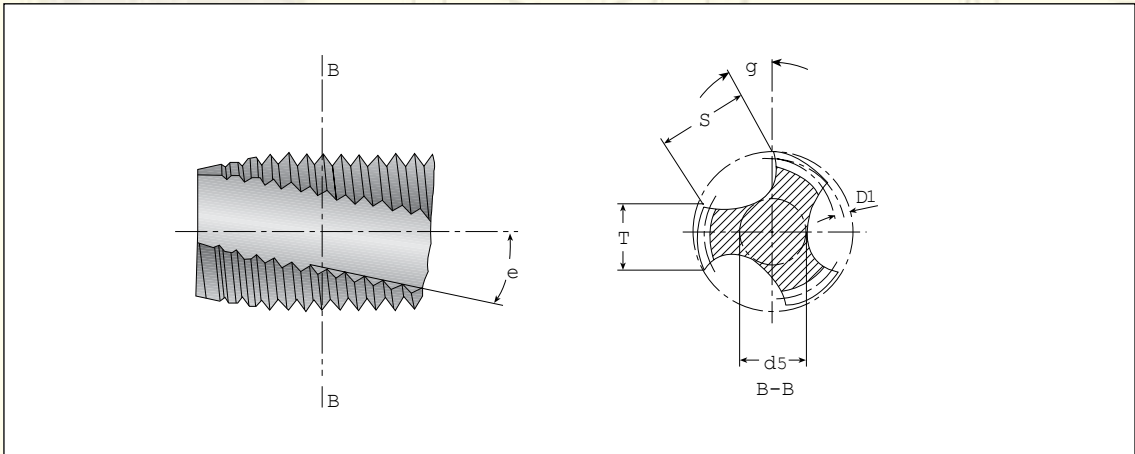
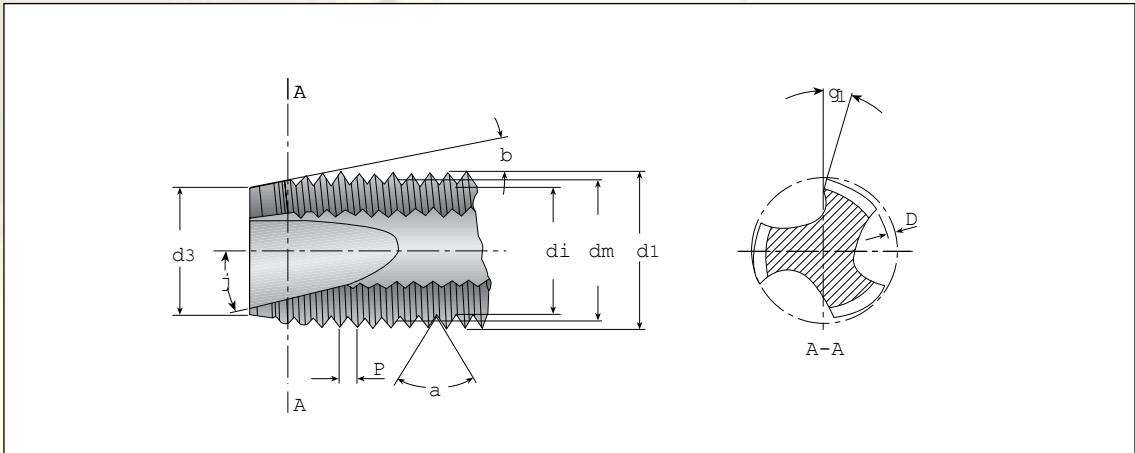
Troubleshooting

Problem	Cause	Solution
Tapped hole oversized	Incorrect tap (cutting geometry unsuitable for application)	Use tap selected from the relevant material group
	Faulty alignment	Ensure that the tap is correctly aligned with the core hole axis
	Tap jamming	Improve lubrication and direction of coolant Adjust cutting speed
	Incorrectly reground tap (lead tip is not concentric)	Regrind tap
Problem	Cause	Solution
Stripped threads	Incorrect tap (cutting geometry incorrect for application)	Use a tap from the relevant material group
	Spindle speed and feed rate are not synchronized	Check feed rate programming and/or pitch of leading spindle Use a tapping spindle with axial float (GTI/GTIN)
	Insufficient starting pressure exerted on tap (causes peeling)	Increase starting pressure
Problem	Cause	Solution
Bell mouthed tapped hole	Incorrect starting pressure	Use a tapping spindle with axial float (GTI/GTIN)
Problem	Cause	Solution
Unsatisfactory thread surface finish	Incorrect tap (cutting geometry unsuitable for application)	Select tap for the relevant material group
	The tap is blunt	Replace or regrind tap
	Tap badly re-ground	Regrind tap Check that cutting geometry is suitable for material
	Incorrect lubricant, concentration or quantity	Ensure the use of a suitable coolant and an ample supply

Troubleshooting

Problem	Cause	Solution
Partial chipping of tap	Swarf jamming	Check cutting speed Use alternative tap
	Tap has jammed against bottom of pre-hole	Check hole and thread depths Drill a deeper pre-hole
	Tap incorrectly reground (lead-in diameter too short, therefore too few cutting teeth)	Ensure that correct dimensions are maintained when regrounding
	Irregular workpiece material structure	Adjust cutting speed Improve lubricant quality of coolant
Problem	Cause	Solution
Excessive tap wear	Incorrect cutting speed	Adjust cutting speed to suit workpiece material
	Coolant lacking in lubricating qualities and/or quantity	Ensure the use of a suitable coolant and an ample supply Check that coolant is reaching the cutting zone
	Surface of the pre-hole is compacted	Check pre-hole drilling conditions (drill carefully to reduce risk of surface compacting) Check drill cutting edges
Problem	Cause	Solution
Tap breakage	Incorrect tap in use (cutting geometry unsuitable for application)	Use tap from the relevant material group
	Centering error	Ensure that axes of tap and pre-hole are aligned
	Blunt tap	Re-grind tap
	Tap has reached bottom of pre-hole	Use tapping spindle with axial float and slipping clutch (GTI/GTIN)
	Pre-hole too small	Check for correct pre-hole size see page 202

Tap Nomenclature (Regrinding)



- d_1 Major diameter**
- d_m Flank diameter**
- d_i Minor diameter**
- d_3 Chamfer diameter**
- P Pitch**
- a Flank angle**
- β Chamfer angle**
- ϕ Gun nose angle**
- γ Gun nose front rake angle**
- Δ Chamfer relief**
- Δ_i Pitch diameter relief on the land**
- γ_i Rake angle**
- T Width of land**
- S Flute width**
- d_5 Web thickness**
- ε Angle of spiral flute**

Regrinding

Regrinding

The tap regrinding takes place in two steps:

- a) regrinding of relieved chamfer
- b) regrinding of flutes (see picture 1)

Regrinding of Relieved Chamfer

It is recommended that the resharp-ening should be executed either on specific tap regrinding machines or on conventional resharp-ening machines equipped with an auxiliary device to generate the circular back relief.

Picture 2 shows the regrinding done with the cylindrical surface of a grinding wheel. Before regrinding, verify that the tap, fixed between points or on pincer, runs concentric. Verify also angle b , which has to be correct in order to keep the same number of threads on chamfer.

Resharp-ening of Flutes

The rake angle g is obtained by moving the tap axis, in relation to the regrinding surface, of an amount X to be calculated with the formula: $X = \frac{1}{2} d_l \sin(\gamma)$ (see picture 3). (d_l = tap major diameter)

Example:

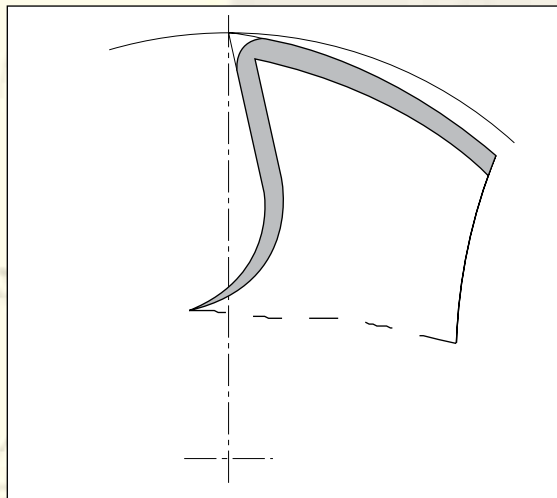
Tap 10 X 1,5 to cut on steel strength =

600 N/mm²

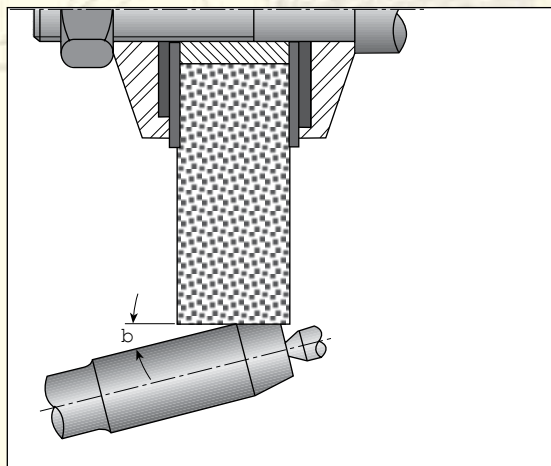
$d_l = 10 \text{ mm}$; $\gamma = 15^\circ$; $\sin(\gamma) = 0,25882$;

$$X = \frac{0,25885 \times 10}{2} ; X = 1,29 \text{ mm}$$

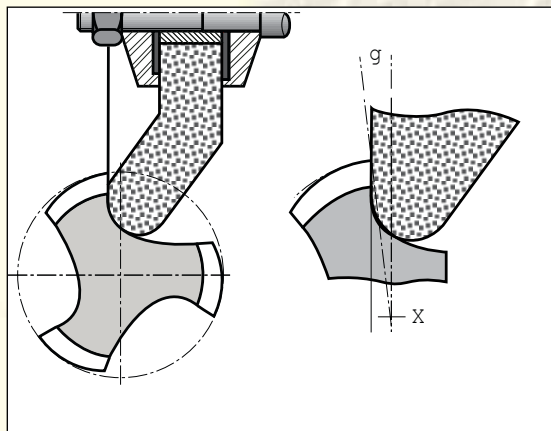
Picture 1



Picture 2



Picture 3



Regrinding

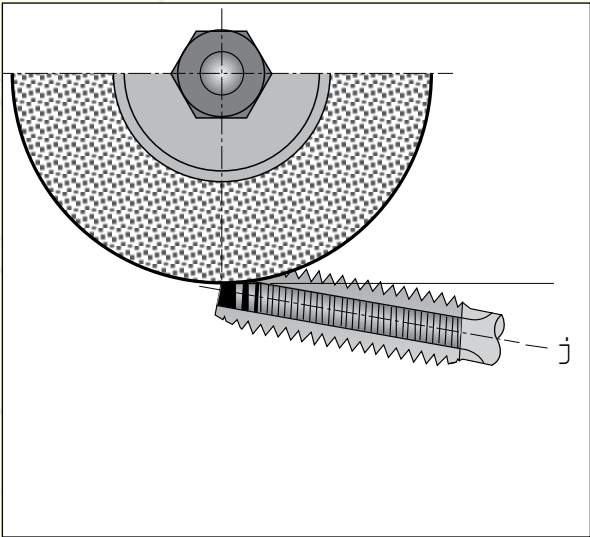
On all taps with spiral flutes, it is possible to find the pitch of the spiral in reference to the lead screw necessary for resharpening. In case of use of taps equipped with a deburring tool, it is necessary to extend the flutes according to supplier's recommendation.

As the wear on a tap is mainly on the chamfer area, for taps with gun nose, the regrinding of the flutes can be done on the front area only (see picture 4).

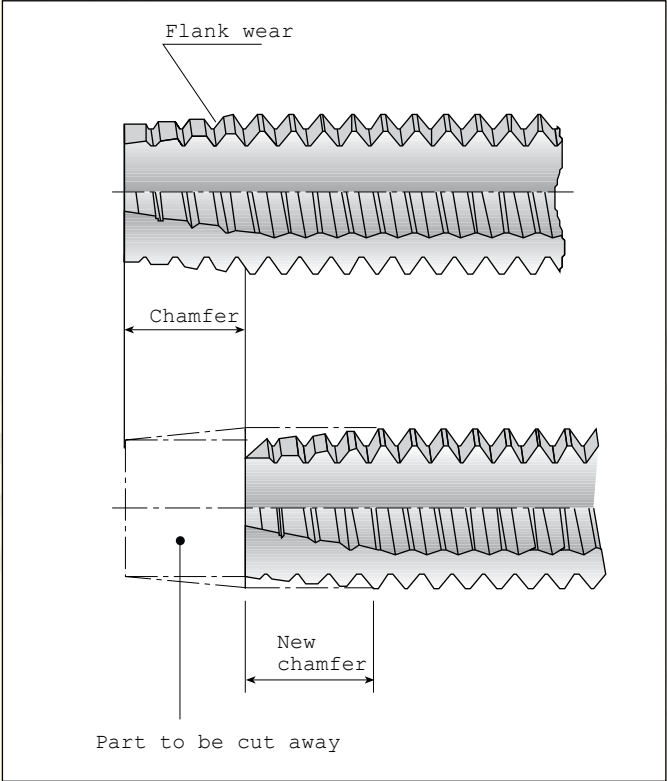
In cases where the thread flanks are worn (in addition to the active edges), the regrinding as described above is impractical. In this case restoration is done, by cutting the chamfer away (thus creating a shorter tap) and then reproducing the chamfer with same angle and relief. (see picture 5)

In the absence of special regrinding machines, such restoration is advisable for regrinding taps with spiral flutes. This is because regrinding the flutes becomes unnecessary.

Picture 4



Picture 5



General Recommendations (Regrinding)

Maintenance

It is important to periodically regrind the worn tap. This is to avoid permanent damage or even tool breakage.

The Grinding Wheels

The structure and grain of grinding wheels must be appropriate for the tap to be reshaped.

Taps for Cast Iron

Taps used on cast iron can rarely be reshaped, as it is very abrasive and tends to wear the flank in such a manner that it becomes grossly out of tolerance.

Taps for Aluminum

After regrinding it is advisable to remove the steel burrs with a wire brush.

Tap Inspection

It is important to inspect the tap after regrinding to ensure that all of the dimensions and angles have remained according to the specifications.

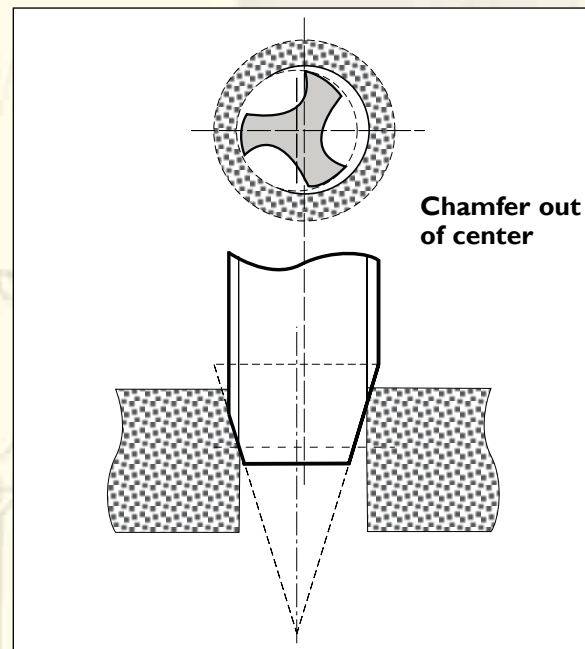
Controls (tests)

Once the tap is reshaped, it is always best to test them to correctly obtain the same threads as when the tap was new.

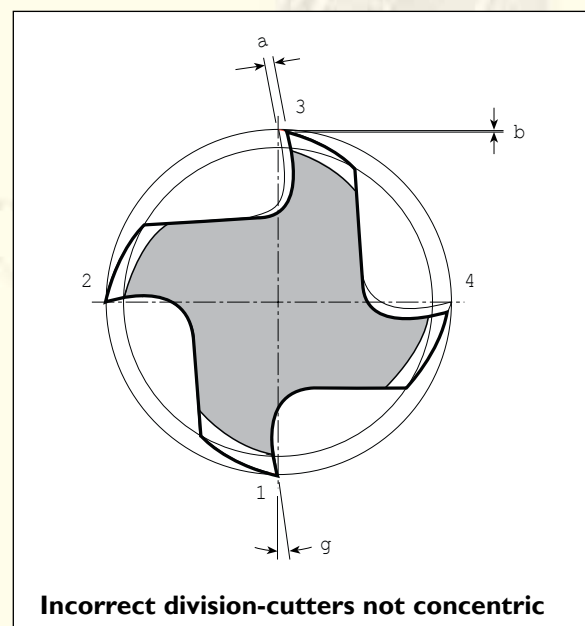
The chamfer must be perfectly on axis in order to avoid the effects of picture 6.

- The cutters must have correct divisions. The results of reshaping with an incorrect division is shown in picture 7.
- The length and number of threads in chamfer must be precisely identical to those of the new tap.

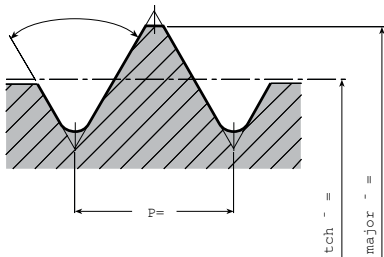
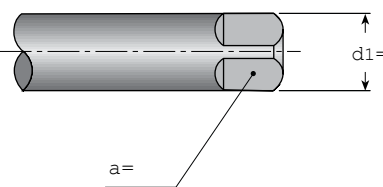
Picture 6

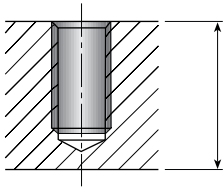
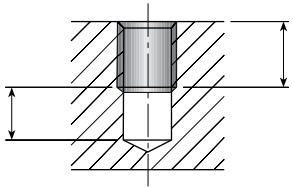


Picture 7



Test Report Form

Company _____		Department _____	
Address _____		Phone _____	
_____		_____	
Tool	Description of the tap being used at present		Make _____ Type _____
	Thread diameter and pitch _____		Class of tolerance _____
	☐ Right-hand cutting		☐ Left-hand cutting _____
	☐ Fluteless		☐ Right-hand spiral flutes _____ degrees
	☐ Straight flutes		☐ Left-hand spiral flutes _____ degrees
	☐ Spiral point		☐ Length of chamfer _____ mm
	Additional information for special pitch- es or thread forms		
	Pitch diameter _____		Major diameter _____
	Minor diameter _____		Flank angle _____ degrees
			
		Overall Length _____ mm	
Hole	Tap drill diameter _____		Length of hole _____
	☐ Through hole		Depth of full thread _____
			☐ Blind hole
	Special requirements or unusual characteristics of the threaded product _____		

			
	Unusual characteristics of the threaded product or of the tapping method. ie. _____		
	counterbore, tapping on an angle, etc. _____		

Test Report Form

Tapping speed	_____ m/min		
	_____ RPM		
Lubricant	☐ None	☐ Emulsion _____ %	☐ Cutting oil
	☐ Under pressure	☐ Vaporization	☐ Other _____
Machine	Type _____	☐ Horizontal tapping	☐ Vertical tapping
Driving	☐ Tap revolves	Number of spindles _____	
	☐ Workpiece revolves		
Feed	☐ Without	☐ Power	☐ CNC _____ %
Toolholder	☐ Rigid	☐ Floating m Safety clutch	
	Make _____	Type _____	
Material to be tapped	Material no. or designation _____		
	Composition, if known _____		
	Tensile strength or hardness _____ N/mm² _____ HB _____ HRc		
	Chip form	☐ Short	☐ Long
	☐ Annealed steel	☐ Hardened steel	☐ Heat treated steel
More details: _____			

Contact person _____			
Date _____		Signature _____	

Tap Selection Guide and Cutting Speed Recommendations

Hole Type			Tap Color Code				
			Tool Material				
			Surface Treatment/Coating				
			Flute Hand and Angle				
			Lead according to DIN 2197				
			Hole Type				
Material No.	Material	Condition	Tensile Strength [N/mm²]	Hardness HB	Chip	Coolant	
1	Non-alloy steel and cast steel, free cutting steel and cast steel (less than 5% all elements)	< 0.25 %C	Annealed	420	125	Ext. Long	T
2		>= 0.25 %C	Annealed	650	190	Medium	T
3		< 0.55 %C	Quench and tempered	850	250	Long	T
4		>= 0.55 %C	Annealed	750	220	Long	T
7				930	275	Long	X
8		Quench and tempered		1000	300	Long	X
9				1200	350	Long	A
10		Annealed		680	200	Long	X
11		Quench and tempered		1100	325	Long	X
12	High alloyed steel, cast steel and tool steel	Ferritic/Martensitic		680	200	Medium	A
13		Martensitic		820	240	Long	A
14	Stainless steel	Austenitic		600	180	Long	A
15	Cast iron nodular (GGG)	Ferritic/pearlitic			180	Ext. Short	X
16		Pearlitic			260	Ext. Short	X
17	Gray cast iron (GG)	Ferritic			160	Short	X
18		Pearlitic			250	Ext. Short	X
19	Malleable cast iron	Ferritic			130	Short	X
20		Pearlitic			230	Short	X
21	Aluminum-wrought alloy	Not cureable			60	Medium	T
22		Cured			100	Medium	T
23	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	Short	T
24			Cured		90	Short	T
25		>12% Si	High temp.		130	Short	T
26		>1% Pb	Free cutting		110	Med/Short	T
27	Copper alloys	Brass			90	Long	T
28		Electrolitic copper			100	Long	T
29	Non-metallic	Duroplastics, fiber plastics				Short	Z
31	High temp. alloys	Fe based	Annealed		200	Long	A
32			Cured		280	Long	A
33	Super alloys	Ni or Co based	Annealed		250	Long	A
34			Cured		350	Long	A
35			Cast		250	Long	A
36	Titanium and Ti alloys			400		Med/Short	A
37		Alpha+beta alloys cured		1050		Med/Short	A

Coolant

A - Cutting oil
T - Oil emulsion
X - Oil or emulsion
S - Dry
Z - Dry or emulsion

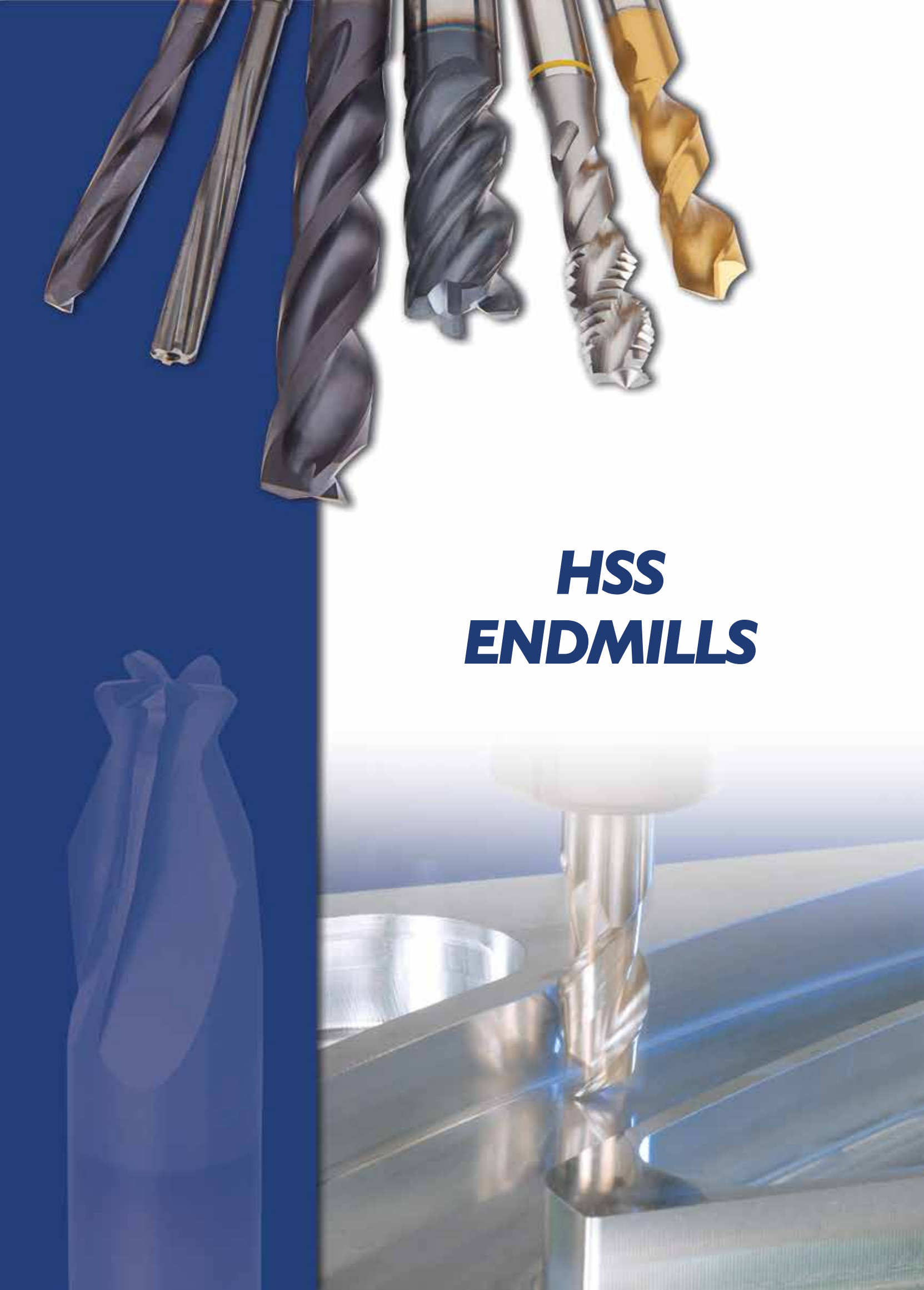
HSS TAPS USER GUIDE

W	M	M	M	M	M	M	S	H	N	H	G	F
HSS	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E
-	-	TI	ST	-	TI	ST	ST	-	ST	ST	NI	TI
-	-	-	-	R40°	R40°	R40°	-	-	R40°	R40°	-	-
I\2\3	B	B	B	C	C	C	B	B	C	C	C	C
I-2-3-4-5	4-5	4-5	4-5	I-2-3	I-2-3	I-2-3	4-5	4-5	I-2-3	I-2-3	I-2-3-4-5	I-2-3-4-5
	ml/min	ml/min	ml/min	ml/min	ml/min	ml/min		ml/min	ml/min	ml/min		ml/min
•	10-25	•	15-45	•	8-25	•	20-25	•	8-25	•	20-25	•
•	10-20	•	12-40	•	10-35	•	15-20	•	10-35	•	15-20	•
•	12-18	•	15-25	•	6-12	•	12-18	•	12-18	•	12-18	•
•	12-18	•	15-40	•	6-20	•	12-18	•	12-18	•	12-18	•
•	10-15	•	5-25	•	4-10	•	10-15	•	10-15	•	10-15	•
•	6-10	•	5-25	•	4-10	•	6-10	•	6-10	•	6-10	•
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•	2-4	•	4-8	•	2-4	•	3-7	•	2-4	•	2-4	•
•	6-10	•	6-10	•	6-10	•	6-10	•	6-10	•	6-10	•
•	6-10	•	6-10	•	6-10	•	6-10	•	6-10	•	6-10	•

- Recommended
- Suitable
- * Can be selected

HSS TAPS



The image is a composite. The top half features a row of seven different HSS endmills against a white background, with a dark blue vertical bar on the left. The endmills vary in size, length, and design, including standard double-flute, double-flute with a yellow band, and more complex multi-flute and wiper-flute designs. The bottom half shows a close-up of an endmill cutting into a metal workpiece, with a bright blue chip being removed. A dark blue vertical bar is also present on the left side of this section.

HSS ENDMILLS

2 Flutes.....	232-239, 253-254
3 Flutes.....	240-244
4 Flutes.....	245-253
Dovetail Cutter	255
Inverted Dovetail Cutter.....	255
Woodruff Cutter	256
T-Slot Cutter.....	257
Counterbores	258
Corner-Rounding Cutters	259
Reamers	260-262
Slitting Saws Staggered Teeth.....	263-266

HSS-PM LINE

(A) M-TK (HSS Co 5%) - Uncoated: Uncoated grade made from high speed steel, includes 5% Cobalt. This grade is for general purposes and is best suited for roughing operations.

(C) X-85 (PM Co 8.5%) - Uncoated: Uncoated grade made from high speed steel, includes 8.5% Cobalt. High degree of hot hardness and wear resistance. This grade is top efficient on high strength steels.

(EX) X-105 (PM Co 10.5%) - Coated: Coated grade made from high speed steel includes 10.5% Cobalt. Exceptional wear resistance property, high thermal resistance, edge holding ability and toughness for all types of machining operations including high temperatures and high speeds.

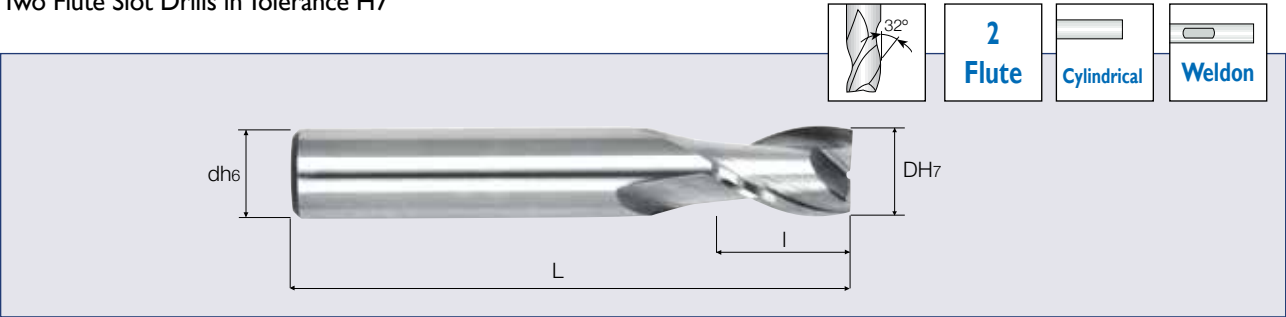
(CX) Skin Coating Grade: Coated grade of 1-3 micron for different kinds of materials and applications. High hardness of 3500 HV makes higher speed machining of harder materials possible. This coating is recommended for hardened steel, high temperature and steel alloys because of the high oxidation resistance.



HSS-PM LINE

I0102

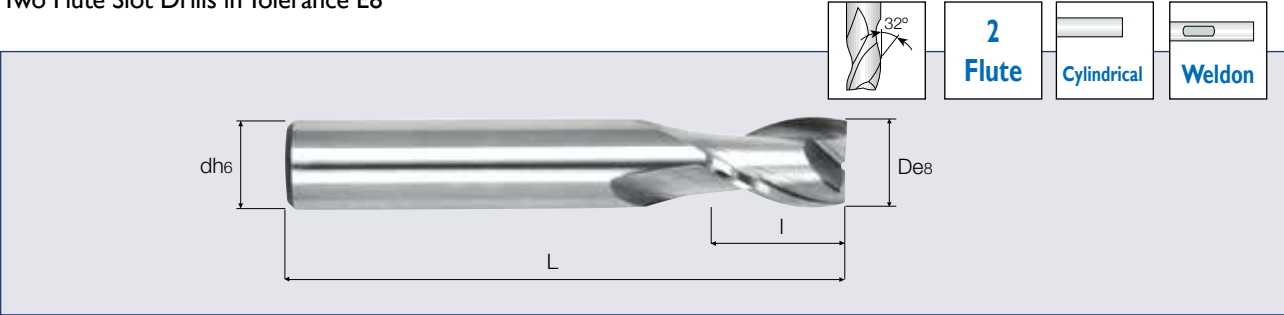
Two Flute Slot Drills in Tolerance H7



Designation	DH7	l	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
I01020100	1	3	47	6	2	C	CX
I01020150	1,5	3	47	6	2	C	CX
I01020200	2	4	48	6	2	C	CX
I01020250	2,5	5	49	6	2	C	CX
I01020300	3	5	49	6	2	C	CX
I01020350	3,5	6	50	6	2	C	CX
I01020400	4	7	51	6	2	C	CX
I01020450	4,5	7	51	6	2	C	CX
I01020500	5	8	52	6	2	C	CX
I01020550	5,5	8	52	6	2	C	CX
I01020600	6	8	52	6	2	C	CX
I01020650	6,5	10	60	10	2	C	CX
I01020700	7	10	60	10	2	C	CX
I01020750	7,5	10	60	10	2	C	CX
I01020800	8	11	61	10	2	C	CX
I01020850	8,5	11	61	10	2	C	CX
I01020900	9	11	61	10	2	C	CX
I01020950	9,5	13	63	10	2	C	CX
I01021000	10	13	63	10	2	C	CX
I01021050	10,5	13	70	12	2	C	CX
I01021100	11	13	70	12	2	C	CX
I01021200	12	16	73	12	2	C	CX
I01021300	13	16	73	12	2	C	CX
I01021400	14	16	73	12	2	C	CX
I01021500	15	19	79	16	2	C	CX
I01021600	16	19	79	16	2	C	CX
I01021700	17	19	79	16	2	C	CX
I01021800	18	19	79	16	2	C	CX
I01021801	18	19	85	20	2	C	CX
I01021900	19	22	82	16	2	C	CX
I01021901	19	22	88	20	2	C	CX
I01022000	20	22	82	16	2	C	CX
I01022001	20	22	88	20	2	C	CX
I01022100	21	22	88	20	2	C	CX
I01022200	22	22	88	20	2	C	CX
I01022201	22	22	98	25	2	C	CX
I01022300	23	22	88	20	2	C	CX
I01022400	24	26	102	25	2	C	CX
I01022500	25	26	102	25	2	C	CX
I01022600	26	26	102	25	2	C	CX
I01022800	28	26	102	25	2	C	CX
I01023000	30	26	102	25	2	C	CX
I01023200	32	32	112	32	2	C	CX
I01023400	34	32	112	32	2	C	CX
I01023500	35	32	112	32	2	C	CX
I01023600	36	32	112	32	2	C	CX
I01023800	38	38	118	32	2	C	CX
I01024000	40	38	118	32	2	C	CX
I01024500	45	38	118	32	2	C	CX
I01025000	50	45	125	32	2	C	CX

HSS-PM LINE

I0110
Two Flute Slot Drills in Tolerance E8

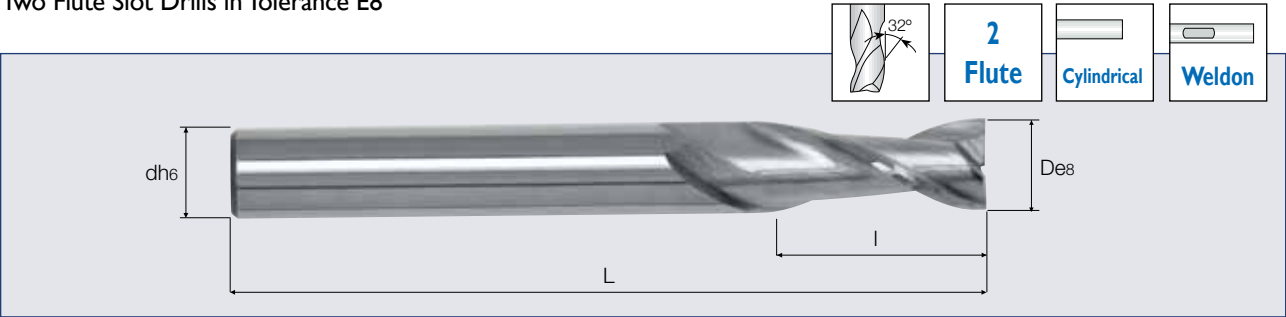


Designation	De8	I	L	dh6	Z	M-TK (HSS-E)	X-85 (PM Co 8,5%)	Coating
I01100100	1	3	47	6	2	–	C	CX
I01100150	1,5	3	47	6	2	–	C	CX
I01100200	2	4	48	6	2	–	C	CX
I01100250	2,5	5	49	6	2	–	C	CX
I01100300	3	5	49	6	2	–	C	CX
I01100350	3,5	6	50	6	2	–	C	CX
I01100400	4	7	51	6	2	–	C	CX
I01100450	4,5	7	51	6	2	–	C	CX
I01100500	5	8	52	6	2	–	C	CX
I01100550	5,5	8	52	6	2	–	C	CX
I01100600	6	8	52	6	2	A	C	CX
I01100650	6,5	10	60	10	2	A	C	CX
I01100700	7	10	60	10	2	A	C	CX
I01100750	7,5	10	60	10	2	A	C	CX
I01100800	8	11	61	10	2	A	C	CX
I01100850	8,5	11	61	10	2	A	C	CX
I01100900	9	11	61	10	2	A	C	CX
I01100950	9,5	13	63	10	2	A	C	CX
I01101000	10	13	63	10	2	A	C	CX
I01101050	10,5	13	70	12	2	A	C	CX
I01101100	11	13	70	12	2	A	C	CX
I01101200	12	16	73	12	2	A	C	CX
I01101300	13	16	73	12	2	A	C	CX
I01101400	14	16	73	12	2	A	C	CX
I01101500	15	19	79	16	2	A	C	CX
I01101600	16	19	79	16	2	A	C	CX
I01101700	17	19	79	16	2	A	C	CX
I01101800	18	19	79	16	2	A	C	CX
I01101801	18	19	85	20	2	A	C	CX
I01101900	19	22	82	16	2	A	C	CX
I01101901	19	22	88	20	2	A	C	CX
I01102000	20	22	82	16	2	A	C	CX
I01102001	20	22	88	20	2	A	C	CX
I01102100	21	22	88	20	2	A	C	CX
I01102200	22	22	88	20	2	A	C	CX
I01102201	22	22	98	25	2	A	C	CX
I01102300	23	22	88	20	2	A	C	CX
I01102400	24	26	102	25	2	A	C	CX
I01102500	25	26	102	25	2	A	C	CX
I01102600	26	26	102	25	2	A	C	CX
I01102800	28	26	102	25	2	A	C	CX
I01103000	30	26	102	25	2	A	C	CX
I01103200	32	32	112	32	2	A	C	CX
I01103400	34	32	112	32	2	A	C	CX
I01103500	35	32	112	32	2	A	C	CX
I01103600	36	32	112	32	2	A	C	CX
I01103800	38	38	118	32	2	A	C	CX
I01104000	40	38	118	32	2	A	C	CX
I01104500	45	38	118	32	2	A	C	CX
I01105000	50	45	125	32	2	A	C	CX

HSS-PM LINE

I0125

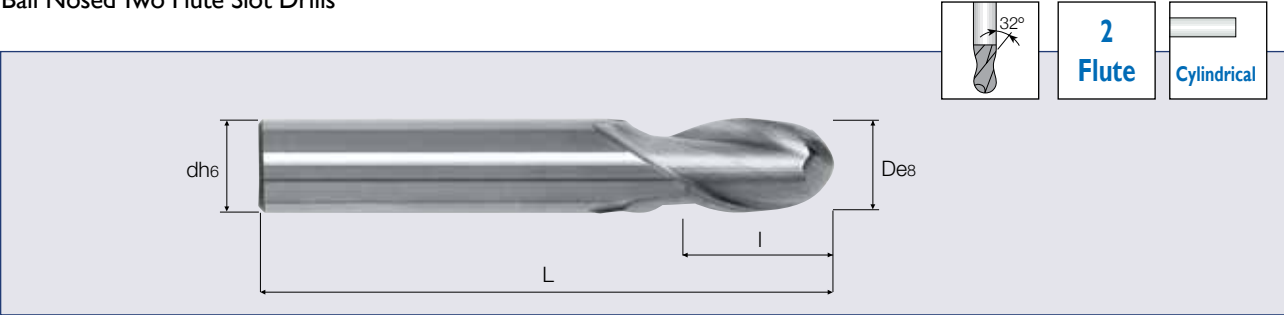
Two Flute Slot Drills in Tolerance E8



Designation	De8	l	L	dh6	Z	M-TK (HSS-E)	X-85 (PM Co 8,5%)	Coating
I01250300	3	9	60	6	2	–	C	CX
I01250350	3,5	13	67	6	2	–	C	CX
I01250400	4	13	67	6	2	–	C	CX
I01250450	4,5	13	70	6	2	–	C	CX
I01250500	5	16	70	6	2	–	C	CX
I01250550	5,5	16	76	6	2	–	C	CX
I01250600	6	16	76	6	2	A	C	CX
I01250650	6,5	16	76	10	2	A	C	CX
I01250700	7	19	79	10	2	A	C	CX
I01250750	7,5	19	79	10	2	A	C	CX
I01250800	8	19	79	10	2	A	C	CX
I01250850	8,5	22	83	10	2	A	C	CX
I01250900	9	22	83	10	2	A	C	CX
I01250950	9,5	22	83	10	2	A	C	CX
I01251000	10	22	83	10	2	A	C	CX
I01251050	10,5	25	95	12	2	A	C	CX
I01251100	11	25	95	12	2	A	C	CX
I01251200	12	28	98	12	2	A	C	CX
I01251300	13	28	98	12	2	A	C	CX
I01251400	14	32	102	12	2	A	C	CX
I01251500	15	32	108	16	2	A	C	CX
I01251600	16	32	108	16	2	A	C	CX
I01251700	17	35	114	16	2	A	C	CX
I01251800	18	35	114	16	2	A	C	CX
I01251900	19	38	117	16	2	A	C	CX
I01252000	20	38	117	16	2	A	C	CX
I01252100	21	38	132	20	2	–	C	CX
I01252200	22	41	135	20	2	A	C	CX
I01252300	23	41	135	20	2	–	C	CX
I01252400	24	41	152	25	2	A	C	CX
I01252500	25	44	159	25	2	A	C	CX
I01252600	26	44	159	25	2	A	C	CX
I01252800	28	44	159	25	2	A	C	CX
I01253000	30	50	159	25	2	A	C	CX
I01253200	32	52	165	32	2	A	C	CX
I01253400	34	54	167	32	2	A	C	CX
I01253500	35	54	167	32	2	A	C	CX
I01253600	36	54	167	32	2	A	C	CX
I01253800	38	56	169	32	2	A	C	CX
I01254000	40	56	174	32	2	A	C	CX
I01254500	45	60	180	32	2	A	C	CX
I01255000	50	65	185	32	2	A	C	CX

HSS-PM LINE

I0140
Ball Nosed Two Flute Slot Drills



Designation	De8	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
I01400100	1	3	47	6	2	C	CX
I01400150	1,5	3	47	6	2	C	CX
I01400200	2	4	48	6	2	C	CX
I01400300	3	5	49	6	2	C	CX
I01400400	4	7	51	6	2	C	CX
I01400500	5	8	52	6	2	C	CX
I01400600	6	8	52	6	2	C	CX
I01400700	7	10	60	10	2	C	CX
I01400800	8	11	61	10	2	C	CX
I01400900	9	11	61	10	2	C	CX
I01401000	10	13	63	10	2	C	CX
I01401100	11	13	70	12	2	C	CX
I01401200	12	16	73	12	2	C	CX
I01401300	13	16	73	12	2	C	CX
I01401400	14	16	73	12	2	C	CX
I01401500	15	19	79	16	2	C	CX
I01401600	16	19	79	16	2	C	CX
I01401700	17	19	79	16	2	C	CX
I01401800	18	19	79	16	2	C	CX
I01401900	19	22	88	20	2	C	CX
I01402000	20	22	88	20	2	C	CX
I01402200	22	22	88	20	2	C	CX
I01402500	25	26	102	25	2	C	CX
I01402800	28	26	102	25	2	C	CX
I01403000	30	26	102	25	2	C	CX
I01403200	32	32	112	32	2	C	CX

HSS-PM LINE

I0155

Ball Nosed Two Flute Slot Drills

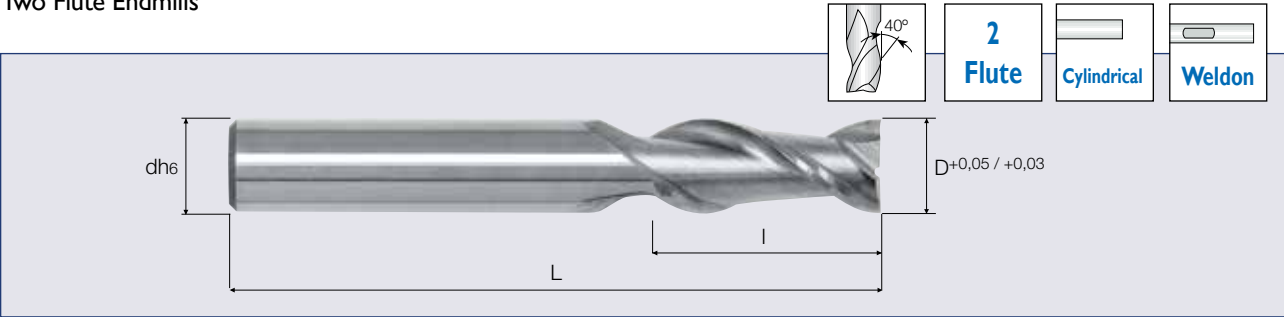


Designation	De8	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
I01550300	3	9	60	6	2	C	CX
I01550400	4	13	67	6	2	C	CX
I01550500	5	16	70	6	2	C	CX
I01550600	6	16	76	6	2	C	CX
I01550700	7	19	79	10	2	C	CX
I01550800	8	19	79	10	2	C	CX
I01550900	9	22	83	10	2	C	CX
I01551000	10	22	83	10	2	C	CX
I01551100	11	25	95	12	2	C	CX
I01551200	12	28	98	12	2	C	CX
I01551300	13	28	98	12	2	C	CX
I01551400	14	32	102	12	2	C	CX
I01551500	15	32	108	16	2	C	CX
I01551600	16	32	108	16	2	C	CX
I01551700	17	35	114	16	2	C	CX
I01551800	18	35	114	16	2	C	CX
I01551900	19	38	132	20	2	C	CX
I01552000	20	38	132	20	2	C	CX
I01552200	22	41	135	20	2	C	CX
I01552500	25	44	159	25	2	C	CX
I01552800	28	44	159	25	2	C	CX
I01553000	30	50	159	25	2	C	CX
I01553200	32	52	165	32	2	C	CX



HSS-PM LINE

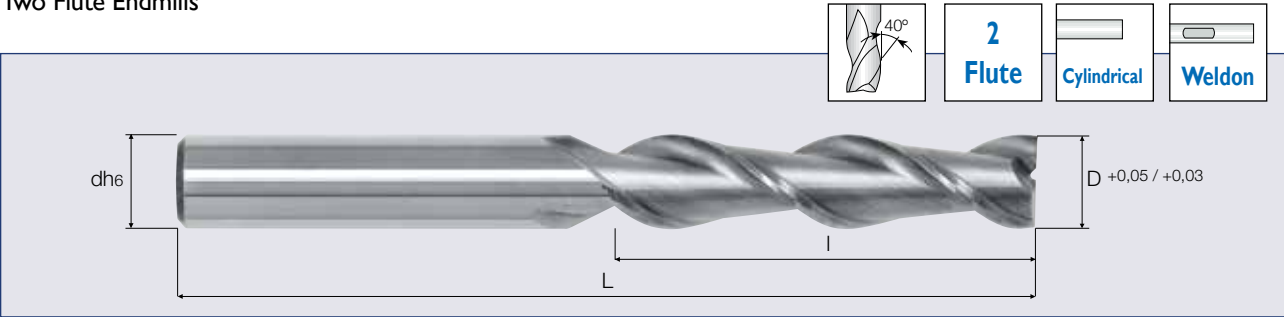
I2105
Two Flute Endmills



Designation	D+0,05 +0,03	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
I21050200	2	7	51	6	2	C	CX
I21050300	3	8	52	6	2	C	CX
I21050400	4	11	55	6	2	C	CX
I21050500	5	13	57	6	2	C	CX
I21050600	6	13	57	6	2	C	CX
I21050700	7	16	66	10	2	C	CX
I21050800	8	19	69	10	2	C	CX
I21050900	9	19	69	10	2	C	CX
I21051000	10	22	72	10	2	C	CX
I21051100	11	22	79	12	2	C	CX
I21051200	12	26	83	12	2	C	CX
I21051300	13	26	83	12	2	C	CX
I21051400	14	26	83	12	2	C	CX
I21051500	15	32	92	16	2	C	CX
I21051600	16	32	92	16	2	C	CX
I21051800	18	32	92	16	2	C	CX
I21052000	20	38	104	20	2	C	CX
I21052200	22	38	104	20	2	C	CX
I21052500	25	45	121	25	2	C	CX
I21052800	28	45	121	25	2	C	CX
I21053000	30	45	121	25	2	C	CX
I21053200	32	53	133	32	2	C	CX

HSS-PM LINE

I2I20
Two Flute Endmills

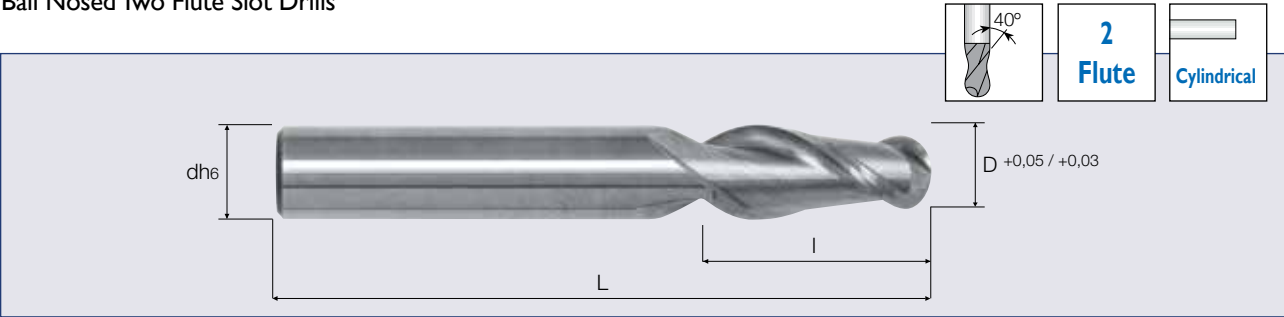


Designation	D+0,05 +0,03	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
I2I200300	3	12	56	6	2	C	CX
I2I200400	4	19	63	6	2	C	CX
I2I200500	5	24	68	6	2	C	CX
I2I200600	6	24	68	6	2	C	CX
I2I200700	7	30	80	10	2	C	CX
I2I200800	8	38	88	10	2	C	CX
I2I200900	9	38	88	10	2	C	CX
I2I201000	10	45	95	10	2	C	CX
I2I201100	11	45	102	12	2	C	CX
I2I201200	12	53	110	12	2	C	CX
I2I201300	13	53	110	12	2	C	CX
I2I201400	14	53	110	12	2	C	CX
I2I201500	15	63	123	16	2	C	CX
I2I201600	16	63	123	16	2	C	CX
I2I201800	18	63	123	16	2	C	CX
I2I202000	20	75	141	20	2	C	CX
I2I202200	22	75	141	20	2	C	CX
I2I202500	25	90	166	25	2	C	CX
I2I202800	28	90	166	25	2	C	CX
I2I203000	30	90	166	25	2	C	CX
I2I203200	32	106	186	32	2	C	CX

HSS-PM LINE

I2505

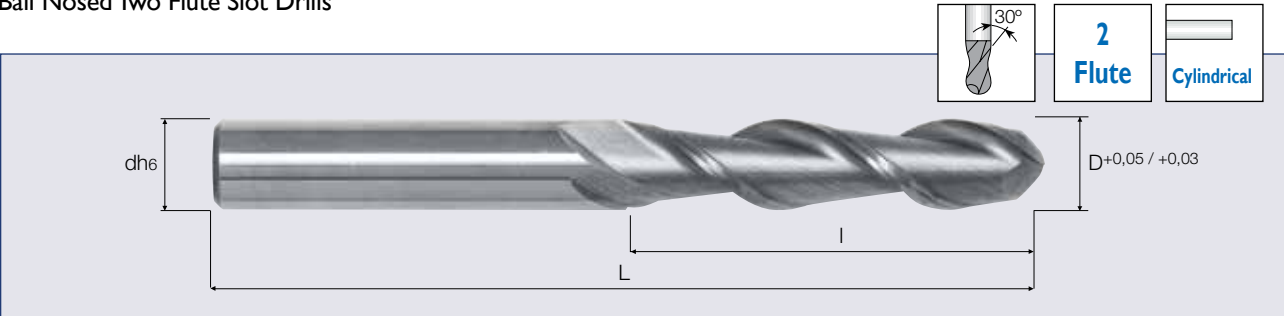
Ball Nosed Two Flute Slot Drills



Designation	D+0,05 +0,03	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
I25050200	2	7	51	6	2	C	CX
I25050300	3	8	52	6	2	C	CX
I25050400	4	11	55	6	2	C	CX
I25050500	5	13	57	6	2	C	CX
I25050600	6	13	57	6	2	C	CX
I25050800	8	19	69	10	2	C	CX
I25051000	10	22	72	10	2	C	CX
I25051200	12	26	83	12	2	C	CX
I25051400	14	26	83	12	2	C	CX
I25051500	15	32	92	16	2	C	CX
I25051600	16	32	92	16	2	C	CX
I25051800	18	32	92	16	2	C	CX
I25052000	20	38	104	20	2	C	CX
I25052200	22	38	104	20	2	C	CX
I25052500	25	45	121	25	2	C	CX
I25052800	28	45	121	25	2	C	CX
I25053000	30	45	121	25	2	C	CX
I25053200	32	53	133	32	2	C	CX

I2520

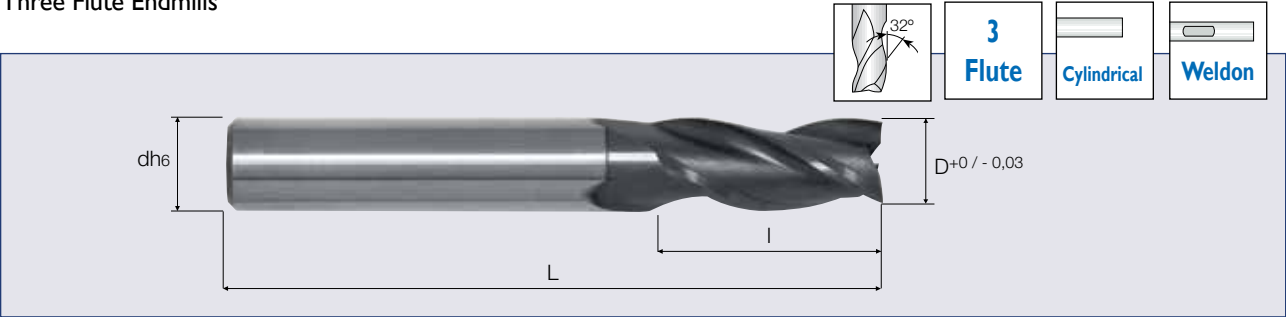
Ball Nosed Two Flute Slot Drills



Designation	D+0,05 +0,03	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
I25200300	3	12	56	6	2	C	CX
I25200400	4	19	63	6	2	C	CX
I25200500	5	24	68	6	2	C	CX
I25200600	6	24	68	6	2	C	CX
I25200800	8	38	88	10	2	C	CX
I25201000	10	45	95	10	2	C	CX
I25201200	12	53	110	12	2	C	CX
I25201400	14	53	110	12	2	C	CX
I25201500	15	63	123	16	2	C	CX
I25201600	16	63	123	16	2	C	CX
I25201800	18	63	123	16	2	C	CX
I25202000	20	75	141	20	2	C	CX
I25202200	22	75	141	20	2	C	CX
I25202500	25	90	166	25	2	C	CX
I25202800	28	90	166	25	2	C	CX
I25203000	30	90	166	25	2	C	CX
I25203200	32	106	186	32	2	C	CX

HSS-PM LINE

I4105
Three Flute Endmills

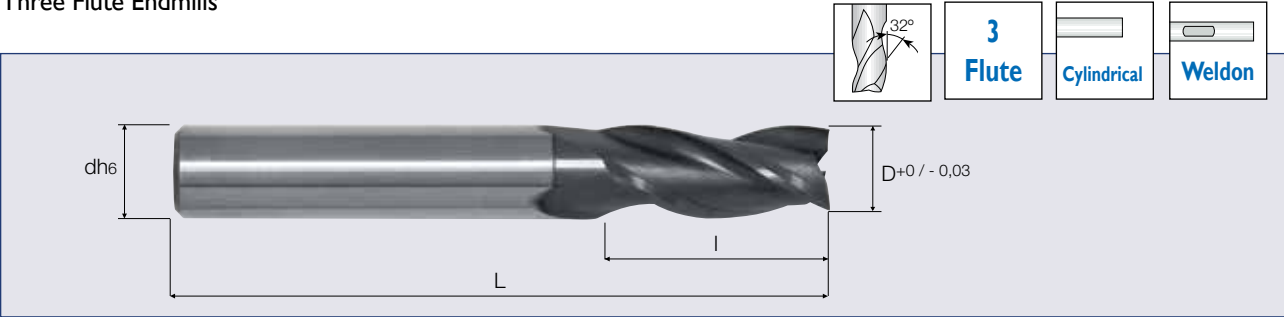


Designation	D+0 - 0,03	I	L	dh6	Z	X-105 (PM Co 10,5%) Coating
I41050600	6	13	57	6	3	EX
I41050800	8	19	69	10	3	EX
I41051000	10	22	72	10	3	EX
I41051200	12	26	83	12	3	EX
I41051400	14	26	83	12	3	EX
I41051600	16	32	92	16	3	EX
I41051800	18	32	92	16	3	EX
I41052001	20	38	104	20	3	EX
I41052200	22	38	104	20	3	EX
I41052500	25	45	121	25	3	EX
I41052800	28	45	121	25	3	EX
I41053000	30	45	121	25	3	EX
I41053200	32	53	133	32	3	EX



HSS-PM LINE

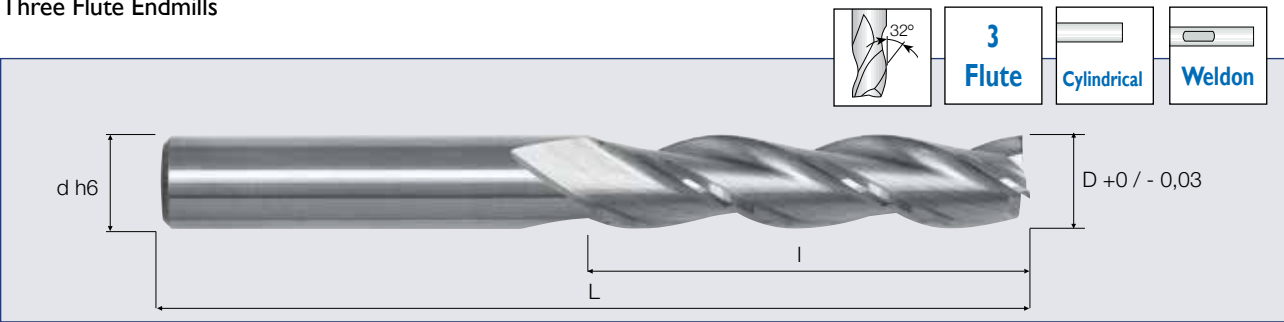
I4105
Three Flute Endmills



Designation	D+0 - 0,03	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
I41050200	2	7	51	6	3	C	CX
I41050250	2,5	8	52	6	3	C	CX
I41050300	3	8	52	6	3	C	CX
I41050350	3,5	10	54	6	3	C	CX
I41050400	4	11	55	6	3	C	CX
I41050450	4,5	11	55	6	3	C	CX
I41050500	5	13	57	6	3	C	CX
I41050550	5,5	13	57	6	3	C	CX
I41050600	6	13	57	6	3	C	CX
I41050650	6,5	16	66	10	3	C	CX
I41050700	7	16	66	10	3	C	CX
I41050800	8	19	69	10	3	C	CX
I41050900	9	19	69	10	3	C	CX
I41051000	10	22	72	10	3	C	CX
I41051100	11	22	79	12	3	C	CX
I41051200	12	26	83	12	3	C	CX
I41051300	13	26	83	12	3	C	CX
I41051400	14	26	83	12	3	C	CX
I41051500	15	32	92	16	3	C	CX
I41051600	16	32	92	16	3	C	CX
I41051700	17	32	92	16	3	C	CX
I41051800	18	32	92	16	3	C	CX
I41051900	19	38	98	16	3	C	CX
I41052000	20	38	98	16	3	C	CX
I41052200	22	38	104	20	3	C	CX
I41052400	24	45	121	25	3	C	CX
I41052500	25	45	121	25	3	C	CX
I41052600	26	45	121	25	3	C	CX
I41052800	28	45	121	25	3	C	CX
I41053000	30	45	121	25	3	C	CX
I41053200	32	53	133	32	3	C	CX
I41053400	34	53	133	32	3	C	CX
I41053500	35	53	133	32	3	C	CX
I41053600	36	53	133	32	3	C	CX
I41053800	38	63	143	32	3	C	CX
I41054000	40	63	143	32	3	C	CX
I41054500	45	63	143	32	3	C	CX
I41054800	48	75	155	32	3	C	CX
I41055000	50	75	155	32	3	C	CX

HSS-PM LINE

I4120
Three Flute Endmills

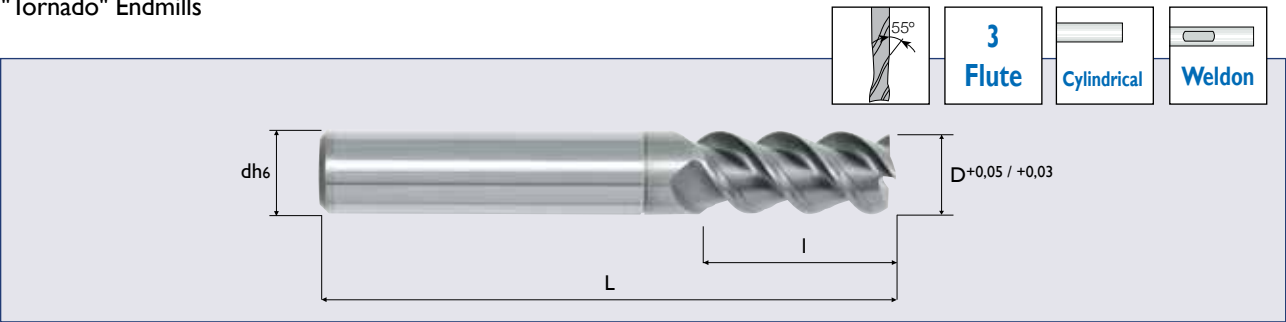


Designation	D+0 - 0,03	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
I41200200	2	10	54	6	3	C	CX
I41200300	3	12	56	6	3	C	CX
I41200400	4	19	63	6	3	C	CX
I41200500	5	24	68	6	3	C	CX
I41200600	6	24	68	6	3	C	CX
I41200700	7	30	80	10	3	C	CX
I41200800	8	38	88	10	3	C	CX
I41200900	9	38	88	10	3	C	CX
I41201000	10	45	95	10	3	C	CX
I41201100	11	45	102	12	3	C	CX
I41201200	12	53	110	12	3	C	CX
I41201300	13	53	110	12	3	C	CX
I41201400	14	53	110	12	3	C	CX
I41201500	15	63	123	16	3	C	CX
I41201600	16	63	123	16	3	C	CX
I41201700	17	63	123	16	3	C	CX
I41201800	18	63	123	16	3	C	CX
I41201900	19	75	135	16	3	C	CX
I41202000	20	75	135	16	3	C	CX
I41202200	22	75	141	20	3	C	CX
I41202400	24	90	166	25	3	C	CX
I41202500	25	90	166	25	3	C	CX
I41202600	26	90	166	25	3	C	CX
I41202800	28	90	166	25	3	C	CX
I41203000	30	90	166	25	3	C	CX
I41203200	32	106	186	32	3	C	CX
I41203400	34	106	186	32	3	C	CX
I41203500	35	106	186	32	3	C	CX
I41203600	36	106	186	32	3	C	CX
I41203800	38	125	205	32	3	C	CX
I41204000	40	125	205	32	3	C	CX

HSS-PM LINE

I4505

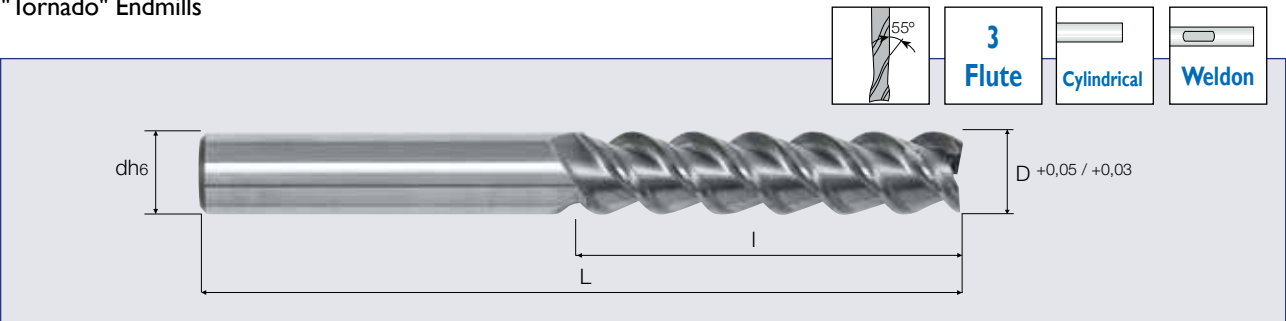
"Tornado" Endmills



Designation	D+0,05 +0,03	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
I45050300	3	8	52	6	3	C	CX
I45050400	4	11	55	6	3	C	CX
I45050500	5	13	57	6	3	C	CX
I45050600	6	13	57	6	3	C	CX
I45050700	7	16	66	10	3	C	CX
I45050800	8	19	69	10	3	C	CX
I45050900	9	19	69	10	3	C	CX
I45051000	10	22	72	10	3	C	CX
I45051200	12	26	83	12	3	C	CX
I45051400	14	26	83	12	3	C	CX
I45051500	15	32	92	16	3	C	CX
I45051600	16	32	92	16	3	C	CX
I45051800	18	32	92	16	3	C	CX
I45052000	20	38	104	20	3	C	CX
I45052200	22	38	104	20	3	C	CX
I45052500	25	45	121	25	4	C	CX

I4520

"Tornado" Endmills

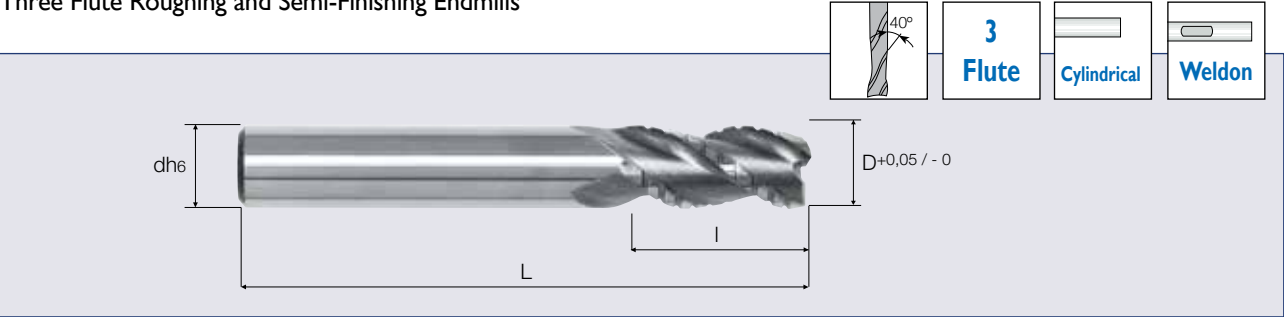


Designation	D+0,05 +0,03	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
I45200300	3	12	56	6	3	C	CX
I45200400	4	19	63	6	3	C	CX
I45200500	5	24	68	6	3	C	CX
I45200600	6	24	68	6	3	C	CX
I45200700	7	30	80	10	3	C	CX
I45200800	8	38	88	10	3	C	CX
I45200900	9	38	88	10	3	C	CX
I45201000	10	45	95	10	3	C	CX
I45201200	12	53	110	12	3	C	CX
I45201400	14	53	110	12	3	C	CX
I45201500	15	63	123	16	3	C	CX
I45201600	16	63	123	16	3	C	CX
I45201800	18	63	123	16	3	C	CX
I45202000	20	75	141	20	3	C	CX
I45202200	22	75	141	20	3	C	CX
I45202500	25	90	166	25	4	C	CX

HSS-PM LINE

I5105

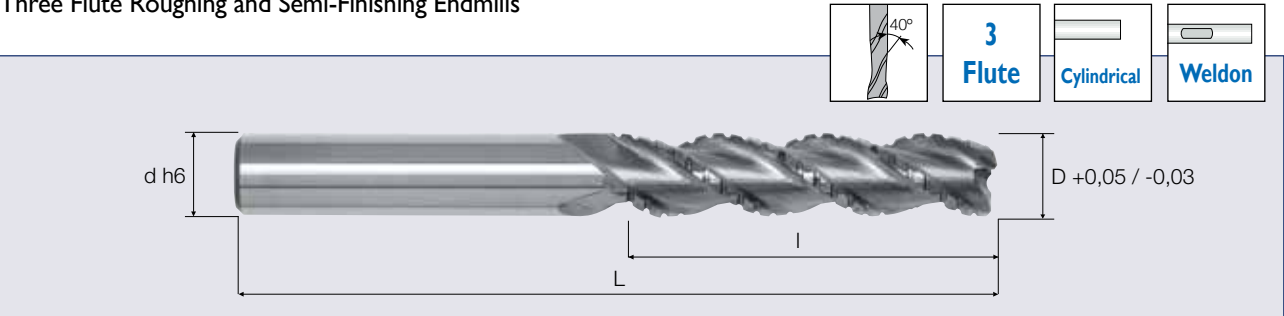
Three Flute Roughing and Semi-Finishing Endmills



Designation	D+0,05 - 0	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
I51050600	6	13	57	6	3	C	CX
I51050800	8	19	69	10	3	C	CX
I51051000	10	22	72	10	3	C	CX
I51051200	12	26	83	12	3	C	CX
I51051400	14	26	83	12	3	C	CX
I51051500	15	32	92	16	3	C	CX
I51051600	16	32	92	16	3	C	CX
I51051800	18	32	92	16	3	C	CX
I51052000	20	38	104	20	3	C	CX
I51052200	22	38	104	20	3	C	CX
I51052500	25	45	121	25	3	C	CX
I51052800	28	45	121	25	3	C	CX
I51053000	30	45	121	25	3	C	CX
I51053200	32	53	133	32	3	C	CX
I51053600	36	53	133	32	3	C	CX
I51054000	40	63	143	32	3	C	CX

I5120

Three Flute Roughing and Semi-Finishing Endmills

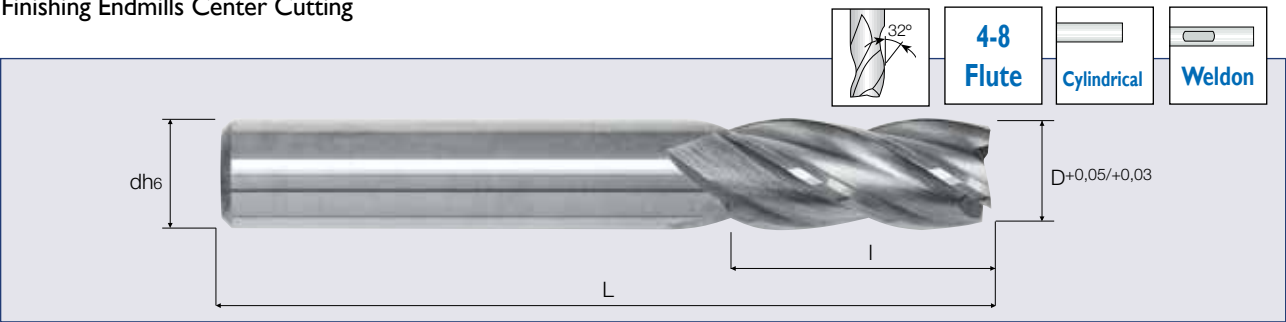


Designation	D+0,05 - 0	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
I51200600	6	24	68	6	3	C	CX
I51200800	8	38	88	10	3	C	CX
I51201000	10	45	95	10	3	C	CX
I51201200	12	53	110	12	3	C	CX
I51201400	14	53	110	12	3	C	CX
I51201500	15	63	123	16	3	C	CX
I51201600	16	63	123	16	3	C	CX
I51201800	18	63	123	16	3	C	CX
I51202000	20	75	141	20	3	C	CX
I51202200	22	75	141	20	3	C	CX
I51202500	25	90	166	25	3	C	CX
I51202800	28	90	166	25	3	C	CX
I51203000	30	90	166	32	3	C	CX
I51203200	32	106	186	32	3	C	CX
I51203600	36	106	186	32	3	C	CX
I51204000	40	125	205	32	3	C	CX

HSS-PM LINE

I7305

Finishing Endmills Center Cutting

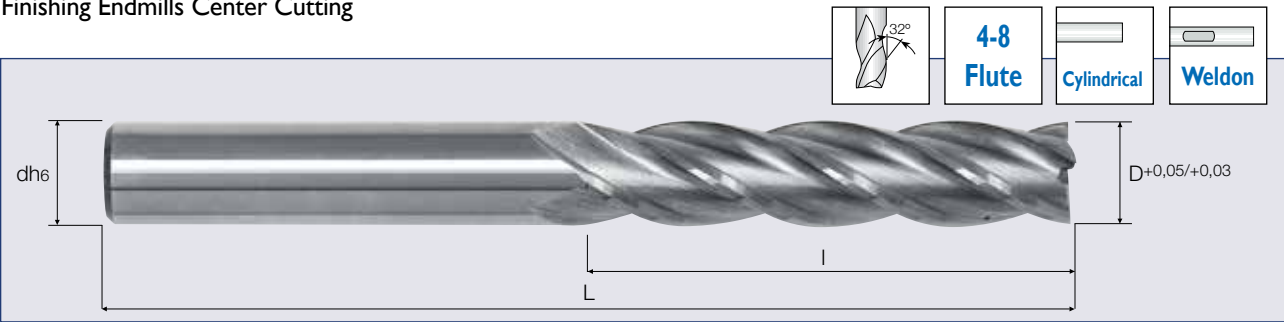


Designation	D+0,05 +0,03	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
I73050200	2	7	51	6	4	C	CX
I73050300	3	8	52	6	4	C	CX
I73050400	4	11	55	6	4	C	CX
I73050500	5	13	57	6	4	C	CX
I73050600	6	13	57	6	4	C	CX
I73050800	8	19	69	10	4	C	CX
I73051000	10	22	72	10	4	C	CX
I73051200	12	26	83	12	4	C	CX
I73051400	14	26	83	12	4	C	CX
I73051500	15	32	92	16	4	C	CX
I73051600	16	32	92	16	4	C	CX
I73051800	18	32	92	16	4	C	CX
I73052000	20	38	98	16	4	C	CX
I73052001	20	38	104	20	4	C	CX
I73052200	22	38	104	20	4	C	CX
I73052400	24	45	121	25	5	C	CX
I73052500	25	45	121	25	5	C	CX
I73052600	26	45	121	25	5	C	CX
I73052800	28	45	121	25	5	C	CX
I73053000	30	45	121	25	6	C	CX
I73053200	32	53	133	32	6	C	CX
I73053600	36	53	133	32	6	C	CX
I73054000	40	63	143	32	8	C	CX
I73055000	50	75	155	32	8	C	CX

HSS-PM LINE

I7320

Finishing Endmills Center Cutting

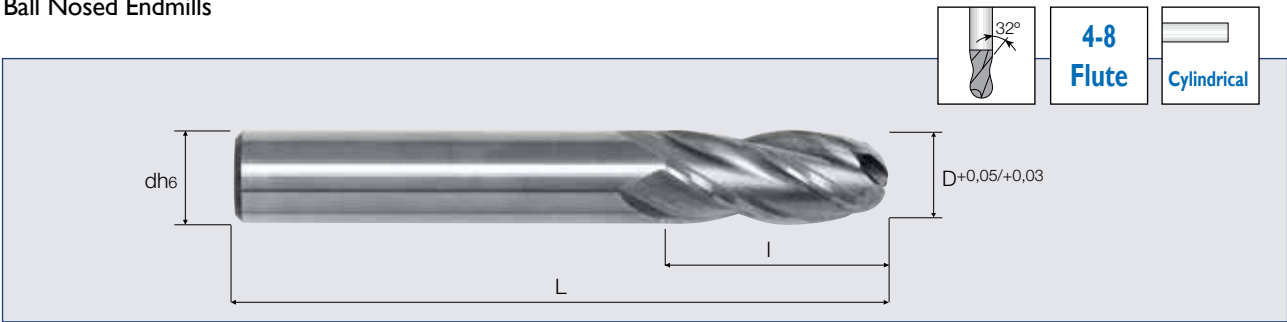


Designation	D+0,05 +0,03	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
I73200200	2	10	54	6	4	C	CX
I73200300	3	12	56	6	4	C	CX
I73200400	4	19	63	6	4	C	CX
I73200500	5	24	68	6	4	C	CX
I73200600	6	24	68	6	4	C	CX
I73200800	8	38	88	10	4	C	CX
I73201000	10	45	95	10	4	C	CX
I73201200	12	53	110	12	4	C	CX
I73201400	14	53	110	12	4	C	CX
I73201500	15	63	123	16	4	C	CX
I73201600	16	63	123	16	4	C	CX
I73201800	18	63	123	16	4	C	CX
I73202000	20	75	135	16	4	C	CX
I73202001	20	75	141	20	4	C	CX
I73202200	22	75	141	20	4	C	CX
I73202400	24	90	166	25	5	C	CX
I73202500	25	90	166	25	5	C	CX
I73202600	26	90	166	25	5	C	CX
I73202800	28	90	166	25	5	C	CX
I73203000	30	90	166	25	6	C	CX
I73203200	32	106	186	32	6	C	CX
I73203600	36	106	186	32	6	C	CX
I73204000	40	125	205	32	8	C	CX



HSS-PM LINE

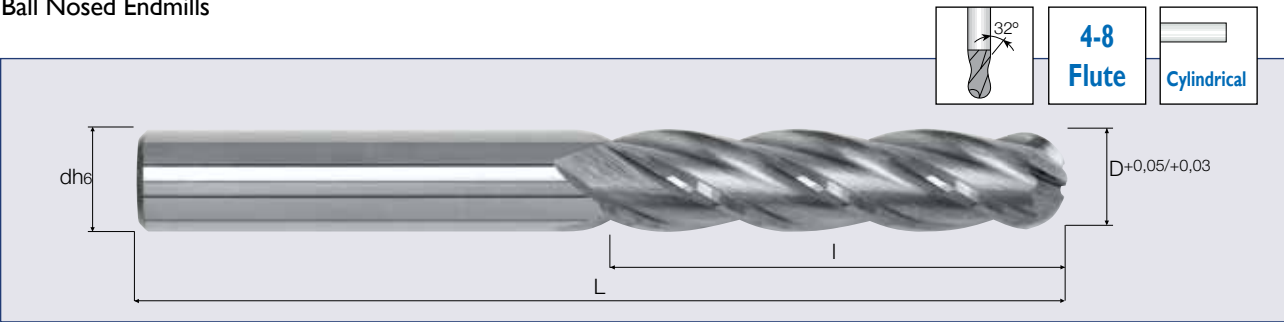
I7505
Ball Nosed Endmills



Designation	D+0,05 +0,03	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
I75050200	2	7	51	6	4	C	CX
I75050300	3	8	52	6	4	C	CX
I75050400	4	11	55	6	4	C	CX
I75050500	5	13	57	6	4	C	CX
I75050600	6	13	57	6	4	C	CX
I75050800	8	19	69	10	4	C	CX
I75051000	10	22	72	10	4	C	CX
I75051200	12	26	83	12	4	C	CX
I75051400	14	26	83	12	4	C	CX
I75051500	15	32	92	16	4	C	CX
I75051600	16	32	92	16	4	C	CX
I75051800	18	32	92	16	4	C	CX
I75052000	20	38	98	16	4	C	CX
I75052001	20	38	104	20	4	C	CX
I75052200	22	38	104	20	4	C	CX
I75052400	24	45	121	25	5	C	CX
I75052500	25	45	121	25	5	C	CX
I75052600	26	45	121	25	5	C	CX
I75052800	28	45	121	25	5	C	CX
I75053000	30	45	121	25	6	C	CX
I75053200	32	53	133	32	6	C	CX
I75053600	36	53	133	32	6	C	CX
I75054000	40	63	143	32	8	C	CX
I75055000	50	75	155	32	8	C	CX

HSS-PM LINE

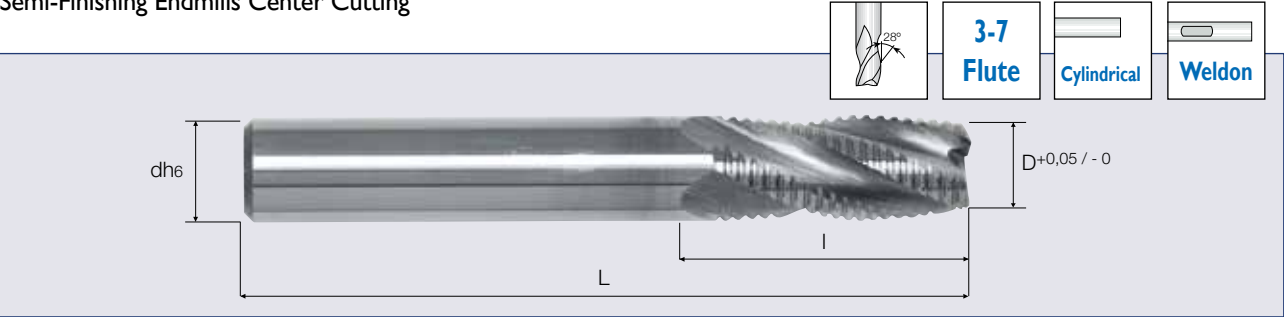
I7520
Ball Nosed Endmills



Designation	D+0,05 +0,03	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
I75200200	2	10	54	6	4	C	CX
I75200300	3	12	56	6	4	C	CX
I75200400	4	19	63	6	4	C	CX
I75200500	5	24	68	6	4	C	CX
I75200600	6	24	68	6	4	C	CX
I75200800	8	38	88	6	4	C	CX
I75201000	10	45	95	10	4	C	CX
I75201200	12	53	110	12	4	C	CX
I75201400	14	53	110	12	4	C	CX
I75201500	15	63	123	16	4	C	CX
I75201600	16	63	123	16	4	C	CX
I75201800	18	63	123	16	4	C	CX
I75202000	20	75	135	16	4	C	CX
I75202001	20	75	141	20	4	C	CX
I75202200	22	75	141	20	4	C	CX
I75202400	24	90	166	25	5	C	CX
I75202500	25	90	166	25	5	C	CX
I75202600	26	90	166	25	5	C	CX
I75202800	28	90	166	25	5	C	CX
I75203000	30	90	166	25	6	C	CX
I75203200	32	106	186	32	6	C	CX
I75203600	36	106	186	32	6	C	CX
I75204000	40	125	205	32	8	C	CX

HSS-PM LINE

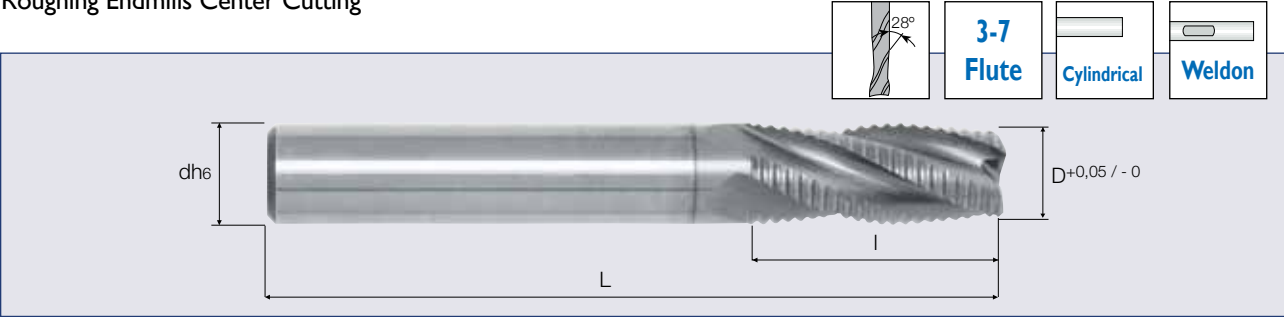
21105
Semi-Finishing Endmills Center Cutting



Designation	D+0,05 - 0	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
211050601	6	13	57	6	3	C	CX
211050701	7	16	66	10	3	C	CX
211050801	8	19	69	10	4	C	CX
211050901	9	19	69	10	4	C	CX
211051001	10	22	72	10	4	C	CX
211051101	11	22	79	12	4	C	CX
211051201	12	26	83	12	4	C	CX
211051301	13	26	83	12	4	C	CX
211051401	14	26	83	12	4	C	CX
211051501	15	32	92	16	4	C	CX
211051601	16	32	92	16	4	C	CX
211051701	17	32	92	16	4	C	CX
211051801	18	32	92	16	4	C	CX
211051805	18	32	98	20	4	C	CX
211052001	20	38	98	16	4	C	CX
211052005	20	38	104	20	4	C	CX
211052201	22	38	104	20	4	C	CX
211052205	22	38	114	25	4	C	CX
211052401	24	45	121	25	5	C	CX
211052501	25	45	121	25	5	C	CX
211052601	26	45	121	25	5	C	CX
211052801	28	45	121	25	5	C	CX
211053001	30	45	121	25	5	C	CX
211053201	32	53	133	32	5	C	CX
211053601	36	53	133	32	6	C	CX
211054001	40	63	143	32	6	C	CX
211054501	45	63	143	32	6	C	CX
211055001	50	75	155	32	7	C	CX

HSS-PM LINE

21105
Roughing Endmills Center Cutting

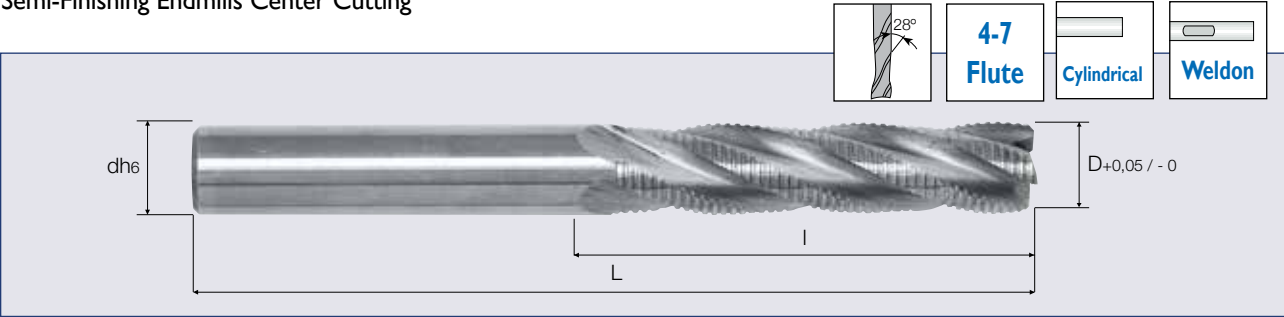


Designation	D+0,05 - 0	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
211050603	6	13	57	6	3	C	CX
211050703	7	16	66	10	3	C	CX
211050803	8	19	69	10	4	C	CX
211050903	9	19	69	10	4	C	CX
211051003	10	22	72	10	4	C	CX
211051103	11	22	79	12	4	C	CX
211051203	12	26	83	12	4	C	CX
211051303	13	26	83	12	4	C	CX
211051403	14	26	83	12	4	C	CX
211051503	15	32	92	16	4	C	CX
211051603	16	32	92	16	4	C	CX
211051703	17	32	92	16	4	C	CX
211051803	18	32	92	16	4	C	CX
211051807	18	32	98	20	4	C	CX
211052003	20	38	98	16	4	C	CX
211052007	20	38	104	20	4	C	CX
211052203	22	38	104	20	4	C	CX
211052207	22	38	114	25	4	C	CX
211052403	24	45	121	25	5	C	CX
211052503	25	45	121	25	5	C	CX
211052603	26	45	121	25	5	C	CX
211052803	28	45	121	25	5	C	CX
211053003	30	45	121	25	5	C	CX
211053203	32	53	133	32	5	C	CX
211053603	36	53	133	32	6	C	CX
211054003	40	63	143	32	6	C	CX
211054503	45	63	143	32	6	C	CX
211055003	50	75	155	32	7	C	CX



HSS-PM LINE

21120
Semi-Finishing Endmills Center Cutting



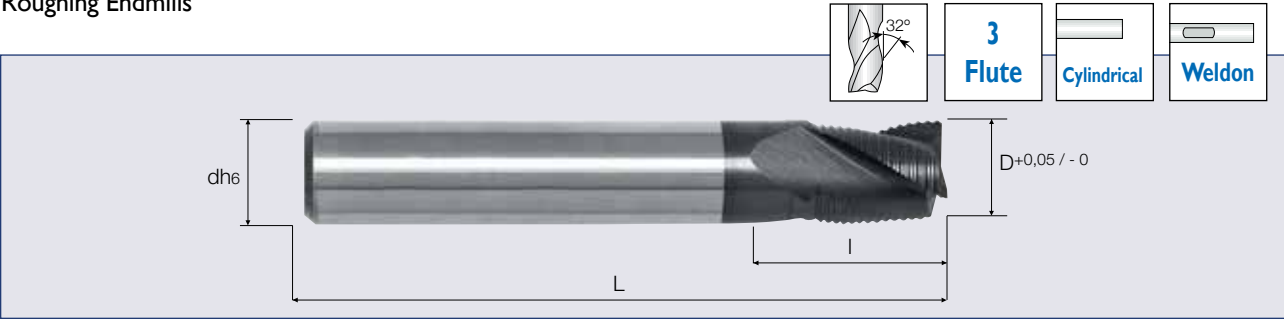
Designation	D+0,05 - 0	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
211200801	8	38	88	10	4	C	CX
211201001	10	45	95	10	4	C	CX
211201201	12	53	110	12	4	C	CX
211201401	14	53	110	12	4	C	CX
211201501	15	63	123	16	4	C	CX
211201601	16	63	123	16	4	C	CX
211201801	18	63	123	16	4	C	CX
211201805	18	63	129	20	4	C	CX
211202001	20	75	135	16	4	C	CX
211202005	20	75	141	20	4	C	CX
211202201	22	75	141	20	4	C	CX
211202205	22	75	151	25	4	C	CX
211202401	24	90	166	25	5	C	CX
211202501	25	90	166	25	5	C	CX
211202801	28	90	166	25	5	C	CX
211203001	30	90	166	25	5	C	CX
211203201	32	106	186	32	5	C	CX
211203601	36	106	186	32	6	C	CX
211204001	40	125	205	32	6	C	CX
211204501	45	125	205	32	6	C	CX
211205001	50	150	230	32	7	C	CX

21120
Roughing Endmills Center Cutting

Designation	D+0,05 - 0	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
211200803	8	38	88	10	4	C	CX
211201003	10	45	95	10	4	C	CX
211201203	12	53	110	12	4	C	CX
211201403	14	53	110	12	4	C	CX
211201503	15	63	123	16	4	C	CX
211201603	16	63	123	16	4	C	CX
211201803	18	63	123	16	4	C	CX
211201807	18	63	129	20	4	C	CX
211202003	20	75	135	16	4	C	CX
211202007	20	75	141	20	4	C	CX
211202203	22	75	141	20	4	C	CX
211202207	22	75	151	25	4	C	CX
211202403	24	90	166	25	5	C	CX
211202503	25	90	166	25	5	C	CX
211202803	28	90	166	25	5	C	CX
211203003	30	90	166	25	5	C	CX
211203203	32	106	186	32	5	C	CX
211203603	36	106	186	32	6	C	CX
211204003	40	125	205	32	6	C	CX
211204503	45	125	205	32	6	C	CX
211205003	50	150	230	32	7	C	CX

HSS-PM LINE

22105
Roughing Endmills



Designation	D+0,05 - 0	I	L	dh6	Z	X-105 (PM Co 10,5%) Coating
221050602	6	8	52	6	3	EX
221050802	8	11	61	10	3	EX
221051002	10	13	63	10	3	EX
221051202	12	13	73	12	3	EX
221051402	14	16	73	12	3	EX
221051602	16	19	79	16	3	EX
221051802	18	19	79	16	3	EX
221052002	20	22	88	20	3	EX
221052202	22	22	88	20	3	EX
221052502	25	26	102	25	3	EX
221052802	28	26	102	25	3	EX
221053002	30	26	102	25	3	EX
221053202	32	32	112	32	3	EX

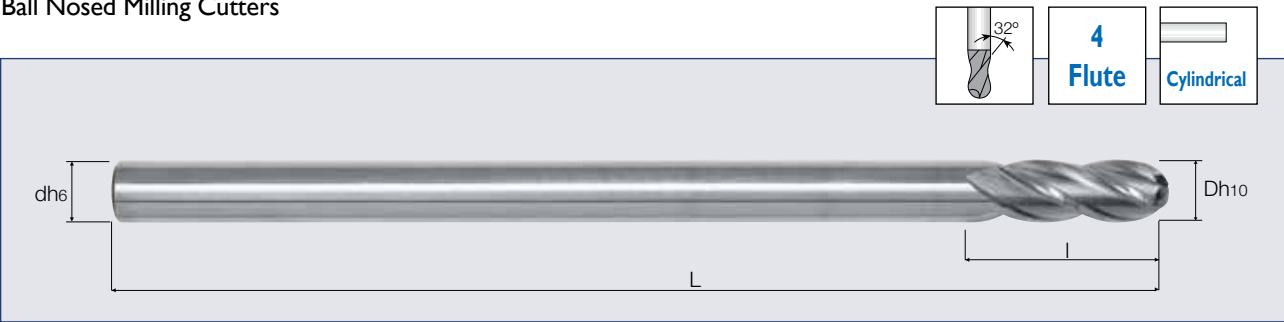
24105
Four Flutes Milling Cutters



Designation	Dh10	I	L	dh6	Z	X-85 (PM Co 8,5%) Coating
241051000	10	30	200	10	4	CX
241051200	12	30	200	12	4	CX
241051600	16	35	200	16	4	CX
241052000	20	35	200	20	4	CX
241052500	25	40	200	25	4	CX

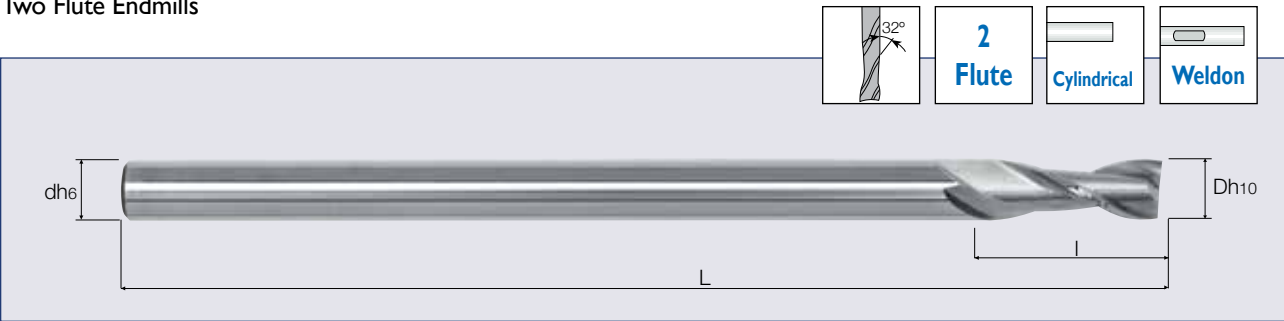
HSS-PM LINE

24110
Ball Nosed Milling Cutters



Designation	Dh10	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
241101000	10	30	200	10	4	C	CX
241101200	12	30	200	12	4	C	CX
241101600	16	35	200	16	4	C	CX
241102000	20	35	200	20	4	C	CX
241102500	25	40	200	25	4	C	CX

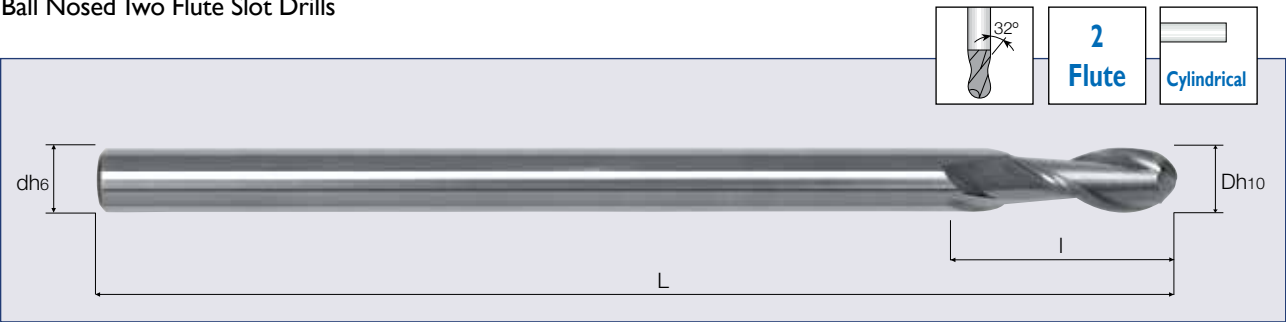
24115
Two Flute Endmills



Designation	Dh10	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
241151000	10	30	200	10	2	C	CX
241151200	12	30	200	12	2	C	CX
241151600	16	35	200	16	2	C	CX
241152000	20	35	200	20	2	C	CX
241152500	25	40	200	25	2	C	CX

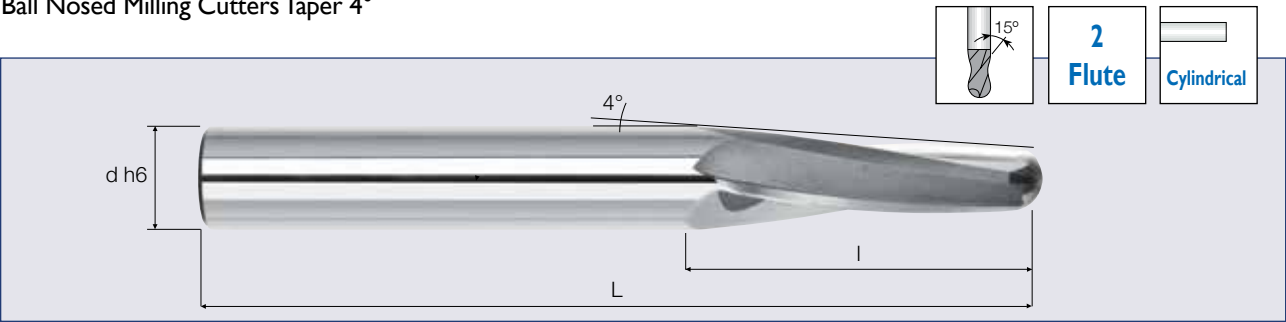
HSS-PM LINE

24120
Ball Nosed Two Flute Slot Drills



Designation	Dh10	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
241201000	10	30	200	10	2	C	CX
241201200	12	30	200	12	2	C	CX
241201600	16	35	200	16	2	C	CX
241202000	20	35	200	20	2	C	CX
241202500	25	40	200	25	2	C	CX

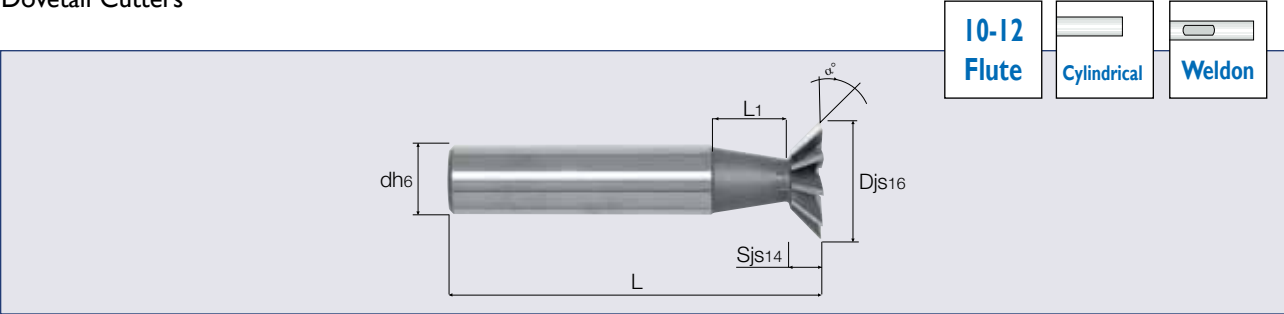
24125
Ball Nosed Milling Cutters Taper 4°



Designation	R	I	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
241250150	1,5	50	180	10	2	C	CX
241250200	2	45	180	10	2	C	CX
241250250	2,5	38	180	10	2	C	CX
241250300	3	45	200	12	2	C	CX
241250350	3,5	40	200	12	2	C	CX
241250400	4	47	200	14	2	C	CX
241250500	5	47	200	16	2	C	CX
241250600	6	63	200	20	2	C	CX
241250800	8	72	200	25	2	C	CX

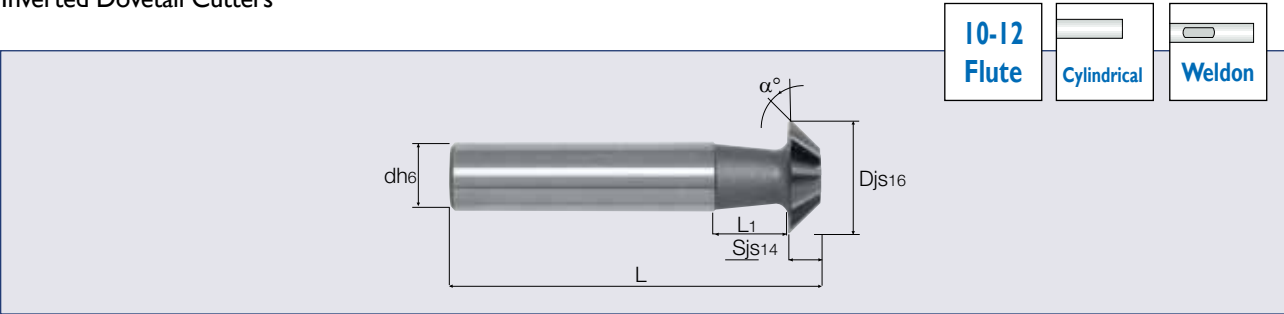
HSS-PM LINE

06130
Dovetail Cutters



Designation	Djs16	α° $\pm 30'$	Sjs14	L1	L	dh6	Z	M-TK (HSS-E)	X-85 (PM Co 8,5%)	Coating
061304516	16	45	4	11,3	60	12	10	A	C	CX
061304520	20	45	5	13,5	63	12	10	A	C	CX
061304525	25	45	6,3	13	67	12	10	A	C	CX
061304532	32	45	8	14	71	16	12	A	C	CX
061306016	16	60	6,3	11	60	12	10	A	C	CX
061306020	20	60	8	10	63	12	10	A	C	CX
061306025	25	60	10	11,5	67	12	10	A	C	CX
061306032	32	60	12,5	10	71	16	12	A	C	CX
061307016	16	70	7	10	60	12	10	A	C	CX
061307020	20	70	9	10	63	12	10	A	C	CX
061307025	25	70	11	8,7	67	16	10	A	C	CX

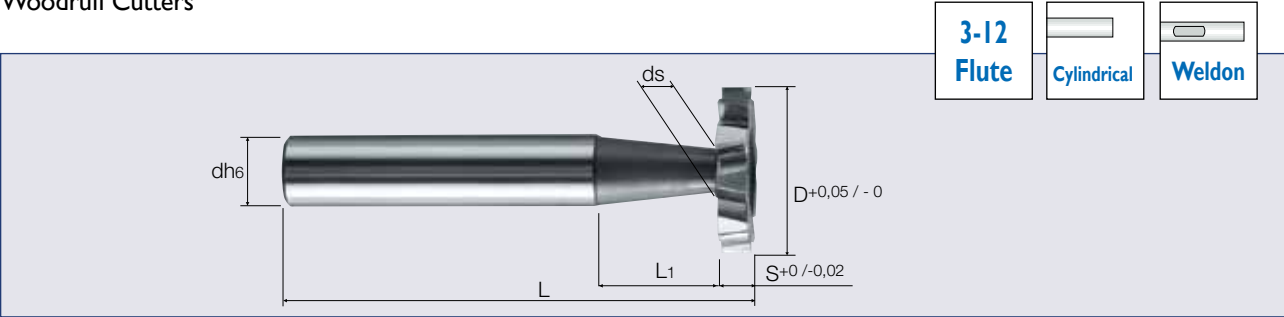
06145
Inverted Dovetail Cutters



Designation	Djs16	α° $\pm 30'$	Sjs14	L1	L	dh6	Z	M-TK (HSS-E)	X-85 (PM Co 8,5%)	Coating
061454516	16	45	4	11,3	60	12	10	A	C	CX
061454520	20	45	5	13,5	63	12	10	A	C	CX
061454525	25	45	6,3	13	67	12	10	A	C	CX
061454532	32	45	8	14	71	16	12	A	C	CX
061456016	16	60	6,3	11	60	12	10	A	C	CX
061456020	20	60	8	10	63	12	10	A	C	CX
061456025	25	60	10	11,5	67	12	10	A	C	CX
061456032	32	60	12,5	10	71	16	12	A	C	CX
061457016	16	70	7	10	60	12	10	A	C	CX
061457020	20	70	9	10	63	12	10	A	C	CX
061457025	25	70	11	8,7	67	16	10	A	C	CX

HSS-PM LINE

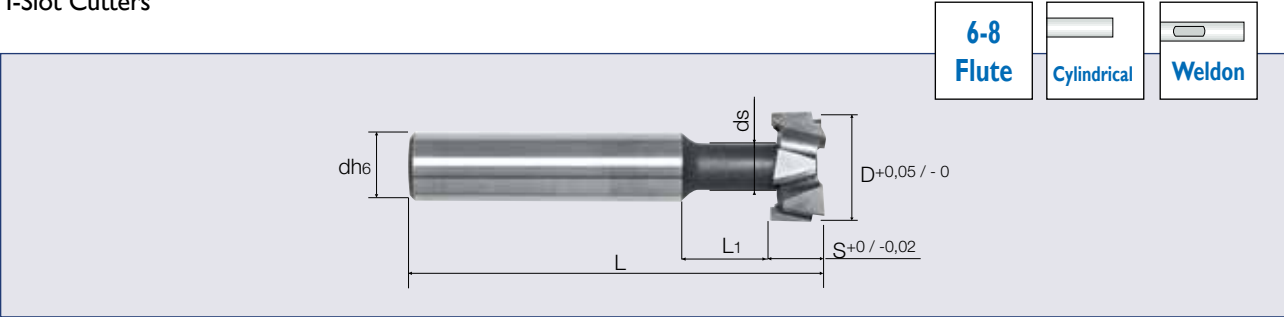
27105
Woodruff Cutters



Designation	D +0,05 - 0	S+0 - 0,02	ds	L1	L	dh6	λ°	Z	M-TK (HSS-E)	X-85 (PM Co 8,5%)	Coating
271051020	10,5	2	4	9	50	6	13	8	A	C	CX
271051025	10,5	2,5	4	9	50	6	13	8	A	C	CX
271051030	10,5	3	4,2	8	50	6	13	8	A	C	CX
271051302	13,5	2	4,6	12	56	10	15	8	A	C	CX
271051303	13,5	3	4,6	12	56	10	15	8	A	C	CX
271051304	13,5	4	4,6	12	56	10	15	8	A	C	CX
271051603	16,5	3	4,6	12	56	10	15	8	A	C	CX
271051604	16,5	4	4,6	12	56	10	15	8	A	C	CX
271051605	16,5	5	5	9,5	56	10	15	8	A	C	CX
271051606	16,5	6	5	9,5	56	10	15	8	A	C	CX
271051903	19,5	3	5,6	17,5	63	10	15	10	A	C	CX
271051904	19,5	4	5,6	17,5	63	10	15	10	A	C	CX
271051905	19,5	5	6	16	63	10	15	10	A	C	CX
271051906	19,5	6	6,5	15	63	10	15	10	A	C	CX
271052204	22,5	4	6	17	63	10	13	10	A	C	CX
271052205	22,5	5	6	17	63	10	13	10	A	C	CX
271052206	22,5	6	6,5	13	63	10	13	10	A	C	CX
271052208	22,5	8	6,5	13	63	10	13	10	A	C	CX
271052505	25,5	5	7,5	12	63	10	15	12	A	C	CX
271052506	25,5	6	7,5	12	63	10	15	12	A	C	CX
271052507	25,5	7	7,5	12	63	10	15	12	A	C	CX
271052508	25,5	8	7,5	12	63	10	15	12	A	C	CX
271052806	28,5	6	8,5	10	63	10	13	12	A	C	CX
271052807	28,5	7	8,5	10	63	10	13	12	A	C	CX
271052808	28,5	8	8,5	10	63	10	13	12	A	C	CX
271052810	28,5	10	9,3	13	71	12	13	12	A	C	CX
271053206	32,5	6	8,5	16	71	12	15	12	A	C	CX
271053207	32,5	7	8,5	16	71	12	15	12	A	C	CX
271053208	32,5	8	8,5	16	71	12	15	12	A	C	CX
271053210	32,5	10	9,3	13	71	12	15	12	A	C	CX
271054510	45,5	10	11	13	71	12	13	12	A	C	CX

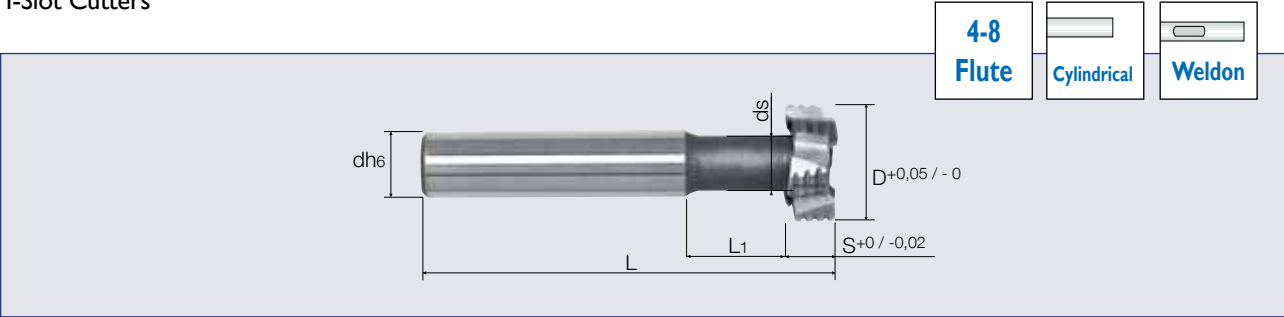
HSS-PM LINE

27120
T-Slot Cutters



Designation	D +0,05 - 0	S+0 - 0,02	ds	L1	L	dh6	λ°	Z	M-TK (HSS-E)	X-85 (PM Co 8,5%)	Coating
271201256	12,5	6	5	11	57	10	12	6	A	C	CX
271201608	16	8	7	14	62	10	12	6	A	C	CX
271201808	18	8	8	15	70	12	15	6	A	C	CX
271201909	19	9	8	15	70	12	15	8	A	C	CX
271202109	21	9	10	18	74	12	15	8	A	C	CX
271202210	22	10	10	17	74	12	15	8	A	C	CX
271202511	25	11	12	20	82	16	15	8	A	C	CX
271202812	28	12	13	22	85	16	15	8	A	C	CX
271203214	32	14	15	25	90	16	15	8	A	C	CX

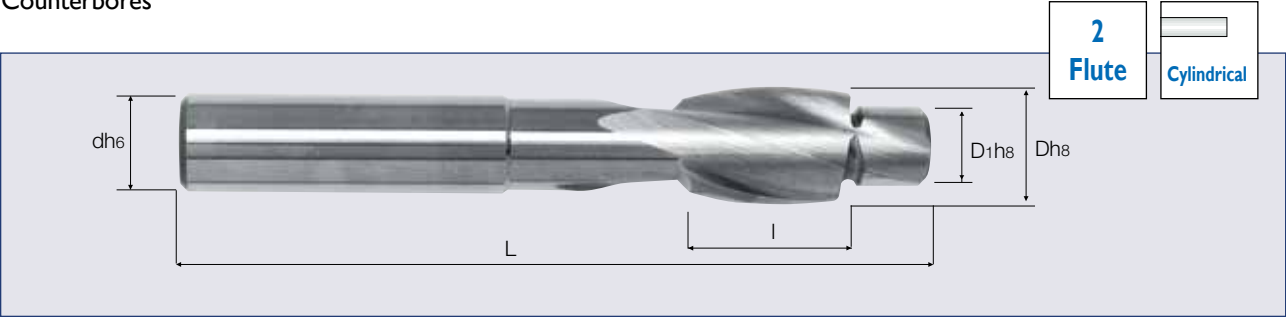
27135
T-Slot Cutters



Designation	D +0,05 - 0	S+0 - 0,02	ds	L1	L	dh6	Z	M-TK (HSS-E)	X-85 (PM Co 8,5%)	Coating
271351256	12,5	6	5	11	57	10	4	A	C	CX
271351608	16	8	7	14	62	10	6	A	C	CX
271351808	18	8	8	15	70	12	6	A	C	CX
271351909	19	9	8	15	70	12	6	A	C	CX
271352109	21	9	10	18	74	12	6	A	C	CX
271352210	22	10	10	17	74	12	6	A	C	CX
271352511	25	11	12	20	82	16	8	A	C	CX
271352812	28	12	13	22	85	16	8	A	C	CX
271353214	32	14	15	25	90	16	8	A	C	CX

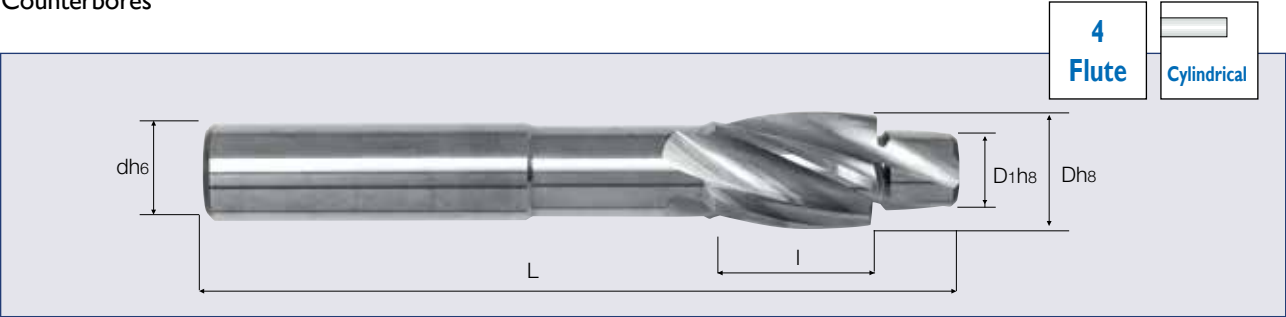
HSS-PM LINE

28105
Counterbores



Designation		Dh8	D1h8	I	L	dh6	Z	M-TK (HSS-E)	X-85 (PM Co 8,5%)	Coating
281050302	3M	5,9	3,2	12	70	6	2	A	C	CX
281050402	4M	7,4	4,3	12	70	8	2	A	C	CX
281050502	5M	9,4	5,3	14	90	10	2	A	C	CX
281050602	6M	10,4	6,4	16	100	10	2	A	C	CX
281050802	8M	13,5	8,4	20	115	12	2	A	C	CX
281051002	10M	16,5	10,5	25	120	12	2	A	C	CX
281051202	12M	19	13	25	120	16	2	A	C	CX
281051402	14M	23	15	30	130	16	2	A	C	CX
281051602	16M	25	17	35	155	20	2	A	C	CX
281051802	18M	28	19	40	160	20	2	A	C	CX
281052002	20M	31	21	50	180	20	2	A	C	CX
281052202	22M	34	23	50	185	22	2	A	C	CX
281052402	24M	37	25	50	200	22	2	A	C	CX

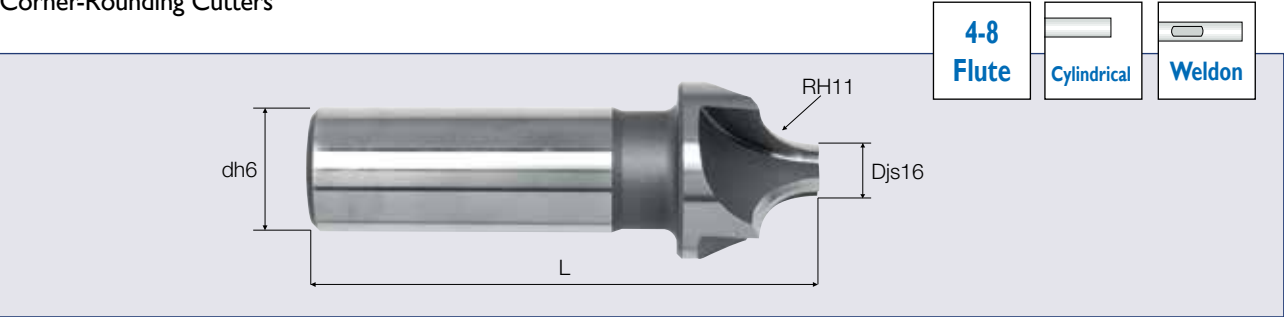
28105
Counterbores



Designation		Dh8	D1h8	I	L	dh6	Z	M-TK (HSS-E)	X-85 (PM Co 8,5%)	Coating
281050304	3M	5,9	3,2	12	70	6	4	A	C	CX
281050404	4M	7,4	4,3	12	70	8	4	A	C	CX
281050504	5M	9,4	5,3	14	90	10	4	A	C	CX
281050604	6M	10,4	6,4	16	100	10	4	A	C	CX
281050804	8M	13,5	8,4	20	115	12	4	A	C	CX
281051004	10M	16,5	10,5	25	120	12	4	A	C	CX
281051204	12M	19	13	25	120	16	4	A	C	CX
281051404	14M	23	15	30	130	16	4	A	C	CX
281051604	16M	25	17	35	155	20	4	A	C	CX
281051804	18M	28	19	40	160	20	4	A	C	CX
281052004	20M	31	21	50	180	20	4	A	C	CX
281052204	22M	34	23	50	185	22	4	A	C	CX
281052404	24M	37	25	50	200	22	4	A	C	CX

HSS-PM LINE

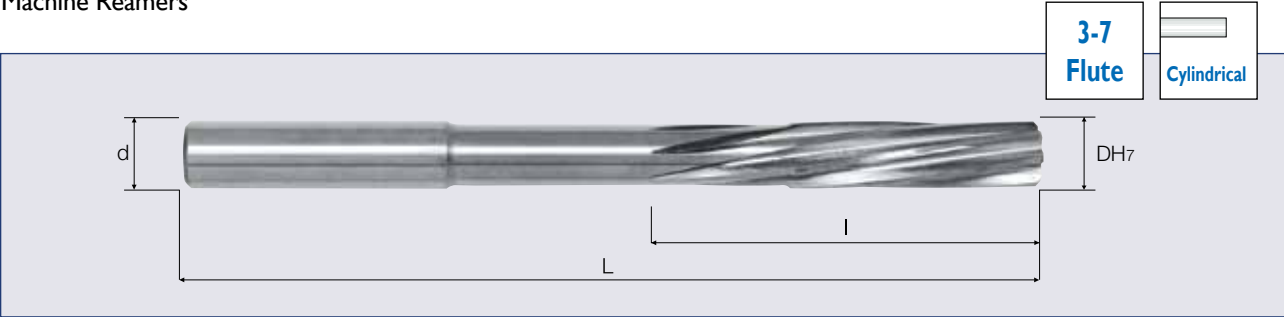
28505
Corner-Rounding Cutters



Designation	RH11	Djs16	L	dh6	Z	X-85 (PM Co 8,5%)	Coating
285050100	1	10	60	10	4	C	CX
285050150	1,5	10	60	10	4	C	CX
285050200	2	10	60	10	4	C	CX
285050250	2,5	10	60	10	4	C	CX
285050300	3	12	60	12	4	C	CX
285050400	4	15	60	12	4	C	CX
285050500	5	18	70	16	4	C	CX
285050600	6	21	70	16	4	C	CX
285050700	7	24	70	16	4	C	CX
285050800	8	24	70	16	4	C	CX
285050900	9	28	85	20	4	C	CX
285050901	9	28	85	25	4	C	CX
285051000	10	28	85	20	4	C	CX
285051001	10	28	85	25	4	C	CX
285051100	11	35	90	20	4	C	CX
285051101	11	35	90	25	4	C	CX
285051200	12	35	100	20	4	C	CX
285051201	12	35	100	25	4	C	CX
285051250	12,5	35	100	20	4	C	CX
285051251	12,5	35	100	25	4	C	CX
285051300	13	42	100	25	4	C	CX
285051400	14	42	100	25	4	C	CX
285051500	15	48	105	25	5	C	CX
285051600	16	48	105	25	5	C	CX
285051800	18	52	115	32	5	C	CX
285052000	20	60	115	32	6	C	CX

HSS-PM LINE

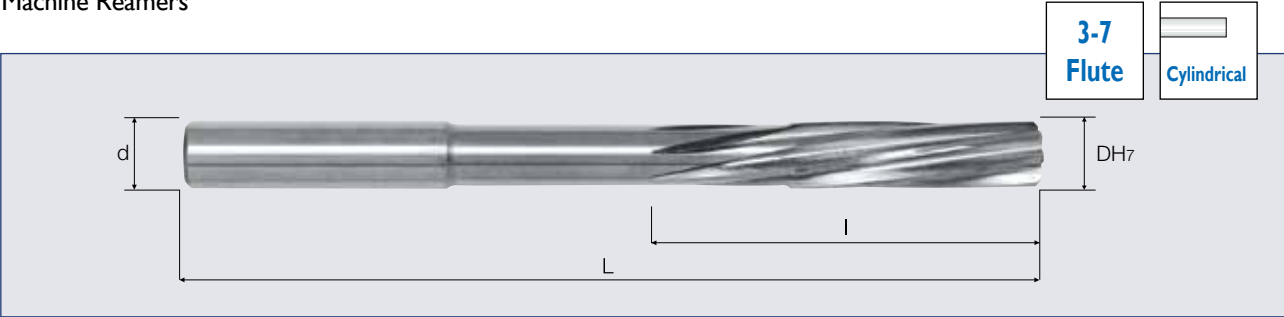
32105
Machine Reamers



Designation	Dh7	l	L	d	λ°	Z	X-85 (PM Co 8,5%)	Coating
321050100	1	5	37	1	30	3	C	CX
321050110	1,1	7	40	1,1	30	3	C	CX
321050120	1,2	7	40	1,2	30	3	C	CX
321050130	1,3	7	40	1,3	30	3	C	CX
321050140	1,4	8	40	1,4	30	3	C	CX
321050150	1,5	8	40	1,5	30	3	C	CX
321050160	1,6	9	43	1,6	30	3	C	CX
321050170	1,7	9	43	1,7	30	3	C	CX
321050180	1,8	10	46	1,8	30	3	C	CX
321050190	1,9	10	46	1,9	30	3	C	CX
321050200	2	11	49	2	10	5	C	CX
321050210	2,1	11	49	2,1	10	5	C	CX
321050220	2,2	12	53	2,2	10	5	C	CX
321050230	2,3	12	53	2,3	10	5	C	CX
321050240	2,4	14	57	2,4	10	5	C	CX
321050250	2,5	14	57	2,5	10	5	C	CX
321050260	2,6	14	57	2,6	10	5	C	CX
321050270	2,7	15	61	2,7	10	5	C	CX
321050280	2,8	15	61	2,8	10	5	C	CX
321050290	2,9	15	61	2,9	10	5	C	CX
321050300	3	15	61	3	10	5	C	CX
321050310	3,1	16	65	3,1	10	5	C	CX
321050320	3,2	16	65	3,2	10	5	C	CX
321050330	3,3	16	65	3,3	10	5	C	CX
321050340	3,4	18	70	3,4	10	5	C	CX
321050350	3,5	18	70	3,5	10	5	C	CX
321050360	3,6	18	70	3,6	10	5	C	CX
321050370	3,7	18	70	3,7	10	5	C	CX
321050380	3,8	19	75	3,8	10	5	C	CX
321050390	3,9	19	75	3,9	10	5	C	CX
321050400	4	19	75	4	10	5	C	CX
321050410	4,1	19	75	4,1	10	5	C	CX
321050420	4,2	19	75	4,2	10	5	C	CX
321050430	4,3	21	80	4,3	10	5	C	CX
321050440	4,4	21	80	4,4	10	5	C	CX
321050450	4,5	21	80	4,5	10	5	C	CX
321050460	4,6	21	80	4,6	10	5	C	CX
321050470	4,7	21	80	4,7	10	5	C	CX
321050480	4,8	23	86	4,8	10	5	C	CX
321050490	4,9	23	86	4,9	10	5	C	CX
321050500	5	23	86	5	10	5	C	CX
321050510	5,1	23	86	5,1	10	5	C	CX
321050520	5,2	23	86	5,2	10	5	C	CX
321050530	5,3	26	93	5,3	10	5	C	CX
321050540	5,4	26	93	5,4	10	5	C	CX
321050550	5,5	26	93	5,5	10	6	C	CX
321050560	5,6	26	93	5,6	10	6	C	CX
321050570	5,7	26	93	5,7	10	6	C	CX
321050580	5,8	26	93	5,8	10	6	C	CX
321050590	5,9	26	93	5,9	10	6	C	CX
321050600	6	26	93	6	10	6	C	CX
321050610	6,1	28	101	6,1	10	6	C	CX
321050620	6,2	28	101	6,2	10	6	C	CX

HSS-PM LINE

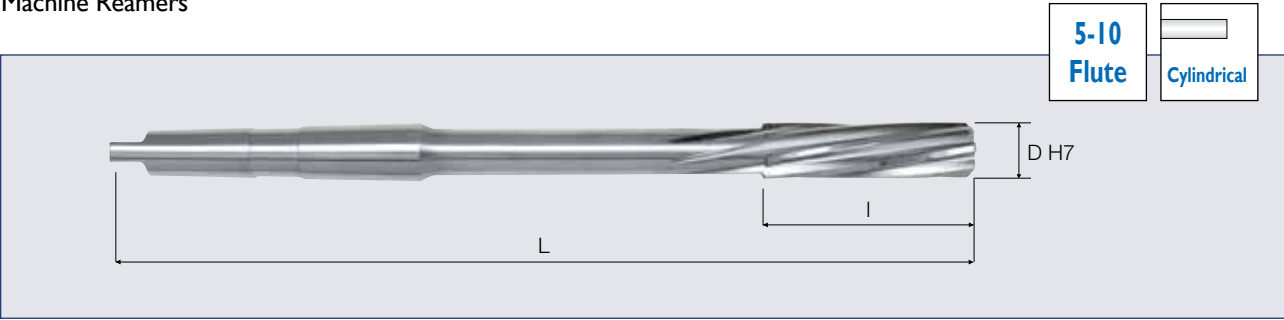
32105 (continued)
Machine Reamers



Designation	Dh7	I	L	d	λ°	Z	X-85 (PM Co 8,5%)	Coating
321050630	6,3	28	101	6,3	10	6	C	CX
321050640	6,4	28	101	6,4	10	6	C	CX
321050650	6,5	28	101	6,5	10	6	C	CX
321050660	6,6	28	101	6,6	10	6	C	CX
321050670	6,7	31	109	6,7	10	6	C	CX
321050680	6,8	31	109	6,8	10	6	C	CX
321050690	6,9	31	109	6,9	10	6	C	CX
321050700	7	31	109	7	10	6	C	CX
321050710	7,1	31	109	7,1	10	6	C	CX
321050720	7,2	31	109	7,2	10	6	C	CX
321050730	7,3	31	109	7,3	10	6	C	CX
321050740	7,4	31	109	7,4	10	6	C	CX
321050750	7,5	33	117	7,5	10	6	C	CX
321050760	7,6	33	117	7,6	10	6	C	CX
321050770	7,7	33	117	7,7	10	6	C	CX
321050780	7,8	33	117	7,8	10	6	C	CX
321050790	7,9	33	117	7,9	10	6	C	CX
321050800	8	33	117	8	10	6	C	CX
321050810	8,1	33	117	8,1	10	6	C	CX
321050820	8,2	33	117	8,2	10	6	C	CX
321050830	8,3	33	117	8,3	10	6	C	CX
321050840	8,4	33	117	8,4	10	6	C	CX
321050850	8,5	36	125	8,5	10	6	C	CX
321050860	8,6	36	125	8,6	10	6	C	CX
321050870	8,7	36	125	8,7	10	6	C	CX
321050880	8,8	36	125	8,8	10	6	C	CX
321050890	8,9	36	125	8,9	10	6	C	CX
321050900	9	36	125	9	10	6	C	CX
321050910	9,1	36	125	9,1	10	6	C	CX
321050920	9,2	36	125	9,2	10	6	C	CX
321050930	9,3	36	125	9,3	10	6	C	CX
321050940	9,4	36	125	9,4	10	6	C	CX
321050950	9,5	38	133	9,5	10	6	C	CX
321050960	9,6	38	133	9,6	10	6	C	CX
321050970	9,7	38	133	9,7	10	6	C	CX
321050980	9,8	38	133	9,8	10	6	C	CX
321050990	9,9	38	133	9,9	10	6	C	CX
321051000	10	38	133	10	10	6	C	CX
321051050	10,5	41	142	10,5	10	7	C	CX
321051100	11	41	142	11	10	7	C	CX
321051150	11,5	44	151	11,5	10	7	C	CX
321051200	12	44	151	12	10	7	C	CX
321051250	12,5	44	151	12,5	10	7	C	CX
321051300	13	44	151	13	10	7	C	CX
321051350	13,5	47	160	13,5	10	7	C	CX
321051400	14	47	160	14	10	7	C	CX
321051450	14,5	50	162	14,5	10	7	C	CX
321051500	15	50	162	15	10	7	C	CX
321051550	15,5	52	170	15,5	10	7	C	CX
321051600	16	52	170	16	10	7	C	CX

HSS-PM LINE

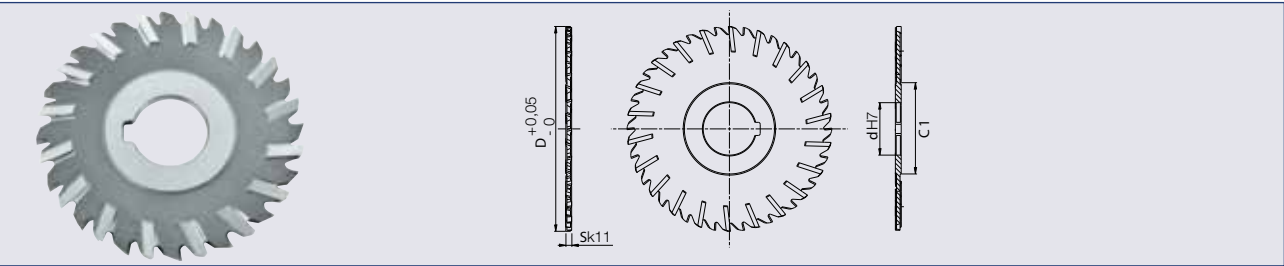
32150
Machine Reamers



Designation	Dh7	I	L	CM	Z	M-TK (HSS-E)	X-85 (PM Co 8,5%)	Coating
321500500	5	23	133	1	5	A	C	CX
321500600	6	26	138	1	6	A	C	CX
321500700	7	31	150	1	6	A	C	CX
321500800	8	33	156	1	6	A	C	CX
321500900	9	36	162	1	6	A	C	CX
321501000	10	38	168	1	6	A	C	CX
321501100	11	41	175	1	7	A	C	CX
321501200	12	44	182	1	7	A	C	CX
321501300	13	44	182	1	7	A	C	CX
321501400	14	47	189	1	7	A	C	CX
321501500	15	50	204	2	7	A	C	CX
321501600	16	52	210	2	7	A	C	CX
321501700	17	54	214	2	8	A	C	CX
321501800	18	56	219	2	8	A	C	CX
321501900	19	58	223	2	8	A	C	CX
321502000	20	60	228	2	8	A	C	CX
321502100	21	62	232	2	8	A	C	CX
321502200	22	64	237	2	8	A	C	CX
321502300	23	66	241	2	8	A	C	CX
321502400	24	68	268	3	8	A	C	CX
321502500	25	68	268	3	8	A	C	CX
321502600	26	70	273	3	8	A	C	CX
321502700	27	71	277	3	10	A	C	CX
321502800	28	71	277	3	10	A	C	CX
321502900	29	73	281	3	10	A	C	CX
321503000	30	73	281	3	10	A	C	CX
321503100	31	75	285	3	10	A	C	CX
321503200	32	77	317	4	10	A	C	CX
321503300	33	77	317	4	10	A	C	CX
321503400	34	78	321	4	10	A	C	CX
321503500	35	78	321	4	10	A	C	CX
321503600	36	79	325	4	10	A	C	CX
321503700	37	79	325	4	10	A	C	CX
321503800	38	81	329	4	10	A	C	CX
321503900	39	81	329	4	10	A	C	CX
321504000	40	81	329	4	10	A	C	CX

HSS-PM LINE

04110
Slitting Saws Staggered Teeth



Designation	D + 0,05 - 0	Sk11	C1	dH7	λ°	Z	X-85 (PM Co 8,5%)	Coating
041102016	63	1,6	33	22	20	32	C	CX
041102020	63	2	33	22	20	32	C	CX
041102025	63	2,5	33	22	20	32	C	CX
041102030	63	3	33	22	20	28	C	CX
041102035	63	3,5	33	22	20	28	C	CX
041103020	80	2	36	22	20	36	C	CX
041103025	80	2,5	36	22	20	36	C	CX
041103030	80	3	36	22	20	32	C	CX
041103035	80	3,5	36	22	20	32	C	CX
041104020	100	2	46	27	20	44	C	CX
041104025	100	2,5	46	27	20	44	C	CX
041104030	100	3	46	27	20	40	C	CX
041104035	100	3,5	46	27	20	40	C	CX
041105020	125	2	52	32	20	44	C	CX
041105025	125	2,5	52	32	20	44	C	CX
041105030	125	3	52	32	20	44	C	CX
041105035	125	3,5	52	32	20	40	C	CX
041105040	125	4	52	32	20	40	C	CX
041106030	160	3	58	32	20	50	C	CX
041106040	160	4	58	32	20	50	C	CX
041106050	160	5	58	32	20	50	C	CX
041107040	200	4	80	40	20	60	C	CX
041107050	200	5	80	40	20	60	C	CX
041107060	200	6	80	40	20	60	C	CX
041108060	250	6	90	50	15	68	C	CX
041108080	250	8	90	50	15	68	C	CX
041108100	250	10	90	50	15	68	C	CX
041108120	250	12	90	50	15	68	C	CX

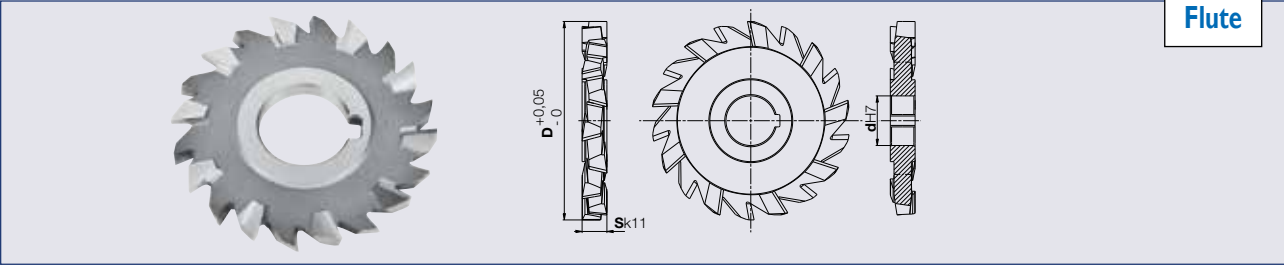


HSS-PM LINE

04105

Side and Face Milling Cutters Staggered Teeth

16-38
Flute



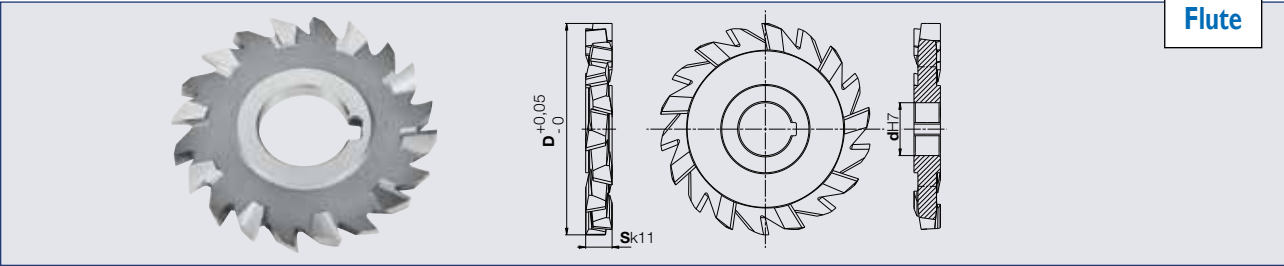
Designation	D + 0,05 - 0	Sk 11	C1	dH7	λ°s	Z	M-TK (HSS-E)	X-85 (PM Co 8,5%)	Coating
041051040	50	4	26	16	20	16	A	C	CX
041051050	50	5	26	16	20	16	A	C	CX
041051060	50	6	26	16	20	16	A	C	CX
041051070	50	7	26	16	15	16	A	C	CX
041051080	50	8	26	16	15	16	A	C	CX
041051090	50	9	26	16	15	16	A	C	CX
041051100	50	10	26	16	15	16	A	C	CX
041052040	63	4	33	22	20	18	A	C	CX
041052050	63	5	33	22	15	18	A	C	CX
041052060	63	6	33	22	15	18	A	C	CX
041052070	63	7	33	22	15	18	A	C	CX
041052080	63	8	33	22	15	18	A	C	CX
041052090	63	9	33	22	15	18	A	C	CX
041052100	63	10	33	22	15	18	A	C	CX
041052120	63	12	33	22	10	18	A	C	CX
041052140	63	14	33	22	10	18	A	C	CX
041052160	63	16	33	22	10	16	A	C	CX
041052180	63	18	33	22	10	16	A	C	CX
041052200	63	20	33	22	10	16	A	C	CX
041053040	80	4	36	22	20	20	A	C	CX
041053041	80	4	40	27	20	20	A	C	CX
041053050	80	5	36	22	15	20	A	C	CX
041053051	80	5	40	27	15	20	A	C	CX
041053060	80	6	36	22	15	20	A	C	CX
041053061	80	6	40	27	15	20	A	C	CX
041053070	80	7	36	22	15	20	A	C	CX
041053071	80	7	40	27	15	20	A	C	CX
041053080	80	8	36	22	15	20	A	C	CX
041053081	80	8	40	27	15	20	A	C	CX
041053090	80	9	36	22	15	20	A	C	CX
041053091	80	9	40	27	15	20	A	C	CX
041053100	80	10	36	22	15	18	A	C	CX
041053101	80	10	40	27	15	18	A	C	CX
041053120	80	12	36	22	15	18	A	C	CX
041053121	80	12	40	27	15	18	A	C	CX
041053140	80	14	36	22	10	18	A	C	CX
041053141	80	14	40	27	10	18	A	C	CX
041053160	80	16	36	22	15	18	A	C	CX
041053161	80	16	40	27	15	18	A	C	CX
041053180	80	18	36	22	15	18	A	C	CX
041053181	80	18	40	27	15	18	A	C	CX
041053200	80	20	36	22	10	18	A	C	CX
041053201	80	20	40	27	10	18	A	C	CX
041054040	100	4	46	27	15	24	A	C	CX
041054041	100	4	50	32	15	24	A	C	CX
041054050	100	5	46	27	15	24	A	C	CX
041054051	100	5	50	32	15	24	A	C	CX
041054060	100	6	46	27	15	24	A	C	CX
041054061	100	6	50	32	15	24	A	C	CX
041054070	100	7	46	27	15	24	A	C	CX
041054071	100	7	50	32	15	24	A	C	CX
041054080	100	8	46	27	15	22	A	C	CX
041054081	100	8	50	32	15	22	A	C	CX

HSS-PM LINE

04105 (continued)

Side and Face Milling Cutters Staggered Teeth

16-38
Flute



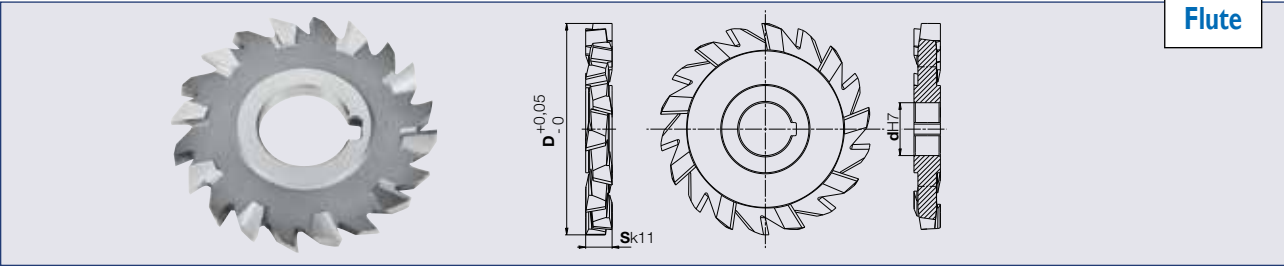
Designation	D + 0,05 - 0	Sk 11	Cl	dH7	λ°s	Z	M-TK (HSS-E)	X-85 (PM Co 8,5%)	Coating
041054090	100	9	46	27	15	22	A	C	CX
041054091	100	9	50	32	15	22	A	C	CX
041054100	100	10	46	27	15	22	A	C	CX
041054101	100	10	50	32	15	22	A	C	CX
041054120	100	12	46	27	15	20	A	C	CX
041054121	100	12	50	32	15	20	A	C	CX
041054140	100	14	46	27	15	20	A	C	CX
041054141	100	14	50	32	15	20	A	C	CX
041054150	100	15	46	27	15	20	A	C	CX
041054151	100	15	50	32	15	20	A	C	CX
041054160	100	16	46	27	15	20	A	C	CX
041054161	100	16	50	32	15	20	A	C	CX
041054180	100	18	46	27	13	20	A	C	CX
041054181	100	18	50	32	13	20	A	C	CX
041054200	100	20	46	27	13	20	A	C	CX
041054201	100	20	50	32	13	20	A	C	CX
041054220	100	22	46	27	10	20	A	C	CX
041054221	100	22	50	32	10	20	A	C	CX
041054250	100	25	46	27	10	20	A	C	CX
041054251	100	25	50	32	10	20	A	C	CX
041055050	125	5	52	32	15	26	A	C	CX
041055060	125	6	52	32	15	26	A	C	CX
041055080	125	8	52	32	15	26	A	C	CX
041055100	125	10	52	32	15	24	A	C	CX
041055120	125	12	52	32	15	22	A	C	CX
041055140	125	14	52	32	15	22	A	C	CX
041055160	125	16	52	32	15	22	A	C	CX
041055180	125	18	52	32	15	22	A	C	CX
041055200	125	20	52	32	10	22	A	C	CX
041055220	125	22	52	32	10	22	A	C	CX
041055250	125	25	52	32	10	22	A	C	CX
041055280	125	28	52	32	10	22	A	C	CX
041056060	160	6	58	32	15	28	A	C	CX
041056061	160	6	66	40	15	28	A	C	CX
041056080	160	8	58	32	15	28	A	C	CX
041056081	160	8	66	40	15	28	A	C	CX
041056100	160	10	58	32	15	26	A	C	CX
041056101	160	10	66	40	15	26	A	C	CX
041056120	160	12	58	32	15	26	A	C	CX
041056121	160	12	66	40	15	26	A	C	CX
041056140	160	14	58	32	15	24	A	C	CX
041056141	160	14	66	40	15	24	A	C	CX
041056160	160	16	58	32	15	24	A	C	CX
041056161	160	16	66	40	15	24	A	C	CX
041056180	160	18	58	32	15	24	A	C	CX
041056181	160	18	66	40	15	24	A	C	CX
041056200	160	20	58	32	15	24	A	C	CX
041056201	160	20	66	40	15	24	A	C	CX
041056220	160	22	58	32	13	24	A	C	CX
041056221	160	22	66	40	13	24	A	C	CX
041056250	160	25	58	32	13	24	A	C	CX
041056251	160	25	66	40	13	24	A	C	CX
041056280	160	28	58	32	10	24	A	C	CX
041056281	160	28	66	40	10	24	A	C	CX

HSS-PM LINE

04105 (continued)

Side and Face Milling Cutters Staggered Teeth

16-38
Flute



Designation	D + 0,05 - 0	Sk 11	Cl	dH7	λ°s	Z	M-TK (HSS-E)	X-85 (PM Co 8,5%)	Coating
041056320	160	32	58	32	10	24	A	C	CX
041056321	160	32	66	40	10	24	A	C	CX
041057080	200	8	80	40	16	34	A	C	CX
041057100	200	10	80	40	16	32	A	C	CX
041057120	200	12	80	40	16	30	A	C	CX
041057140	200	14	80	40	16	30	A	C	CX
041057160	200	16	80	40	16	30	A	C	CX
041057180	200	18	80	40	16	30	A	C	CX
041057200	200	20	80	40	16	30	A	C	CX
041057220	200	22	80	40	16	30	A	C	CX
041057250	200	25	80	40	16	30	A	C	CX
041057280	200	28	80	40	14	30	A	C	CX
041057320	200	32	80	40	14	30	A	C	CX
041058140	250	14	90	50	15	38	A	C	CX
041058160	250	16	90	50	15	36	A	C	CX
041058180	250	18	90	50	15	34	A	C	CX
041058200	250	20	90	50	15	34	A	C	CX
041058250	250	25	90	50	15	30	A	C	CX
041058280	250	28	90	50	15	28	A	C	CX
041058300	250	30	90	50	15	26	A	C	CX
041058320	250	32	90	50	15	26	A	C	CX

The image is a composite graphic. The top half features a row of seven different drill bits against a white background, with a blue gradient on the left. The bits vary in size, material (some are gold-colored), and design (standard double-flute, triple-flute, and more complex multi-flute designs). The bottom half shows a close-up of a large, dark grey metal casting with a circular hole. A drill bit is shown drilling into the metal, with metal shavings visible around the hole. The background of the bottom half is a blue gradient.

MATERIAL GROUPS

According to VDI 3323 Standard

Material Group	 AISI/SAE	 Material No. DIN	 BS EN	 AFNOR
I	A 366 (1012) 1008	0.0030 C10	040 A 10 045 M 10 1449 10 CS	AF 34 C 10 XC 10
I		1.0028 Ust 34-2 (S250G1T)		A 34-2
I		1.0034 RSt 34-2 (S250G2T)	1449 34/20 HR, HS,CR,CS	A 34-2 NE
I		1.0035 St185 (Fe 310-0) St 33	Fe 310-0 1449 15 HR,HS	A 33
I	A 570 Gr. 33,36	1.0036 S235JRG1 (Fe 360 B) Ust 37-2	Fe 360 B 4360-40 B	
I		1.0037 S235JR (Fe 360 B) St 37-2	Fe 360 B 4360-40 B	E 24-2
I	1115	1.0038 GS-CK16	030A04 IA	
I	A 570 Gr. 40	1.0044 S275JR (Fe 430 B) St44-2	Fe 430 B FN 1449 43/25 HR, HS 4360-43 B	E 28-2
I		1.0045 S355JR	4360-50 B	E 36-2
I	A 570 Gr.50 A572 Gr.50	1.0050 E295 (Fe 490-2) St 50-2	Fe 490-2 FN 4360-50 B	A 50-2
I	A 572 Gr. 65	1.0060 E335 (Fe 590-2) St 60-2	Fe 60-2 4360-55 E; 55 C	A 60-2
I		1.0060 St60-2		
I		1.0070 E360 (Fe 690-2) St 70-2	Fe 690-2 FN	A 70-2
I		1.0112 P235S	1501-164-360B LT20	A37AP
I		1.0114 S235JU;St 37-3 U	4360-40C	E 24-3
I	A 284 Gr.D A 573 Gr.58 A 570 Gr 36;C A 611 Gr. C	1.0116 S235J2G3 (Fe 360 D 1) St 37-3	Fe 360 DI FF 1449 37/23 CR 4360-40 D	E 24-3 E 24-4
I		1.0130 P265S	1501-164-400B LT 20	A 42 AP
I		1.0143 S275J0; St 44-3 U	4360-43C	E 28-3
I	A 573 Gr. 70 A 611 Gr.D	1.0144 S275J2G3 (Fe 430 D 1) St 44-3	Fe 430 DI FF 4360-43 C; 43 D	E 28-3 E 28-4
I		1.0149 S275JOH; RoSt 44-2	4360-43C	
I		1.0226 DX51D; St 02 Z	Z2	GC
I	M 1010	1.0301 C10	040 A 10 045 M 10 1449 10 CS	AF 34 C 10 XC 10
I	A 621 (1008)	1.0330 DC 01 St 2; St 12	1449 4 CR 1449 3 CS	TC
I	A 619 (1008)	1.0333 Ust 3 (DC03GI) Ust 13	1449 2 CR;3 CR	E
I	A 621 (1008)	1.0334 UStW 23 (DD12GI)		S C

 SS	 UNI	 UNE	 JIS	 GOST
	C 10 I C 10	F.1511 F.151.A	S 10C	10
	Fe 330, Fe 330 B FU Fe 330 B FN		SS 330	St2sp
I300	Fe 320	Fe 310-0		St0
I311 I312	FE37BFU	AE 235 B Fe 360 B		I6D, I8Kp St3Kp
I311	Fe 360 B I449 37/23 HR	AE 235 B Fe 360 B	STKM 12 A;C	
I325				
I412	Fe 430 B Fe 430 B FN	AE 275 B Fe 430 B FN	SM 400 A;B;C	St3ps; sp
2172	Fe 510 B	AE 355 B		
I550 2172	Fe 490	a 490-2 Fe 490-2 FN	SS 490	St5ps; sp
I650	Fe 60-2 Fe 590 FE60-2	A 590-2 Fe 590-2 FN	SM 570	St6ps; sp
I655	Fe 70-2 Fe 690	A 690-2 Fe 690-2 FN		
	Fe 360 C	AE 235 C		
	Fe 360 C	AE 235 C		
I312 I313	Fe 360 DI FF Fe 360 C FN Fe 360 D FF Fe 37-2	AE 235 D Fe 360 DI FF		St3kp; ps; sp I6D
		SPH 265		
I414-01	Fe 430 D	AE 275 D		
I411, I412 I414	Fe 430 B, Fe 430 C (FN) Fe 430 D (FF)	AE 275 D Fe 430 DI FF	SM 400 A;B;C	St4kp; ps; sp
I412-04	Fe 430 C	Fe 430 C		
I151 I0	FeP 02 G	FeP 02 G		
	C 10 I C 10	F.1511 F.151.A	S 10C	10
I142	FeP 00 FeP 01	AP 11	SPHD	15 kp
	FeP 02	AP 02	SPCD	
	FeP 12	AP 12	SPHE	10kp

According to VDI 3323 Standard

Material Group	 AISI/SAE	 Material No. DIN	 BS EN	 AFNOR
I	A 622 (1008)	I.0335 DD13; StW 24	I449 I HR	3 C
I	A 620 (1008)	I.0338 DC04 St4; St 14	I449 I CR;2 CR	ES
I	A 516 Gr. 65; 55 A 515 Gr. 65;55 A 414 Gr. C A 442 Gr.55	I.0345 P235GH H I	I501 Gr. 141-360 I501 Gr. 161-360; 151-360 I501 Gr. 161-400; 154-360 I501 Gr. 164-360; 161-360	A 37 CP;AP
I	(M) 1020 M 1023	I.0402 C22	055 M 15, 070 M 20 2C/2D I499 22 HS, CS	AF 42 C 20; XC 25;I C 22
I	1020	I.0402 C22	050A20 2C/2D	CC20
I	1020;1023	I.0402 C22	055 M 15;070 M 20 2C	AF 42 C 20; XC 25;I C 22
I		I.0425 P265GH H II	I501 Gr. 161-400;151-400 I501 Gr. 164-360; 161-400 I501 Gr. 164-400;154-400	A 42 CP;AP
I	A27 65-35	I.0443 GS-45	AI	E 23-45 M
I		I.0539 S355NH;StE 335		TSE 355-4
I		I.0545 S355N; StE 355	4360-50E	E 355 R
I		I.0546 S355NL;TStE 355	4360-50EE	E 355 FP
I		I.0547 S355JOH	4360-50C	TSE 355-3
I		I.0549 S355 NLH;TStE 355		
I		I.0553 S355JO;St 52-3U	4360-50C	E 36-3
I	A 633 Gr.C A 588	I.0562 P355N StE 355	I501 Gr.225-490A LT 20	FeE 355 KG N E 355 R/FP; A 510 AP
I		I.0565 P355NH;WStE 355	I501-225-490B LT 20	A 510 AP
I		I.0566 P355NLI;TStE 355	I501-225-490A LT 50	A 510 FP
I	I	I.0570 S355J2G3 St 52-3	Fe 510 DI FF I449 50/35 HR>HS 4360-50 D	E 36-3 E 36-4
I	I213	I.0715 9 SMn 28 (ISMn30)	230 M 07	S 250
I	I213	I.0715 9 SMn 28	230 M 07	S 250
I	I2 L 13	I.0718 9 SMnPb 28 (I ISMnPb30)		S 250 Pb
I	I108 I109	I.0721 10 S 20	(210 M 15)	I0S20 I0F 2
I	I1 L 08	I.0722 10 SPb 20		I0PbF 2
I	I1 L 08	I.0722 10 SPb 20		I0 PbF 2
I	I215	I.0736 9 SMn 36 I ISMn37)		S 300
I	I2 L 14	I.0737 9 SMnPb 36 (I ISMnPb37)		S 300 Pb
I		I.0972 S315MC; QStE 300 TM	I501-40F30	E 315 D
I		I.0976 S355MC; QStE 360 TM	I501-43F35	E 355 D
I		I.0982 S460MC; QStE 460 TM	I501-50F45	

 SS	 UNI	 UNE	 JIS	 GOST
	FeP 13	AP 13	SPHE	08kp
1147	FeP 04	AP 04	SPCE	08Ju; JuA
1331 1330	FeE235, Fe 360 I KW;KG Fe 360 2 KW;KG	A 37 RC I RA II	SGV 410, SGV 450 SGV 48, SPV 450; SPV 480	
1450	C 20 C 21, C 25	I C 22 F.II 2	S20C	20
1450	C20C21	F.II 2	S22 C	20
1450	C 20; C 21;C 25	I C 22F.II 2	S 20 C;S 22 C	
1431 1430 1432 1305	Fe 410 I KW; KG; KT Fe 410 2 KW; KG	A 42 RC I A 42 RC II	SPV 315; SPV 355 SG 295; SGV 410 SGV 450; SGV 480	16K 20K
2134-04	Fe 510 B	Fe 355 KGN		
2334-01	FeE 355 KG	AE 355 KG		
2135-01	FeE 355 KT	AE 355 KT		
2172-04	Fe 510 C	Fe 510 C		
2135	Fe 510 D	FeE 355 KTM		
	Fe 510 C			
2106	FeE 355 KG;KW	AEE 355 KG;DD	SM 490 A;B;C;YA;YB	15GF
2106	FeE 355-2			
2107-01	FeE 355-3			
2132, 2133 2134, 2174	17GS 17GIS	AE 355 D Fe 510, DI FF	SM 490 A;B;C;YA;YB	17GS 17GIS
1912	CF SMn 28	F2111 - 11 SMn 28	SUM 22	
1912	CF 9 SMn 28	11 SMn 28	SUM 22	
1914	CF 9 SMnPb 28	F2112-11 SMnPb 28	SUM 22 L SUM 23 L, SUM 24 L	
	CF 10 S 20	F.2121 - 10 S 20		
	CF 10 SPb 20	F2122-10 SPb 20		
	CF 10 SPb 20	10 SPb 20		
	CF 9 Mn 36	F2113 - 12 SMn 35	SUM 25	
1926	CF 9 SMnPb 36	F2114- 12 SMnPb 35		
2642	FeE 355TM			

According to VDI 3323 Standard

Material Group	 AISI/SAE	 Material No. DIN	 BS	 EN	AFNOR
1		1.0984	S500MC; QStE 500 TM		E 490 D
1		1.0986	S500MC; QStE 500 TM	1501 - 60F55	E 560 D
1	1010	1.1121	CK 10 (C10E)	040 A 10	XC 10
1		1.1121	St 37-1	4360 40 A	
1	1015	1.1141	CK 15 (C15E)	040 A 15 080 M 15	32C XC 12 XC 15 XC 18
1	1020 1023	1.1151	C22E CK 22	055 M 15 (070 M 20)	2 C 22 XC 18 XC 25
1	D 3	1.2080	X 210 Cr 12	BD 3	Z 200 C 12
1	A36		St 44-2	4360 43 A	NFA 35-501 E 28
1			StE 320-3Z	1 501 160	
1	A572-60	1.8900	StE 380	4360 55 E	
2	(M) 1025	1.0406	C 25	070 M 26	1 C 25
2		1.0416	GS-38		20-400 M
2	A 537 Cl.1 A 414 Gr. G A 612	1.0473	P355GH	19 Mn 6	A 52 CP
2	1035	1.0501	C35	080 A 32, 080 A 35 080 M 36, 1449 40 CS	1 C 35 AF 55 C 35 XC 38
2	1045	1.0503	CF 45 (C45G)	060 A 47 080 M 46	XC 42 H I TS
2	1040	1.0511	C40	080 M 40	1 C 40 AF 60 C 40
2		1.0540	C 50		
2	A27 70-36	1.0551	GS-52	A2	280-480 M
2	A148 80-40	1.0553	GS-60	A3	320-560 M
2	A738	1.0577	S355J2G4 (Fe 510 D 2)	Fe 510 D2 FF 1501 Gr.224-460 1501 Gr. 224-490	A 52 FP
2	1140	1.0726	35 S 20	212 M 36	8M 35MF 6
2	1146	1.0727	45 S 20 (46S20)		45 MF 4
2	1035 1041	1.1157	40Mn4	150 M 36	15 35 M 5 40 M 5
2	1025	1.1158	C25E CK 25	(070 M 25)	2 C 25 XC 25
2	1536	1.1166	34Mn5		
2	1330	1.1170	28Mn6	(150 M 28), (150 M 18)	20 M 5, 28 Mn 6
2	1330	1.1170	28 Mn 6	150 M 5	20 M 5
2	1330	1.1170	28Mn6		14A 20M5
2		1.1178	C30E; CK 30	080M30	XC 32
2	1035	1.1180	C35R Cm 35	080 A 35	3 C 35 XC 32

 SS	 UNI	 UNE	 JIS	 GOST
2662	FeE 490 TM FeE 560 TM			
1265	C 10, 2 C 10 2 C 15	F.1510-C 10 K	S 9 CK S 10 C	08;10
1300				
1370	C 15 C 16	F.1110-C 15 K F.1511-C 16 K	S 15 S 15 CK	15
1450	C 20 C 25	F.1120-C 25 K	S 20 C, S 20 CK S 22 C	20
				Ch12
1411				
1421				
2145	FeE390KG C 25 I C 25		S25C	
1306				
2101 2102	Fe E 355-2	A 52 RC I RA II	SGV 410 SGV 450 SGV 480	
1572 1550	C 35 I C 35	F.113	S 35 C	35
1672	C 43 C 46 C40	I C 40	S 45 C F.114.A	45
1674	C 50	I C 50		
1505				
1606				
2107		A 52 RB II AE 355 D		
1957 1973		F.210.G		
				40G
	C25	F.1120 - C 25 K	S 25 C S 28 C	25
		TO.B	SMn 433 H	
	C 28 Mn	28 Mn 6	SCMn I	30G
	C28Mn		SCMnI	
	C 30	2 C 30		
1572		F.1135-C 35 K-I		

According to VDI 3323 Standard

Material Group	 AISI/SAE	 Material No. DIN	 BS	 EN	AFNOR
2	1035 1038	1.1181	C35E CK 35	080 A 35 (080 M 36)	2 C 35, XC 32 XC 38 H I
2	1035	1.1181	C35E CK 35	080 A 35 (080 M 36)	XC 38
2	1042	1.1191	GS- Ck 45	080 A 46	XC 45
2	1049 1050	1.1206	C50E CK 50	080 M 50	2 C 50 XC 48 H I; XC 50 HI
2	1050 1055	1.1213	Cf 53 (C53G)	070 M 55	XC 48 HTS
2	4520	1.5423	22Mo4	1503-245-420	
3		1.0050	St50-2		
3	A 516 Gr.70 A 515 Gr. 70 A 414 Gr.F; G	1.0481	P295GH 17 Mn 4	1501 Gr. 224	a 48 Cp;AP
3	1043	1.0503	C35	060 A 47 080 M 46 1449 50 HS, CS	1 C 45 AF 65 C 45
3	1074	1.0614	C 76 D; D 75-2		XC 75
3	1086	1.0616	C 86 D; D 85-2		XC 80
3	1095	1.0618	C 92 D; D 95-2		XC 90
3	1036 1330	1.1165	30Mn5	120 M 36 (150 M 28)	35 M 5
3	1335	1.1167	36Mn5	150 M 36	40 M 5
3	1040	1.1186	C40E CK 40	060 A 40, 080 A 40 080 M 40	2 C 40 XC 42 H I
3	1045	1.1191	C45E CK 45	080 M 46 060 A 47	2 C 45 XC 42 H I XC 45 XC 48 H I
3	1049	1.1201	C45R Cm 45	080 M 46	3 C 45 XC 42 H I XC 48 H I
3		1.7242	18 CrMo 4		
3	A 387 Gr. 12 Cl	1.7337	16 CrMo 4 4		
3	A 387 Gr. 12 Cl.	1.7337	16 CrMo 4 4		
3		1.7362	12 CrMo 19 5	3606-625	Z 10 CD 5.05
3	A572-60		17 MnV 6	436055 E	NFA 35-501 E 36
4	1055	1.0535	C55	070 M 55	1 C 55 AF 70 C 55
4	1060	1.0601	C60	060 A 62 1449 HS,CS	43D 1 C 60 AF 70 C 55
4	107	1.0603	C67	080 A 67 1449 70 HS	XC 65

 SS	 UNI	 UNE	 JIS	 GOST
1550 1572 1572	C 35 C36	F.1130-C 35 K	S 35 C S35C	35
1660 1674	C45 C 50	F-1140		45 50
1674	C 53		S 50 C	50
	16 Mo 5 KG; KW FE50	F2602- 16 Mo 5	SB 450 M; SB 480 M	
	Fe 510 KG;KT;KW Fe 510-2 KG;KT;KW FeE 295	A 47 RC I RA II	SG 365,SGV 410 SGV 450 SGV 480	14G2
1672 1650	C 45 I C 45	F.114	S 45 C	45
				75
C 85				85
		F.8211-30 Mn 5 f.8311-AM 30 Mn 5	SMn 433 H SCMn 2	27ChGSNMDTL 30GSL
2120		F.1203-36 Mn 6 F.8212-36 Mn 5	ssmN 438 (H) SCMn 3	35G2 35GL
	C 40		S 40 C	40
1672	C 45 C 46	F.1140-C 45 K F.1142-C48 K	S 45 C S 48 C	45
1660	C 45	F.1145-C 45K-I F.1147C 48 K-I	S 50 C	
18 CrMo 4				
	A 18 CrMo 4 5 KW A 18 CrMo 4 5 KW 16 CrMo 20 5			15ChM
2142 1655	C 55 I C 55		S 55 C	55
	C 60 I C 60		S 58 C	60(G)
	C 67			

According to VDI 3323 Standard

Material Group	 AISI/SAE	 Material No. DIN	 BS	 EN	AFNOR
4	1074 1075	1.0605	C75	1449 80 HS	
4	1055	1.1203	C55E CK 55	060 A 57 070 M 55	2 C 55 XC 55 H 1
4	1055	1.1209	C55R Cm 55	070 M 55	3 C 55 XC 55 H 1
4	1060 1064	1.1221	C60E CK 60	060 A 62	43D 2 C 60 XC 60 H 1
4	1070	1.1231	Ck 67 (C67E)	060 A 67	XC 68
4	1074 1075 1078	1.1248	CK 75 (C75E)	060 A 78	XC 75
4	1086	1.1269	CK 85 (C85E)		XC 90
4	1095	1.1274	Ck 101 (C101E)		XC 100
4	W 112	1.1663	C 125 W		Y2 120
4					
5		1.0070	St70-2		
5		1.7238	49 CrMo 4		
5		1.7701	51 CrMoV 4		
6	A573-81 65	1.0116	St 37-3	4360 40 B	E 24-U
6	A515 65	1.0345	H1	1 501 161	A 37 CP
6	5120	1.0841	St 52-3	150 M 19	20 MC 5
6	9255	1.0904	55 Si 7	250A53	45 55S7
6	9254	1.0904	55 Si 7	250 A 53	55 S 7
6	9262	1.0961	60SiCr7		60SC6
6	L3	1.2067	100Cr6	BL3	Y100C6
6	L1	1.2108	90 CrSi 5		
6	L2	1.2210	115CrV3		100C3
6		1.2241	51CrV4		
6		1.2311	40 CrMnMo 7		
6	4135	1.2330	35 CrMo 4	708 A 37	34 CD 4
6		1.2419	105WCr6		105WC13
6	0 1	1.2510	100 MnCrW 4	BO1	8 MO 8
6	SI	1.2542	45 WCrV7	BS1	
6	SI	1.2550	60WCrV7		55WC20
6	L6	1.2713	55NiCrMoV6		55NCDV7
6	L6	1.2721	50NiCr13		55 NCV 6
6	O2	1.2842	90MnCrV8	BO2	90 MV8
6	E 50100	1.3501	100 Cr 2		
6	52100	1.3505	100Cr6	2 S 135 535 A 99	31 100 C 6
6		1.5024	46Si7		45 S 7;Y 46 7;46 SI 7

 SS	 UNI	 UNE	 JIS	 GOST
	C 75			75
1655	C 55	F.I 150-C 55 K	S 55 C	55
	C 55	F.I 155-C 55K-I		
1665 1678 1770	C 60		S 58 C	60 60G, 60GA 65GA 68GA , 70
774	C 75			75(A)
	C 90			85(A)
1870	C 100	F-5117	SUP 4	
2223				
	FE70-2			
	5I CrMoV 4			
1312 1330	Fe37-3			
2172	Fe 52	F-43I		
2085	55Si8	56Si7		
2090				
60SiCr8	60SiCr8			
	100Cr6			Ch
2092	105WCr 5			
	107CrV3KU			
	35 cRmO 8 KU			
2234	35CrMo4	34CrMo4	SCM435TK	
2140	10WCr6	105WCr5		ChWG
2140	10WCr6	105WCr5	SKS3I	
2710	45 WCrV8 KU	45WCrSi8		5ChW25F
2710	58WCr9KU			
		F.520.S	SKT4	5ChNM
2550		f-528		
2258	100Cr6	F.I 310 - 100 Cr 6	SUJ2	SchCh 15
		F. 145I - 46 SI 7		

According to VDI 3323 Standard

Material Group	 AISI/SAE	 Material No. DIN	 BS	 EN	AFNOR
6	9255	1.5025 51Si7			51 S 7 51 Si 7
6	9255	1.5026 55Si7	251 a 58		55 S 7
6	9260	1.5027 60Si7	251 A 60 251 H 60		60 S 7
6	9260 H	1.5028 65Si7			60 S 7
6		1.5120 38 MnSi 4			
6	A 204 Gr.A 4017	1.5415 16Mo3 15 Mo 3	1503-243 B		15 D 3
6	4419	1.5419 20Mo4	1503-243-430		
6	A 350-LF 5	1.5622 14Ni6			16N6
6	3415	1.5732 1 Ni1Cr10			14 NC 11
6	3310; 3314	1.5752 14NiCr14	655M13	36A	12NC15
6		1.6587 17CrNiMo6	820A16		18NCD6
6		1.6657 14NiCrMo134			
6	5015	1.7015 15Cr3	523 M 15		12 C 3
6	5132	1.7033 34Cr4	530A32	18B	32C4
6	5140	1.7035 41Cr4	530M40	18	42C4
6	5140	1.7045 42Cr41	530 A 40		42 C 4 TS
6	5115	1.7131 16MnCr5	527 M 17		16 MC 5
6		1.7139 16MnCr5			
6	5155	1.7176 55Cr3	527 A 60	48	55 C 3
6	4135; 4137	1.7220 34CrMo4	708 Aa 37		35 CD 4
6	4142	1.7223 41CrMo4			
6	4140	1.7225 42CrMo4	708 M 0		42 CD 4
6		1.7228 55NiCrMoV6G	823M30	33	
6		1.7262 15CrMo5			12 CD 4
6		1.7321 20 mOcr 4			
6	ASTM A182 F-12	1.7335 13CrMo4 4	1501-620Gr27		
6	A 182-F11;12	1.7335 13 CrMo 4 4	1 501 620 Gr. 27		15 CD 4.5
6	ASTM A 182 F.22	1.7380 10CrMo9 10	1501-622gR31; 45		
6	A182 F-22	1.7380 10 CrMo 9 10	1501-622		12 CD 9.10
6		1.7715 14MoV6 3	1503-660-440		
6	A355A	1.8509 41CrAlMo 7	905 M 39	41B	40 CAD 6.12
7	A570.36	1.0038 S235JRG2 (Fe 360 B) RSt 37-2	Fe 360 B FU 1449 27/23 CR 4360-40 B		E 24-2NE
7	3135	1.5710 36NiCr6	640A35		35NC6
7		1.5755 31 NiCr 14	653 M 31		18 NC 13
7	8620	1.6523 2 NiCrMo2	805M20	362	20 NCD 2
7	8740	1.6546 40 NiCrMo 22	311-Tyre 7		
7	4130	1.7218 25CrMo4	CDS 110		25 CD 4
7		1.7733 24 CrMoV 5 5			20 CDV 6
7		1.7755 GS-45 CrMOV 10 4			

 SS	 UNI	 UNE	 JIS	 GOST
2090	48 Si 7 50 Si 7	F.1450-50 Si 7		
2085 2090	55 Si 7 60 Si 7	F.1440 - 56 Si 7 F.1441 - 60 Si 7		55S2 60S2
			50 P 7 SUP 6	
2912	16Mo3(KG;KW)	F.2601 - 16 Mo 3		
-2512	G 20 Mo 5 G 22 Mo5		SCPH 11	
14 Ni 6 KG;KT	F.2641 - 15 Ni 6			
16NiCr11	15NiCr11	SNC415(H) SNC815(H)		
	14NiCrMo13			
	14NiCrMo13I			
			SCr415(H)	15Ch
	34Cr4(KB)	35Cr4	SCr430(H)	35Ch
	41Cr4	42Cr4	SCr440(H)	
2245	41Cr4	42Cr4	SCr440	
2511	16MnCr5	16MnCr5		
2127				
2253			SUP9(A)	50ChGA
2234				35ChM
	41CrMo4	42CrMo4	SNB 22-1	40ChFA
2244				
2512	653M3I			
2216		12CrMo4		
2625				
	14CrMo4 5	14CrMo45		
2216		12CrMo4	SCM415(H)	12ChM; 15ChM
2218	12CrMo9,10	TU.H		
		13MoCrV6		
2940	41CrAlMo7	41CrAlMo7		
1312	Fe 360 B FN	AE 235 B FN;FU Fe 360 B FN; FU		St3ps; sp
2506	20NiCrMo2	20NiCrMo2	SNCM220(H)	20ChGNM
	40NiCrMo2(KB)	40NiCrMo2	SNCM240	38ChGNM
2225	25CrMo4(KB)	55Cr3	SCM420/430	20ChM; 30ChM
	21 CrMoV 5 11			

According to VDI 3323 Standard

Material Group	 AISI/SAE	 Material No. DIN	 BS	 EN	AFNOR	
7		1.8070	21 CrMoV 5 11			
8	4142	1.2332	47 CrMo 4	708 M 40	19A	42 CD 4
8	A128 (A)	1.3401	G-X120 Mn 12			Z 120 M 12
8	3435	1.5736	36 NiCr 10			30 NC 11
8	9840	1.6511	36CrNiMo4	816M40	110	40NCD3
8	4340	1.6582	35CrNiM 6	817 M 40	24	35 NCD 6
8		1.7361	32 CeMo12	722 M 24	40B	30 CD 12
8	6150	1.8159	50 CrV 4	735 A 50	47	50CrV4
8		1.8161	58 CrV 4			
8		1.8515	32 CrMo 12	722 M 24	40B	30 CD 12
8		1.8523	39CrMoV13 9	897M39	40C	
9		1.4882	X 50 CrMnNiNbN 21 9			Z 50 CMNNb 21.09
9	3135	1.5710	36NiCr6	640A35	111A	35NC6
9		1.5864	35 niCr 18			
9			31 NiCrMo 13 4	830 m 31		
10	A573-81	1.0144	ST 44-3	4360 43 C		E 28-3
10	A 619	1.0347	DCO3 RSt;RRSt 13	1449 3 CR 1449 2 CR		E
10	M 1015 M 1016 M 1017	1.0401	C15	080 M 15 080 M 15 1449 17 CS		AF 37 C12 XC 18
10		1.0570	ST 52-3	4360 50 B		E 36-3
10	12L13	1.0718	9SMnPb28			S250Pb
10	(12L13)	1.0718	9 SMnPb 28			S 250 Pb
10		1.0723	15 S22 15 S 20	210 A 15 210 M 15		
10		1.2083				
10	H 11	1.2343	x 38 CrMoV 5 1	BH 11		Z 38 CDV 5
10	H 13	1.2344	X 40 CrMoV 5 1	BH 13		Z 40 CDV 5
10	A 2	1.2363	X100 CrMoV 5 1	BA 2		Z 100 CDV 5
10	D 2	1.2379	X 155 CrVMo 12 1	BD2		Z 160 CDV 12
10	HNV3	1.2379	X210Cr12G	BD2		Z160CDV12
10	D 4 (D 6)	1.2436	X 210 CrW 12	BD6		Z 200 CD 12
10	H 21	1.2581	X 30 WCrV 9 3	BH 21		Z 30 WCV 9
10		1.2601	X 165 CrMoV 12			
10	H 12	1.2606	X 37 CrMoW 5 1	BH 12		Z 35 CWDV 5
10	D3	1.3343	S 6-5-2	BM2		Z200C12
10	N08028	1.4563				ZINCDU31-27-03
10	ASTM A353	1.5662	X8Ni9	1501-509;510		
10	ASM A353	1.5662	X8Ni9	502-650		9 Ni
10	2517	1.5680	12Ni19	12Ni19		Z18N5
10	2515	1.5680	12 Ni 19			Z 18 N 5
11		1.3202	S 12-1-4-5	BT 15		

 SS	 UNI	 UNE	 JIS	 GOST
	35 NiCr 9			
2244	42CrMo4	42CrMo4	SCM (440)	
2183	GX120Mn12	F.8251-AM-X120Mn12	SCMnH 1, SCMn H 11	110G13L
	36nCrMo4(KB)	35NiCrMo4	SUP10	40ChN2MA
2541	35NiCrMo6(KB)		SNCM 447	38Ch2N2MA
2240	30CrMo12	F.124.A		
2230	50CrV4	51CrV4		50ChGFA
2240	32CrMo12	F.124.A		
	36CrMoV12			
			SNC236	
2534		f-1270		
1412			SM 400A;B;C	St4KP; ps; sp
	Fep 02	AP 02		08JU
1350	C15 C16 I C 15	F.111	S 15 C	
2132	Fe52BFN/Fe52CFN		SM490A;B;C;YA;YB	17G5
1914	CF9SMnPb28	11SMnPb28		
1914	CF 9 SMnPb 28	11 SMnPb 28	12 L 13	
1922		F.210.F	SUM 32	
2314				
	X 37 CrMoV 5 1 KU			4Ch5MFS
2242	X40CrMoV511KU	F-5318	SKD61	4Ch5MFIS
2260	X100CrMoV51KU	F-5227	SKD12	
2310	X165CrMoW12KU	X160CrMoW12KU		
2736				
2312	X215CrW 12 1 KU	F-5213		
	X30WCrV 9 3 KU	F-526	SKD5	3Ch2W8F
2310				
	X 35 CrMoW 05 KU	F.537		5ChNM
2715	X210Cr13KU	X210Cr12	SUH3	R6M5
2584				
	14 Ni 6 KG;KT	XBNiO9		
	X10Ni9	F-2645	SL9N60(53)	
	HS 12-1-5-5	12-1-5-5		

According to VDI 3323 Standard

Material Group	 AISI/SAE	 Material No. DIN	 BS	 EN	AFNOR
11		1.3207	S 10-4-3-10	BT42	Z130WKCDV
11	T 15	1.3243	S 6-5-2-5		KCV 06-05-05-04-02
11		1.3246	S 7-4-2-5		Z110WKCDV 07-05-04
11		1.3247	S 2-10-1-8	BM 42	Z110 DKCWV 09-08-04
11	M 42	1.3249	S 2-9-2-8	BM 34	
11	T 4	1.3255	S 18-1-2-5	BT 4	Z 80 WKC 18-05-04-0
11	M 2	1.3343	S6-5-2	BM2	Z 85 WDCV
11	M 7	1.3348	S2-9-2		Z 100 DCWV 09-04-02-
11	T 1	1.3355	S 18-0-1	BT 1	Z 80 WCV 18-4-01
11	630	1.4548			Z7CNU17-04
11	HNV 3	1.4718	X45CrSi 9 3	401S45	52 Z45CS9
11	422	1.4935	x20 CrMoWV 12 1		
12	403	1.4000	X6Cr13	403 S 17	Z 6 C 13
12		1.4001	X6Cr14		
12	(410S)	1.4001	X7 Cr 13	(403 S 7)	Z 8 C 13
12	405	1.4002	X6CrAl2	405S17	Z8CA12
12	405	1.4002	X6 CrAl 13	405 S 17	Z6CA13
12	416	1.4005	X12CrS 13	416 S 21	Z11 CF 13
12	410; CA-15	1.4006	(G-)X10 Cr 13	410S21	56A Z10 C 13
12	430	1.4016	X8Cr17	Z8C17	430S15
12	430	1.4016	X6 Cr 17	430 S 15	60 Z 8 C 17
12		1.4027	G-X20Cr14	420C29	Z20C13M
12		1.4027	G-X 20 Cr 14	420 C 29	Z 20 C 13 M
12	420	1.4028	X30 Cr 13	420 S 45	Z 30 C 13
12		1.4086	G-X120Cr29	452C11	
12	430 F	1.4104	X12CrMoS17	420 S 37	Z 10 CF 17
12	440B	1.4112	X90 CrMoV 18		
12	434	1.4113	X6CrMo 17	434 S 17	Z 8 CD 17.01
12		1.4340	G-X40CrNi27 4		
12	S31500	1.4417	X2CrNiMoSi9 5		
12	S31500	1.4417	X2 CrNoMoSi 18 5 3		
12		1.4418	X4 CrNiMo16 5		Z6CND16-04-01
12	XM 8 430Ti 439	1.4510			Z 4 CT 17
12	430tl	1.4510	X6 CrTi 17		Z 4 CT 17
12		1.4511	X 6 CrNb 17(X 6 CrNb 17		Z 4 CNb 17
12	409	1.4512	X 6 CrTi 12 (X2CrTi12)	LW 19 409 S 19	Z 3 CT 12

 SS	 UNI	 UNE	 JIS	 GOST
2723	HS 6-5-2-5	6-5-2-5	SKH55	R6M5K5
7-4-2-5	HS 7-4-2-5	M 35		
2-10-1-8	HS 2-9-1-8 2-9-2-8	M 41		
R6M5				
2722	HS 6 5 2	F-5604	SKH 51	
2782	HS 2 9 2	F-5607		
R18				
	X45CrSi8	F322	SUHI	40Ch9S2
2301	X6Cr13	F3110	SUS403	08Ch13
		F8401		08Ch13
2301				08Ch13
	X6CrAl13			
2302	X6CrAl13			
2380	X12 CrSC13	F-3411	SUS 416	
2302	X12Cr13	F3401	SUS410	12Ch13
2320	X8Cr17	F3113		12Ch17
2320	X8Cr17	F3113	SUS430	12Ch17
				20Ch13L
				20Ch13L
2304				20Ch13
2383	X10CrSi17	F3117	SUS430F	
2325	X8CrMo17		SUS434	
2376				
2376				
2387				
	X 6 CrTi 17	F3115 -X 5 CrTi 17	SUS 430 LX	08Ch17T
				08Ch17T
	X 6 CrNb 17	F3122-X 5 CrNb 17	SUS 430 LK	
	X 6 CrTi 12		SUH 409	

According to VDI 3323 Standard

Material Group	 AISI/SAE	 Material No. DIN	 BS	 EN AFNOR
14	316L	1.4404 X2 CrNiMo 17 13 2 (X2 CrNiMo 17-12-2) GX 2 CrNiMoN 18-10	316 S 11, 316 S 13 316 S 14, 316 S 31; Z 2 316 S 42, S.537;316 Z 3 C 12, T.75, S. 161	Z 2 CND 17-12 CND 18-13 CND 17-11-02 Z 3 CND 17-12-02 FF Z 3 CND 18-12-03 Z 3 CND 19.10 M
14	316LN	1.4406 X2 CrNiMoN 17 12 2 (X2CrNiMoN 18-10)	316 S 61 316 S 63	Z2 CND 17-12 AZ
14	CF-8M	1.4408 GX 5 CrNiMoN 7 12 2 G-X 6 CrNiMo 18 10	316 C 16 (LT 196) ANC 4 B	
14		1.4410 G-X10CrNiMo18 9		Z5CND20.12M
14	316 Ln	1.4429 X2 CrNiMo 17 -13-3	316 S 62	Z 2 CND 17-13 Az
14	316L	1.4435 X2 CrNiMo18 14 3	316 S 11;316 S 13 316 S 14;316 S 31 LW 22 LWCF 22	Z 3 CND 17-12-03 Z 3 CND 18-14-03
14	316	1.4436 X 5 CrNiMo 17 13 3 (X4CRNIMO 17-13-3)	316 S 19;316 S 31 316 S 33 LW 23 LWCF 23	Z 6 CND 18-12-03 Z 7 CND 18-12-03
14	317L	1.4438 X2 CrNiMo 18 16 4 (X2CrNiMo 18-15-4)	317 S 12	Z 2 CND 19-15-04 z 3 cnd 19-15-04
14	(s31726)	1.4439 X2 CrNiMoN 17 13 5		Z 3 CND 18-14-06 AZ
14		1.4440 X 2 CrNiMo 18 13		
14	317	1.4449 X5 CrNiMo 17 13 3	317 S 16	
14	329	1.4460 X 4 CrNiMo 27 5 2 (X3CrNiMo27-5-2)		(Z 3 CND 25-07 Az) Z 5 CND 27-05 Az
14	329	1.4460 X8CrNiMo27 5		
14		1.4462 X2CrNiMoN22 5 3	318 S 13	Z 3 CND 22-05 Az (Z 2 CND 24 -08 Az) (Z 3 CND 25-06-03 Az)
14		1.4500 G-X7NiCrMoCuNb25 20		23NCDU25.20M
14	17-7PH	1.4504	316S111	
14	443 444	1.4521 X2CrMoTi18-2		
14	UNS N 08904	1.4539 X1NiCrMoCuN25-20-5		Z 2 NCDU 25-20
14	CN-7M	1.4539 (G-)X1 NiCrMoCu 25 20 5		Z1 NCDU 25-02 M
14	321	1.4541 Z 6 CrNiTi 18-10	321 S 31 321 S 51 (1010;1105) LW 24 LWCF 24	Z 6 CNT 18-10

 SS	 UNI	 UNE	 JIS	 GOST
2348	X 2 CrNiMo 17 12 G-X 2 CrNiMo 19 11	F3533 - X 2 CrNiMo 17 13 2 F3537 - X 2 CrNiMo 17 13 3	SUS 316 L	
	X 2 CrNiMoN 17 12	F3542-X 2 CrNiMoN 17 12 2	SUS316LN	07Ch18N; 18Ni10G2S2MSL
2343		F8414-AM-X 7 CrNiMo 20 10	SCS 14	
2328				
2375	X 2 CrNiMoN 17 13	F3543-X 2 CrNiMoN 17 13 3	(SUS 316 LN	
2375	X2CrNiMoN 17 13	F3533-X 2 CrNiMo 17 13 2	SUS 316 L	O3Ch17Ni14M3
2343	X 5 CrNiMo 117 13 X 8 cRnlmO 17 13	F3543-X 5 CrNiMo 17 12 2 3 F3538-X 5 CrNiMo 17 13	SUS 316	
2367	X2CrNiMo18 16	f.3539-x 2 cRnlmO 18 16 4	SUS317L	
	X 5 CrNiMo 18 15		SUS 317	
2324		F3309-X 8 CrNiMo 17 12 2 F3552-X 8 CrNiMo 18 16 4	SUS 329 J I	
2324				
2377			SUS 329 J3L	
	Z8CNA17-07	X2CrNiMo1712		
2326		F3123-X 2 CrMoTiNb 18 2	SUS 444	
2562				
2564				
2337	X 6 CrNiTi 18 11	F3523 - X 6 CrNiTi 18 10	SUS 321	06Ch18Ni10T 08Ch18Ni10T 09Ch18Ni10T 12Ch18Ni10T

According to VDI 3323 Standard

Material Group	 AISI/SAE	 Material No. DIN	 BS	 EN	AFNOR
14	630	1.4542	X5 CrNiCuNb 17 4 (X5 CrNiChNb 16-4)		Z 7 CNU 15-05 Z 7 CNU 17-04
14	17-4PH	1.4542			Z7CNU17-04
14	S31254	1.4547	X1 CrNiMoN 20 18 7		
14	17-4PH	1.4548			Z7CNU17-04
14	347	1.4550	X6 CrNiNb 18 10	347 S 17	58F
14		1.4552	G-X7CrNiNb18 9		Z 6 CNNb 18.10 Z4CNNb19.10M
14	17-7PH	1.4568		316S111	
14	316Ti	1.4571	X6 CrNiMoTi 17 12 2	320 S 31	
14	316 Ti	1.4571	x 6 CrNiMoTi 17 12 2	320 S 31	58j
14		1.4581	G-X 5 CrNiMoNb	318 C 17	
14	318	1.4583	X 10CrNiMoNb 18 12	303 S 21	
14		1.4585	G-X7CrNiMoCuNb18 18		Z 4 CNDNb 18.12 M
14		1.4821	X20CrNiSi25 4		Z15CNS20.12
14		1.4823	G-X40CrNiSi27 4		Z20CNS25.04
14	309	1.4828	X15CrNiSi20 12	309 S 24	58C
14		1.4829	X 12 CrNi 22 12		
14	309S	1.4833	X6 CrNi 22 13	309 S 13	
14	310 S	1.4845	X12 CrNi 25 21	310S24	
14	321	1.4878	X6 CrNiTi 18 9	32 I S 20	58B
14	Ss30415	1.4891	X5 CrNiNb 18 10		Z 15 CN 24-13
14	S30815	1.4893	X8 CrNiNb 11		Z 12 CN 25-20
14	304H	1.4948	X6 CrNi 18 11	304 S 51	
14	660	1.4980	X5 NiCrTi 25 15		Z 6 CNT 18-12 (B)
14			X5 NiCrN 35 25		
14	S31753		X2 CrNiMoN 18 13 4		
14			X2 CrNiMoN 25 22 7		
15	CLASS20	0.6010	GG10		Ft10D
15	A48-20B	0.6010	GG-10		FT 10 D
15	NO 25 B	0.6015	GG 15	Grade 150	FT 15 D
15	CLASS25	0.6015	GG15	GRADE150	Ft15D
15	A48 25 B	0.6015	GG 15	Grade 150	Ft 15 D
15	A48-30B	0.6020	GG-20	Grade 220	Ft 20 D
15	NO 30 B	0.6020	GG 20	Grade 220	Ft 20 D
15	A436 Type 2	0.6660	GGL-NiCr202	L-NiCuCr202	L-NC 202
15	60-40-18	0.7040	GGG 40	SNG 420/12	FCS 400-12
15	No 20 B		GG 10		Ft 10 D
16	CLASS30	0.6020	GG20	GRADE220	Ft20D
16	CLASS45	0.6030	GG30	GRADE300	Ft30D
16	A48-45 B	0.6030		Grade 300	Ft 30 D
16	A48-50	0.6035	GG-35	GRADE 350	Ft35D
16	A48-60 B	0.6040	GG40	GRADE400	Ft 40 D
16	100/70/03	0.7070	GGG-70	SNG700/2	FGS 700-2
17		0.7033	GGG35.3		

 SS	 UNI	 UNE	 JIS	 GOST
			SCS 24 SUS 630	
2378				
2338	X6CrNiNb18 11	F3552	SUS347	08Ch18N12B
	Z8CNA17-07	X2CrNiMo1712		09Ch17Nju1 10Ch17N13M2T 10Ch17N13M2T
2350				
2350	X6CrNiMoTi17 12	F3535		
	x15cRnls12 12 X6CrNiMoTi17 12			
		F8414	SCS17	20Ch20N14S2
2361	X6CrNi25 20	F331	SUH310	20Ch23N18
2337	X6CrNiTi18 11	F3553	SUS321	
2372				
2368				
2333				
2570				
110	G10			SCh10
0110-00				SCh10
0115-00	G 15	FG 15	FC150	SCh15
115	G 15	FG 15		SCh15
01 15-00	G14	FG15		SCh15
0120-00				SCh20
120	G 20		FC200	SCh20
0523-00				
0717-02	GS 370-17	FGE 38-17	FCD400	VCh42-12
110		FC100		
120	G 20	FG 20		
130	G 30	FG 30	FC300	SCh20
01 30-00				SCh30
135	G 35	FG 35	FC350	SCh30
140				SCh40
07 37-01	GGG 70	GGG 70	FCD700	
07 17-15				

According to VDI 3323 Standard

Material Group	 AISI/SAE	 Material No. DIN	 BS	 EN	AFNOR
17		0.7033	GGG-35.3	350/22 L 40	FGS 370/17
17	60-40-18	0.7040	GGG-40	SNG 420/12	FGS 400-12
17	60/40/18	0.7043	GGG-40.3	370/7	FGS 370/17
17	80-55-06	0.7050	GGG50	SNG500/7	FGS 500/7
17	65-45-12	0.7050	GGG-50	SNG 500/7	FGS 500-7
17		0.7652	GGG-NiMn 13 7	S-NiMn 137	S-Mn 137
17	A43D2	0.7660	GGG-NiCr 20 2	Grade S6	S-NC 202
17			GGG 40.3	SNG 370/17	FGS 370-17
18	A48-40 B	0.6025	GG25	Grade260	Ft 25 D
18		0.7060	GGG60	SNG600/3	FGS600-3
18	80/55/06	0.7060	GGG-60	600/3	FGS 600/3
18	A48 40 B				
19		0.8055	GTW55		
19	325 10	0.8135	GTS-35-10	B 340/12	MN35-10
19	A47-325 10	0.8135	GTS-35-10	B 340/2	Mn 35-10
19	A220-400 10	0.8145	GTS-45-06	P 440/7	Mn 450-6
19			GTS-35	B 340/12	
19				8 290/6	MN 32-8
19	325 10		GTS-35	B340/12	MN 35-10
20		0.8035	GTM-35	W340/3	MB35-7
20		0.8040	GTW-40	W410/4	MB40-10
20		0.8045			
20		0.8065	GTMW-65		
20	A220-50005	0.8155	GTS-55-04	P 510/4	Mn 550-4
20	50005	0.8155	GTS-55-04	P510/4	MP 50-5
20	70003	0.8165	GTS-65-02	P 570/3	Mn 650-3
20	90001	0.8170	GTS-70-02	P 690/2	Mn 700-2
20	A220-90001	0.8170	GTS-70-02		Mn 700-2
20		0.817	GTS-70-02	IP 70-2	
20	1022				
	1518	1.1133	20Mn5	120 M 19	20 M 5
20	1035	1.1183	Cf 35 (C35G)	080 A 35	XC 38 H I TS
20	400 10		GTS-45	P440/7	
20	70003		GTS-65	P 570/3	MP 60-3
21	AI99	3.0205			
21	1000	3.0255	AI99.5	L31/34/36	A59050C
21		3.3315	AlMgI		
22		3.1325	AlCuMg I		
22		3.1655	AlCuSiPb		
22		3.2315	AlMgSi I		
22	7050	3.4345	AlZnMgCuO,5	L 86	AZ 4 GU/905 I
23		3.2381	G-AlSi10Mg		
23		3.2382	GD-AlSi10Mg		
23		3.2581	G-AlSi12		

 SS	 UNI	 UNE	 JIS	 GOST
0717-15				
0717-02				VCh42-12
0717-15				VCh42-12
0727-02	GGG 50			VCh50-2
	0727-02		FCD 500	
VCh50-2				
0772-00				
0776-00				
0717-12				SCh25
125	G 25	FG 25	FC250	VCh60-2
07 32-03	GGG 60	GGG 60		
0727-03			FCD600	
		GTW 55		
810		GTS 35		KCh35-10
0815-00				KCh35-10
	0852-00	GMN 45	FCMW370	
0810-00				
814			AC4A	
08 15			FCMW330	
852		GTM 35		
	GMB40	GTM 40		
	GMB45	GTM 45		KCh55-4
		GTW 65		KCh55-4
0854-00				KCh60-3
0854-00	GMN 55		FCMP490	KCh70-2
0856-00	GMN 65		FCMP590	KCh70-2
0862-00	GMN 70		FCMP690	KCh70-2
0864-00				20G
2132	G 22 Mn 3			35
	20 Mn 7	F.1515-20 Mn 6	SMnC 420	
1572	C 36; C 38		S 35 C	35
08 52				
858			FCMP540	AD0
				DI
				AD35
				AK9
811-04				
				AK12

According to VDI 3323 Standard

Material Group	 AISI/SAE	 Material No. DIN	 BS	 EN	AFNOR
23		3.3561	G-AlMg 5		
23	ZE 41	3.5101	G-MgZn4sElZrI	MAG 5	
23	EZ 33	3.5103	MgSE3Zn27rI	MAG 6	G-TR3Z2
23	AZ 81	3.5812	G-MgAl8ZnI	NMAG 1	
23	AZ 91	3.5912	G-MgAl9ZnI	MAG 7	
24		2.1871	G-AlCu 4 TiMg		
24		3.1754	G-AlCu5NiI,5		
24		3.2163	G-AlSi9Cu3		
24	4218 B	3.2371	G-AlSi 7 Mg		
24	SC64D	3.2373	G-AlSi9MGWA		A-S7G
24		3.2373	G-AlSi 9 Mg		
24	QE 22	3.5106	G-MgAg3SE2ZrI	MAG 12	
24	GD-AISI12		G-ALMG5	LM5	A-SU12
23-24	A360.2	3.2383	G-AlSi0Mg(Cu)	LM9	
23-24	A356-72			2789;1973	NF A32-201
23-24	356.1			LM25	
23-24	A413.2		G-AlSi12	LM 6	
23-24	A413.1		G-AlSi 12 (Cu)	LM 20	
23-24	A413.0		GD-AISI12		
23-24	A380.1		GD-AlSi8Cu3	LM24	
26	C 93200	2.1090	G-CuSn 7 5 pb		U-E 7 Z 5 pb 4
26	C 83600	2.1096	G-CuSn5ZnPb	LG 2	
26	C 83600	2.1098	G-CuSn 2 Znpb		
26	C 23000	2.1182	G-CuPb15Sn	LB1	U-pb 15 E 8
26	C 93800	2.1182	G-CuPb15Sn		Uu-PB 15e 8
27		2.0240	CuZn 15		
27	C 27200	2.0321	CuZn 37	CZ 108	CuZn 36, CuZn 37
27	C 27700	2.0321	CuZn 37	CZ 108	CuZn 36, CuZn 37
27		2.0590	G-CuZn40Fe		
27	C 86500	2.0592	G-CuZn 35 Al 1	U-Z 36 N 3	HTB 1
27	C 86200	2.0596	G-CuZn 34 Al 2	HTB 1	U-Z 36 N 3
27	C 18200	2.1293	CuCrZr	CC 102	U-Cr 0.8 Zr
28		2.0060	E-Cu57		
28		2.0375	CuZn36Pb3		
28	C 94100	2.0596	G-CuZn 34 Al 2	HTB 1	U-Z 36 N 3
28	C 63000	2.0966	CuAl 10 Ni 5 Fe 4	Ca 104	U-A 10 N
28	B-148-52	2.0975	G-CuAl 10 Ni		
28	C 90700	2.1050	G-CuSn 10	CTI	
28	C 90800	2.1052	G-CuSn 12	pb 2	UE 12 P
28	C 81500	2.1292	G-CuCrF 35	CCI-FF	
28		2.4764	CoCr20W15Ni		
31	N 08800	1.4558	X 2 NiCrAlTi 32 20	NA 15	
31	N 08031	1.4562	X 1 NiCrMoCu 32 28 7		
31	N 08028	1.4563	X 1 NiCrMoCuN 31 27 4		

According to VDI 3323 Standard

Material Group	 AISI/SAE	 Material No. DIN	 BS EN	 AFNOR	
31	N 08330	1.4864	X 12 NiCrSi 36 16	NA 17	Z 12 NCS 35.16
31	330	1.4864	X12 NiCrSi 36 16	NA 17	Z 12 NCS 37.18
31		1.4865	G-X40NiCrSi38 18	330 C 40	
31		1.4958	X 5 NiCrAlTi 31 20		
31	AMS 5544	LW2.4668	NiCr19NbMo		NC20K14
32		1.4977	X 40 CoCrNi 20 20		Z 42 CNKDWNb
33	Monel 400	2.4360	NiCu30Fe	NA 13	NU 30
33	5390A	2.4603			NC22FeD
33	Hastelloy C-4	2.4610	NiMo16Cr16Ti		
33	Nimonic 75	2.4630	NiCr20Ti	HR 5,203-4	NC 20 T
33		2.4630	NiCr20Ti	HR5,203-4	NC20T
33	Inconel 690	2.4642	NiCr29Fe		Nnc 30 Fe
33	Inconel 625	2.4856	NiCr22Mo9Nb	NA 21	NC 22 FeDNb
33	5666	2.4856	NiCr22Mo9Nb		Inconel 625
33	Incoloy 825	2.4858	NiCr21Mo	NA 16	NC 21 Fe DU
34	Monel k-500	2.4375	NiCu30 Al	NA 18	NU 30 AT
34	4676	2.4375	NiCu30Al	3072-76	
34		2.4631	NiCr20TiAl	Hr40;60I	NC20TA
34	Inconel 718	2.4668	NiCr19FeNbMo		NC 19 Fe Nb
34	Inconel	2.4694	NiCr16Fe7TiAl		
34		2.4955	NiFe25Cr20NbTi		
34	5383	LM2.4668	NiCr19Fe19NbMo	HR8	NC19eNB
34	5391	LW2 4670	S-NiCr13Al6MoNb	3146-3	NC12AD
34	5660	LW2.4662	NiFe35Cr14MoTi		ZSNCDT42
34	5537C	LW2.4964	CoCr20W15Ni		KC20WN
34	AMS 5772		CoCr22W14Ni		KC22WN
35	Inconel X-750	2.4669	NiCr15Fe7TiAl		NC 15 TNb A
35	Hastelloy B	2.4685	G-NiMo28		
35	Hastelloy C	2.4810	G-NiMo30		
35	AMS 5399	2.4973	NiCr19Co11MoTi		NC19KDT
35		3.7115	TiAl5Sn2		
36	R 50250	3.7025	Ti I	2 TA I	
36	R 52250	3.7225	Ti I pd	TP I	
36	AMS 5397	LW2 4674	NiCo15Cr10MoAlTi		
37		3.7124	TiCu2	2 TA 21-24	
37	R 54620	3.7145	TiAl6Sn2Zr4Mo2Si		
37		3.7165	TiAl6V4	TA 10-13;TA 28	T-A 6 V
37		3.7185	TiAl4Mo4Sn2	TA 45-51;TA 57	
37		3.7195	TiAl 3 V 2.5		
37			TiAl4Mo4Sn4Si0.5		
37	AMS R54520		TiAl5Sn2.5	TA14/17	T-A5E
37	AMS R56400		TiAl6V4	TA10-13/TA28	T-A6V
37	AMS R56401		TiAl6V4ELI	TA11	

 SS	 UNI	 UNE	 JIS	 GOST
			SUH330	
	XG50NiCr39 I9		SCH15	
				KhN38VT
				KhN77TYuR
				VT5-I
				VTI-00
				VT6

According to VDI 3323 Standard

Material Group					
	AISI/SAE	Material No. DIN		BS EN	AFNOR
38	W 1	1.1545	C 105 W1	BW 1A	Y1 105
38	W210	1.1545	C105W1	BW2	Y120
38		1.2762	75 CrMoNiW 6 7		
38	440C	1.4125	X105 CrMo 17		Z 100 CD 17
38		1.6746	32 nlcRmO 14 5	832 M 31	35 NCD 14
40	Ni- Hard 2	0.9620	G-X 260 NiCr 4 2	Grade 2 A	
40	Ni- Hard 1	0.9625	G-X 330 Ni Cr 4 2	Grade 2 B	
40	Ni-Hard 4	0.9630	G-X 300 CrNiSi 9 5 2		
40		0.9640	G-X 300 CrMoNi 15 2 1		
40	A 532 III A 25% Cr	0.9650	G-X 260 Cr 27	Grade 3 D	
40	A 532 III A 25% Cr	0.9655	G-X 300 CrNMo 27 1	Grade 3 E	
40		1.2419	105 WCr 6	105WC 13	
40	310	1.4841	X15 CrNiSi 25 20	314 S31	Z 15 CNS 25-20
41		0.9635	G-X 300 CrMo 15 3		
41		0.9645	G-X 260 CrMoNi 20 2 1		
41		0.9655	G-X 300 CrNMo 27 1		



 SS	 UNI	 UNE	 JIS	 GOST
1880	C 100 KU	F-5118	SK 3	U10A
2900	CI20KU	CF515	SUP4	U10A
				95Ch18
	0512-00			
	0513-00			
	0466-00			ChWG 20Ch25N20S2
		107 WCr 5 KU		



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