

PRODUCT NEWS 2025





NEW PRODUCT NEWS 2025

NEW PRODUCTS AND SERIES EXPANSIONS AT A GLANCE

Mitsubishi Materials is consistently focusing on specific customer needs to better meet the challenges of the modern metal working industry. This catalogue shows all the new products and series expansions for turning, milling and drilling applications.

CURRENT, INNOVATIVE, COMPETITIVE

NOTES: This Product News 2025 (N038) complements the General Catalogue C010. It contains all new products and series expansions that have been launched after the release of the C010 catalogue.

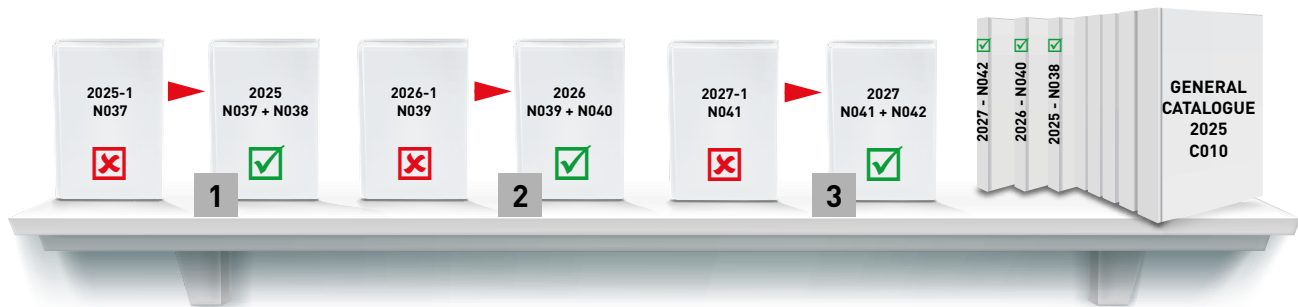
We reserve the right to make changes to any item compared to the information and illustrations shown in this catalogue, e.g. with regard to technical data, construction, equipment provided, material and external appearance. All dimensions are in millimetres. You will find the latest version of this catalogue on our website: www.mmc-carbide.com

NEW = NEW / PRODUCT EXPANSION
FOR PRODUCT NEWS 2025 (N038)

NEW = NEW / PRODUCT EXPANSION
FOR PRODUCT NEWS 2025-1 (N037)

CATALOGUE SYSTEM

HOW TO REPLACE PRODUCT NEWS BOOKS



NOTES:

- 1 The Product News 2025-1 – N037 will be integrated into Product News 2025 – N038.
- 2 The Product News 2026-1 – N039 will be integrated into Product News 2026 – N040.
- 3 The Product News 2027-1 – N041 will be integrated into Product News 2027 – N042.

✓ The yearly Product News catalogues N038, N040 and N042 will complement the existing GENERAL CATALOGUE.

✗ The Product News book ending with -1, can be disposed of after the publishing of the yearly Product News book.

TRANSITION FROM THE EXISTING TO THE NEW GENERAL CATALOGUE



NOTES:

✓ The yearly Product News catalogues N038, N040 and N042 will merge into the new GENERAL CATALOGUE.

INDEX

TURNING TOOLS

NEW	GT SERIES	6
10/2025	External grooving form for small parts machining. GTAT type inserts added for ring and circlip grooving.	
NEW	XB SERIES	21
10/2025	Versatile indexable turning tool for a wide variety of grooving and chamfering applications with one holder. Thread tapping can be replaced by machining.	
NEW	BORING BARS AND INSERTS FOR SMALL PARTS MACHINING	39
10/2025	Expansion of positive geometry E class inserts.	
NEW	FSF / FSF-P chipbreaker – Ideal chipbreaker for small depths of cut and finish turning operations.	
04/2025	New high performance hard steel boring bars. Boring bars for small parts machining, compatible with Swiss-type lathes.	
NEW	FSF / FSF-P CHIPBREAKER	101
04/2025	Ideal chipbreaker for small depths of cut and finish turning operations.	
NEW	MC / MP7100 SERIES	108
04/2025	Dedicated carbide substrate. New coating technology for stainless steel turning. Creation of a new series for a variety of stainless steel applications.	
NEW	MC6100 SERIES	139
04/2025	New FPH chipbreaker for low depths of cut and high feed finishing. CVD coated grade for steel turning.	
NEW	MICRO-MINI TWIN	145
04/2025	New sleeves with internal coolant. Expansion of sleeves with external coolant. Micro-Mini Twin boring bars for high precision and small parts machining. Ideal for small-diameter boring of steel and stainless steel. Economical, solid shank type with two cutting edges.	
NEW	BC8200 / MB8200 SERIES	166
04/2025	The next generation of coated and uncoated PcBN grades for machining hardened steels. Expanded geometry range for coated PcBN grades BC8220 and BC8210. Introduction of the new BL-Breaker in BC8220, ensuring effective chip control during medium to light depth-of-cut operations. Launch of the new uncoated PcBN grades MB8220 and MB8210 for hardened steel turning applications.	

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SOLID MILLING TOOLS

NEW iMX END MILL SYSTEM WITH EXCHANGEABLE HEADS

201

10/2025 Conical torus iMX head with multiple through coolant holes.
The ideal tool for blade machining.
ER Collet with ER range 16 – 40 and iMX connection sizes iMX10 – 25.

NEW VQ SERIES

206

10/2025 VQ3XL/VQ4XL/VQ4XLRB – 3 and 4 flute square type and 4 flute corner radius solid carbide end mills for maximum performance on micro-machining applications.

NEW VQJCS/VQLCS/VQELCS – Solid carbide milling cutters with chipbreaker and irregular pitch

04/2025 flutes in 3, 4 and 5 x DC cutting lengths.

VQ2XLBR – Expanded range of 2-flute ball nose end mills.

VQJCSRB/VQLCSRB/VQELCSRB – New corner radius, solid carbide milling cutters with chipbreaker and irregular pitch flutes in 3, 4 and 5 x DC cutting lengths.

INDEXABLE MILLING TOOLS

NEW MV1000 SERIES

240

04/2025 Expanded geometry range for a wide variety of applications.
The ideal coated carbide grade for milling.

NEW WWX SERIES

254

04/2025 MV1030 – Grade expansion for WWX200/WWX400.

WWX200 – Expanded geometry range.

High performance 90° face milling cutter with double-sided trigon inserts for shoulder, face and copy milling.

NEW MX3030

279

04/2025 APX3000 – Expanded geometry range.

Cermet grade for a wider range of applications.

INDEX

DRILLING TOOLS

NEW DXAS

10/2025 New and innovative exchangeable head drills.
For high performance and accurate drilling of steels.
From diameter 18.0 - 30.0 mm with L/D 1.5/3/5/8.

284

NEW DFAS / MFE

04/2025 DFAS-E – Solid carbide flat bottom drills (m7 tolerance).
DFAS – Now available in a longer L/D = 5 type.
MFE – Solid carbide flat bottom drills (h7 tolerance).

298

NEW MINI DVAS

04/2025 Solid carbide TRISTAR drill series – Fast, reliable and accurate.
Now available in extra long L/D = 50.
Ø 1.0 mm – Ø 2.9 mm / L/D = 2 – 50

320

MPLUS TOOLS

NEW G80A (not available)

04/2025 Parting off system for TORNOS multi-spindle machines.

331

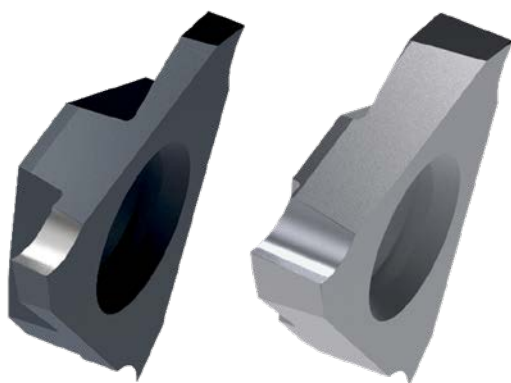
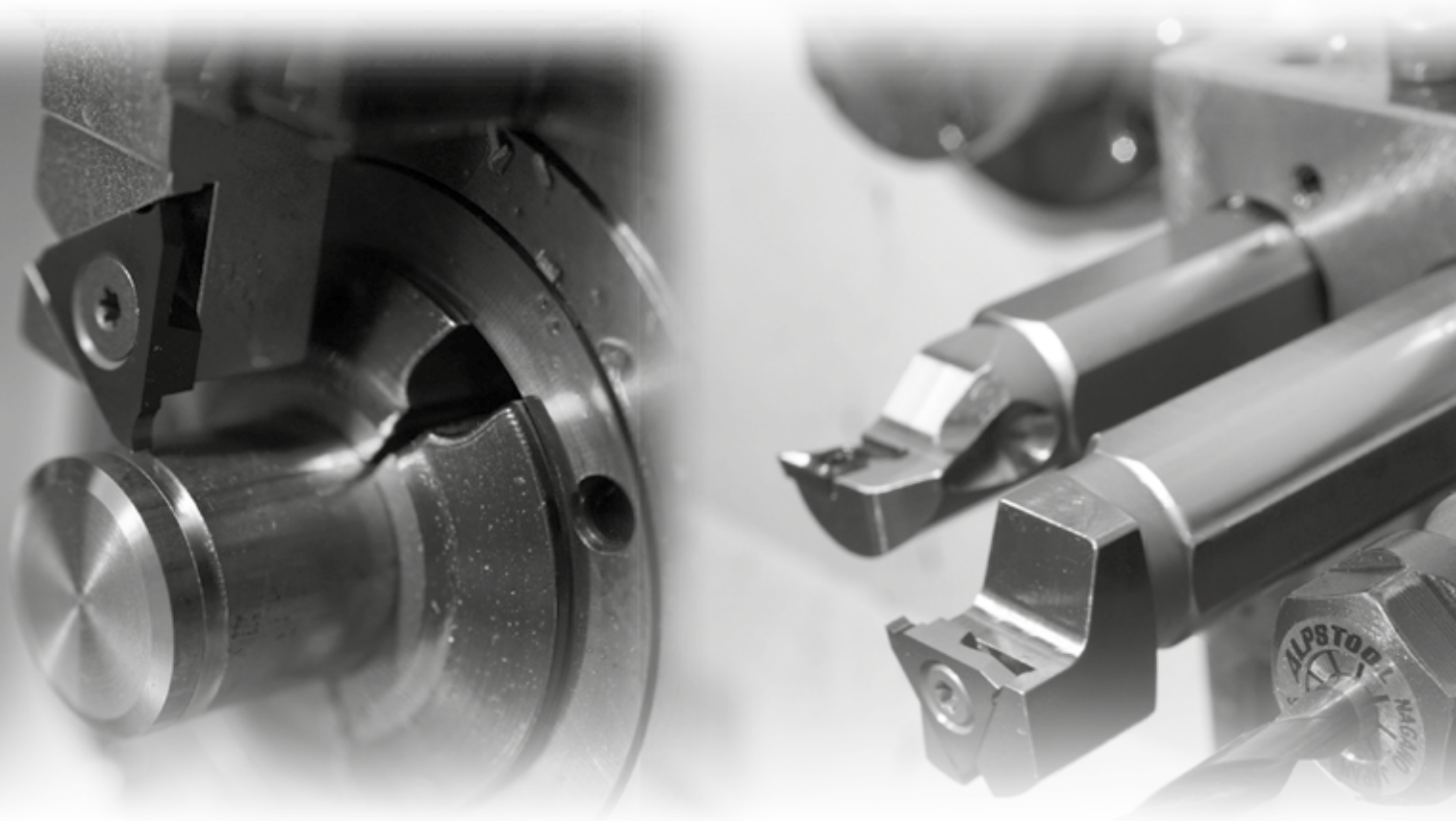
NEW 415SD

04/2025 MV1020 / MV1030 – Grade expansion.
First choice for high-feed machining.

345

GT SERIES

FOR EXTERNAL AND INTERNAL APPLICATIONS



Interested in more...

B282

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 **MITSUBISHI MATERIALS**

GT HOLDER

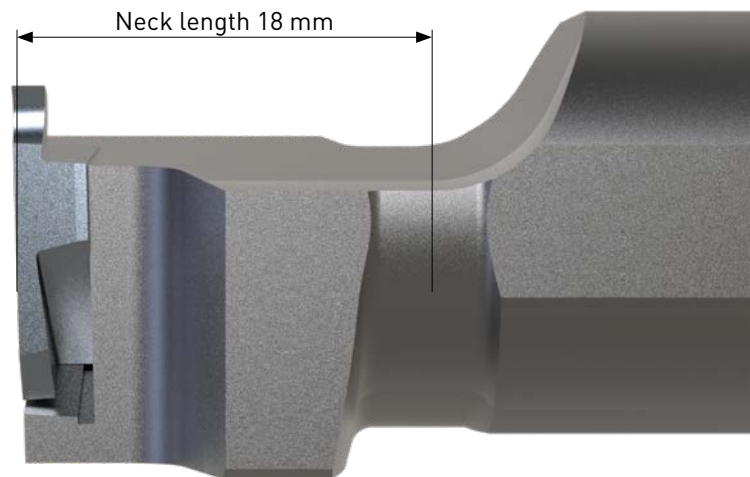
EXTERNAL GROOVING FOR SMALL PARTS MACHINING

NEW - 90° HOLDER

The neck dimensions have been optimised to improve resistance to chatter and vibration.

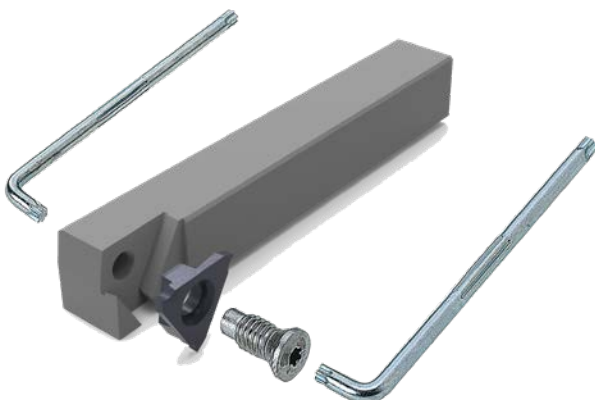


ROUND SHANK HOLDER FOR REAR TOOL POST



BACK CLAMPING MECHANISM

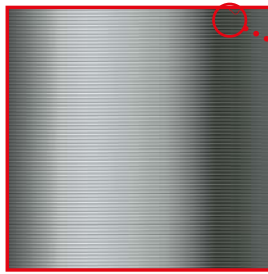
For gang type tool posts on Swiss automatic lathes, tools can be changed quickly and accurately using the same wrench on both sides, improving machine operating efficiency. Offset type is not included.



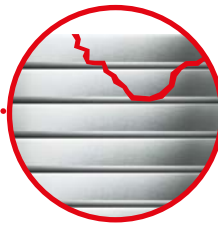
COATING

MS7025 – NANO-MULTILAYER COATING

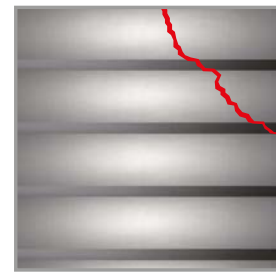
By combining the high lubrication layer with excellent welding resistance and the high hardness layer with a greater wear resistance that suppresses the progress of wear at the nano-level, the film damage is significantly reduced and the welding and wear resistance are dramatically improved.



Nano-multilayer coating



Enlarged image

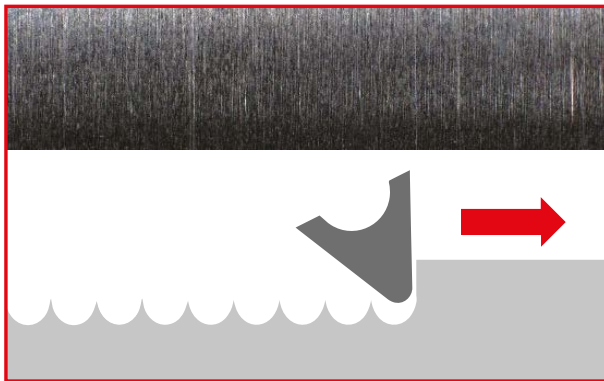


Conventional multilayer coating

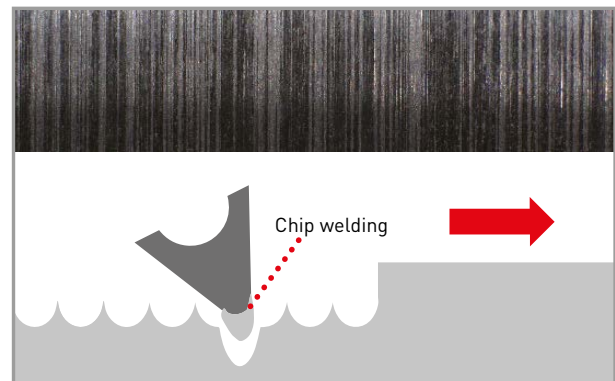
EFFECTS OF THE HIGH LUBRICATION LAYER

The nano-level, high lubrication layer suppresses built-up edge caused by chip welding which tends to occur in low feed machining. Additionally, this reduces blemishes on the machined surface of the component.

Surface Finish



MS7025



Conventional

MT2015 – CARBIDE GRADE (NON COATED)

Has the usual high wear resistance of carbide but is also tough and therefore resists sudden fracturing. Expected to extend the tool life when machining non-ferrous metals such as aluminium alloys.

VP15TF/VP15KZ – PVD COATED GRADES

(Al,Ti)N coated grade with excellent heat resistance and has high adhesion strength to the carbide substrate. Highly versatile and can be used in a variety of machining processes.

GT SERIES

SELECTION STANDARD

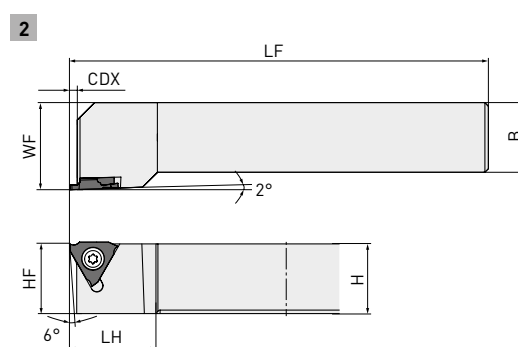
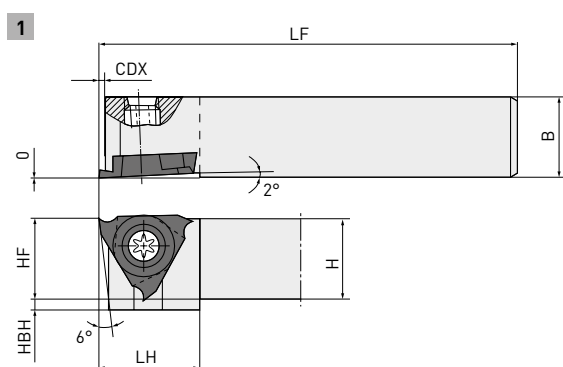
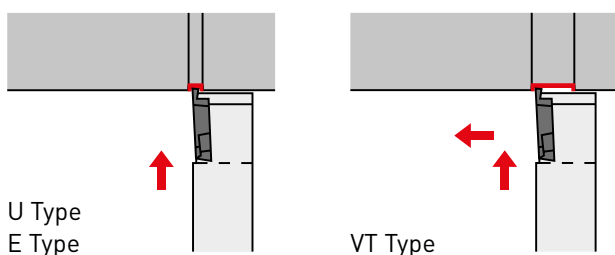
Angle	Name of tool holder	Note	Shank size	Applicable insert type				
SQUARE SHANK								
0°	GTAH	CW (Groove width) 0.25 – 3.0 mm	Without offset	8 x 8 x 80	GTAT GTBT GTCT			
				8 x 8 x 120				
				10 x 10 x 80				
				10 x 10 x 120				
				12 x 12 x 80				
				12 x 12 x 120				
				16 x 16 x 120				
			With offset	20 x 20 x 120				
				25 x 25 x 150				
				10 x 10 x 80				
	GTBH	CW (Groove width) 1.45 – 3.0 mm	Without offset	10 x 10 x 120	GTBT GTCT			
				12 x 12 x 120				
				16 x 16 x 120				
			With offset	20 x 20 x 120				
25 x 25 x 150								
GTCH				CW (Groove width) 2.5 – 3.0 mm		Without offset	10 x 10 x 80	GTCT
							10 x 10 x 120	
90°	GTAF	CW (Groove width) 0.25 – 3.0 mm		GTAT GTBT GTCT				
			10 x 10 x 100					
			12 x 12 x 100					
			16 x 16 x 120					
			20 x 20 x 120					
			25 x 25 x 120					
ROUND SHANK								
90°	SH-GTAF	CW (Groove width) 0.25 – 3.0 mm	For back tool post	16 x 85	GTAT GTBT GTCT			
				19.05 x 115				
				20 x 100				
				22 x 120				
				25 x 120				
				25.4 x 115				

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 = **NEW**

GTAH/GTBH/GTCH

EXTERNAL GROOVING



Right hand tool holder shown.

Order number	Stock		H	B	HF	LF	WF	CDX*	LH	HBH	Cutting width		Type	Insert
	R	L									min.	max.		
GTAHR/L0808-20S	●	●	8	8	8	80	—	2	15	5	0.25	3.0	1	GTAT GTBT* GTCT*
GTAHR/L0808-20	●	●	8	8	8	120	—	2	15	5	0.25	3.0	1	
GTAHR/L1010-20S	●	●	10	10	10	80	—	2	15	3	0.25	3.0	1	
GTAHR/L1010-20	●	●	10	10	10	120	—	2	15	3	0.25	3.0	1	
GTAHR/L1212-20S	●	●	12	12	12	80	—	2	15	1	0.25	3.0	1	
GTAHR/L1212-20	●	●	12	12	12	120	—	2	15	1	0.25	3.0	1	
GTAHR/L1616-20	●	●	16	16	16	120	—	2	15	—	0.25	3.0	1	
NEW GTAHR/L2020-20	●	●	20	20	20	120	25	2	25	—	0.25	3.0	2	GTBT GTCT
NEW GTAHR/L2525-20	●	●	25	25	25	150	32	2	25	—	0.25	3.0	2	
GTBHR/L1010-30S	●	●	10	10	10	80	—	3	15	3	1.45	3.0	1	
GTBHR/L1010-30	●	●	10	10	10	120	—	3	15	3	1.45	3.0	1	
GTBHR/L1212-30	●	●	12	12	12	120	—	3	15	1	1.45	3.0	1	
GTBHR/L1616-30	●	●	16	16	16	120	—	3	15	—	1.45	3.0	1	
NEW GTBHR/L2020-30	●	●	20	20	20	120	25	3	25	—	1.45	3.0	2	
NEW GTBHR/L2525-30	●	●	25	25	25	150	32	3	25	—	1.45	3.0	2	GTCT
GTCHR/L1010-30S	●	●	10	10	10	80	—	3	15	3	2.5	3.0	1	
GTCHR/L1010-30	●	●	10	10	10	120	—	3	15	3	2.5	3.0	1	

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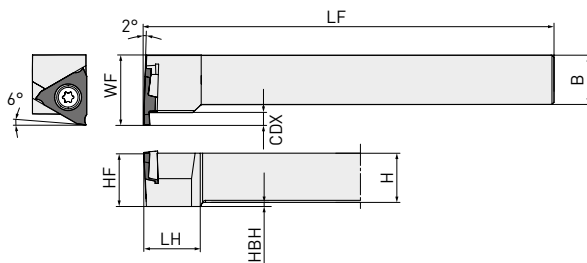
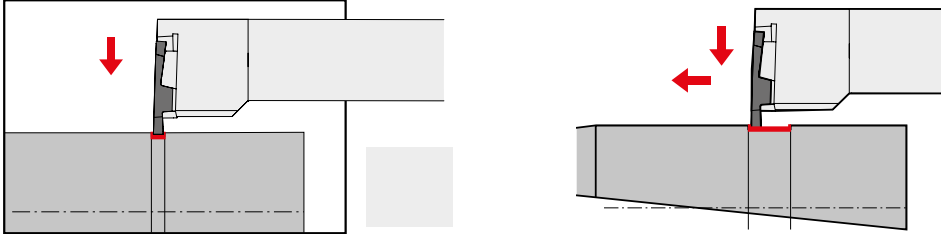
(Each case contains 5 inserts. Blank inserts are packed in 10 per case.)

* It is not possible to machine depths over CDX dimensions (max. groove depth).
For the actual maximum depth that can be machined, only check the CDX of the insert.

1. Please use right hand inserts for right hand holders and left hand inserts for left hand holders.

GTA

EXTERNAL GROOVING



Right hand tool holder shown.

Order number	Stock		H	B	HF	LF	WF	CDX*	LH	HBH	Cutting width		Insert
	R	L									min.	max.	
GTAFR/L1010-30	●	●	10	10	10	100	15	3	14	3	0.25	3.0	GTAT GTBT* GTCT*
GTAFR/L1212-30	●	●	12	12	12	100	17	3	14	1	0.25	3.0	
GTAFR/L1616-30	●	●	16	16	16	120	21	3	14	—	0.25	3.0	
GTAFR/L2020-30	●	●	10	10	10	120	25	3	14	—	0.25	3.0	
GTAFR/L2525-30	●	●	25	25	25	120	30	3	14	—	0.25	3.0	

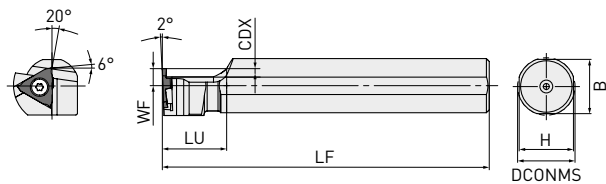
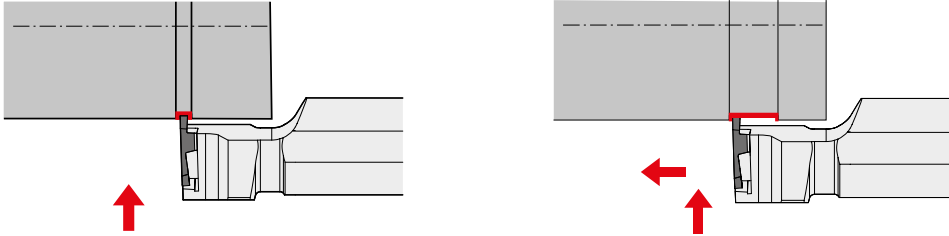
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* It is not possible to machine depths over CDX dimensions (max. groove depth).
For the actual maximum depth that can be machined, only check the CDX of the insert.

1. Please use left hand insert for right hand holder and right hand insert for left hand holder.

SH-GTAF

EXTERNAL GROOVING



Left hand tool holder shown.

Order number	Stock		H	B	DCONMS	LF	LU	WF	CDX*	Cutting width		Insert
	R	L								min.	max.	
SH160-GTAFL-30	●		15	15	16	85	18	6	3	0.25	3.0	GTAT GTBT* GTCT*
SH190-GTAFL-30	●		18	18	19.05	115	18	6	3	0.25	3.0	
SH200-GTAFL-30	●		19	19	20	100	18	6	3	0.25	3.0	
SH220-GTAFL-30	●		21	21	22	120	18	6	3	0.25	3.0	
SH250-GTAFL-30	●		24	24	25	120	18	10	3	0.25	3.0	
SH254-GTAFL-30	●		24	24	25.4	115	18	10	3	0.25	3.0	

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* It is not possible to machine depths over CDX dimensions (max. groove depth).
For the actual maximum depth that can be machined, only check the CDX of the insert.

1. Please use left hand insert for right hand holder and right hand insert for left hand holder.

SPARE PARTS

GTAH/GTBH/GTCH

Holder type			
	Clamp screw	Clamp torque (Nm)	Wrench
GT [®] H-0808, 1010, 1212, 1616	NS404W	1.0	NKY15S
GT [®] H-2020, 2525	FC400890T	2.5	TKY10F

GTAF

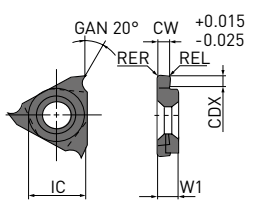
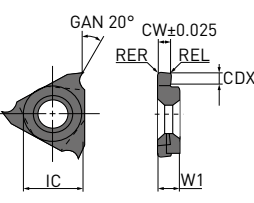
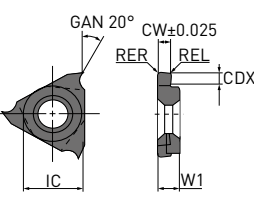
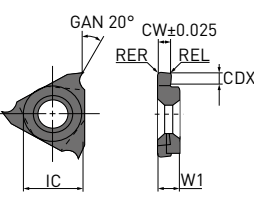
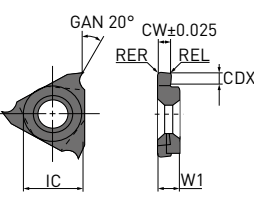
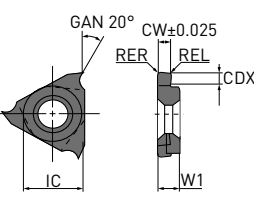
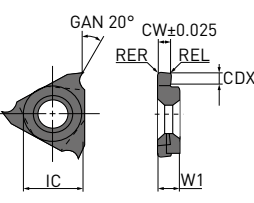
		
Clamp screw	Clamp torque (Nm)	Wrench
FC400890T	2.5	TKY10F

SH-GTAF

		
Clamp screw	Clamp torque (Nm)	Wrench
FC400890T	2.5	TKY10F

GT SERIES

INSERTS

	Order number	Hand	MS7025	VP15TF	VP15KZ	MT2015	TF15	CW	CDX*	RER/L	IC	W1	Geometry
NEW	GTAT02506V3RP-E	R	●			●		0.25	0.27	0.03	9.525	3.18	Precision Groove E Type (Ring and circlip grooving) 
NEW	GTAT03006V3RP-E	R	●			●		0.30	0.27	0.03	9.525	3.18	
NEW	GTAT03306V3RP-E	R	●			●		0.33	0.27	0.03	9.525	3.18	
NEW	GTAT04312V3RP-E	R	●			●		0.43	0.9	0.03	9.525	3.18	
NEW	GTAT05312V5RP-E	R	●			●		0.53	0.9	0.05	9.525	3.18	
NEW	GTAT05312V5LP-E	L	●			●		0.53	0.9	0.05	9.525	3.18	
	GTAT03306V3R-E	R		●				0.33	0.27	0.03	9.525	3.18	E Type (Ring and circlip grooving) 
	GTAT03306V3L-E	L		★				0.33	0.27	0.03	9.525	3.18	
	GTAT04312V3R-E	R		●				0.43	0.9	0.03	9.525	3.18	
	GTAT04312V3L-E	L		★				0.43	0.9	0.03	9.525	3.18	
	GTAT05312V5R-E	R		●				0.53	0.9	0.05	9.525	3.18	
	GTAT05312V5L-E	L		★				0.53	0.9	0.05	9.525	3.18	
NEW	GTAT06512V5R-E	R	●			●		0.65	0.9	0.05	9.525	3.18	Right hand insert shown. 
NEW	GTAT06512V5L-E	L	●			●		0.65	0.9	0.05	9.525	3.18	
	GTAT07520V5R-E	R	●	●		●		0.75	1.8	0.05	9.525	3.18	
	GTAT07520V5L-E	L	●	★		●		0.75	1.8	0.05	9.525	3.18	
	GTAT09520V5R-E	R	●	●		●		0.95	1.8	0.05	9.525	3.18	
	GTAT09520V5L-E	L	●	★		●		0.95	1.8	0.05	9.525	3.18	
	GTAT10020V5R-E	R	●	●		●		1.00	1.8	0.05	9.525	3.18	Right hand insert shown. 
	GTAT10020V5L-E	L	●	★		●		1.00	1.8	0.05	9.525	3.18	
	GTAT1002001R-E	R		●				1.00	1.8	0.1	9.525	3.18	
	GTAT1002001L-E	L		★				1.00	1.8	0.1	9.525	3.18	
NEW	GTAT11020V5R-E	R	●			●		1.10	1.8	0.05	9.525	3.18	
NEW	GTAT11020V5L-E	L	●			●		1.10	1.8	0.05	9.525	3.18	
	GTAT12020V5R-E	R	●	●		●		1.20	1.8	0.05	9.525	3.18	Right hand insert shown. 
	GTAT12020V5L-E	L	●	★		●		1.20	1.8	0.05	9.525	3.18	
	GTAT1202001R-E	R		●				1.20	1.8	0.1	9.525	3.18	
	GTAT1202001L-E	L		★				1.20	1.8	0.1	9.525	3.18	
NEW	GTAT12520V5R-E	R	●			●		1.25	1.8	0.05	9.525	3.18	
NEW	GTAT12520V5L-E	L	●			●		1.25	1.8	0.05	9.525	3.18	
	GTAT14020V5R-E	R	●	●		●		1.40	1.8	0.05	9.525	3.18	Right hand insert shown. 
	GTAT14020V5L-E	L	●	★		●		1.40	1.8	0.05	9.525	3.18	
	GTBT14530V5R-E	R	●			●		1.45	2.8	0.05	9.525	3.18	
	GTBT14530V5L-E	L	●			●		1.45	2.8	0.05	9.525	3.18	
	GTBT15030V5R-E	R	●	●		●		1.50	2.8	0.05	9.525	3.18	
	GTBT15030V5L-E	L	●	★		●		1.50	2.8	0.05	9.525	3.18	
	GTBT1503001R-E	R		●				1.50	2.8	0.1	9.525	3.18	Right hand insert shown. 
	GTBT1503001L-E	L		★				1.50	2.8	0.1	9.525	3.18	
	GTBT17030V5R-E	R	●			●		1.70	2.8	0.05	9.525	3.18	
	GTBT17030V5L-E	L	●			●		1.70	2.8	0.05	9.525	3.18	
	GTBT17530V5R-E	R	●			●		1.75	2.8	0.05	9.525	3.18	
	GTBT17530V5L-E	L	●			●		1.75	2.8	0.05	9.525	3.18	

Right hand insert shown.

1/3

(Each case contains 5 inserts. Blank inserts are packed in 10 per case.)

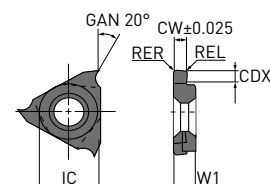
* CDX is a value that assumes the machining diameter of $\varnothing 42$ or less.
Please note that the maximum machining depth is limited by the holder used.

● / ★ = Expansion

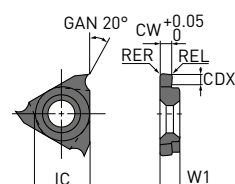
● : Inventory maintained. ★ : Inventory maintained in Japan.

GT SERIES – INSERTS

Order number	Hand	MS7025	VP15TF	VP15KZ	MT2015	TF15	CW	CDX*	RER/L	IC	W1	Geometry
GTBT18030V5R-E	R	●	●		●		1.80	2.8	0.05	9.525	3.18	E Type (Ring and circlip grooving)
GTBT18030V5L-E	L	●	★		●		1.80	2.8	0.05	9.525	3.18	
GTBT20030V5R-E	R	●	●		●		2.00	2.8	0.05	9.525	3.18	
GTBT20030V5L-E	L	●	★		●		2.00	2.8	0.05	9.525	3.18	
GTBT2003001R-E	R	●	●				2.00	2.8	0.1	9.525	3.18	
GTBT2003001L-E	L	●	★				2.00	2.8	0.1	9.525	3.18	
GTBT22530V5R-E	R	●	●		●		2.25	2.8	0.05	9.525	3.18	
GTBT22530V5L-E	L	●	★		●		2.25	2.8	0.05	9.525	3.18	
GTBT2253001R-E	R	●					2.25	2.8	0.1	9.525	3.18	
GTBT2253001L-E	L	●					2.25	2.8	0.1	9.525	3.18	
GTCT25030V5R-E	R	●	★		●		2.50	2.8	0.05	9.525	3.18	
GTCT25030V5L-E	L	●	★		●		2.50	2.8	0.05	9.525	3.18	
GTCT2503001R-E	R	●					2.50	2.8	0.1	9.525	3.18	
GTCT2503001L-E	L	●					2.50	2.8	0.1	9.525	3.18	
GTCT27530V5R-E	R	●	★		●		2.75	2.8	0.05	9.525	3.18	
GTCT27530V5L-E	L	●	★		●		2.75	2.8	0.05	9.525	3.18	
GTCT30030V5R-E	R	●	★		●		3.00	2.8	0.05	9.525	3.18	
GTCT30030V5L-E	L	●	★		●		3.00	2.8	0.05	9.525	3.18	
GTCT3003001R-E	R	●					3.00	2.8	0.1	9.525	3.18	
GTCT3003001L-E	L	●					3.00	2.8	0.1	9.525	3.18	
GTAT03006V3R-U	R	●	●		●		0.30	0.27	0.03	9.525	3.18	U Type (General purpose grooving)
GTAT03006V3L-U	L	●	★		●		0.30	0.27	0.03	9.525	3.18	
GTAT05012V5R-U	R	●	●		●		0.50	0.9	0.05	9.525	3.18	
GTAT05012V5L-U	L	●	★		●		0.50	0.9	0.05	9.525	3.18	
GTAT07520V5R-U	R	●	●		●		0.75	1.8	0.05	9.525	3.18	
GTAT07520V5L-U	L	●	★		●		0.75	1.8	0.05	9.525	3.18	
GTAT09520V5R-U	R	●	●		●		0.95	1.8	0.05	9.525	3.18	
GTAT09520V5L-U	L	●	★		●		0.95	1.8	0.05	9.525	3.18	
GTAT10020V5R-U	R	●	●		●		1.00	1.8	0.05	9.525	3.18	
GTAT10020V5L-U	L	●	★		●		1.00	1.8	0.05	9.525	3.18	
GTAT10320V5R-U	R		●				1.03	1.8	0.05	9.525	3.18	
GTAT12520V5R-U	R	●	●		●		1.25	1.8	0.05	9.525	3.18	
GTAT12520V5L-U	L	●	★		●		1.25	1.8	0.05	9.525	3.18	
GTBT14530V5R-U	R	●	●		●		1.45	2.8	0.05	9.525	3.18	
GTBT14530V5L-U	L	●	★		●		1.45	2.8	0.05	9.525	3.18	
GTBT15030V5R-U	R	●	●		●		1.50	2.8	0.05	9.525	3.18	
GTBT15030V5L-U	L	●	★		●		1.50	2.8	0.05	9.525	3.18	
GTBT17530V5R-U	R	●	●		●		1.75	2.8	0.05	9.525	3.18	
GTBT17530V5L-U	L	●	★		●		1.75	2.8	0.05	9.525	3.18	
GTBT20030V5R-U	R	●	●		●		2.00	2.8	0.05	9.525	3.18	
GTBT20030V5L-U	L	●	★		●		2.00	2.8	0.05	9.525	3.18	
GTCT25030V5R-U	R	●	★		●		2.50	2.8	0.05	9.525	3.18	
GTCT25030V5L-U	L	●	★		●		2.50	2.8	0.05	9.525	3.18	



Right hand insert shown.



Right hand insert shown.

2/3

(Each case contains 5 inserts. Blank inserts are packed in 10 per case.)

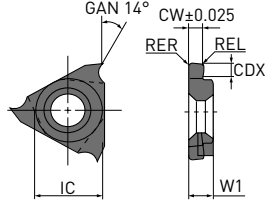
* CDX is a value that assumes the machining diameter of $\varnothing 42$ or less.
Please note that the maximum machining depth is limited by the holder used.

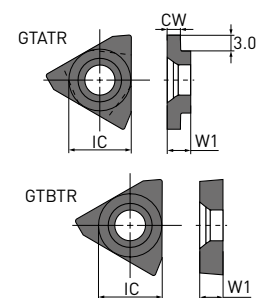
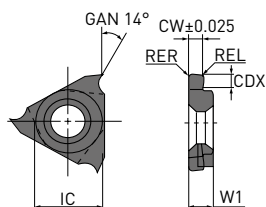


● / ★ = Expansion

● : Inventory maintained. ★ : Inventory maintained in Japan.

GT SERIES – INSERTS

Order number	Hand	MS7025	VP15TF	VP15KZ	MT2015	TF15	CW	CDX*	RER/L	IC	W1	Geometry
GTAT0330600R-VT	R			●			0.33	0.25	0	9.525	3.18	VT Type (Grooving, Side turning) 
GTAT0431200R-VT	R			●			0.43	0.9	0	9.525	3.18	
GTAT0532000R-VT	R			●			0.53	1.6	0	9.525	3.18	
GTAT0652000R-VT	R			●			0.65	1.6	0	9.525	3.18	
GTAT0752000R-VT	R			●			0.75	1.6	0	9.525	3.18	
GTAT0802000R-VT	R			●			0.80	1.6	0	9.525	3.18	
GTAT0852000R-VT	R			●			0.85	1.6	0	9.525	3.18	
GTAT0952000R-VT	R			●			0.95	1.6	0	9.525	3.18	
GTAT1002000R-VT	R			●			1.00	1.6	0	9.525	3.18	
GTAT1102000R-VT	R			●			1.10	1.6	0	9.525	3.18	
GTAT1202000R-VT	R			●			1.20	1.6	0	9.525	3.18	
GTAT1302000R-VT	R			●			1.30	1.6	0	9.525	3.18	
GTAT1402000R-VT	R			●			1.40	1.6	0	9.525	3.18	
GTBT1503000R-VT	R			●			1.50	2.7	0	9.525	3.18	
GTBT2003000R-VT	R			●			2.00	2.7	0	9.525	3.18	
GTATR	R					★	1.76	—	—	9.525	3.18	Blank
GTATL	L					★	1.76	—	—	9.525	3.18	
GTBTR	R					★	—	—	—	9.525	3.18	
GTBTL	L					★	—	—	—	9.525	3.18	



Right hand insert shown.

3/3

(Each case contains 5 inserts. Blank inserts are packed in 10 per case.)

* CDX is a value that assumes the machining diameter of $\varnothing 42$ or less.
Please note that the maximum machining depth is limited by the holder used.



● / ★ = Expansion

● : Inventory maintained. ★ : Inventory maintained in Japan.

GT SERIES

RECOMMENDED CUTTING CONDITIONS

	Material	Hardness	Grade	Vc	f
P	Pure iron, Free cutting steel	—	MS7025, VP15TF	110 (30 – 180)	0.05 (0.01 – 0.09)
	Carbon steel , Alloy steel	180HB – 280HB	MS7025, VP15TF	100 (50 – 150)	0.05 (0.02 – 0.09)
M	Stainless steel	≤200HB	MS7025	80 (50 – 120)	0.03 (0.02 – 0.05)
N	Non-Ferrous metal	—	MT2015	150 (70 – 230)	0.07 (0.03 – 0.11)

1/1



SH-GTAF

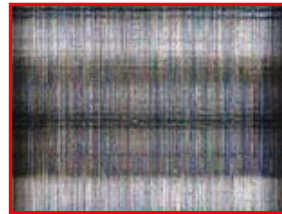
APPLICATION EXAMPLES

SUS304: COMPARISON OF MACHINED SURFACES (ROUND SHANK HOLDER)

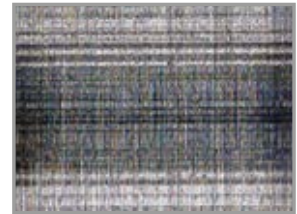
High rigidity and large machining depth provide excellent resistance to chatter and vibration.

Material	SUS304 Ø 16 mm
Vc (m/min)	80
f (mm/rev)	0.03, 0.07
Groove width (mm)	3.0
Groove depth (mm)	1.5
Cutting mode	Wet cutting

f = 0.03 (mm/rev)

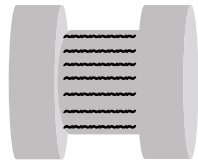


SH-GTAF



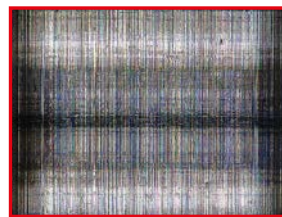
Conventional

Chatter and vibration occurred.

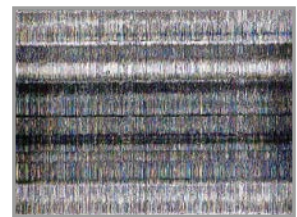


Traces of chatter and vibration

f = 0.07 (mm/rev)



SH-GTAF



Conventional

Chatter and vibration occurred.

MT2015

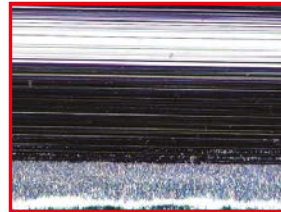
APPLICATION EXAMPLES

COMPARISON OF CUTTING EDGE DAMAGE : A6061

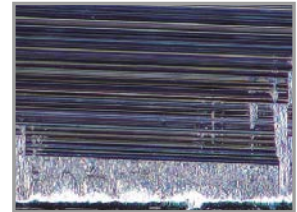
By suppressing damage to the cutting edge caused by chip welding, longer tool life can be expected.

Material	A6061 Ø 18 mm
Vc (m/min)	150
f (mm/rev)	0.04
Radial depth of cut (mm)	2.5
Cutting mode	Wet cutting

AFTER 1 MACHINING PASS

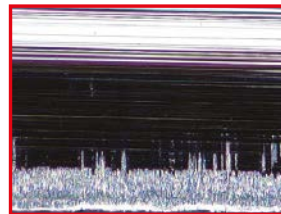


GTBT - MT2015

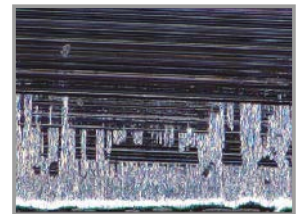


Conventional

AFTER 50 MACHINING PASSES

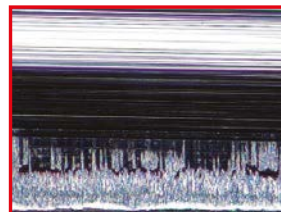


GTBT - MT2015

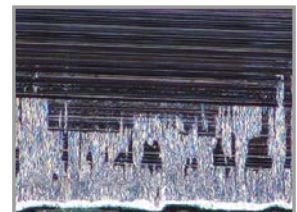


Conventional

AFTER 100 MACHINING PASSES



GTBT - MT2015



Conventional

MS7025

APPLICATION EXAMPLES

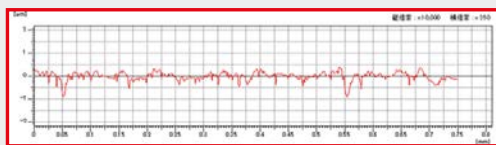
COMPARISON OF SURFACE ROUGHNESS AND CUTTING EDGE DAMAGE: PURE IRON-BASED SOFT MAGNETIC MATERIALS

The component surface roughness is excellent because damage caused by welding is suppressed. It also has excellent wear resistance.

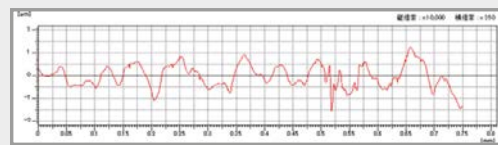
SURFACE ROUGHNESS WHEN FINISHING A GROOVE WITH A BOTTOM DIAMETER OF 11MM

MS7025 achieves a good component surface finish from the start of machining and maintains excellent consistency even after 100 passes.

AFTER 50 MACHINING PASSES

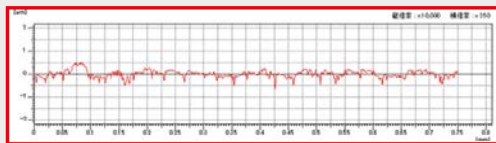


GTBT - MS7025

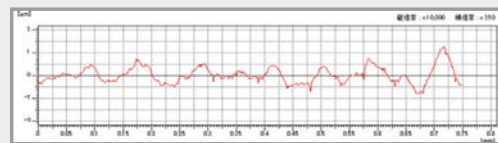


Conventional

AFTER 100 MACHINING PASSES



GTBT - MS7025



Conventional

Measurement
position



CUTTING EDGE DAMAGE

Material	Pure iron-based soft magnetic material $\varnothing 16$ mm
V_c (m/min)	150
f (mm/rev)	0.04
Radial depth of cut (mm)	2.5
Cutting mode	Wet cutting

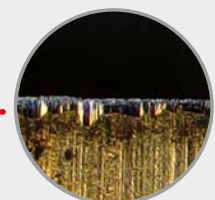
AFTER 50 MACHINING PASSES



GTBT - MS7025



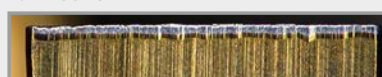
Conventional
Chipping occurred due to welding.



AFTER 100 MACHINING PASSES



GTBT - MS7025



Conventional

NEW

XB SERIES

INDEXABLE TURNING TOOL



Interested in more...

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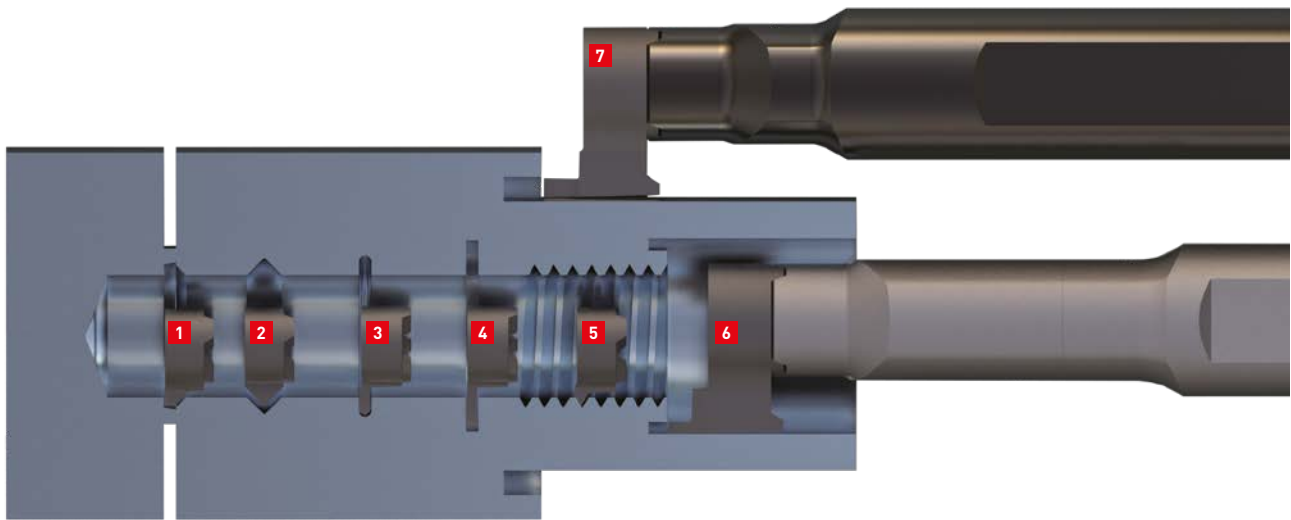
 **MITSUBISHI MATERIALS**

XB SERIES

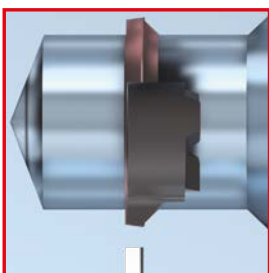
INDEXABLE TURNING TOOL

VERSATILE RANGE OF APPLICATIONS WITH ONE HOLDER

With high-quality cutting edges and excellent sharpness, a full range of tools for a variety of applications are available. Experience the efficiency and stability provided by this new indexable turning tool.

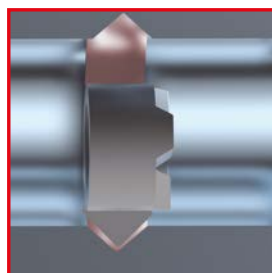


1 CHAMFERING
(Internal cutting for cutting off)



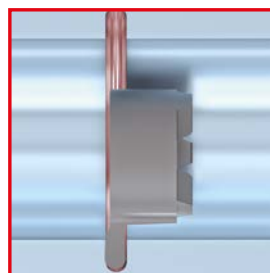
XBSX

2 CHAMFERING



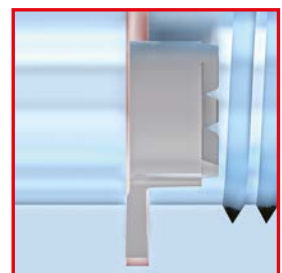
XBSC

3 GROOVING
(Round type)



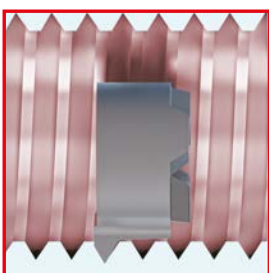
XBSR

4 GROOVING
(Flat type)



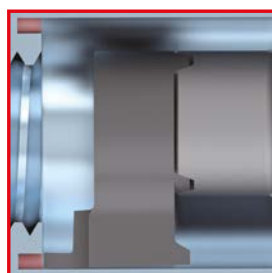
XB SG

5 INTERNAL THREADING



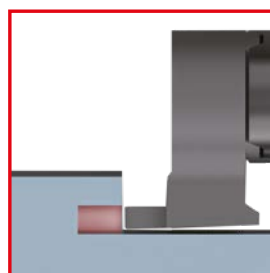
XBST

6 INTERNAL SIDE FACE GROOVING



XBSF

7 EXTERNAL SIDE FACE GROOVING



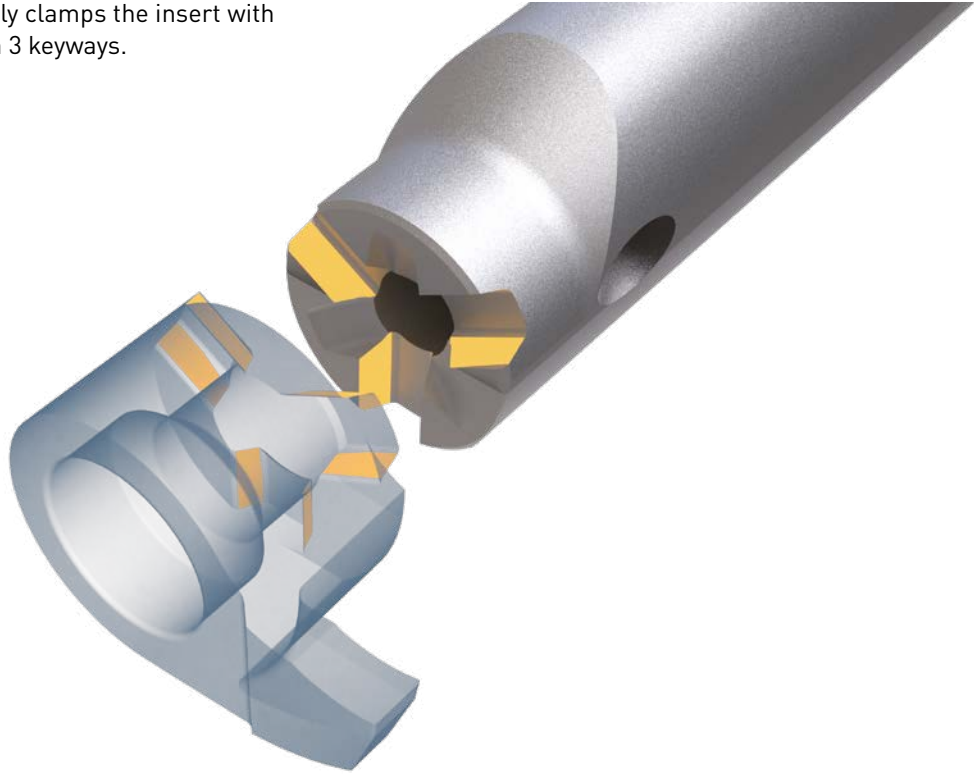
XBSE

XB SERIES

FEATURES

SIX-SIDED RESTRAINT

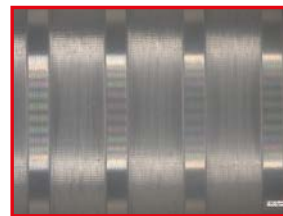
Highly rigid design that firmly clamps the insert with six side restraints located in 3 keyways.



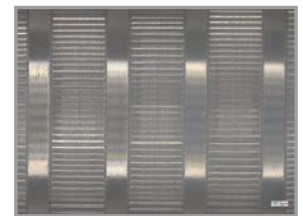
SUS304: COMPARISON OF GROOVING SURFACES

The XB Series excels at suppressing chatter and vibration.

Material	SUS304
Tool	XBSG08H08200R005R
Vc (m/min)	65
f (mm/rev)	0.01
Groove Shape (mm)	2.0 (Width) 0.75 (ap)
Cutting mode	Internal coolant 1 MPa



XB Series



Conventional

Chatter and vibration occurred.

XB SERIES

FEATURES

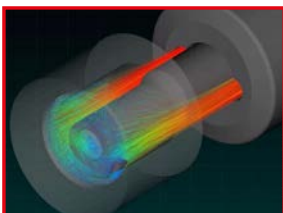
INTERNAL AND EXTERNAL COOLANT TYPE

Both types of holders, carbide and steel are supplied as standard with internal coolant. External coolant type is also standard for the steel holders, but it can be combined with the internal coolant type SLV sleeve holder.

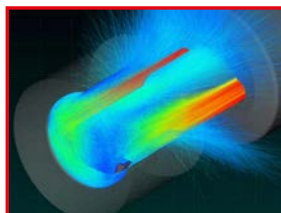


COMBINATION WITH SLV SLEEVE HOLDER

The internal coolant type SLV sleeve holder has a taper pipe thread at the rear end of the sleeve, that enables direct connection of high-pressure coolant. Supplying copious coolant through the tool provides adequate cooling and improves chip removal. This significantly reduces problems during internal machining.



Delivers large amounts of coolant.



Easily penetrates to the bottom of the hole and prevents chip accumulation.

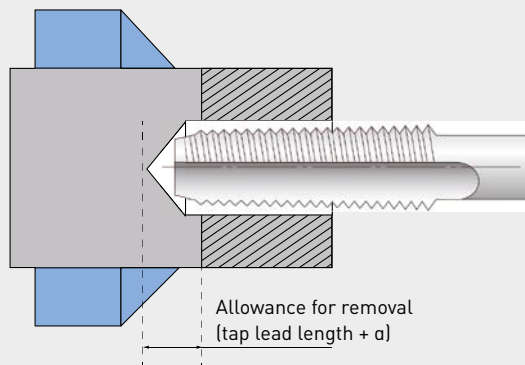


XB SERIES

PROPOSE A SOLUTION

THREADING: REPLACE TAPPING WITH AN INDEXABLE TURNING TOOL

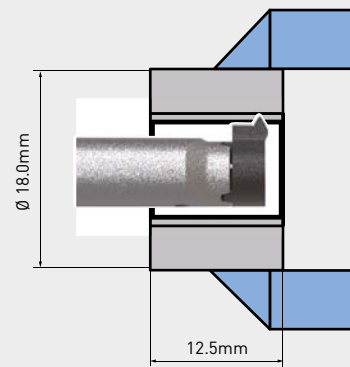
Compared to tapping, which requires a clearance (lead length + α), the XB Series can save work material and reduce cycle times. Therefore it is recommended to switch from tapping to using an indexable tool.



Tool	Carbide tap
Vc (m/min)	40
f (mm/rev)	1.25

A four step process is required to remove the chips.

With the XB Series, threading can be started immediately after cutting-off.



Tool	XB Series
Vc (m/min)	60
f (mm/rev)	1.25

6 passes

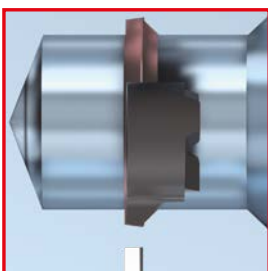
Tool life comparison using a tap and threading insert

Tap - Number of components machined - 100

XB Threading insert - Number of components machined - 176

REALISE BURR-FREE MACHINING BY UTILISING INTERNAL CUTTING OFF

Chamfering before cutting-off reduces the need for a deburring process.



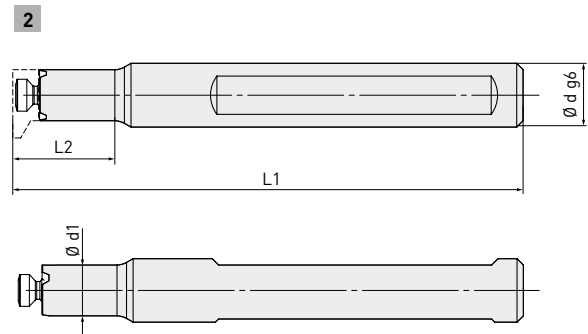
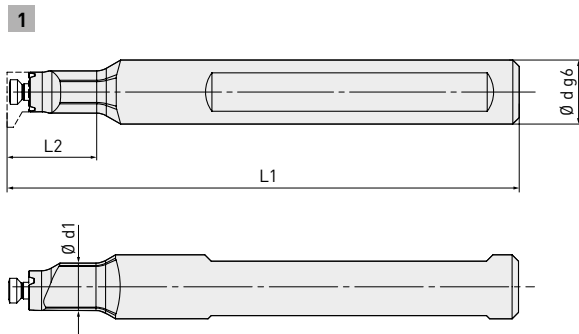
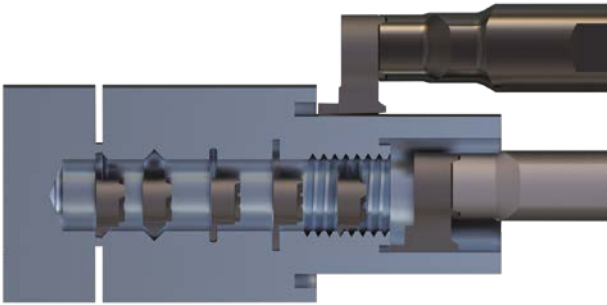
XB SERIES

MIN. CUTTING DIAMETER AND MAX. CUTTING DEPTH BY APPLICATION

Applications	Shape	Min. cutting diameter (mm)	Max. cutting depth (mm)	Holder type				
				H07	H08	H09	H11	H14
Grooving	Flat type	7.8	2.0	✓				
		8.0	1.0		✓			
		9.0	1.8			✓		
		10.0	2.8			✓		
		11.0	2.3				✓	
		14.0	4.0					✓
	Round type	8.0	1.0		✓			
		9.0	1.6			✓		
		11.0	2.3				✓	
		14.0	4.0					✓
	External side face	14.0	6.0					✓
	Internal side face	12.0	6.0					✓
Internal threading	Partial profile 60°	8.0	—		✓			
		9.0	—			✓		
		11.0	—				✓	
	ISO metric 60°	9.0	—			✓		
		11.0	—				✓	
		14.0	—					✓
Chamfering	45°	7.0	0.8	✓				
		8.0	1.4		✓			
		9.0	1.3			✓		
		11.0	1.5				✓	
		14.0	1.5					✓
	Internal cutting for cutting off	8.0	1.0		✓			
		9.0	1.5			✓		
		11.0	1.5				✓	
		14.0	1.5					✓

XBSH_S

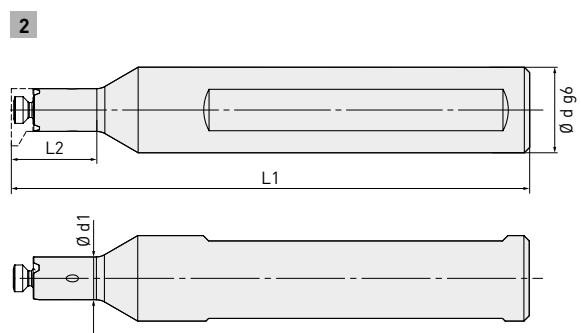
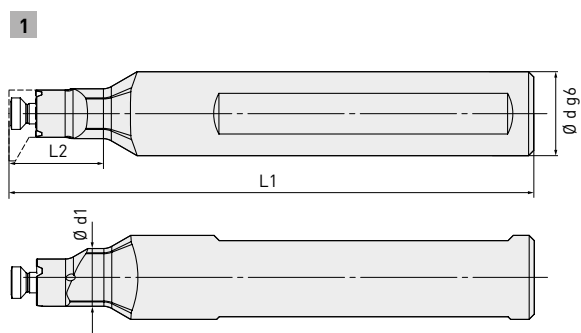
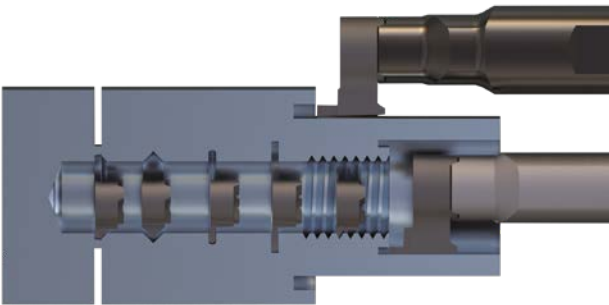
STEEL SHANK WITHOUT COOLANT HOLE



Order number	Hand	Stock	Ø d g6	Ø d1	L1	L2	Insert number	Type
XBSH070700080S	R	●	7	4.8 x 6	80	12	XBS○○○H07	1
XBSH080700080S	R	●	7	6	80	12	XBS○○○H08	2
XBSH091000080S	R	●	10	6.6 x 7.4	80	14	XBS○○○H09	1
XBSH111000080S	R	●	10	8	80	16	XBS○○○H11	2
XBSH141200080S	R	●	12	9.5 x 11	80	18	XBS○○○H14	1
								1/1

XBSH_S-C

STEEL SHANK WITH COOLANT HOLE

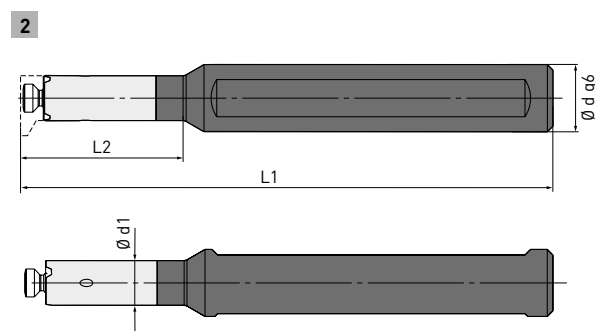
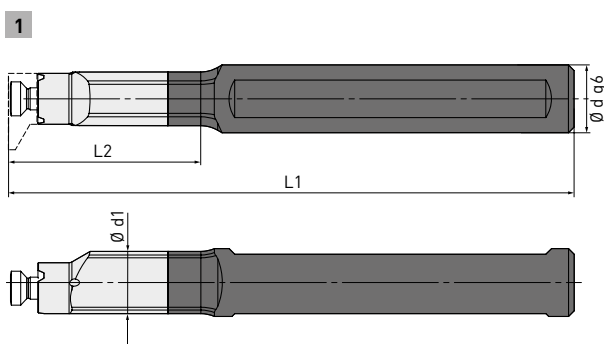
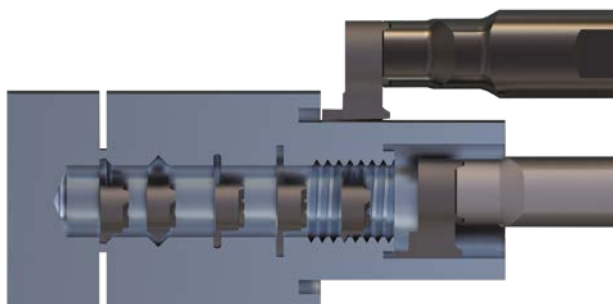


Order number	Hand	Stock	Ø d g6	Ø d1	L1	L2	Insert number	Type
XBSH071600080S-C	R	●	16	4.8 x 6	80	12	XBS○○○H07	1
XBSH081600080S-C	R	●	16	6	80	12	XBS○○○H08	2
XBSH091600095S-C	R	●	16	6.6 x 7.4	95	14	XBS○○○H09	1
XBSH111600097S-C	R	●	16	8	97	16	XBS○○○H11	2
XBSH141600100S-C	R	●	16	9.5 x 11	100	18	XBS○○○H14	1

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XBSH_C-C

CARBIDE SHANK WITH COOLANT HOLE



Order number	Hand	Stock	Ø d g6	Ø d1	L1	L2	Insert number	Type
XBSH071200080C-C	R	●	12	4.8 x 6	80	21	XBS○○○H07	1
XBSH081200080C-C	R	●	12	6	80	21	XBS○○○H08	2
XBSH091200090C-C	R	●	12	6.6 x 7.4	90	22	XBS○○○H09	1
XBSH091200098C-C	R	●	12	6.6 x 7.4	98	30	XBS○○○H09	1
XBSH111200095C-C	R	●	12	8	95	29	XBS○○○H11	2
XBSH111200110C-C	R	●	12	8	110	42	XBS○○○H11	2
XBSH141200100C-C	R	●	12	9.5 x 11	100	34	XBS○○○H14	1
XBSH141200110C-C	R	●	12	9.5 x 11	110	45	XBS○○○H14	1

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SPARE PARTS

Tool holder type			Torque (Nm)
	Clamp screw	Wrench	
XBSH07	TPS20-X	TIP7F-X	0.8
XBSH08	TPS26-X	TIP8F-X	1.2
XBSH09	TPS26-X	TIP8F-X	1.2
XBSH11	TPS35-X	TIP10F-X	3.5
XBSH14	TPS40-X	TIP15F-X	4.5

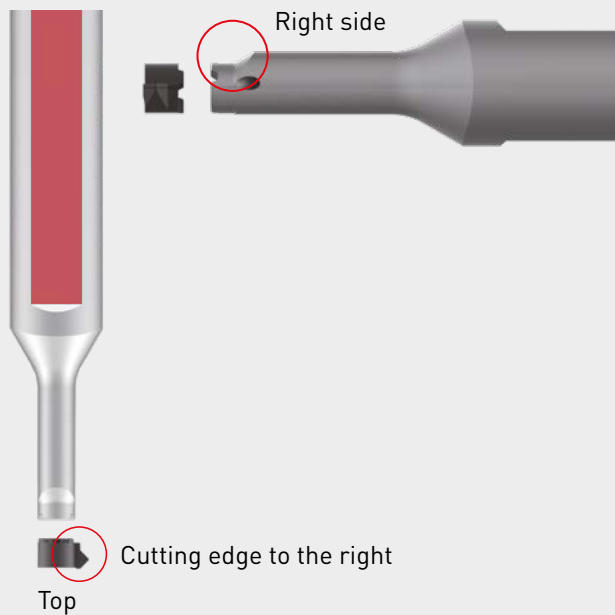
XB SERIES

PRECAUTIONS WHEN INSTALLING INSERTS

Set the cutting edge so that the tip faces to the right, using the flat surface of the holder as a reference.
The location of the keyway varies depending on the holder size.

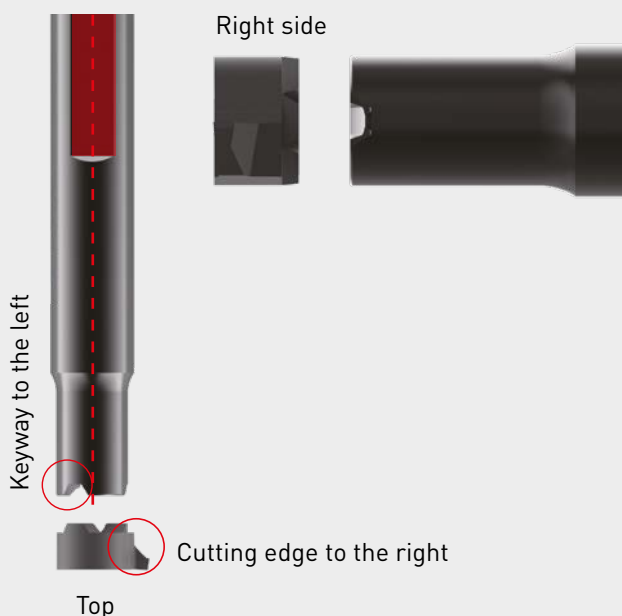
XBSH07/XBSH09/XBSH14

The holder datum is the flat surface with the slope shown below, and the cutting edge of the insert is on the right side.



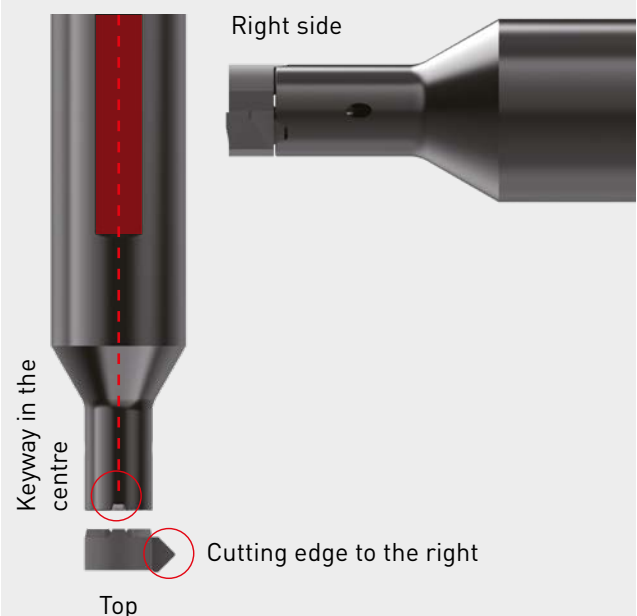
XBSH08

The holder has a cylindrical shape.
The side with the keyway to the left of the centre of the flat surface is the top.



XBSH11

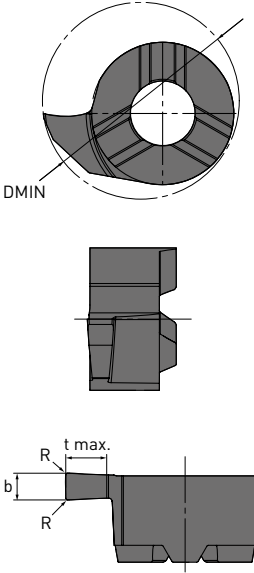
The holder is cylindrical.
The side with the key groove in the centre is the top.



XB SERIES

INSERTS

GROOVING (FLAT TYPE)

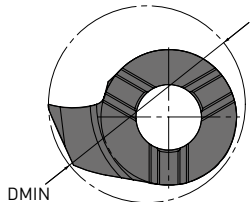
Order number	Hand	MPB115*	DMIN	R	t max.	b	Holder type	Geometry
XBSG08H07100R005R	R	●	7.8	0.05	2.0	1.00	H07	
XBSG08H07125R005R	R	●	7.8	0.05	2.0	1.25	H07	
XBSG08H07150R005R	R	●	7.8	0.05	2.0	1.50	H07	
XBSG08H07200R005R	R	●	7.8	0.05	2.0	2.00	H07	
XBSG08H08100R005R	R	●	8.0	0.05	1.0	1.00	H08	
XBSG08H08125R005R	R	●	8.0	0.05	1.0	1.25	H08	
XBSG08H08150R005R	R	●	8.0	0.05	1.0	1.50	H08	
XBSG08H08200R005R	R	●	8.0	0.05	1.0	2.00	H08	
XBSG09H09100R005R	R	●	9.0	0.05	1.8	1.00	H09	
XBSG09H09125R005R	R	●	9.0	0.05	1.8	1.25	H09	
XBSG09H09150R005R	R	●	9.0	0.05	1.8	1.50	H09	
XBSG09H09200R005R	R	●	9.0	0.05	1.8	2.00	H09	
XBSG10H09100R005R	R	●	10.0	0.05	2.8	1.00	H09	
XBSG10H09125R005R	R	●	10.0	0.05	2.8	1.25	H09	
XBSG10H09150R005R	R	●	10.0	0.05	2.8	1.50	H09	
XBSG10H09200R005R	R	●	10.0	0.05	2.8	2.00	H09	
XBSG10H09250R010R	R	●	10.0	0.10	2.8	2.50	H09	
XBSG10H09300R010R	R	●	10.0	0.10	2.8	3.00	H09	
XBSG11H11100R005R	R	●	11.0	0.05	2.3	1.00	H11	
XBSG11H11125R005R	R	●	11.0	0.05	2.3	1.25	H11	
XBSG11H11150R010R	R	●	11.0	0.10	2.3	1.50	H11	
XBSG11H11200R010R	R	●	11.0	0.10	2.3	2.00	H11	
XBSG11H11250R020R	R	●	11.0	0.20	2.3	2.50	H11	
XBSG11H11300R020R	R	●	11.0	0.20	2.3	3.00	H11	
XBSG14H14100R005R	R	●	14.0	0.05	4.0	1.00	H14	
XBSG14H14125R005R	R	●	14.0	0.05	4.0	1.25	H14	
XBSG14H14150R010R	R	●	14.0	0.10	4.0	1.50	H14	
XBSG14H14200R010R	R	●	14.0	0.10	4.0	2.00	H14	
XBSG14H14250R020R	R	●	14.0	0.20	4.0	2.50	H14	
XBSG14H14300R020R	R	●	14.0	0.20	4.0	3.00	H14	

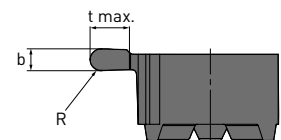
1/1

* Coated

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XB SERIES – INSERTS**GROOVING
(ROUND TYPE)**

Order number	Hand	MPB115*	DMIN	R	t max.	b	Holder type	Geometry
XBSR08H08080R040R	R	●	8.0	0.4	1.0	0.8	H08	
XBSR08H08100R050R	R	●	8.0	0.5	1.0	1.0	H08	
XBSR08H08200R100R	R	●	8.0	1.0	1.0	2.0	H08	
XBSR09H09080R040R	R	●	9.0	0.4	1.6	0.8	H09	
XBSR09H09100R050R	R	●	9.0	0.5	1.6	1.0	H09	
XBSR09H09200R100R	R	●	9.0	1.0	1.6	2.0	H09	
XBSR11H11080R040R	R	●	11.0	0.4	2.3	0.8	H11	
XBSR11H11100R050R	R	●	11.0	0.5	2.3	1.0	H11	
XBSR11H11200R100R	R	●	11.0	1.0	2.3	2.0	H11	
XBSR14H14100R050R	R	●	14.0	0.5	4.0	1.0	H14	
XBSR14H14200R100R	R	●	14.0	1.0	4.0	2.0	H14	
XBSR14H14300R150R	R	●	14.0	1.5	4.0	3.0	H14	



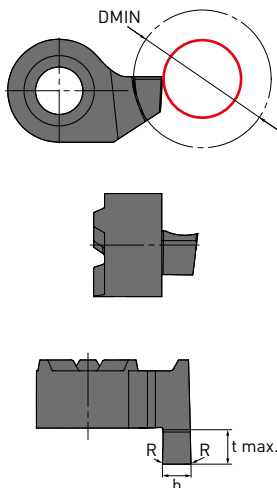
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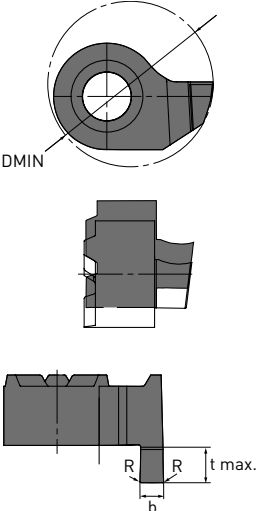
* Coated

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XB SERIES – INSERTS

EXTERNAL AND INTERNAL SIDE FACE GROOVING

Order number	Hand	MPB115*	DMIN	R	t max.	b	Holder type	Geometry
XBSE12H14100R010R	R	●	12.0	0.1	1.5	1.0	H14	External side face 
XBSE12H14150R010R	R	●	12.0	0.1	2.5	1.5	H14	
XBSE12H14200R010R	R	●	12.0	0.1	3.0	2.0	H14	
XBSE12H14250AR010R	R	●	12.0	0.1	3.0	2.5	H14	
XBSE12H14250BR010R	R	●	12.0	0.1	5.0	2.5	H14	
XBSE12H14300AR010R	R	●	12.0	0.1	3.0	3.0	H14	
XBSE12H14300BR010R	R	●	12.0	0.1	6.0	3.0	H14	

XBSF14H14100R010R	R	●	14.0	0.1	1.5	1.0	H14	Internal side face 
XBSF14H14150R010R	R	●	14.0	0.1	2.5	1.5	H14	
XBSF14H14200R010R	R	●	14.0	0.1	3.0	2.0	H14	
XBSF14H14250AR010R	R	●	14.0	0.1	3.0	2.5	H14	
XBSF14H14250BR010R	R	●	14.0	0.1	5.0	2.5	H14	
XBSF14H14300AR010R	R	●	14.0	0.1	3.0	3.0	H14	
XBSF14H14300BR010R	R	●	14.0	0.1	6.0	3.0	H14	

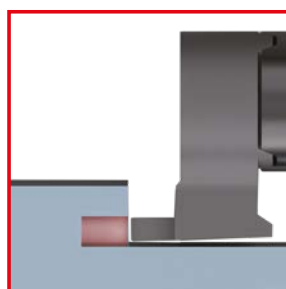
1/1

* Coated

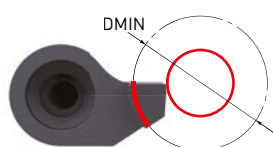
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It is designed to avoid interference, therefore correct installation is important.

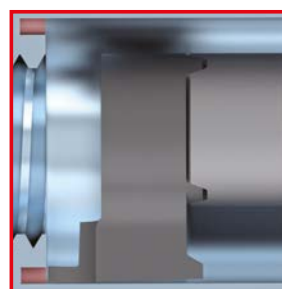
EXTERNAL SIDE FACE



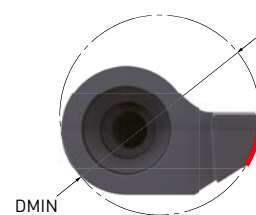
Relief angle is inside



INTERNAL SIDE FACE

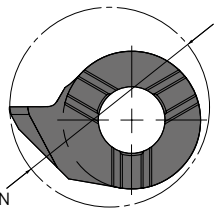
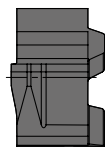
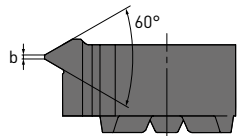


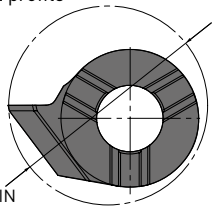
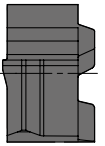
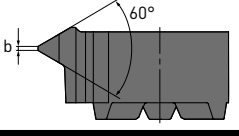
Relief angle is outside



XB SERIES – INSERTS

INTERNAL THREADING

Order number	Hand	MPB115*	DMIN	b	Pitch	Holder type	Geometry
XBST09H09100ISOR	R	●	9.0	0.12	1.00	H09	ISO metric 60°   
XBST09H09150ISOR	R	●	9.0	0.18	1.50	H09	
XBST09H09175ISOR	R	●	9.0	0.20	1.75	H09	
XBST11H11100ISOR	R	●	11.0	0.12	1.00	H11	
XBST11H11150ISOR	R	●	11.0	0.18	1.50	H11	
XBST11H11200ISOR	R	●	11.0	0.25	2.00	H11	
XBST14H14100ISOR	R	●	14.0	0.12	1.00	H14	
XBST14H14150ISOR	R	●	14.0	0.18	1.50	H14	
XBST14H14200ISOR	R	●	14.0	0.25	2.00	H14	
XBST14H14250ISOR	R	●	14.0	0.31	2.50	H14	

XBST08H0805060R	R	●	8.0	0.06	0.5 – 0.75	H08	Partial profile 60°   
XBST08H0810060R	R	●	8.0	0.12	1.0 – 1.25	H08	
XBST08H0815060R	R	●	8.0	0.18	1.5 – 1.75	H08	
XBST09H0905060R	R	●	9.0	0.06	0.5 – 0.75	H09	
XBST09H0910060R	R	●	9.0	0.12	1.0 – 1.25	H09	
XBST09H0915060R	R	●	9.0	0.18	1.5 – 1.75	H09	
XBST09H0917560R	R	●	9.0	0.20	1.75 – 2.0	H09	
XBST11H1110060R	R	●	11.0	0.12	1.0 – 1.25	H11	
XBST11H1115060R	R	●	11.0	0.18	1.5 – 1.75	H11	
XBST11H1120060R	R	●	11.0	0.25	2.0 – 2.5	H11	

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* Coated

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XB SERIES – INSERTS

CHAMFERING

Order number	Hand	MPB115*	DMIN	R	t max.	Holder type	Geometry
XBSC07H074545R020R	R	●	7.0	0.2	0.8	H07	
XBSC08H084545R020R	R	●	8.0	0.2	1.4	H08	
XBSC09H094545R020R	R	●	9.0	0.2	1.3	H09	
XBSC11H114545R020R	R	●	11.0	0.2	1.5	H11	
XBSC14H144545R020R	R	●	14.0	0.2	1.5	H14	

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* Coated

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CHAMFERING (INTERNAL CUTTING FOR CUTTING OFF)

Order number	Hand	MPB115*	DMIN	t max.	t	b	Holder type	Geometry
XBSX08H080845R	R	●	8.0	1.0	0.2	1.0	H08	
XBSX09H090845R	R	●	9.0	1.5	0.2	1.0	H09	
XBSX11H110845R	R	●	11.0	1.5	0.2	1.0	H11	
XBSX14H140845R	R	●	14.0	1.5	0.2	1.0	H14	

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* Coated

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● : Inventory maintained. ★ : Inventory maintained in Japan.

XB SERIES

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED

	Material		Heat treatment	Hardness	Vc
P	Non-alloyed steel	S10C	Annealing	125 HB	160 [100 – 260]
		S45C	Annealing	190 HB	140 [80 – 230]
		S45C	Tempering	250 HB	140 [80 – 180]
		S55C	Annealing	270 HB	110 [70 – 180]
		S55C	Tempering	300 HB	100 [60 – 150]
	Low alloy steel	SCM415	Annealing	180 HB	110 [70 – 180]
		SCM415	Tempering	275 HB	100 [60 – 150]
		SCM440	Tempering	300 HB	90 [50 – 140]
		SCM440	Tempering	375 HB	80 [50 – 130]
	High alloy steel	S45C, SCM440	Annealing	200 HB	80 [50 – 130]
		SKD61	Quenching and tempering	300 HB	70 [40 – 100]
		SKD61	Quenching and tempering	400 HB	50 [30 – 80]
M	Ferritic stainless steel	SUS430	Annealing	200 HB	100 [60 – 160]
	Martensitic stainless steel	SUS420J1, SUS420J2	Tempering	250 HB	90 [50 – 140]
	Austenitic stainless steel	SUS304	Quench hardening	200 HB	80 [50 – 180]
		SUH310	Tempering	300 HB	70 [40 – 140]
	Duplex stainless steel	SUS329J1	Annealing	230 HB	60 [40 – 110]
K	Grey cast iron	FC200	—	180 HB	90 [50 – 230]
		FC300	—	260 HB	100 [50 – 160]
	Ductile cast iron, Ferrite	FCD400	—	160 HB	80 [50 – 150]
	Ductile cast iron, Pearlite	FCD700	—	250 HB	70 [40 – 130]
	Malleable cast iron, Ferrite	FCMB350	—	130 HB	120 [70 – 230]
	Malleable cast iron, Pearlite	FCMP490	—	230 HB	100 [60 – 190]
N	Forged aluminium alloys	A1050	Annealing	60 HB	290 [180 – 540]
		A6061	Hardening Treatment	100 HB	280 [170 – 510]
	Cast aluminium alloys	AC4A	Annealing	75 HB	240 [140 – 440]
		AC4CH	Hardening Treatment	90 HB	200 [120 – 380]
		AC9B, ADC14	Hardening Treatment	130 HB	120 [70 – 230]
	Copper, Copper alloys	C3604	—	110 HB	210 [130 – 390]
		C2700	—	90 HB	180 [110 – 330]
		C1100	—	100 HB	130 [90 – 290]
	Magnesium alloys	AZ61	—	70 HB	100 [70 – 290]
S	Titanium alloys	Ti-99.5	—	—	50 [30 – 100]
		Ti-6Al-4V, Ti-3Al-2.5V	Hardening Treatment	—	40 [20 – 60]
		Ti-5Al-5V-5Mo-3Cr, Ti-10V-2Fe-3Al	—	410 HB	30 [20 – 50]

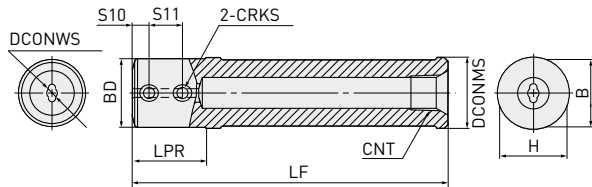
1/1

FEED PER REVOLUTION

Machining	f (mm/rev)
Grooving	0.01 – 0.03
Boring and profiling	0.03 – 0.10
End face grooving	0.02 – 0.06

XB SERIES

SLV HOLDER



WITH COOLANT HOLE

Order number	Stock	DCONMS	DCONWS	BD	LF	LU	H	B	S10	S11	CNT
SLV190080070A	●	19.05	7.0	18.5	80	20	17.8	17.8	5.0	10	Rc1/8
SLV190110070A	●	19.05	7.0	18.5	110	20	17.8	17.8	5.0	10	Rc1/8
SLV200080070A	●	20.0	7.0	19.0	80	20	18.8	18.8	5.0	10	Rc1/8
SLV220115070A	●	22.0	7.0	20.0	115	20	20.8	20.8	5.0	10	Rc1/8
SLV250067070A	●	25.0	7.0	20.0	67	20	23.9	23.9	5.0	10	Rc1/8
SLV250110070A	●	25.0	7.0	20.0	110	20	23.9	23.9	5.0	10	Rc1/8
SLV254080070A	●	25.4	7.0	20.0	80	20	24.4	24.4	5.0	10	Rc1/8
SLV254110070A	●	25.4	7.0	20.0	110	20	24.4	24.4	5.0	10	Rc1/8
SLV320110070A	●	32.0	7.0	20.0	110	22	31.1	31.1	5.0	10	Rc1/8
SLV320110100A	●	32.0	10.0	25.0	110	22	31.1	31.1	5.0	10	Rc1/4
SLV320110120A	●	32.0	12.0	25.0	110	22	31.1	31.1	5.0	10	Rc3/8

1/1

XB SERIES – SLV HOLDER**MOUNTING CHART**

Series		Boring bar type	Holder type
XB	Multifunction	XBSH07	SLV0000000070A/N
XB	Multifunction	XBSH08	SLV0000000070A/N
XB	Multifunction	XBSH09	SLV0000000100A/N
XB	Multifunction	XBSH11	SLV0000000100A/N
XB	Multifunction	XBSH14	SLV0000000120A/N
MICRO-MINI TWIN	Boring	CB07RS	SLV0000000070A/N
MICRO-MINI TWIN	Grooving	CG0712RS	SLV0000000070A/N
MICRO-MINI TWIN	Grooving	CG0713RS	SLV0000000070A/N
MICRO-MINI TWIN	Grooving	CG07RS	SLV0000000070A/N
MICRO-DEX	Internal	C07KS000R00	SLV0000000070A/N
BORING BAR	Internal	C08-07S000R/L	SLV0000000070A/N
BORING BAR	Internal	C12-10S000R/L	SLV0000000100A/N
BORING BAR	Internal	C13-10SDQCR/L	SLV0000000100A/N
BORING BAR	Internal	C14-10SDUCR/L	SLV0000000100A/N
BORING BAR	Internal	C/S14-12S000R/L	SLV0000000120A/N
BORING BAR	Internal	C16-10SVPCR/L	SLV0000000100A/N
BORING BAR	Internal	C/S16-12S000R/L	SLV0000000120A/N
BORING BAR	Internal	C/S20-12SVPBR/L	SLV0000000120A/N

1/1

SPARE PARTS

Tool holder type			Torque (Nm)
	Clamp screw	Wrench	
SLV0000000070A/N	HSS05004	HKY25R	4.0
SLV0000000100A/N			
SLV0000000120A/N			

BORING BARS AND INSERTS FOR SMALL PARTS MACHINING

COMPATIBLE WITH SWISS-TYPE AUTOMATIC LATHES



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B210-H

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 **MITSUBISHI MATERIALS**

BORING BARS AND INSERTS FOR SMALL PARTS MACHINING

OVERALL LENGTH COMPATIBLE WITH SWISS-TYPE AUTOMATIC LATHES



SCREW-ON TYPE

CARBIDE SHANK:

80 mm, 90 mm, 140 mm, 180 mm

HARD STEEL SHANK*:

70 mm, 80 mm, 90 mm

* The shank material has excellent resistance to damage caused by chip evacuation.

STEEL SHANK:

90 mm, 150 mm

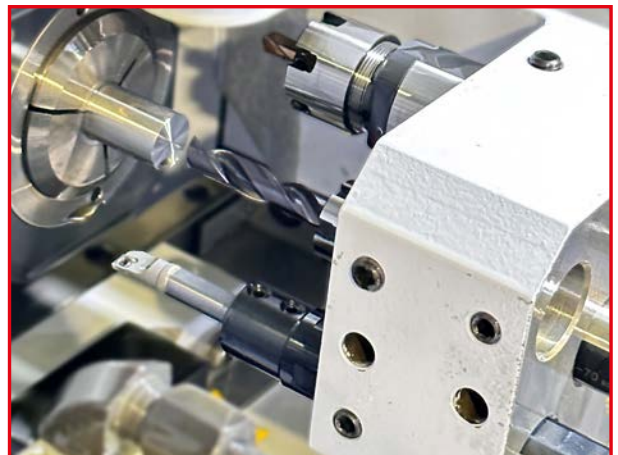
WITH COOLANT HOLE

Some items with small diameter carbide shanks do not have a coolant hole.

Please check the series list on page 42.

NO NEED TO SHORTEN THE SHANK

The length of the tools are compatible with Swiss-type automatic lathes, therefore no need to cut the shank to prevent interference.



THROUGH COOLANT CARBIDE SHANK WITH MINIMUM MACHINING DIAMETER OF 9 MM

The boring bar with a minimum machining diameter of 9 mm provides a large clearance and enables excellent chip evacuation.

CLEARANCE COMPARISON: HOLE DIAMETER 11 MM



Boring Bar for machining small parts
Minimum machining diameter of 9 mm



Dimple Bar
Minimum machining diameter of 10 mm

IDENTIFICATION

1. Shank material	4. Clamp structure	5. Insert shape	6. Cutting angle KAPR	7. Insert clearance
C Carbide shank	S Screw-on	C RHOMBIC 80°	U 93°	B 5° POSITIVE
H Hard steel shank		D RHOMBIC 55°	L 95°	C 7° POSITIVE
S Steel shank		T TRIANGULAR 60°	Q 107.5°	P 11° POSITIVE
		V RHOMBIC 35°	P 117.5°	
		W TRIGON	J 142°	

2. Min. machining Diameter DMIN (mm)	3. Shank diameter DCONMS (mm)
---	--------------------------------------

C	18	-	16	S	C	L	C	8	9	-	10	-	11
1	2		3	4	5	6	7						

8. Hand of tool	9. Cutting edge length symbol and inscribed circle	10. Tool length (mm)	11. Coolant hole
R Right hand	Inscribed circle (mm) 3.97 4.76 5.56 6.35 7.94 9.525	070 70	C With coolant hole
L Left hand	RHOMBIC 80° 03 04 — 06 08 09	080 80	
	RHOMBIC 55° — — — 07 — 11	090 90	
	TRIANGULAR 60° 06 08 09 11 — 16	140 140	
	RHOMBIC 35° — 08 — 11 — 16	150 150	
	TRIGON 02 L3 — 04 — 06	180 180	
		200 200	
		250 250	

SELECTION STANDARD

Insert shape	Holder type	KAPR	Shank material	Tool length	DMIN	DCONMS	Economical	Cutting edge strength	Profile turning	Internal coolant	Deep boring (L/D>6)	Holder	Insert
RHOMBIC 80° Normal clearance 7°	SCLC	95°	Carbide	80, 90	5 – 8	4 – 7		⊙			⊙	B210-H	60
			Carbide	90, 140, 180	9 – 34	8 – 32		⊙		⊙	⊙	B210-H	
			Hard Steel	70,80,90	5 – 10	4 – 8		⊙				43	
			Hard Steel	90	12	10		⊙		⊙		44	
			Steel	90, 150	14 – 34	12 – 32		⊙		⊙		B210-H	
RHOMBIC 80° Normal clearance 11°	SCLP	95°	Carbide	140, 180	12 – 30	10 – 25		⊙		⊙	⊙	B210-H	69
			Hard Steel	90	12	10		⊙		⊙		45	
			Steel	90, 150	14 – 30	12 – 25		⊙		⊙		B210-H	
TRIANGULAR 60° Normal clearance 7°	STUC	93°	Carbide	90	7 – 8	6 – 7	⊙				⊙	B210-H	80
			Carbide	90, 140, 180	9 – 32	8 – 25	⊙			⊙	⊙	B210-H	
			Hard Steel	80	7 – 10	6 – 8	⊙					46	
			Hard Steel	90	12	10	⊙			⊙		47	
			Steel	90, 150	14 – 40	12 – 32	⊙			⊙		B210-H	
TRIANGULAR 60° Normal clearance 11°	STUP	93°	Carbide	90, 140, 180	10 – 34	8 – 25	⊙			⊙	⊙	B210-H	83
			Hard Steel	80	10	8	⊙					48	
			Hard Steel	90	12	10	⊙			⊙		49	
			Steel	90, 150	14 – 34	12 – 25	⊙			⊙		B210-H	
RHOMBIC 55° Normal clearance 7°	SDUC	93°	Carbide	140, 180	14 – 32	10 – 25			⊙	⊙	⊙	B210-H	72
			Hard Steel	90	14	10			⊙	⊙		50	
			Steel	150	16 – 32	12 – 25			⊙	⊙		B210-H	
RHOMBIC 55° Normal clearance 7°	SDQC	107.5°	Carbide	140, 180	13 – 30	10 – 25			⊙	⊙	⊙	B210-H	72
			Hard Steel	90	13	10			⊙	⊙		51	
			Steel	90, 150	16 – 30	12 – 25			⊙	⊙		B210-H	
RHOMBIC 35° Normal clearance 7°	SVUC	93°	Carbide	140	16	12			⊙	⊙		52	90
			Steel	90	16	12			⊙	⊙		53	
	SVPC	117.5°	Carbide	140	16	10			⊙	⊙		54	
			Hard Steel	90	16	10			⊙	⊙		55	
	SVJC	142°	Steel	90, 150	16 – 20	12 – 16			⊙	⊙		57	
RHOMBIC 35° Normal clearance 5°	SVUB	93°	Carbide	180	20 – 34	16 – 25			⊙	⊙		52	87
			Steel	150, 200	20 – 40	16 – 32			⊙	⊙		53	
	SVPB	117.5°	Carbide	180	20 – 34	12 – 25			⊙	⊙		54	
			Steel	150, 200	20 – 40	12 – 32			⊙	⊙		56	
	SVJB	142°	Steel	150, 200, 250	25 – 50	20 – 40			⊙	⊙		57	
TRIGON Normal clearance 7°	SWUC	93°	Carbide	80, 90	6 – 8	5 – 7	⊙	⊙			⊙	B210-H	92
			Carbide	90, 140, 180	10 – 22	8 – 20	⊙	⊙		⊙	⊙	B210-H	
			Hard Steel	70,80	6 – 10	5 – 8	⊙	⊙				58	
			Hard Steel	80	12	10	⊙	⊙		⊙		59	
			Steel	90, 150	14 – 22	12 – 20	⊙	⊙		⊙		B210-H	

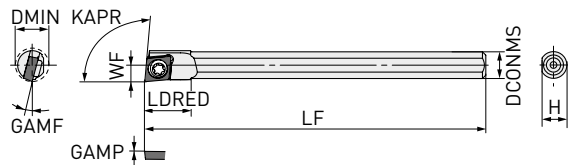
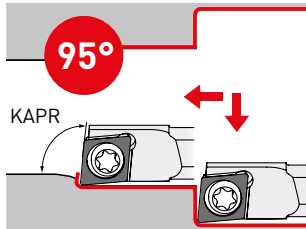
INSTRUCTIONS FOR THE USE OF CPGT, TPGX / TPMX TYPE INSERTS

Boring bars for machining small parts can use the inserts listed in the table below by changing the clamp screws.

Insert type	Clamp screw	Insert type	Clamp screw
CPGT0802⊙⊙ (Ø7.94)	TS3	TPGX0802⊙⊙ (Ø4.76)	CS200T
CPGT0903⊙⊙ (Ø9.525)	TS4	TPGX/TPMX0902⊙⊙ (Ø5.56)	CS250T
		TPGX/TPMX1103⊙⊙ (Ø9.525)	CS300890T

H-SCLC

HARD STEEL SHANK WITHOUT COOLANT HOLE



Right hand tool holder shown.

CC⁰⁰-Inserts



Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
H05-04SCLCR03-070	●	R	5	4	70	7	2.5	3.7	15°	0°	CC●●	03S1●●
H05-04SCLCL03-070	●	L	5	4	70	7	2.5	3.7	15°	0°		03S1●●
H055-04SCLCR03-070	●	R	5.5	4	70	7	2.95	3.7	15°	0°		03S1●●
H06-05SCLCR03-070	●	R	6	5	70	9	3.0	4.7	13°	0°		03S1●●
H06-05SCLCL03-070	●	L	6	5	70	9	3.0	4.7	13°	0°		03S1●●
H07-06SCLCR04-080	●	R	7	6	80	10	3.5	5.7	13°	0°		04T0●●
H07-06SCLCL04-080	●	L	7	6	80	10	3.5	5.7	13°	0°		04T0●●
H08-07SCLCR04-080	●	R	8	7	80	11	4.0	6.7	11°	0°		04T0●●
H08-07SCLCL04-080	●	L	8	7	80	11	4.0	6.7	11°	0°		04T0●●
H09-08SCLCR04-080	●	R	9	8	80	16	4.5	7.7	10°	0°		04T0●●
H10-08SCLCR04-080	●	R	10	8	80	16	5.0	7.7	9°	0°		04T0●●
H10-08SCLCR06-090	●	R	10	8	90	16	5.0	7.7	14°	0°		0602●●
H10-08SCLCL06-090	●	L	10	8	90	16	5.0	7.7	14°	0°		0602●●

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SPARE PARTS

Boring bar type



Clamp screw *



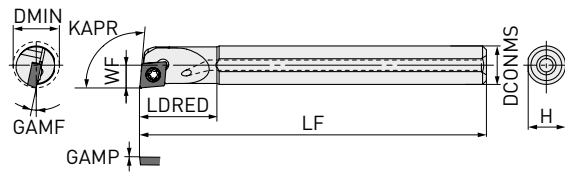
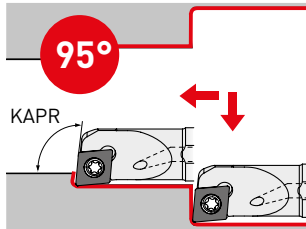
Wrench

H ⁰⁰ - ⁰⁰ SCLCR/L03	TS16	TKY06F
H ⁰⁰ - ⁰⁰ SCLCR/L04	TS21	TKY06F
H ⁰⁰ - ⁰⁰ SCLCR/L06	TS25	TKY08F

* Clamp torque [Nm]: TS16 = 0.6, TS21 = 0.6, TS25 = 1.0

H-SCLC-C

HARD STEEL SHANK WITH COOLANT HOLE



Right hand tool holder shown.

CC⁰⁰-Inserts



Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number
H12-10SCLCR06-090-C	●	R	12	10	90	20	6.0	9.7	12°	0°	CC ⁰⁰ 0602 ⁰⁰
H12-10SCLCL06-090-C	●	L	12	10	90	20	6.0	9.7	12°	0°	CC ⁰⁰ 0602 ⁰⁰

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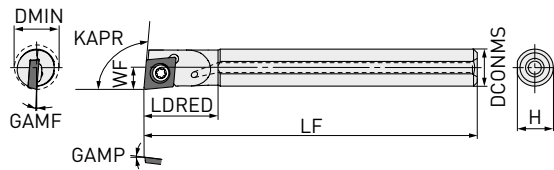
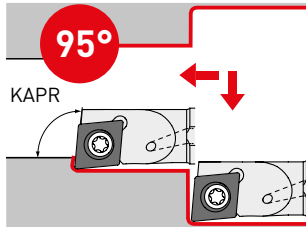
SPARE PARTS

Boring bar type	Clamp screw *	Wrench
H ⁰⁰ ⁰⁰ ⁰⁰ SCLCR/L06	TS25	TKY08F

* Clamp torque (Nm): TS25 = 1.0

H-SCLP-C

HARD STEEL SHANK WITH COOLANT HOLE



Right hand tool holder shown.

CP⁰⁰-Inserts

FP	FM	LP	LM
(08)	(08)	(08)	(08)
		Flat Top	PCBN/PCD
MP	MM		
(08)	(08)	(08)	(08)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number
H12-10SCLPR08-090-C	●	R	12	10	90	20	6.0	9.7	5°	5°	CP ⁰⁰ 0802 ⁰⁰
H12-10SCLPL08-090-C	●	L	12	10	90	20	6.0	9.7	5°	5°	CP ⁰⁰ 0802 ⁰⁰

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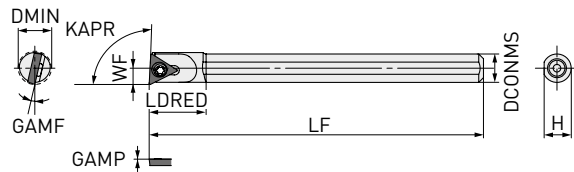
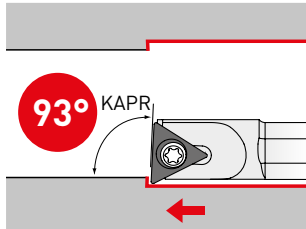
SPARE PARTS

Boring bar type		
	Clamp screw *	Wrench
H12-10SCLPR/L08	TS3D	TKY10F

* Clamp torque (Nm): TS3D = 2.5

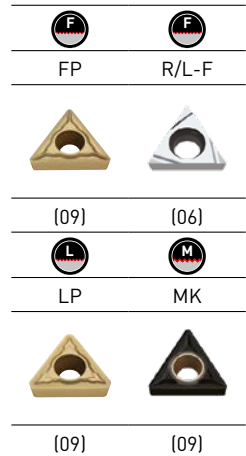
H-STUC

HARD STEEL SHANK WITHOUT COOLANT HOLE



Right hand tool holder shown.

TC⁰⁰-Inserts



Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
H07-06STUCR06-080	●	R	7	6	80	12	3.5	5.7	13°	0°	TC	0601
H07-06STUCL06-080	●	L	7	6	80	12	3.5	5.7	13°	0°		0601
H08-07STUCR06-080	●	R	8	7	80	12	4.0	6.7	12°	0°		0601
H08-07STUCL06-080	●	L	8	7	80	12	4.0	6.7	12°	0°		0601
H09-08STUCR06-080	●	R	9	8	80	16	4.5	7.7	11°	0°		0601
H10-08STUCR09-080	●	R	10	8	80	16	5.0	7.7	14°	0°		0902
H10-08STUCL09-080	●	L	10	8	80	16	5.0	7.7	14°	0°		0902
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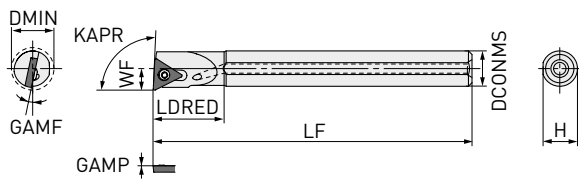
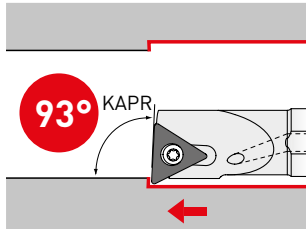
SPARE PARTS

Boring bar type	Clamp screw *	Wrench
H ⁰⁰ ⁰⁰ ⁰⁰ STUCR/L06	TS2C	TKY06F
H ⁰⁰ ⁰⁰ ⁰⁰ STUCR/L09	TS22	TKY06F

* Clamp torque (Nm): TS2C = 0.6, TS22 = 0.6

H-STUC-C

HARD STEEL SHANK WITH COOLANT HOLE



Right hand tool holder shown.

TC⁰⁰-Inserts



Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
H12-10STUCR09-090-C	●	R	12	10	90	20	6.2	9.7	12°	0°	TC	0902
H12-10STUCL09-090-C	●	L	12	10	90	20	6.2	9.7	12°	0°		0902
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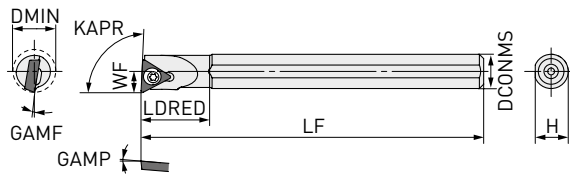
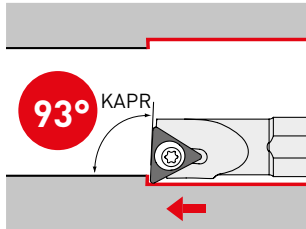
SPARE PARTS

Boring bar type	Clamp screw *	Wrench
H ⁰⁰ ⁰⁰ ⁰⁰ STUCR/L09	TS22	TKY06F

* Clamp torque (Nm): TS22 = 0.6

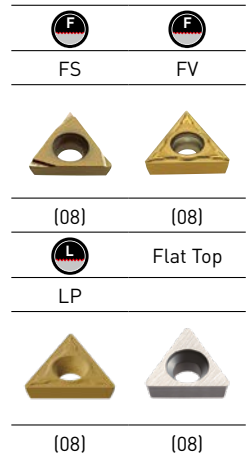
H-STUP

HARD STEEL SHANK WITHOUT COOLANT HOLE



Right hand tool holder shown.

TP⁰⁰-Inserts



Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number
H10-08STUPR08-080	●	R	10	8	80	16	5.0	7.7	10°	5°	TP ⁰⁰ 0802 ⁰⁰
H10-08STUPL08-080	●	L	10	8	80	16	5.0	7.7	10°	5°	TP ⁰⁰ 0802 ⁰⁰

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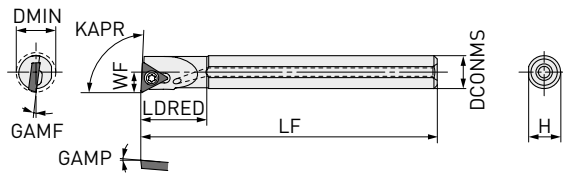
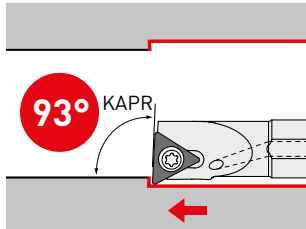
SPARE PARTS

Boring bar type	Clamp screw *	Wrench
H10-08STUPR/L08	TS2D	TKY06F

* Clamp torque [Nm]: TS2D = 0.6

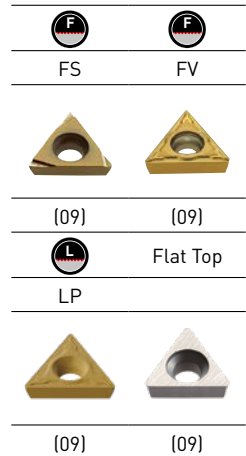
H-STUP-C

HARD STEEL SHANK WITH COOLANT HOLE



Right hand tool holder shown.

TP⁰⁰-Inserts



Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number
H12-10STUPR09-090-C	●	R	12	10	90	20	6.2	9.7	8°	5°	TP ⁰⁰
H12-10STUPL09-090-C	●	L	12	10	90	20	6.2	9.7	8°	5°	

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SPARE PARTS

Boring bar type



Clamp screw *



Wrench

H12-10STUPR/L09

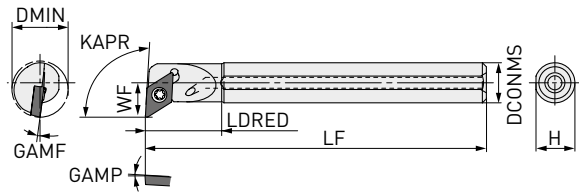
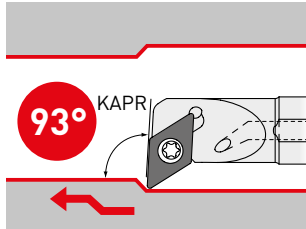
TS25D

TKY08F

* Clamp torque (Nm): TS25D = 1.6

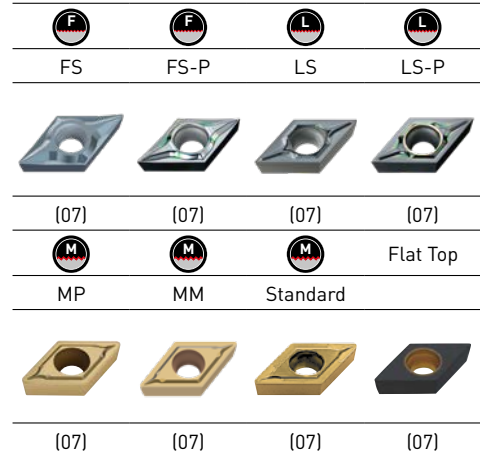
H-SDUC-C

HARD STEEL SHANK WITH COOLANT HOLE



Right hand tool holder shown.

DC $\circ\circ$ -Inserts



Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number
H14-10SDUCR07-090-C	●	R	14	10	90	19	8.7	9.7	7.5°	3°	DC $\circ\circ$ 0702 $\circ\circ$
H14-10SDUCL07-090-C	●	L	14	10	90	19	8.7	9.7	7.5°	3°	DC $\circ\circ$ 0702 $\circ\circ$

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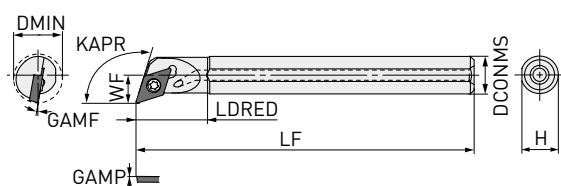
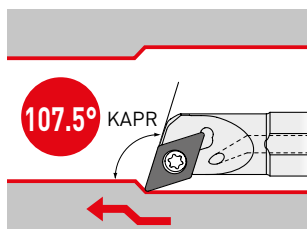
SPARE PARTS

Boring bar type	Clamp screw *	Wrench
H14-10SDUCR/L07	TS25	TKY08F

* Clamp torque (Nm): TS25 = 1.0

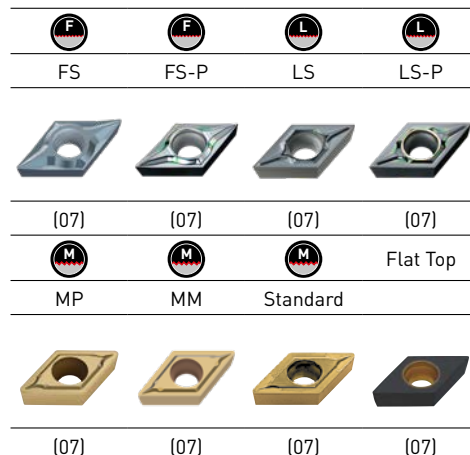
H-SDQC-C

HARD STEEL SHANK WITH COOLANT HOLE



Right hand tool holder shown.

DC $\circ\circ$ -Inserts



Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number
H13-10SDQCR07-090-C	●	R	13	10	90	19	7.5	9.7	10.0°	0°	DC $\circ\circ$ 0702 $\circ\circ$
H13-10SDQCL07-090-C	●	L	13	10	90	19	7.5	9.7	10.0°	0°	DC $\circ\circ$ 0702 $\circ\circ$

1/1



SPARE PARTS

Boring bar type



Clamp screw *



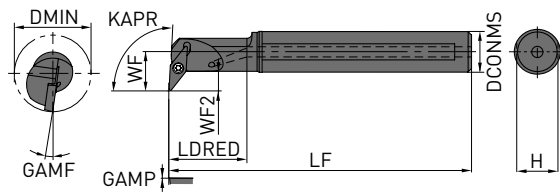
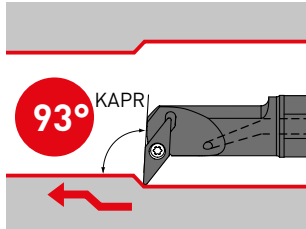
Wrench

H13-10SDQCR/L07	TS25	TKY08F
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* Clamp torque (Nm): TS25 = 1.0

C-SVUC / B-C

CARBIDE SHANK BORING BAR WITH COOLANT HOLE



Right hand tool holder shown.

VC/VB-Inserts

FP	FM	LP	LM
{11,16}	{08,11,16}	{08,11,16}	{08,11,16}
			PCBN/PCD
MP	MM	Standard	
{16}	{16}	{16}	{11,16}

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	WF2	H	GAMF	GAMP	Insert number	
C16-12SVUCR08-140-C	●	R	16	12	140	23	11.5	5.6	11	8°	0°	VC	0802
C20-16SVUBR11-180-C	●	R	20	16	180	28	16.0	8.1	15	8°	0°		1103
C20-16SVUBL11-180-C	●	L	20	16	180	28	16.0	8.1	15	8°	0°		1103
C25-20SVUBR11-180-C	●	R	25	20	180	32	18.0	8.1	19	7°	0°	VB	1103
C30-20SVUBR11-180-C	●	R	30	20	180	32	18.0	8.1	19	6°	0°		1103
C34-25SVUBR16-180-C	●	R	34	25	180	38	20.5	8.4	24	13°	0°		1604

1/1



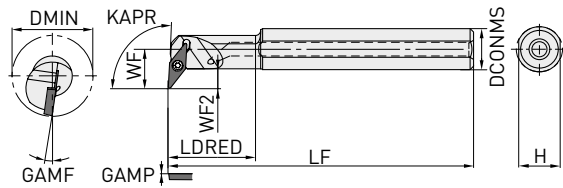
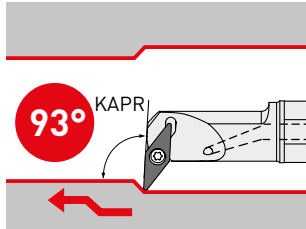
SPARE PARTS

Boring bar type		
	Clamp screw *	Wrench
C16-12SVUCR08	TS202	TKY06F
C- SVUBR/L11	TS255	TKY08F
C34-25SVUBR16	TS35D	TKY15F

* Clamp torque [Nm]: TS202 = 0.6, TS255 = 1.0, TS35D = 3.5

S-SVUC/B-C

STEEL SHANK BORING BAR WITH COOLANT HOLE



Right hand tool holder shown.

VC/VB-Inserts

FP	FM	LP	LM
(11,16)	(08,11,16)	(08,11,16)	(08,11,16)
			PCBN/PCD
MP	MM	Standard	
(16)	(16)	(16)	(11,16)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	WF2	H	GAMF	GAMP	Insert number	
S16-12SVUCR08-090-C	●	R	16	12	90	25.5	11.5	5.6	11	8°	0°	VC-	0802-
S20-16SVUBR11-150-C	●	R	20	16	150	32.5	16.0	8.1	15	8°	0°		1103-
S20-16SVUBL11-150-C	●	L	20	16	150	32.5	16.0	8.1	15	8°	0°		1103-
S25-20SVUBR11-150-C	●	R	25	20	150	40.5	18.0	8.1	19	7°	0°		1103-
S30-20SVUBR11-150-C	●	R	30	20	150	40.5	18.0	8.1	19	6°	0°		1103-
S34-25SVUBR16-150-C	●	R	34	25	150	40.0	20.5	8.4	24	13°	0°		1604-
S40-32SVUBR16-200-C	●	R	40	32	200	84.0	28.0	12.4	31	9°	0°		1604-

1/1



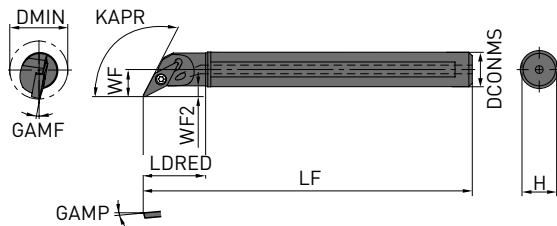
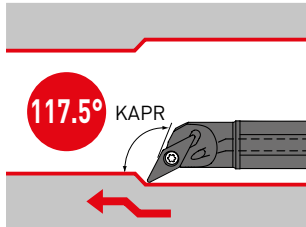
SPARE PARTS

Boring bar type		
	Clamp screw *	Wrench
S16-12SVUCR08	TS202	TKY06F
S--SVUBR/L11	TS255	TKY08F
S--SVUBR16	TS35D	TKY15F

* Clamp torque [Nm]: TS202 = 0.6, TS255 = 1.0, TS35D = 3.5

C-SVPC/B-C

CARBIDE SHANK BORING BAR WITH COOLANT HOLE



Right hand tool holder shown.

VC/VB $\circ\circ$ -Inserts

FP	FM	LP	LM
(11,16)	(08,11,16)	(08,11,16)	(08,11,16)
			PCBN/PCD
MP	MM	Standard	
(16)	(16)	(16)	(11,16)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	WF2	H	GAMF	GAMP	Insert number	
C16-10SVPCR08-140-C	●	R	16	10	140	18	8.0	3.1	9	8°	-5°	VC $\circ\circ$	0802 $\circ\circ$
C16-10SVPCLO8-140-C	●	L	16	10	140	18	8.0	3.1	9	8°	-5°		0802 $\circ\circ$
C20-12SVPBR11-180-C	●	R	20	12	180	23	10.0	4.1	11	8°	-5°	VB $\circ\circ$	1103 $\circ\circ$
C20-12SVPBL11-180-C	●	L	20	12	180	23	10.0	4.1	11	8°	-5°		1103 $\circ\circ$
C25-16SVPBR11-180-C	●	R	25	16	180	28	12.5	4.6	15	6°	-5°		1103 $\circ\circ$
C25-16SVPBL11-180-C	●	L	25	16	180	28	12.5	4.6	15	6°	-5°		1103 $\circ\circ$
C30-20SVPBR11-180-C	●	R	30	20	180	32	15.0	5.1	19	5°	-5°		1103 $\circ\circ$
C34-25SVPBR16-180-C	●	R	34	25	180	38	17.0	4.9	24	13°	-5°		1604 $\circ\circ$

1/1



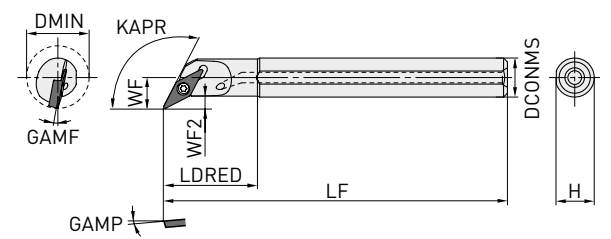
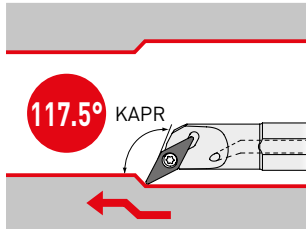
SPARE PARTS

Boring bar type		
	Clamp screw *	Wrench
C16-10SVPCR/L08	TS202	TKY06F
C $\circ\circ\circ$ SVPBR/L11	TS255	TKY08F
C34-25SVPBR16	TS35D	TKY15F

* Clamp torque [Nm]: TS202 = 0.6, TS255 = 1.0, TS35D = 3.5

H-SVPC-C

HARD STEEL SHANK WITH COOLANT HOLE



Right hand tool holder shown.

VC⁰⁰-Inserts



FM



[08]



LP



LM



[08]

[08]

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	WF2	H	GAMF	GAMP	Insert number
H16-10SVPCR08-090-C	●	R	16	10	90	24	8.0	3.1	9.7	8.0°	-5°	VC ⁰⁰ 0802 ⁰⁰

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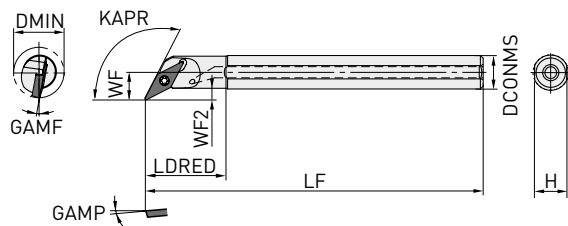
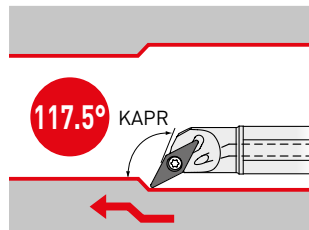
SPARE PARTS

Boring bar type	Clamp screw *	Wrench
H16-10SVPCR08	TS202	TKY06F

* Clamp torque [Nm]: TS202 = 0.6

S-SVPB-C

STEEL SHANK BORING BAR WITH COOLANT HOLE



Right hand tool holder shown.

VB $\circ\circ$ -Inserts

FP	FM	LP	LM
(11,16)	(08,11,16)	(08,11,16)	(08,11,16)
			PCBN/PCD
MP	MM	Standard	
(16)	(16)	(16)	(11,16)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	WF2	H	GAMF	GAMP	Insert number	
S20-12SVPBR11-150-C	●	R	20	12	150	29	10.0	4.1	11	8°	-5°	VB	1103
S20-12SVPBL11-150-C	●	L	20	12	150	29	10.0	4.1	11	8°	-5°		1103
S25-16SVPBR11-150-C	●	R	25	16	150	35	12.5	4.6	15	6°	-5°		1103
S25-16SVPBL11-150-C	●	L	25	16	150	35	12.5	4.6	15	6°	-5°		1103
S30-20SVPBR11-150-C	●	R	30	20	150	41	15.0	5.1	19	5°	-5°		1103
S34-25SVPBR16-150-C	●	R	34	25	150	51	17.0	4.9	24	13°	-5°		1604
S40-32SVPBR16-200-C	●	R	40	32	200	54	22.0	6.4	31	9°	-5°		1604
1/1													

1/1



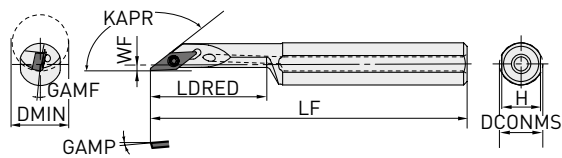
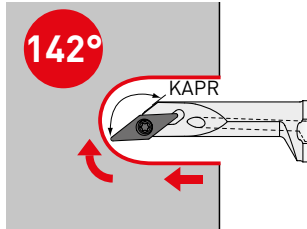
SPARE PARTS

Boring bar type		
	Clamp screw *	Wrench
S $\circ\circ\circ$ - $\circ\circ$ SVPBR/L11	TS255	TKY08F
S $\circ\circ\circ$ - $\circ\circ$ SVPBR16	TS35D	TKY15F

* Clamp torque (Nm): TS255 = 1.0, TS35D = 3.5

S-SVJC / B-C

STEEL SHANK BORING BAR WITH COOLANT HOLE



Right hand tool holder shown.

VC/VB-Inserts

FP	FM	LP	LM
(11,16)	(08,11,16)	(08,11,16)	(08,11,16)
			PCBN/PCD
MP	MM	Standard	
(16)	(16)	(16)	(11,16)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
S16-12SVJCR08-090-C	●	R	16	12	90	33	2.0	11	6°	-5°	VC	0802
S20-16SVJCR08-150-C	●	R	20	16	150	43	2.0	15	5°	-5°		0802
S25-20SVJBR11-150-C	●	R	25	20	150	48	2.0	19	6°	-5°	VB	1103
S30-25SVJBR11-150-C	●	R	30	25	150	58	3.5	24	5°	-5°		1103
S40-32SVJBR16-200-C	●	R	40	32	200	74	3.5	31	8°	-5°		1604
S50-40SVJBR16-250-C	●	R	50	40	250	91	4.5	39	7°	-5°		1604

1/1



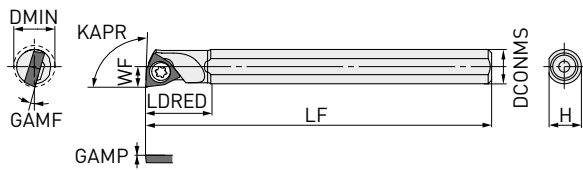
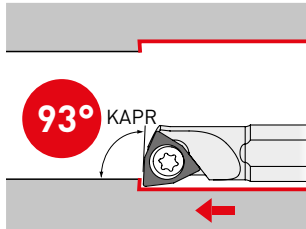
SPARE PARTS

Boring bar type		
	Clamp screw *	Wrench
S-InsertsSVJCR08	TS202	TKY06F
S-InsertsSVJBR11	TS255	TKY08F
S-InsertsSVJBR16	TS35D	TKY15F

* Clamp torque [Nm]: TS202 = 0.6, TS255 = 1.0, TS35D = 3.5

H-SWUC

HARD STEEL SHANK WITHOUT COOLANT HOLE

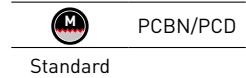


Right hand tool holder shown.

WC^{○○}-Inserts



(02,L3,04) (02,L3,04)



Standard



(02,L3,04) (L3)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
H06-05SWUCR02-070	●	R	6	5	70	9	3.0	4.7	17°	0°	WC○○	0201○○
H06-05SWUCL02-070	●	L	6	5	70	9	3.0	4.7	17°	0°		0201○○
H08-07SWUCRL3-080	●	R	8	7	80	11	4.0	6.7	15°	0°		L302○○
H08-07SWUCLL3-080	●	L	8	7	80	11	4.0	6.7	15°	0°		L302○○
H10-08SWUCR04-080	●	R	10	8	80	16	5.0	7.7	15°	0°		0402○○
H10-08SWUCL04-080	●	L	10	8	80	16	5.0	7.7	15°	0°		0402○○

1/1



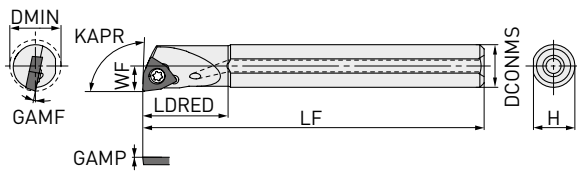
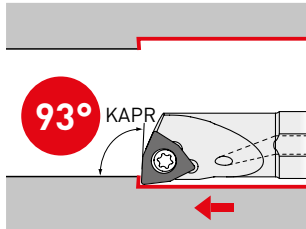
SPARE PARTS

Boring bar type	Clamp screw *	Wrench
H06-05SWUCR/L02	TS21	TKY06F
H08-07SWUCR/LL3	TS2	TKY06F
H10-08SWUCR/L04	TS25	TKY08F

* Clamp torque (Nm): TS21 = 0.6, TS2 = 0.6, TS25 = 1.0

H-SWUC-C

HARD STEEL SHANK WITH COOLANT HOLE



Right hand tool holder shown.

WC $\circ\circ$ -Inserts



FV



(04)



MP



Standard



(04)



(04)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number
H12-10SWUCR04-080-C	●	R	12	10	80	20	6.0	9.7	12°	0°	WC $\circ\circ$ 0402 $\circ\circ$
H12-10SWUCL04-080-C	●	L	12	10	80	20	6.0	9.7	12°	0°	WC $\circ\circ$ 0402 $\circ\circ$

1/1



SPARE PARTS

Boring bar type	 Clamp screw *	 Wrench
H12-10SWUCR/L04	TS25	TKY08F

* Clamp torque (Nm): TS25 = 1.0

80° WITH HOLE



*3 Diameter of inscribed circle is special.

● : Inventory maintained. ★ : Inventory maintained in Japan.

CC TYPE INSERTS, 80° WITH HOLE



|--|



*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)

●: General cutting (1st recommendation)
○: General cutting (2nd recommendation)

✱: Unstable cutting (1st recommendation)
✱: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)

● / ★ = Expansion (N037)

●: Inventory maintained. ★: Inventory maintained in Japan.

P	Steel	
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65

[illegible]

● : Inventory maintained. ★ : Inventory maintained in Japan.

CP TYPE INSERTS



80° WITH HOLE

P	Steel																																								
M	Stainless steel																																								
K	Cast iron																																								
N	Non-ferrous metal																																								
S	Heat resistant alloy, Titanium alloy																																								
		Coated										Coated Cermet										Cermet	Carbide																		
Order number	RE	MS6015	MC6115	MC6125	MC6135	UE6020*1	MS7025	MC7015	MC7025	MP7035	MC7115	MC7125	MP7135	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP30RT	VP15TF	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UT120T	HT105T	HT110	Shape			
CPGT080204L-F	0.4																													★								R/L-F			
CPGT080204R-F	0.4																													★											
CPGT090302L-F	0.2																													★											
CPGT090302R-F	0.2																													★											
CPGT090304L-F	0.4																													★											
CPGT090304R-F	0.4																													★								Finish cutting			
CPGT080202	0.2																																			●	Standard				
CPGT080204	0.4																																			●					
CPGT090302	0.2																																			★					
CPGT090304	0.4																																			●					
																																					Finish cutting				
CPMB080202	0.2																																			★	Flat Top				
CPMB080204	0.4																																			★					
CPMB080208	0.8																																			★					
CPMB090302	0.2																																			★					
CPMB090304	0.4																																			★					
CPMB090308	0.8																																			★					
CPMH080202-FM	0.2																							●													FM				
CPMH080204-FM	0.4																						●																		
CPMH090302-FM	0.2																						●																		
CPMH090304-FM	0.4																						●																		
CPMH090308-FM	0.8																						●														Finish cutting				
CPMH080202-FP	0.2		●	●																																	FP				
CPMH080204-FP	0.4		●	●																																					
CPMH090302-FP	0.2		●	●																																					
CPMH090304-FP	0.4		●	●																																					
CPMH090308-FP	0.8		●	●																																	Finish cutting				
CPMH080202-FS	0.2																						●														FS				
CPMH080204-FS	0.4																						●																		
CPMH090302-FS	0.2																						●																		
CPMH090304-FS	0.4																						●																		
CPMH090308-FS	0.8																						●														Finish cutting				
CPMH080202-FV	0.2		★	★	★																			●		★				★	★							FV			
CPMH080204-FV	0.4		★	★	●																		●	●	●	★		●	★												
CPMH090302-FV	0.2		★	★	★																			●		★			★	★											
CPMH090304-FV	0.4		●	★	●																		●	●	●	★		★	★												
CPMH090308-FV	0.8		●	★	★																		●	●	●	★		★	★								Finish cutting				

1/

1/3

*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)

●: General cutting (1st recommendation)
○: General cutting (2nd recommendation)

✱: Unstable cutting (1st recommendation)
✱: Unstable cutting (2nd recommendation)

● / ✱ = Expansion (N038)

● / ✱ = Expansion (N037)

●: Inventory maintained. ✱: Inventory maintained in Japan.

DC TYPE INSERTS



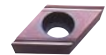
55° WITH HOLE

P	Steel																																								
M	Stainless steel																																								
K	Cast iron																																								
N	Non-ferrous metal																																								
S	Heat resistant alloy, Titanium alloy																																								
		Coated															Coated Cermet					Cermet					Carbide					Shape									
Order number	RE	MS6015	MC6115	MC6125	MC6135	UE6020*1	MS7025	MC7015	MC7025	MP7035	MC7115	MC7125	MP7135	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP30RT	VP15TF	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525		NX3035	MT9005	RT9010	UT120T	HT105T	HT110			
DCET070200L-SN	0.0*2																								★						★							★	R/L-SN		
DCET070200R-SN	0.0*2																								●						★						★				
DCET070201L-SN	0.1*2																								●						★						★				
DCET070201R-SN	0.1*2																								●						★						★				
DCET070202L-SN	0.2*2																								●						★						★				
DCET070202R-SN	0.2*2																								●						★						★				
DCET070204L-SN	0.4*2																								●						★						★				
DCET070204R-SN	0.4*2																								★						★						★				
DCET0702V3L-SN	0.03*2						●												●		●	●	●	★						★							★				
DCET0702V3R-SN	0.03*2						●												●		●	●	●	●						★							★				
DCET11T300L-SN	0.0*2																								★						★							★			
DCET11T300R-SN	0.0*2																								★						★							★			
DCET11T301L-SN	0.1*2																								●						★							★			
DCET11T301R-SN	0.1*2																								●						★							★			
DCET11T302L-SN	0.2*2																								●						★							★			
DCET11T302R-SN	0.2*2																								●						★							★			
DCET11T304L-SN	0.4*2																								●						★							★			
DCET11T304R-SN	0.4*2																								●						★							★			
DCET11T3V3L-SN	0.03*2						●												●		●	●	●	★						★		●						★			
DCET11T3V3R-SN	0.03*2						●												●		●	●	●	●						★		●						★			
NEW DCET070201ML-SN	0.1						●												●		●	●	●															MR/L-SN			
NEW DCET070201MR-SN	0.1						●												●		●	●	●																		
NEW DCET070202ML-SN	0.2						●												●		●	●	●																		
NEW DCET070202MR-SN	0.2						●												●		●	●	●																		
NEW DCET070204MR-SN	0.4						●												●		●	●	●																		
NEW DCET11T301ML-SN	0.1						●												●		●	●	●											●							
NEW DCET11T301MR-SN	0.1						●												●		●	●	●											●							
NEW DCET11T302ML-SN	0.2						●												●		●	●	●											●							
NEW DCET11T302MR-SN	0.2						●												●		●	●	●											●							
NEW DCET11T304ML-SN	0.4						●												●		●	●	●											●							
NEW DCET11T304MR-SN	0.4						●												●		●	●	●											●							





1/8



*1 To be replaced by new products.

*2 Indicates the maximum value of the corner R.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)

●: General cutting (1st recommendation)
○: General cutting (2nd recommendation)

✱: Unstable cutting (1st recommendation)
✱: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)

● / ★ = Expansion (N037)

●: Inventory maintained. ★: Inventory maintained in Japan.

[illegible]

● : Inventory maintained. ★ : Inventory maintained in Japan.

[illegible]

77

DC TYPE INSERTS, 55° WITH HOLE



P	Steel																														
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8/8

*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)

●: General cutting (1st recommendation)
○: General cutting (2nd recommendation)

✱: Unstable cutting (1st recommendation)
✱: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)

● / ★ = Expansion (N037)

●: Inventory maintained. ★: Inventory maintained in Japan.

TC TYPE INSERTS



60° WITH HOLE

P	Steel																																								
M	Stainless steel																																								
K	Cast iron																																								
N	Non-ferrous metal																																								
S	Heat resistant alloy, Titanium alloy																																								
		Coated										Coated Cermet										Cermet										Carbide									
Order number	RE	MS6015	MC6115	MC6125	MC6135	UE6020*1	MS7025	MC7015	MC7025	MP7035	MC7115	MC7125	MP7135	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP30RT	VP15TF	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UT120T	HT105T	HT110	Shape			
NEW TCET080201ML-SS	0.1																																					R/L-SS			
NEW TCET080201MR-SS	0.1																																								
NEW TCET080202ML-SS	0.2																																								
NEW TCET080202MR-SS	0.2																																								
NEW TCET110201ML-SS	0.1																																								
NEW TCET110201MR-SS	0.1																																								
NEW TCET110202ML-SS	0.2																																								
NEW TCET110202MR-SS	0.2																																								
NEW TCET110204ML-SS	0.4																																								
NEW TCET110204MR-SS	0.4																																								
TCGT110202-AZ	0.2																																								
TCGT110204-AZ	0.4																																								
TCGT110208-AZ	0.8																																								
TCGT16T302-AZ	0.2																																								
TCGT16T304-AZ	0.4																																								
TCGT16T308-AZ	0.8																																								
TCGT060101ML-F	0.1*2	●																																							
TCGT060102ML-F	0.2*2	●																																							
TCGT060104ML-F	0.4*2	●																																							
TCGT060101MR-F	0.1*2	●																																							
TCGT060102MR-F	0.2*2	●																																							
TCGT060104MR-F	0.4*2	●																																							
TCGT060101L-F	0.1																							●							●										
TCGT060102L-F	0.2																							●							●							★			
TCGT060102R-F	0.2																							★							★							★			
TCGT060104L-F	0.4																							●							●							★			
TCGT060104R-F	0.4																															●						★			
TCGT0601V3L-F	0.03																															★									
TCGW080201	0.1																																					★	Flat Top		
TCGW080202	0.2																																					★			
TCGW110201	0.1																																					★			
TCGW110202	0.2																																					★			
TCGW110204	0.4																																					★			
TCMT090202-FM	0.2																								★													FM			
TCMT090204-FM	0.4																								●																
TCMT110202-FM	0.2																								●																
TCMT110204-FM	0.4																								●																
TCMT16T304-FM	0.4																								●													Finish cutting			

1/3

*1 To be replaced by new products.

*2 Indicates the maximum value of the corner R.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)

●: General cutting (1st recommendation)
○: General cutting (2nd recommendation)

✱: Unstable cutting (1st recommendation)
✱: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)

● / ★ = Expansion (N037)

●: Inventory maintained. ★: Inventory maintained in Japan.

VB TYPE INSERTS



35° WITH HOLE

P	Steel																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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1/3

*1 To be replaced by new products.

*2 Indicates the maximum value of the corner R.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)

●: General cutting (1st recommendation)
○: General cutting (2nd recommendation)

✱: Unstable cutting (1st recommendation)
✱: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)

● / ★ = Expansion (N037)

●: Inventory maintained. ★: Inventory maintained in Japan.

[illegible]

88

80° WITH HOLE

: Stable cutting (1st recommendation)
 : General cutting (1st recommendation)
 : Unstable cutting (1st recommendation)
: Stable cutting (2nd recommendation)
: General cutting (2nd recommendation)
: Unstable cutting (2nd recommendation)
 / = Expansion (N038)
 / = Expansion (N037)
: Inventory maintained. : Inventory maintained in Japan.

INSERTS FOR OTHER TYPES OF BORING BARS

POSITIVE WITH HOLE

P	Steel	    																			         																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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1/1

*1 To be replaced by new products.

*2 Indicates the maximum value of the corner R.

●: Stable cutting (1st recommendation)

○: Stable cutting (2nd recommendation)

●: General cutting (1st recommendation)

○: General cutting (2nd recommendation)

✱: Unstable cutting (1st recommendation)

✱: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)

● / ★ = Expansion (N037)

●: Inventory maintained. ★: Inventory maintained in Japan.

INSERTS FOR OTHER TYPES OF BORING BARS

POSITIVE WITHOUT HOLE

P	Steel																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)

●: General cutting (1st recommendation)
○: General cutting (2nd recommendation)

✱: Unstable cutting (1st recommendation)
✱: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)

● / ★ = Expansion (N037)

●: Inventory maintained. ★: Inventory maintained in Japan.

RECOMMENDED CUTTING CONDITIONS

Boring Bars for small parts machining

Compatible with Swiss-Type Automatic Lathes

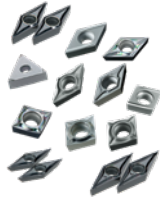


B210-H

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MS6015/MS7025/MS9025

MS Turning Series –
PVD Coated Grades



B275

www.mhg-mediastore.net

MC6100 Series

Bringing the Ultimate High Speed
Cutting Performance



B266

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MC/MP7100 Series

Dedicated Carbide Substrate
New Coating Technology for
Stainless Steel Turning

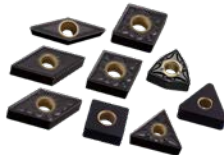


B277

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MC5100 Series

CVD Coated Grades for Cast Iron
Turning from high speed through
to interrupted turning

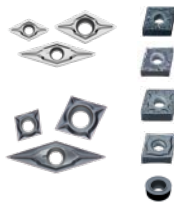


B269

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MP/MT9000

ISO Turning Inserts
for difficult to cut materials



B214

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RECOMMENDED CUTTING CONDITIONS

Material	Hardness	Cutting mode		Grade	Vc	f	ap
P	— Pure iron Free cutting steel	Finish	R/L-F	MS6015	150 (50 – 250)	0.01 – 0.15	0.1 – 0.4
		Light	LS-P	MS6015	150 (50 – 250)	0.01 – 0.15	0.3 – 2.2
		Light	R/L-SS	MS6015	150 (50 – 250)	0.01 – 0.15	0.2 – 0.8
		Medium	R/L-SN	MS6015	150 (50 – 250)	0.01 – 0.15	0.1 – 0.4
		Medium	SMG	MS6015	150 (50 – 250)	0.01 – 0.15	0.1 – 1.5
	180 – 280 HB Carbon steel Alloy steel	Finish	R/L-F	MS6015	100 (50 – 150)	0.01 – 0.15	0.1 – 0.4
		Light	LS-P	MS6015	100 (50 – 150)	0.01 – 0.15	0.3 – 2.2
		Light	R/L-SS	MS6015	100 (50 – 150)	0.01 – 0.15	0.2 – 0.8
		Medium	R/L-SN	MS6015	100 (50 – 150)	0.01 – 0.15	0.1 – 0.4
		Medium	SMG	MS6015	100 (50 – 150)	0.01 – 0.15	0.1 – 1.5
M	— Austenitic stainless steel	Finish	FS-P	MS7025	60 (40 – 100)	0.01 – 0.08	0.2 – 0.5
		Finish	FS-P	MS9025	100 (60 – 150)	0.04 – 0.15	0.2 – 0.5
		Finish	R/L-F	MS7025	60 (40 – 100)	0.01 – 0.08	0.1 – 0.4
		Finish	R-SRF	MS9025	100 (60 – 150)	0.04 – 0.15	0.1 – 0.4
		Light	LS-P	MS7025	60 (40 – 100)	0.01 – 0.08	0.3 – 2.2
		Light	LS-P	MS9025	100 (60 – 150)	0.05 – 0.15	0.3 – 2.2
		Medium	R-SN	MS7025	60 (40 – 100)	0.01 – 0.08	0.1 – 3.8
		Medium	R-SN	MS9025	100 (60 – 150)	0.05 – 0.15	0.1 – 3.8
	— Ferritic and martensitic stainless steel	Finish	FS-P	MS7025	60 (40 – 100)	0.01 – 0.08	0.2 – 0.5
		Finish	R-SRF	MS7025	60 (40 – 100)	0.01 – 0.08	0.1 – 0.4
		Light	LS-P	MS7025	60 (40 – 100)	0.01 – 0.08	0.3 – 2.2
		Light	R-SN	MS7025	60 (40 – 100)	0.01 – 0.08	0.1 – 3.8
	230 HBW Soft magnetic stainless steel (X105CrMo17 / 1.4125, X42Cr13 / 1.2083, etc.)	Finish	FS-P	MS7025	80 (40 – 160)	0.02 – 0.08	0.2 – 1.4
		Finish	FS-P	MS9025	100 (50 – 180)	0.04 – 0.12	0.2 – 1.4
		Finish	R-SRF	MS7025	80 (40 – 160)	0.03 – 0.08	0.1 – 0.4
		Finish	R-SRF	MS9025	100 (50 – 180)	0.05 – 0.12	0.1 – 0.4
		Light	LS-P	MS7025	80 (40 – 160)	0.02 – 0.10	0.3 – 2.2
		Light	LS-P	MS9025	100 (50 – 180)	0.04 – 0.15	0.3 – 2.2
		Medium	R-SN	MS7025	80 (40 – 160)	0.01 – 0.10	0.1 – 3.8
		Medium	R-SN	MS9025	100 (50 – 180)	0.01 – 0.10	0.1 – 3.8
	< 450 HB Precipitation hardened stainless steel (17-4PH / 1.4542, 17-7PH / X7CrNi-A117-7 / X5CrNi-CuNb17-4, etc.)	Finish	FS-P	MS7025	60 (40 – 80)	0.01 – 0.10	0.1 – 1.0
		Finish	FS-P	MS9025	70 (50 – 100)	0.03 – 0.15	0.1 – 1.0
		Finish	R-SRF	MS7025	60 (40 – 80)	0.01 – 0.10	0.1 – 0.4
		Finish	R-SRF	MS9025	70 (50 – 100)	0.03 – 0.15	0.1 – 0.4
		Light	LS-P	MS7025	60 (40 – 80)	0.04 – 0.10	0.2 – 2.2
		Light	LS-P	MS9025	70 (50 – 100)	0.04 – 0.15	0.2 – 2.2
		Medium	R-SN	MS7025	60 (40 – 80)	0.03 – 0.10	0.3 – 2.2
		Medium	R-SN	MS9025	70 (50 – 100)	0.04 – 0.15	0.2 – 2.2
K	— Grey cast iron	Finish	Flat Top	MC5115	225 (150 – 300)	0.04 – 0.15	0.1 – 0.5
		Finish	Flat Top	HTi10	100 (50 – 150)	0.04 – 0.15	0.1 – 0.5
		Light	Flat Top	MC5115	225 (150 – 300)	0.04 – 0.15	0.2 – 1.0
		Light	Flat Top	HTi10	100 (50 – 150)	0.04 – 0.15	0.2 – 1.0
		Medium	Flat Top	MC5115	225 (150 – 300)	0.04 – 0.15	0.1 – 2.0
		Medium	Flat Top	HTi10	100 (50 – 150)	0.04 – 0.15	0.1 – 2.0
S	— Heat resistant alloy (Heat resistant stainless steel, etc.)	Finish	FS-P	MS9025	80 (40 – 140)	0.04 – 0.12	0.2 – 1.0
		Finish	R-SRF	MS9025	80 (40 – 140)	0.05 – 0.12	0.1 – 0.4
		Light	LS-P	MS9025	80 (40 – 140)	0.04 – 0.15	0.3 – 2.2
		Medium	R-SN	MS9025	80 (40 – 140)	0.01 – 0.10	0.1 – 3.8

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1. If chatter or vibration occurs, adjust the cutting conditions and perform machining.
2. If the tool overhang amount is L/D = 5 or more for carbide shank or L/D = 3 or more for steel shank, please reduce the cutting speed by 10 % to 20 %.
3. Regarding the feed rate and depth of cut for breakers not listed in the table, please refer to the general catalogue C010J page A058 of for 7° positive and page A066 for 11° positive. For cutting speed, please refer to the grade introduction page A034.



RECOMMENDED CUTTING CONDITIONS

MC6100 SERIES – 5°, 7° POSITIVE INSERTS (FOR EXTERNAL TURNING)

Material	Hardness	Cutting mode		Priority	Grade		Vc	f	ap
Mild steel	≤180HB		F	1	MC6115	FP	295 – 570	0.04 – 0.20	0.20 – 0.90
			F	2	MC6115	FV	295 – 570	0.04 – 0.20	0.20 – 0.90
			L	1	MC6115	LP	295 – 570	0.06 – 0.25	0.20 – 1.00
			L	2	MC6115	SW	295 – 570	0.06 – 0.24	0.20 – 1.50
			M	1	MC6115	MP	245 – 475	0.08 – 0.30	0.30 – 2.00
			M	2	MC6115	MV	245 – 475	0.08 – 0.30	0.30 – 2.00
			M	3	MC6115	MW	245 – 475	0.10 – 0.35	0.80 – 2.50
			F	1	MC6125	FP	320 – 505	0.04 – 0.20	0.20 – 0.90
			F	2	MC6135	FP	265 – 400	0.04 – 0.20	0.20 – 0.90
			L	1	MC6125	LP	320 – 505	0.06 – 0.25	0.20 – 1.00
			L	2	MC6135	LP	265 – 400	0.06 – 0.25	0.20 – 1.00
			L	3	MC6125	SW	320 – 505	0.06 – 0.24	0.20 – 1.50
			M	1	MC6125	MP	270 – 420	0.08 – 0.30	0.30 – 2.00
			M	2	MC6135	MP	220 – 330	0.08 – 0.30	0.30 – 2.00
			M	3	MC6125	MV	270 – 420	0.08 – 0.30	0.30 – 2.00
			M	4	MC6125	MW	270 – 420	0.10 – 0.35	0.80 – 2.50
Carbon steel Alloy steel	180 – 280HB		F	1	MC6115	FP	220 – 420	0.04 – 0.20	0.20 – 0.90
			F	2	MC6125	FP	240 – 370	0.04 – 0.20	0.20 – 0.90
			F	3	MC6115	FV	220 – 420	0.04 – 0.20	0.20 – 0.90
			L	1	MC6115	LP	220 – 420	0.06 – 0.25	0.20 – 1.00
			L	2	MC6125	LP	240 – 370	0.06 – 0.25	0.20 – 1.00
			M	1	MC6125	MP	200 – 310	0.08 – 0.30	0.30 – 2.00
			M	2	MC6115	MP	180 – 350	0.08 – 0.30	0.30 – 2.00
			M	3	MC6125	MV	200 – 310	0.08 – 0.30	0.30 – 2.00
			M	4	MC6115	MV	180 – 350	0.08 – 0.30	0.30 – 2.00
			M	5	MC6115	MW	180 – 350	0.10 – 0.35	0.80 – 2.50
			F	1	MC6125	FP	240 – 370	0.04 – 0.20	0.20 – 0.90
			F	2	MC6135	FP	195 – 295	0.04 – 0.20	0.20 – 0.90
			F	3	MC6125	FV	240 – 370	0.04 – 0.20	0.20 – 0.90
			L	1	MC6125	LP	240 – 370	0.06 – 0.25	0.20 – 1.00
			L	2	MC6135	LP	195 – 295	0.06 – 0.25	0.20 – 1.00
			L	3	MC6125	SW	240 – 370	0.06 – 0.24	0.20 – 1.50
Carbon steel Alloy steel	280 – 350HB		M	1	MC6125	MP	200 – 310	0.08 – 0.30	0.30 – 2.00
			M	2	MC6135	MP	160 – 245	0.08 – 0.30	0.30 – 2.00
			M	3	MC6125	MV	200 – 310	0.08 – 0.30	0.30 – 2.00
			F	1	MC6115	FP	155 – 295	0.04 – 0.20	0.20 – 0.90
			F	2	MC6115	FV	155 – 295	0.04 – 0.20	0.20 – 0.90
			L	1	MC6115	LP	155 – 295	0.06 – 0.25	0.20 – 1.00
			M	1	MC6115	MP	130 – 245	0.08 – 0.30	0.30 – 2.00
			M	2	MC6115	MV	130 – 245	0.08 – 0.30	0.30 – 2.00
			F	1	MC6125	FP	170 – 265	0.04 – 0.20	0.20 – 0.90
			F	2	MC6135	FP	135 – 210	0.04 – 0.20	0.20 – 0.90
			L	1	MC6125	LP	170 – 265	0.06 – 0.25	0.20 – 1.00
			L	2	MC6135	LP	135 – 210	0.06 – 0.25	0.20 – 1.00
			M	1	MC6125	MP	140 – 220	0.08 – 0.30	0.30 – 2.00
			M	2	MC6135	MP	115 – 175	0.08 – 0.30	0.30 – 2.00
			M	3	MC6125	MV	140 – 220	0.08 – 0.30	0.30 – 2.00

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1. Recommended cutting conditions for 5° / 7° / 11° positive inserts are provided as a guideline only.
Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.

RECOMMENDED CUTTING CONDITIONS

MC6100 SERIES – 11° POSITIVE INSERTS (FOR EXTERNAL TURNING)

Material	Hardness	Cutting mode		Priority	Grade		Vc	f	ap
Mild steel	≤180HB		F	1	MC6125	FP	320 – 505	0.04 – 0.20	0.20 – 0.90
			F	2	MC6125	FV	320 – 505	0.04 – 0.20	0.20 – 0.90
			L	1	MC6125	LP	320 – 505	0.06 – 0.25	0.20 – 1.00
			L	2	MC6115	R-Std	245 – 475	0.08 – 0.30	0.30 – 2.00
			M	1	MC6125	MP	270 – 420	0.08 – 0.30	0.30 – 2.00
			M	2	MC6115	MP	245 – 475	0.08 – 0.30	0.30 – 2.00
			M	3	MC6125	MV	270 – 420	0.08 – 0.30	0.30 – 2.00
			M	4	MC6115	MV	245 – 475	0.08 – 0.30	0.30 – 2.00
			L	1	MC6125	LP	320 – 505	0.06 – 0.25	0.20 – 1.00
			L	2	MC6135	LP	265 – 400	0.06 – 0.25	0.20 – 1.00
			M	1	MC6125	MP	270 – 420	0.08 – 0.30	0.30 – 2.00
			M	2	MC6135	MP	220 – 330	0.08 – 0.30	0.30 – 2.00
			M	3	MC6125	MV	270 – 420	0.08 – 0.30	0.30 – 2.00
			M	4	MC6135	MV	220 – 330	0.08 – 0.30	0.30 – 2.00
Carbon steel Alloy steel	180 – 280HB		F	1	MC6125	FP	240 – 370	0.04 – 0.20	0.20 – 0.90
			F	2	MC6125	FV	240 – 370	0.04 – 0.20	0.20 – 0.90
			L	1	MC6125	LP	240 – 370	0.06 – 0.25	0.20 – 1.00
			L	2	MC6115	LP	220 – 420	0.06 – 0.25	0.20 – 1.00
			M	1	MC6125	MP	200 – 310	0.08 – 0.30	0.30 – 2.00
			M	2	MC6125	MV	200 – 310	0.08 – 0.30	0.30 – 2.00
			M	3	MC6115	R-Std	180 – 350	0.08 – 0.30	0.30 – 2.00
			M	4	MC6125	R-Std	200 – 310	0.08 – 0.30	0.30 – 2.00
			L	1	MC6125	LP	240 – 370	0.06 – 0.25	0.20 – 1.00
			L	2	MC6135	LP	195 – 295	0.06 – 0.25	0.20 – 1.00
			M	1	MC6125	MP	200 – 310	0.08 – 0.30	0.30 – 2.00
			M	2	MC6135	MP	160 – 245	0.08 – 0.30	0.30 – 2.00
			M	3	MC6125	MV	200 – 310	0.08 – 0.30	0.30 – 2.00
			M	4	MC6135	MV	160 – 245	0.08 – 0.30	0.30 – 2.00

1/1

1/1

1. Recommended cutting conditions for 5° / 7° / 11° positive inserts are provided as a guideline only.
Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.

RECOMMENDED CUTTING CONDITIONS

MC5100 SERIES – 5°, 7° POSITIVE INSERTS (FOR EXTERNAL TURNING)

Material	Properties	Cutting mode	Grade	Vc
K	Gray cast iron	●	MC5115	190 – 350
		●	MC5115	140 – 270
		✖	MC5115	80 – 150
	Ductile cast iron	●	MC5115	170 – 320
		●	MC5115	130 – 250
		✖	MC5125	60 – 130
	Tensile strength ≤800MPa	●	MC5115	125 – 240
		●	MC5115	105 – 200
		✖	MC5125	55 – 115

1/1

MC5100 SERIES – 11° POSITIVE INSERTS (FOR EXTERNAL TURNING)

Material	Properties	Cutting mode	Grade	Vc
K	Gray cast iron	●	MC5115	150 – 300
		●	MC5115	140 – 270
		✖	MC5115	80 – 150
	Ductile cast iron	●	MC5115	170 – 320
		●	MC5115	130 – 250
		✖	MC5125	60 – 130
	Tensile strength ≤800MPa	●	MC5115	125 – 240
		●	MC5115	105 – 200
		✖	MC5125	55 – 115

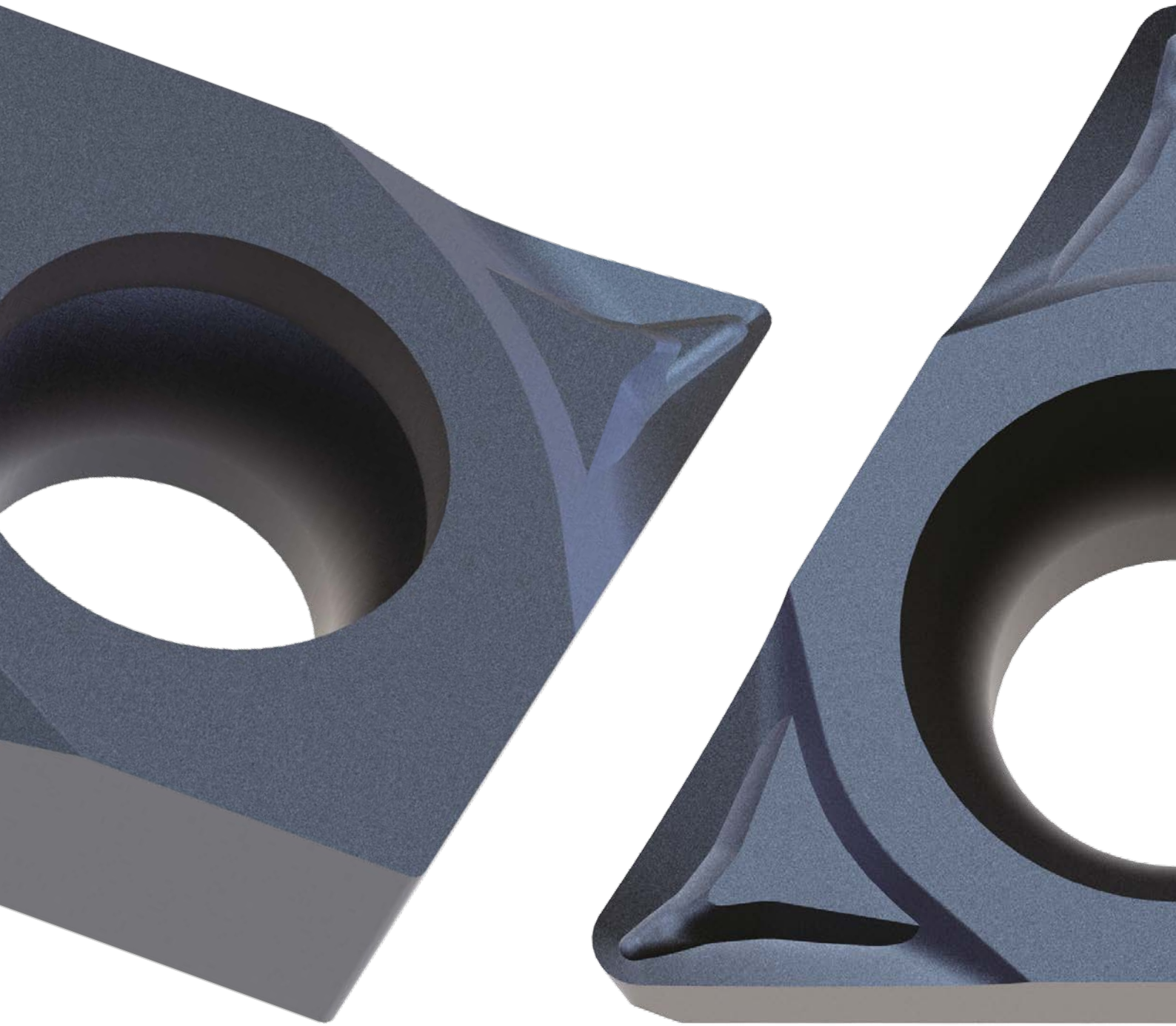
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Cutting area		f	ap
Light cutting	LK	0.06 – 0.25	0.2 – 1.0
	SW	0.06 – 0.24	0.2 – 1.5
Medium cutting	MK	0.08 – 0.30	0.3 – 2.0
	MV	0.08 – 0.30	0.3 – 2.0
	Standard	0.08 – 0.30	0.3 – 2.0
	MW	0.10 – 0.35	0.8 – 2.5
Heavy cutting	Flat Top	0.08 – 0.30	0.3 – 2.0

NEW

FSF / FSF-P CHIPBREAKER

IDEAL CHIPBREAKER FOR SMALL DEPTHS OF CUT
AND FINISHING OPERATIONS



Interested in more...

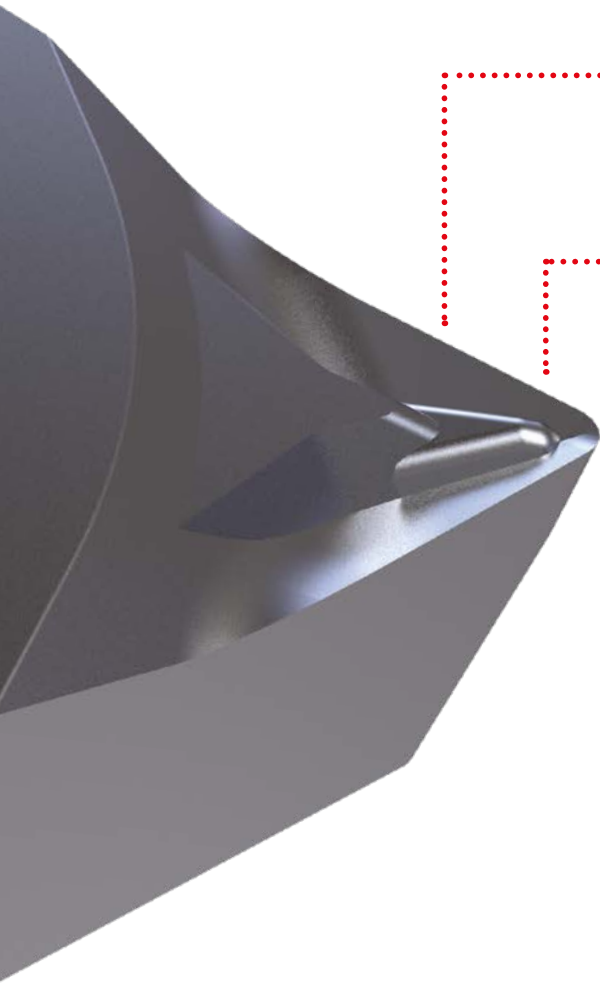
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 **MITSUBISHI MATERIALS**

FSF / FSP-P CHIPBREAKER

CHIPBREAKER FOR SMALL DEPTHS OF CUT



SHARP CUTTING EDGE

The sharp 25° rake angle provides a sharp cutting edge and a beautifully finished surface.

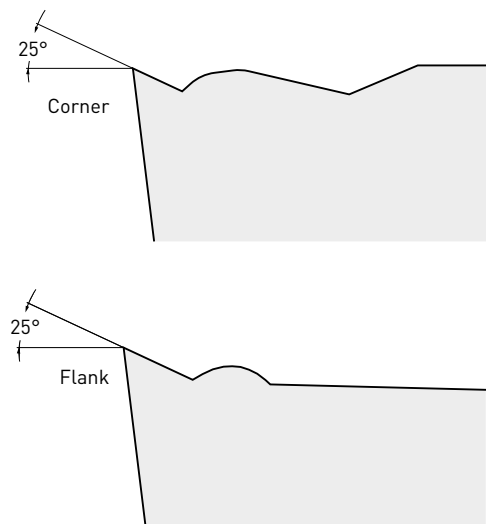
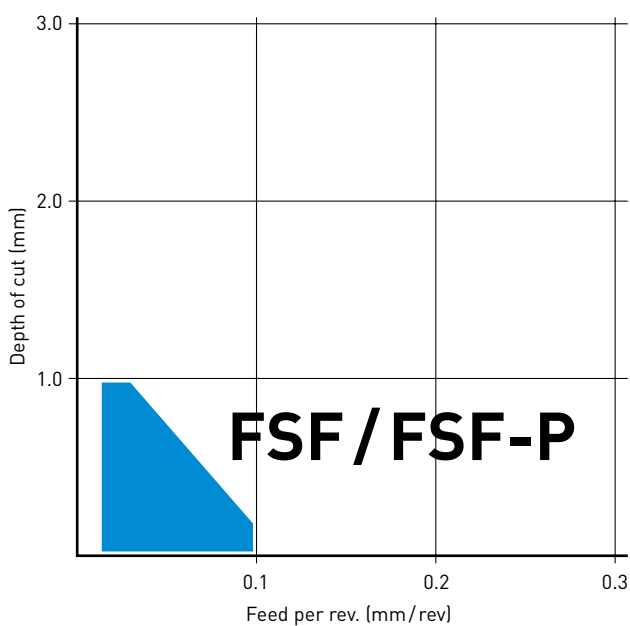
LOW CUTTING RESISTANCE

Low cutting resistance design with gentle chipbreaker protrusion.

MULTI-STAGE CHIPBREAKER

Responds to fluctuations in depth of cut.

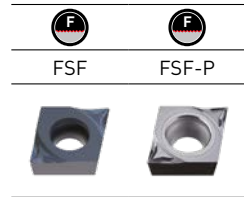
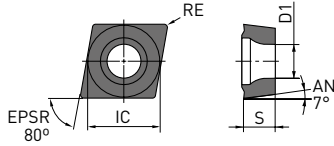
APPLICATION RANGE



CCGT

7° POSITIVE INSERTS (WITH HOLE)

G Class



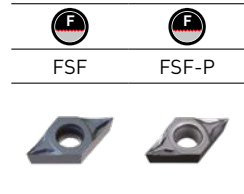
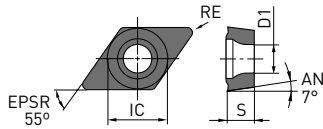
Order number	 	MP9025	MS7025	MS9025	VP30RT	HT110	IC	S	RE	D1
CCGT03S101M-FSF	F	●					3.97	1.39	0.1	2.0
CCGT03S102M-FSF	F	●					3.97	1.39	0.2	2.0
CCGT04T001M-FSF	F	●					4.76	1.79	0.1	2.4
CCGT04T002M-FSF	F	●					4.76	1.79	0.2	2.4
CCGT060201M-FSF	F	●					6.35	2.38	0.1	2.8
CCGT060202M-FSF	F	●					6.35	2.38	0.2	2.8
CCGT060204M-FSF	F	●					6.35	2.38	0.4	2.8
CCGT03S101M-FSF-P	F		●	●			3.97	1.39	0.1	2.0
CCGT03S102M-FSF-P	F		●	●			3.97	1.39	0.2	2.0
CCGT04T001M-FSF-P	F		●	●			4.76	1.79	0.1	2.4
CCGT04T002M-FSF-P	F		●	●			4.76	1.79	0.2	2.4
CCGT0602V5M-FSF-P	F		●		●		6.35	2.38	0.05	2.8
CCGT060201M-FSF-P	F		●	●	●		6.35	2.38	0.1	2.8
CCGT060202M-FSF-P	F		●	●	●		6.35	2.38	0.2	2.8
CCGT060204M-FSF-P	F		●	●	●		6.35	2.38	0.4	2.8
CCGT09T3V5M-FSF-P	F		●		●		9.525	3.97	0.05	4.4
CCGT09T301M-FSF-P	F		●	●	●		9.525	3.97	0.1	4.4
CCGT09T302M-FSF-P	F		●		●		9.525	3.97	0.2	4.4
CCGT09T304M-FSF-P	F		●		●		9.525	3.97	0.4	4.4

1/1

DCGT

7° POSITIVE INSERTS (WITH HOLE)

G Class



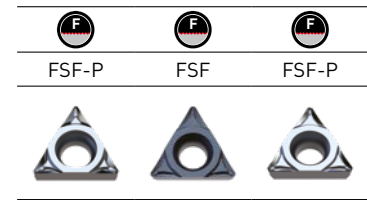
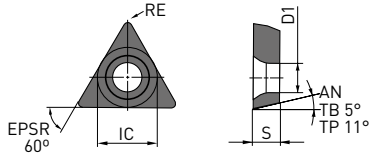
Order number		MP9025	MS7025	MS9025	VP30RT	HT110	IC	S	RE	D1
DCGT070201M-FSF	F	●					6.35	2.38	0.1	2.8
DCGT070202M-FSF	F	●					6.35	2.38	0.2	2.8
DCGT11T301M-FSF	F	●					9.525	3.97	0.1	4.4
DCGT11T302M-FSF	F	●					9.525	3.97	0.2	4.4
DCGT0702V5M-FSF-P	F		●		●		6.35	2.38	0.05	2.8
DCGT070201M-FSF-P	F		●	●	●		6.35	2.38	0.1	2.8
DCGT070202M-FSF-P	F		●	●	●		6.35	2.38	0.2	2.8
DCGT11T3V5M-FSF-P	F		●		●		9.525	3.97	0.05	4.4
DCGT11T301M-FSF-P	F		●	●	●		9.525	3.97	0.1	4.4
DCGT11T302M-FSF-P	F		●	●	●		9.525	3.97	0.2	4.4
DCGT11T304M-FSF-P	F		●		●		9.525	3.97	0.4	4.4

1/1

TBGT, TPGH

5°, 11° POSITIVE INSERTS (WITH HOLE)

G Class



Order number		MP9025	MS7025	MS9025	VP30RT	HT110	IC	S	RE	D1
TBGT060101M-FSF-P	F		●	●	●		3.97	1.59	0.1	2.3
TBGT060102M-FSF-P	F		●		●		3.97	1.59	0.2	2.3
TPGH090201M-FSF	F	●					5.56	2.38	0.1	2.9
TPGH090202M-FSF	F	●					5.56	2.38	0.2	2.9
TPGH090204M-FSF	F	●					5.56	2.38	0.4	2.9
TPGH080201M-FSF-P	F		●	●	●		4.76	2.38	0.1	2.4
TPGH080202M-FSF-P	F		●		●		4.76	2.38	0.2	2.4
TPGH090201M-FSF-P	F		●	●	●		5.56	2.38	0.1	2.9
TPGH090202M-FSF-P	F		●	●	●		5.56	2.38	0.2	2.9
TPGH090204M-FSF-P	F		●	●	●		5.56	2.38	0.4	2.9

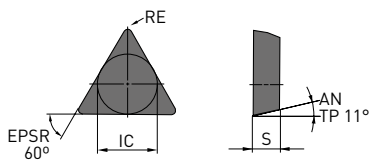
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TPGB

11° POSITIVE INSERTS (WITHOUT HOLE)

G Class



Strong cutting
edge
Flat Top



Order number		MP9025	MS7025	MS9025	VP30RT	HT110	IC	S	RE	D1
TPGB110201	M					●	6.35	2.38	0.1	—
TPGB110202	M					●	6.35	2.38	0.2	—
TPGB110204	M					●	6.35	2.38	0.4	—
TPGB160304	M					●	9.525	3.18	0.4	—
TPGB160308	M					●	9.525	3.18	0.8	—
TPGB080202	M					●	4.76	2.38	0.2	—
TPGB080204	M					●	4.76	2.38	0.4	—
TPGB080208	M					●	4.76	2.38	0.8	—
TPGB090202	M					●	5.56	2.38	0.2	—
TPGB090204	M					●	5.56	2.38	0.4	—
TPGB1102V5	M					●	6.35	2.38	0.05	—
TPGN090202	—					●	5.56	2.38	0.2	—
TPGN090204	—					●	5.56	2.38	0.4	—
TPGN090208	—					●	5.56	2.38	0.8	—

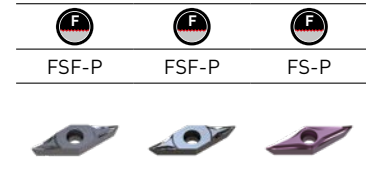
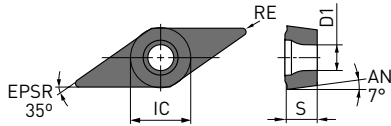
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VCGT, VPGT

7°, 11° POSITIVE INSERTS (WITH HOLE)

G Class



Order number		MP9025	MS7025	MS9025	VP30RT	HT110	IC	S	RE	D1
VCGT110301M-FSF-P	F		●	●	●		6.35	3.18	0.1	2.8
VCGT110302M-FSF-P	F		●		●		6.35	3.18	0.2	2.8
VCGT110304M-FSF-P	F		●		●		6.35	3.18	0.4	2.8
VPGT110301M-FSF-P	F		●	●	●		6.35	3.18	0.1	2.9
VPGT110302M-FSF-P	F		●		●		6.35	3.18	0.2	2.9
VPGT110304M-FSF-P	F		●		●		6.35	3.18	0.4	2.9
VPGT110301M-FS-P	F		●		●		6.35	3.18	0.1	2.9
VPGT110302M-FS-P	F		●		●		6.35	3.18	0.2	2.9

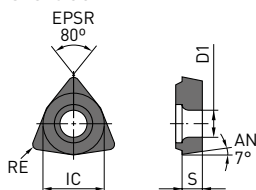
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WCGT

7° POSITIVE INSERTS (WITH HOLE)

G Class



Order number		MP9025	MS7025	MS9025	VP30RT	HT110	IC	S	RE	D1
WCGT020101M-FSF-P	F		●	●	●		3.97	1.59	0.1	2.3
WCGT020102M-FSF-P	F		●	●	●		3.97	1.59	0.2	2.3
WCGTL30201M-FSF-P	F		●	●	●		4.76	2.38	0.1	2.3
WCGTL30202M-FSF-P	F		●	●	●		4.76	2.38	0.2	2.3
WCGT040201M-FSF-P	F		●	●	●		6.35	2.38	0.1	2.8
WCGT040202M-FSF-P	F		●	●	●		6.35	2.38	0.2	2.8
WCGT06T301M-FSF-P	F			●			9.525	3.97	0.1	4.4
WCGT06T302M-FSF-P	F		●	●	●		9.525	3.97	0.2	4.4
WCGT06T304M-FSF-P	F		●		●		9.525	3.97	0.4	4.4

1/1

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FSF / FSF-P CHIPBREAKER

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED

Material	Properties	 	Cutting condition	MP9025 Vc	MS7025 Vc	MS9025 Vc	VP30RT Vc	HT110 Vc
P	Soft magnetic iron, Mild steel	≤180 HB	F	● —	100 – 300	—	—	—
			✱	—	—	—	155 – 190	—
	Carbon steel, Alloy steel	180–280 HB	F	● —	40 – 130	—	—	—
			✱	—	—	—	115 – 140	—
	Carbon steel, Alloy steel	280–350 HB	F	✱ —	—	—	80 – 100	—
M	Austenitic stainless steel	≤200 HB	F	● —	40 – 100	60 – 150	—	—
			✱	—	—	—	50 – 90	—
	Ferritic and martensitic stainless steel	≤200 HB	F	● —	40 – 100	—	—	—
			✱	—	—	—	50 – 90	—
	Austenitic, Ferritic and martensitic stainless steel	>200 HB	F	✱ —	—	—	40 – 75	—
	Electromagnetic stainless steel	230 HBW	F	● —	40 – 160	50 – 180	—	—
	Duplex stainless steel	≤280 HB	F	✱ —	—	—	35 – 60	—
	Precipitation hardening stainless steel	<450 HB	F	✱ 70 – 85	40 – 80	50 – 100	—	—
K	Grey cast iron	≤350 MPa	M	● ✱	—	—	—	90 – 125
	Ductile cast iron	≤450 MPa	M	● ● ✱	—	—	—	70 – 100
	Ductile cast iron	≤800 MPa	M	● ● ✱	—	—	—	60 – 90
N	Aluminium alloys	—	M	● ● ✱	—	—	—	300 – 700
S	Heat resistant alloys	—	F	● —	—	40 – 140	—	—
			✱	25 – 40	—	—	—	—

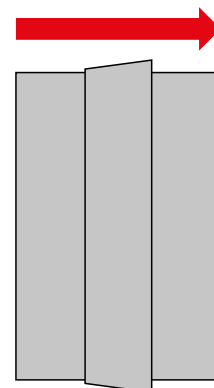
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Chipbreaker	f (mm/rev)	ap (mm)
FSF, FSF-P	0.02 – 0.1	0.02 – 1.0
FS-P	0.04 – 0.2	0.2 – 0.9
Standard	0.08 – 0.3	0.3 – 2.0
Flat Top	0.08 – 0.3	0.3 – 2.0

APPLICATION EXAMPLES

EXTERNAL TURNING

Workpiece material	DIN 1.4301 (X5CrNi18-10)
Insert	DCGT11T301M-FSF-P
Grade	MS9025
Vc (m/min)	120
f (mm/rev)	0.02
ap (mm)	0.1
Cutting mode	Wet cutting (Oil)
Result	Chipping at the cutting edge was suppressed and chip removal was good. It is now possible to process 750 pieces, compared to the conventional 150 pieces tool life.

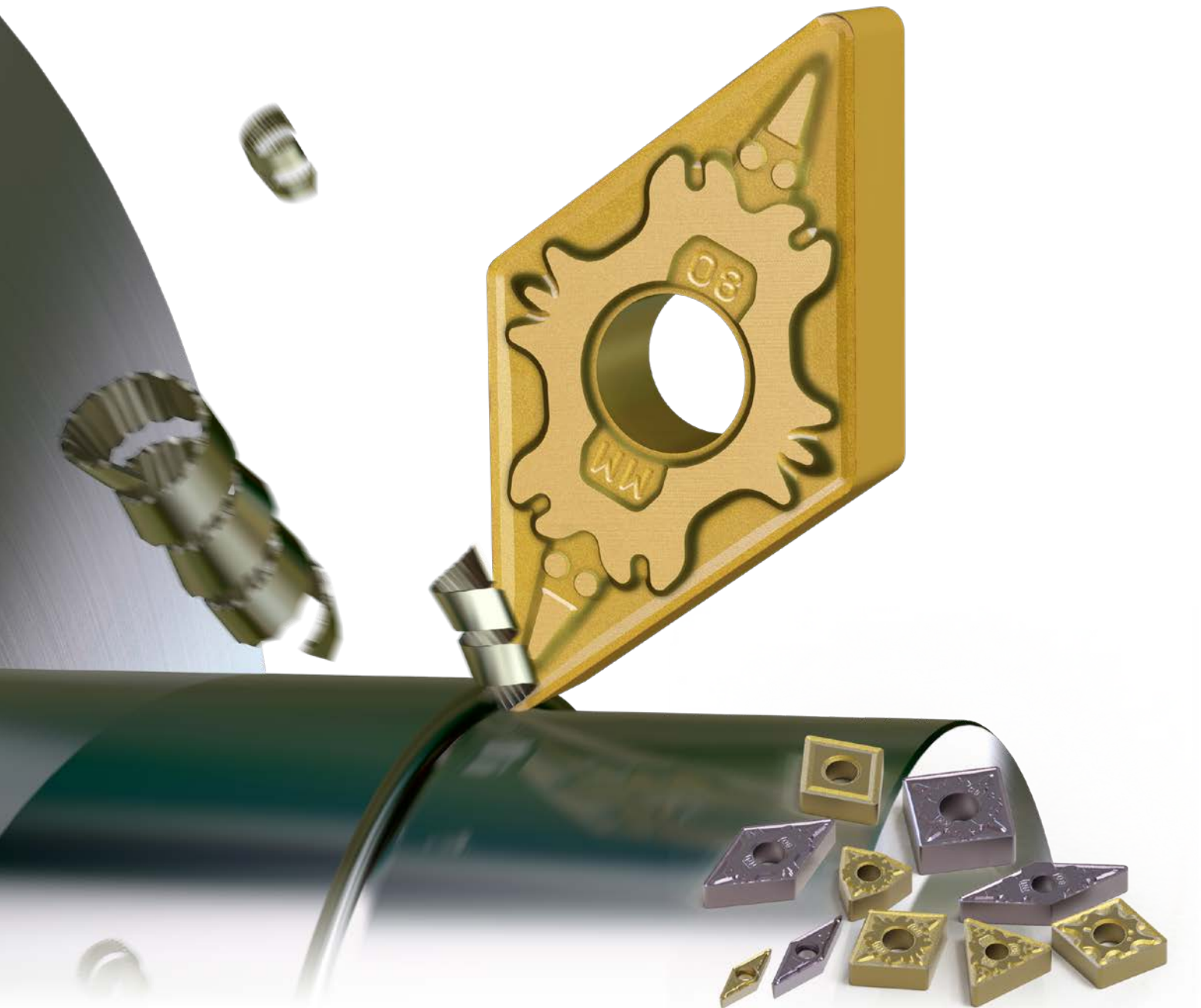


NEW

MC/MP7100 SERIES

DEDICATED CARBIDE SUBSTRATE

NEW COATING TECHNOLOGY FOR STAINLESS STEEL
TURNING



Interested in more...

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 **MITSUBISHI MATERIALS**

MC/MP7100 SERIES

CREATION OF A NEW SERIES FOR A VARIETY OF STAINLESS STEEL APPLICATIONS

MC7125



THE ALL ROUND CHOICE FOR STAINLESS STEEL TURNING

First recommended grade.
Compatible with a wide range of applications,
from continuous cutting through to
interrupted cutting.
Suitable for a wide variety of stainless steels.

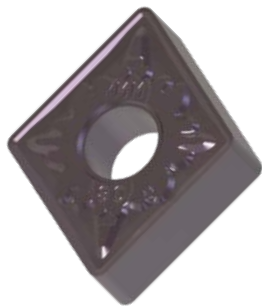
MC7115



FOR HIGH SPEED TURNING

CVD coated carbide grade specialised
for high speed cutting.
For medium to large austenitic stainless steel
parts, cutting speeds of 250 m/min or more reduce
machining time.

MP7135



TOUGHER FOR INTERRUPTED CUTTING

PVD coated carbide grade that is resistant to the
impacts of interrupted cutting.
It is ideal for intermittent cutting of workpieces,
as well as for rough machining of forged and cast
stainless products.

MC/MP7100 SERIES MACHINING VIDEO

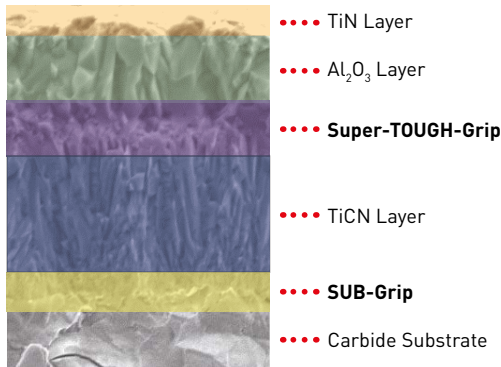


MC/MP7100 SERIES

MC7125

THE ALL-ROUNDER FOR STAINLESS STEEL TURNING

Incredibly stable with both plastic deformation and chipping resistance.



COATING LAYER WITH HIGH ADHESIVE STRENGTH

Tough and Super TOUGH-Grip dramatically improve adhesion strength and maximise the effectiveness of the coating.

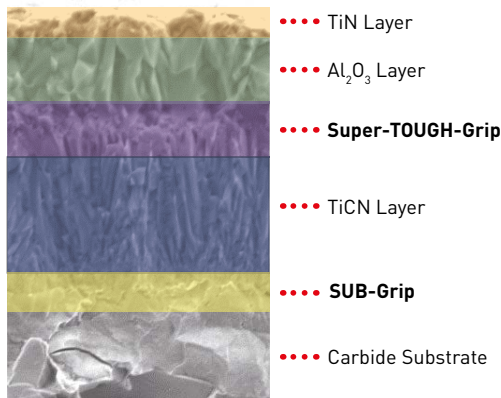
SUBSTRATE RESISTANT TO PLASTIC DEFORMATION AND CHIPPING

By optimising the particle size distribution of the main component WC and improving its dispersibility, reduced contact between the WC particles, dramatically improves resistance to plastic deformation and fracture.

MC7115

FOR HIGH SPEED TURNING

Increases the hardness of the base material, providing excellent resistance to plastic deformation and crater wear.



COATING LAYER WITH HIGH ADHESIVE STRENGTH

Tough and Super Tough Grip improve adhesion strength and maximise the effectiveness of the coating. "Super" Nano Texture Technology suppresses crater wear during high speed cutting.

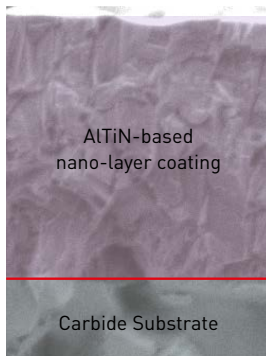
CARBIDE SUBSTRATE THAT IS STRONG FOR HIGH SPEED CUTTING

The hard carbide substrate is resistant to the high temperatures generated during high speed cutting and has excellent resistance to plastic deformation and crater wear.

MP7135

TOUGHER FOR INTERRUPTED CUTTING

The highly heat resistant coating and dedicated carbide substrate provide both wear resistance and chipping resistance.



AlTiN-BASED NANO-LAYER COATING

By layering the highly heat resistant AlTiN coating at the Nano level, excellent wear and chipping resistance has been achieved.

TECHNOLOGY TO IMPROVE ADHESION STRENGTH

Suppresses peeling when machining stainless steel and exhibits excellent chipping resistance.

DEDICATED CARBIDE BASE MATERIAL

A carbide substrate exclusively for stainless steel that combines both wear and fracture resistance.

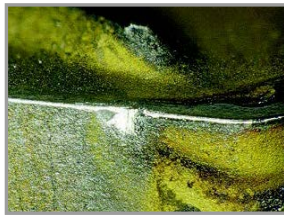
MC/MP7100 SERIES

COATED GRADE FOR STAINLESS STEEL TURNING

IMPROVED COATING ADHESION STRENGTH AND DEDICATED CARBIDE SUBSTRATE SUPPRESSES NOTCHING DURING STAINLESS STEEL TURNING

Stainless steels are widely used for components that require resistance to corrosion. When comparing stainless steels to other steels and cast irons, it has low hardness but is tough to machine and susceptible to work hardening. Due to these characteristics, turning inserts are prone to edge damage and weld chipping. Additionally, plastic deformation of the insert due to the heat generated makes more difficult to cut, resulting in unstable tool life. The properties of stainless steels, such as corrosion and heat resistance, vary greatly depending on the metallurgical structure and composition, and these small differences can make it appear as if a completely different workpiece material is being machined.

Mitsubishi Materials has the ability to combine coating and substrate technology to produce a series of grades to successfully machine stainless steels.



Notching



Fracture from welding chipping

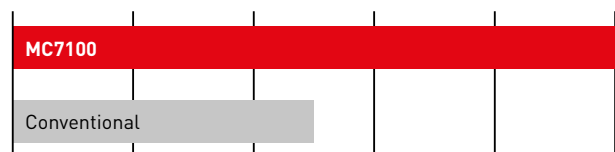
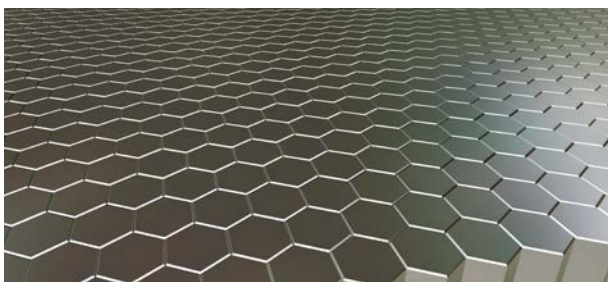


Plastic deformation

FEATURES OF THE MC7100 SERIES COATING

“SUPER” NANO TEXTURE TECHNOLOGY

The standard Nano Texture Technology has been improved and developed to be an industry leading standard for crystal growth of Al_2O_3 coatings. This Super Nano Texture Technology increases tool life and wear resistance due to the process that creates fine, dense crystal growth.



The ratio of Al_2O_3 crystal grains with the same orientation

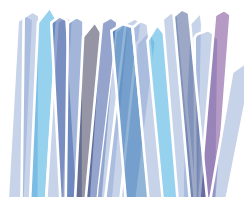
CRYSTAL ORIENTATION

(Image)



Conventional CVD inserts

Grain size and growth direction are uneven.



Nano Texture

Uniformity of the grain size and growth direction has improved.



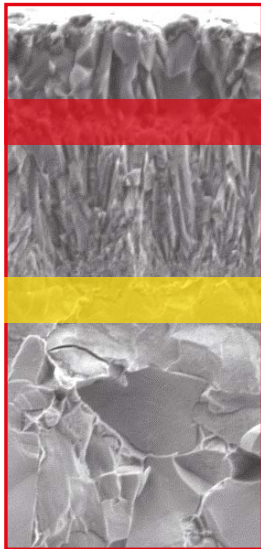
“Super” Nano Texture

Uniformity of the growth direction has drastically improved.

MC/MP7100 SERIES

TOUGH AND SUB GRIP LAYERS

THE EXTRA STRENGTH OF THE ADHESION BETWEEN THE COATING LAYERS SUPPRESSES PEELING DURING MACHINING OF STAINLESS STEELS



SUPER-TOUGH-GRIP

The adhesion strength of the Al_2O_3 layer, which was prone to peeling due to the work-hardened layer when machining stainless steel, has been significantly improved.

SUB-GRIP

It increases the adhesion strength between the carbide substrate and the coating layer, and prevents the coating from peeling off due to welding.

FEATURES OF THE CARBIDE SUBSTRATES

MC7115

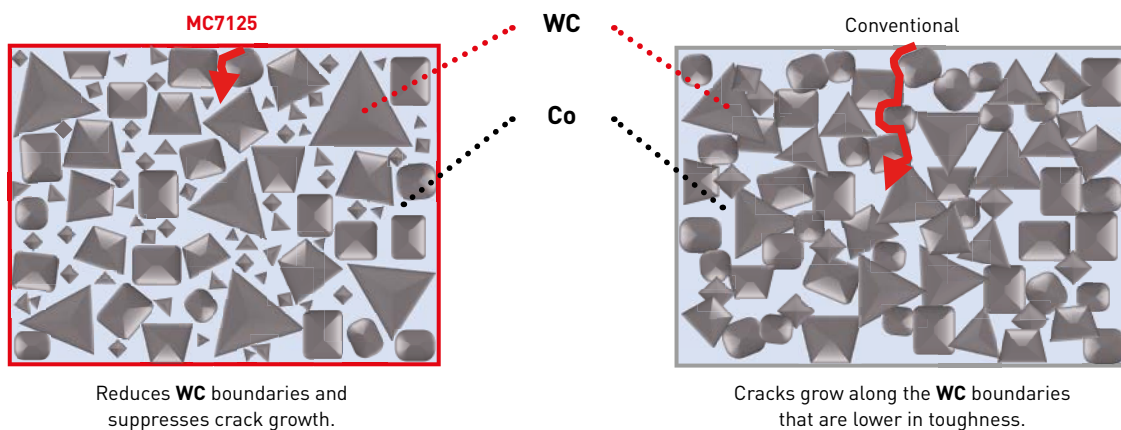
Has crater wear and plastic deformation resistance that are ideal for high-speed cutting of stainless steel.

MP7135

The dedicated carbide substrate has excellent wear resistance and greatly improved chipping resistance.

MC7125

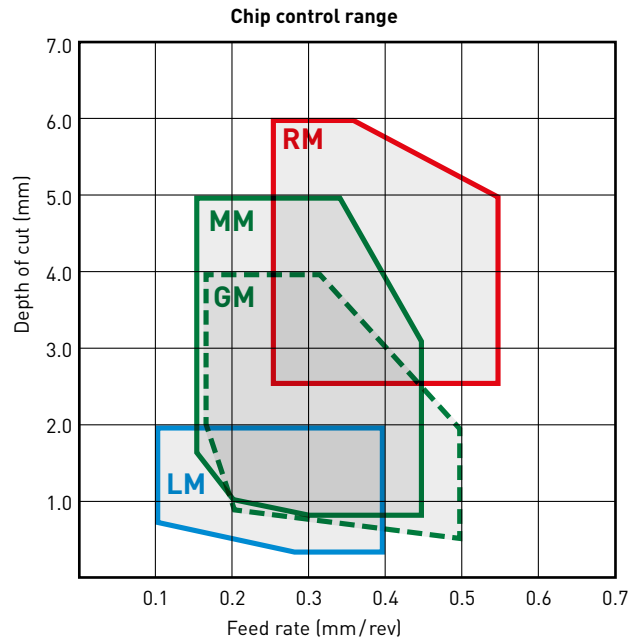
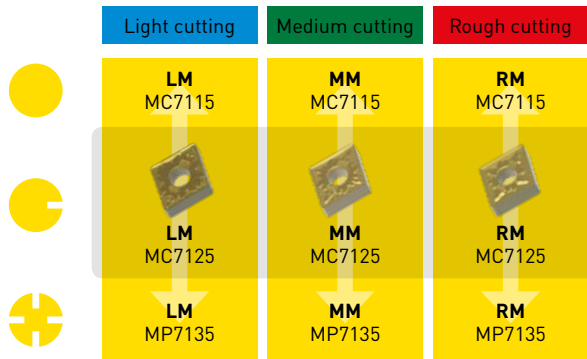
By optimising the particle size distribution, the boundary contact between the low toughness WC particles has been reduced and promotes hardness, thereby dramatically improving plastic deformation and fracture resistance.



CHIPBREAKER SYSTEM

NEGATIVE INSERT FOR EXTERNAL TURNING

M



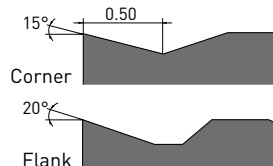
- **Stable cutting**
 - Continuous cutting
 - Constant depth of cut
 - Pre-machined surfaces
 - Securely clamped component cutting
- **General cutting**
- **Unstable cutting**
 - Heavy interrupted cutting
 - Irregular depth of cut
 - Low clamping rigidity cutting

MAIN CHIPBREAKER

LM CHIPBREAKER FOR LIGHT CUTTING

Excellent burr control

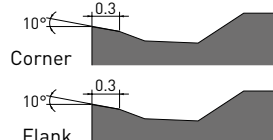
Reduces the incidence of burrs drastically because the sharpness properties and cutting edge strength are optimised with different rake angles.



MM CHIPBREAKER FOR MEDIUM CUTTING

Excellent welding resistance

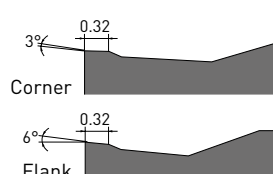
The sharp design of the corner radius and main cutting edge improves welding resistance and prevents problems.



RM CHIPBREAKER FOR ROUGH CUTTING

Excellent fracture resistance

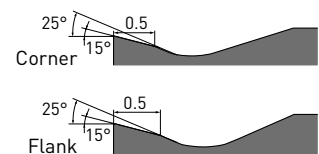
By optimizing the land angle and honing geometry, high cutting edge stability is achieved during interrupted machining.



GM CHIPBREAKER

Interpolated chipbreaker

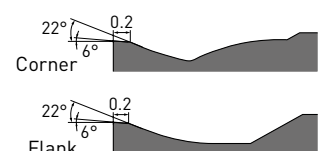
Sub chipbreaker of the main LM and MM chipbreaker. Excellent in notching resistance for light cutting to medium cutting.



MA CHIPBREAKER

Multi-Assist chipbreaker

Suitable for medium cutting range.



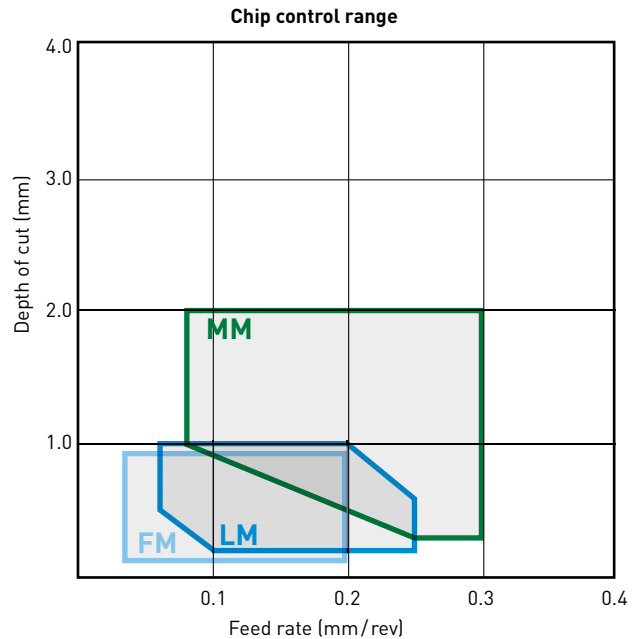
CHIPBREAKER SYSTEM

5°, 7°, 11° POSITIVE INSERT

M

	Finish cutting	Light cutting	Medium cutting
●	FM MC7125	LM MC7125	MM MC7125
◐	FM MC7125	LM MC7125	MM MC7125
⊕	FM MP7135	LM MP7135	MM MP7135

- **Stable cutting**
 - Continuous cutting
 - Constant depth of cut
 - Pre-machined surfaces
 - Securely clamped component cutting
- ◐ **General cutting**
- ⊕ **Unstable cutting**
 - Heavy interrupted cutting
 - Irregular depth of cut
 - Low clamping rigidity cutting



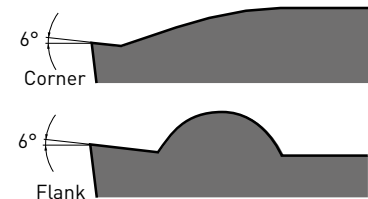
MAIN CHIPBREAKER

FM CHIPBREAKER FOR FINISH CUTTING

First recommendation for finishing stainless steel

Chipbreaker protrusion at the tip controls chips even at small depth of cut. Maintains edge strength and prevents sudden fractures.

5°, 7° Positive Insert



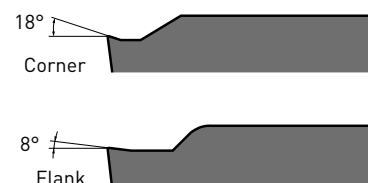
LM CHIPBREAKER FOR LIGHT CUTTING

First recommendation for light cutting of stainless steel

The large rake angle gives a sharp cutting edge that prevents chip welding, which in turn helps to control the surface finish.

The protruding chipbreaker provides an ideal range of chip control.

5°, 7°, 11° Positive Insert

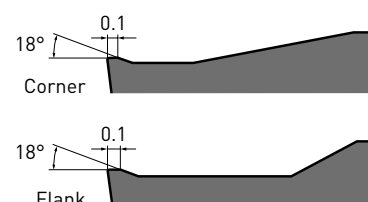


MM CHIPBREAKER FOR MEDIUM CUTTING

First recommendation for medium cutting of stainless steel

The flat land enables a good balance of wear and fracture resistance. The wide pocket reduces vibration and chip jamming and also prevents increases in cutting resistance even at large depths of cut.

5°, 7° Positive Insert



MC/MP7100 SERIES

CLASSIFICATION

M

**Ferritic
stainless steel**

AISI430 / DIN 1.4016

**Austenitic
stainless steel**

AISI304 / DIN 1.4301,
AISI316 / DIN 1.4401

**Martensitic
stainless steel**

AISI420J2 / DIN 1.4028

**Hardened
stainless steel**

AISI630 / DIN 1.4542

MC7125

First recommended

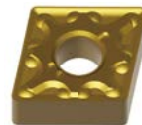
MM Chipbreaker



The new design has improved sharpness and welding resistance.

MA Chipbreaker

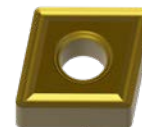
When cutting edge stability is required



A general-purpose chipbreaker with excellent stability and chip control.

GM Chipbreaker

When sharpness is required



It has a sharp cutting edge and produces chips that do not get tangled.

High-efficiency
High-speed

MC7115

MM Chipbreaker



LM Chipbreaker



The large rake angle helps to reduce burrs.

Wear Resistance
Continuous Machining

Fracture Resistance
Intermittent Machining

**Duplex
stainless steel**

Duplex material,
DIN 1.4462

MP7135

First recommended

GM Chipbreaker



Combined with PVD coating, it provides excellent sharpness even during rough machining.

MM Chipbreaker

When cutting edge stability is required



RM Chipbreaker

For rough machining



The strong cutting edge geometry provides excellent breakage resistance during interrupted cutting.

For general stainless steels, MC7125 is the first recommendation.

For duplex stainless steels, MP7135 is the first recommendation.

Even with the same grade, it is possible to improve tool life by selecting the appropriate chipbreaker.

When using MC7125 and wear is stable, higher efficiency could be realised through higher speeds by using MC7115.

For greater fracture resistance choose MP7135.

When using MP7135 for continuous machining wear resistance and improved productivity can be realised by using MC7125.

MC/MP7100 SERIES

RECOMMENDED CUTTING CONDITIONS

EXTRACTS FROM RECOMMENDED CONDITIONS FOR NEGATIVE INSERTS

Material		Cutting conditions	Grade		Vc	f	ap
Austenitic stainless steel AISI304 / DIN 1.4301, AISI316 / DIN 1.4401, etc.	L	First recommended	MC7115	LM	185 – 295	0.10 – 0.35	0.3 – 2.0
		Fracture resistance	MC7125	LM	175 – 240	0.10 – 0.35	0.3 – 2.5
	M	First recommended	MC7125	MM	160 – 220	0.15 – 0.50	0.3 – 5.0
		Alternative	MC7125	GM, MA	160 – 220	0.15 – 0.50	0.3 – 5.0
		Wear resistance	MC7115	MM	170 – 270	0.15 – 0.45	0.7 – 5.0
		Fracture resistance	MP7135	GM, MM, MA	120 – 155	0.15 – 0.50	0.3 – 4.0
	R	First recommended	MP7135	RM	110 – 145	0.25 – 0.60	1.5 – 6.0
		Wear resistance	MC7125	RM	150 – 205	0.25 – 0.55	1.5 – 6.0
Ferritic and martensitic stainless steel AISI430 / DIN 1.4016, AISI420J2 / DIN 1.4028, etc.	L	First recommended	MC7115	LM	185 – 295	0.10 – 0.35	0.3 – 2.0
		Fracture resistance	MC7125	LM	175 – 240	0.10 – 0.50	0.3 – 2.5
	M	First recommended	MC7125	MM	160 – 220	0.15 – 0.50	0.3 – 5.0
		Alternative	MC7125	GM, MA	160 – 220	0.15 – 0.50	0.3 – 5.0
		Wear resistance	MC7115	MM	170 – 270	0.15 – 0.45	0.7 – 5.0
		Fracture resistance	MP7135	GM, MM, MA	120 – 155	0.15 – 0.50	0.3 – 4.0
	R	First recommended	MP7135	RM	110 – 145	0.25 – 0.60	1.5 – 6.0
		Wear resistance	MC7125	RM	150 – 205	0.25 – 0.55	1.5 – 6.0
Precipitation-hardening stainless steel AISI630 / DIN 1.4542, etc.	L	First recommended	MC7115	LM	110 – 165	0.10 – 0.35	0.3 – 2.0
		Fracture resistance	MC7125	LM	95 – 120	0.10 – 0.50	0.3 – 2.5
	M	First recommended	MC7125	MM	90 – 110	0.15 – 0.50	0.3 – 5.0
		Alternative	MC7125	GM, MA	90 – 110	0.15 – 0.50	0.3 – 5.0
		Wear resistance	MC7115	MM	100 – 150	0.15 – 0.45	0.7 – 5.0
		Fracture resistance	MP7135	GM, MM, MA	65 – 90	0.15 – 0.50	0.3 – 5.0
	R	First recommended	MP7135	RM	60 – 85	0.25 – 0.60	1.5 – 6.0
		Wear resistance	MC7125	RM	85 – 100	0.25 – 0.55	1.5 – 6.0
Duplex stainless steel, Duplex material, DIN 1.4462, etc.	L	First recommended	MP7135	LM	85 – 115	0.10 – 0.40	0.3 – 2.5
		Fracture resistance	MC7125	LM	115 – 160	0.10 – 0.40	0.3 – 2.5
	M	First recommended	MP7135	GM	80 – 105	0.15 – 0.50	0.3 – 5.0
		Alternative	MP7135	MM, MA	80 – 105	0.15 – 0.50	0.3 – 5.0
		Wear resistance	MC7125	GM, MM, MA	105 – 145	0.15 – 0.50	0.3 – 5.0
	R	First recommended	MP7135	RM	75 – 100	0.25 – 0.60	1.5 – 6.0

1/1

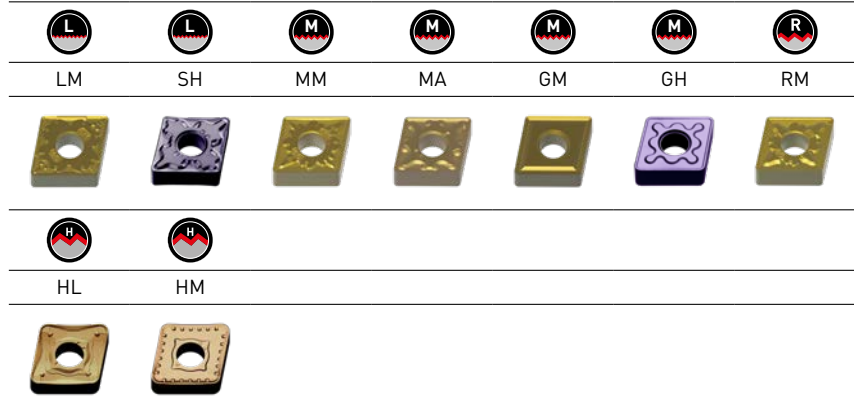
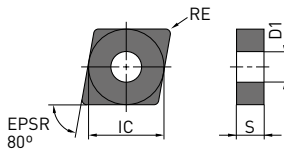
1. For recommended conditions other than those listed above, please refer to the information starting from page 130.

CNMG, CNMM

NEGATIVE INSERTS (WITH HOLE)

M Class

CNMG, CNMM



Order number		MC7115	MC7125	MP7135	IC	S	RE	D1
CNMG120404-LM	L	●	●	●	12.7	4.76	0.4	5.16
CNMG120408-LM	L	●	●	●	12.7	4.76	0.8	5.16
CNMG120412-LM	L	●	●	●	12.7	4.76	1.2	5.16
CNMG120404-SH	L			●	12.7	4.76	0.4	5.16
CNMG120408-SH	L			●	12.7	4.76	0.8	5.16
CNMG120408-MM	M	●	●	●	12.7	4.76	0.8	5.16
CNMG120412-MM	M	●	●	●	12.7	4.76	1.2	5.16
CNMG120416-MM	M	●	●	●	12.7	4.76	1.6	5.16
CNMG160608-MM	M	●	●	●	15.875	6.35	0.8	6.35
CNMG160612-MM	M	●	●	●	15.875	6.35	1.2	6.35
CNMG160616-MM	M	●	●	●	15.875	6.35	1.6	6.35
CNMG190608-MM	M	●	●	●	19.05	6.35	0.8	7.93
CNMG190612-MM	M	●	●	●	19.05	6.35	1.2	7.93
CNMG190616-MM	M	●	●	●	19.05	6.35	1.6	7.93
CNMG120404-MA	M		●	●	12.7	4.76	0.4	5.16
CNMG120408-MA	M		●	●	12.7	4.76	0.8	5.16
CNMG120412-MA	M		●	●	12.7	4.76	1.2	5.16
CNMG120416-MA	M		●	●	12.7	4.76	1.6	5.16
CNMG160608-MA	M			●	15.875	6.35	0.8	6.35
CNMG160612-MA	M			●	15.875	6.35	1.2	6.35
CNMG160616-MA	M			●	15.875	6.35	1.6	6.35
CNMG190612-MA	M			●	19.05	6.35	1.2	7.93
CNMG190616-MA	M		●	●	19.05	6.35	1.6	7.93
CNMG120404-GM	M		●	●	12.7	4.76	0.4	5.16
CNMG120408-GM	M		●	●	12.7	4.76	0.8	5.16
CNMG120412-GM	M		●	●	12.7	4.76	1.2	5.16
CNMG120408-GH	M			●	12.7	4.76	0.8	5.16
CNMG120412-GH	M			●	12.7	4.76	1.2	5.16
CNMG160612-GH	M			●	15.875	6.35	1.2	6.35
CNMG190612-GH	M			●	19.05	6.35	1.2	7.93
CNMG190616-GH	M			●	19.05	6.35	1.6	7.93

1/2

[10 inserts in one case]

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CNMG, CNMM – NEGATIVE INSERTS (WITH HOLE)

Order number			MC7115	MC7125	MP7135	IC	S	RE	D1
CNMG120408-RM	R		●	●	●	12.7	4.76	0.8	5.16
CNMG120412-RM	R		●	●	●	12.7	4.76	1.2	5.16
CNMG120416-RM	R		●	●	●	12.7	4.76	1.6	5.16
CNMG160612-RM	R		●	●	●	15.875	6.35	1.2	6.35
CNMG160616-RM	R		●	●	●	15.875	6.35	1.6	6.35
CNMG190612-RM	R		●	●	●	19.05	6.35	1.2	7.93
CNMG190616-RM	R		●	●	●	19.05	6.35	1.6	7.93
CNMM190612-HL	H			●		19.05	6.35	1.2	7.93
CNMM190616-HL	H			●		19.05	6.35	1.6	7.93
CNMM190612-HM	H			●		19.05	6.35	1.2	7.93
CNMM190616-HM	H			●		19.05	6.35	1.6	7.93
									2/2

[10 inserts in one case]

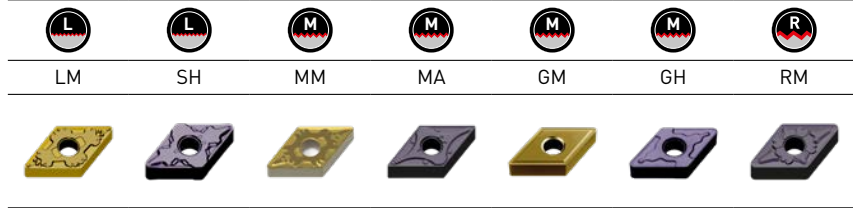
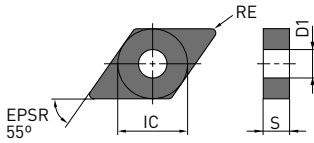
130 

DNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

DNMG



Order number		MC7115	MC7125	MP7135	IC	S	RE	D1
DNMG110404-LM	L	●	●	●	9.525	4.76	0.4	3.81
DNMG110408-LM	L	●	●	●	9.525	4.76	0.8	3.81
DNMG150404-LM	L	●	●	★	12.7	4.76	0.4	5.16
DNMG150408-LM	L	●	●	★	12.7	4.76	0.8	5.16
DNMG150412-LM	L	★	★	★	12.7	4.76	1.2	5.16
DNMG150604-LM	L	●	●	●	12.7	6.35	0.4	5.16
DNMG150608-LM	L	●	●	●	12.7	6.35	0.8	5.16
DNMG110404-SH	L			●	9.525	4.76	0.4	3.81
DNMG110408-SH	L			●	9.525	4.76	0.8	3.81
DNMG150404-SH	L			●	12.7	4.76	0.4	5.16
DNMG150408-SH	L			★	12.7	4.76	0.8	5.16
DNMG150408-MM	M	●	●	●	12.7	4.76	0.8	5.16
DNMG150412-MM	M		★	★	12.7	4.76	1.2	5.16
DNMG150608-MM	M	●	●	●	12.7	6.35	0.8	5.16
DNMG150612-MM	M	★	●	●	12.7	6.35	1.2	5.16
DNMG150404-MA	M		●	●	12.7	4.76	0.4	5.16
DNMG150408-MA	M		●	●	12.7	4.76	0.8	5.16
DNMG150412-MA	M		★	★	12.7	4.76	1.2	5.16
DNMG150604-MA	M		●	●	12.7	6.35	0.4	5.16
DNMG150608-MA	M		●	●	12.7	6.35	0.8	5.16
DNMG150612-MA	M		★	●	12.7	6.35	1.2	5.16
DNMG150404-GM	M		●	●	12.7	4.76	0.4	5.16
DNMG150408-GM	M		★	★	12.7	4.76	0.8	5.16
DNMG150604-GM	M		●	★	12.7	6.35	0.4	5.16
DNMG150608-GM	M		●	●	12.7	6.35	0.8	5.16
DNMG150408-GH	M			●	12.7	4.76	0.8	5.16
DNMG150412-GH	M			★	12.7	4.76	1.2	5.16
DNMG150608-GH	M			●	12.7	6.35	0.8	5.16
DNMG150612-GH	M			●	12.7	6.35	1.2	5.16
DNMG150408-RM	R	●	●	●	12.7	4.76	0.8	5.16
DNMG150412-RM	R		●	★	12.7	4.76	1.2	5.16
DNMG150416-RM	R		★	★	12.7	4.76	1.6	5.16
DNMG150608-RM	R		●	●	12.7	6.35	0.8	5.16
DNMG150612-RM	R		●	★	12.7	6.35	1.2	5.16

1/1

(10 inserts in one case)

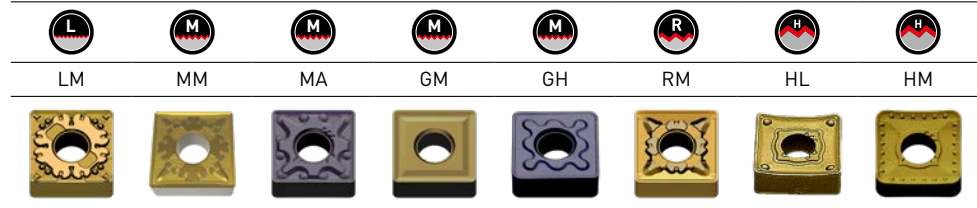
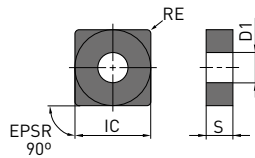
130

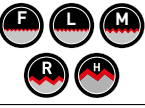
SNMG, SNMM

NEGATIVE INSERTS (WITH HOLE)

M Class

SNMG, SNMM



Order number		MC7115	MC7125	MP7135	IC	S	RE	D1
SNMG120404-LM	L	●	★	★	12.7	4.76	0.4	5.16
SNMG120408-LM	L	●	●	★	12.7	4.76	0.8	5.16
SNMG120408-MM	M	●	●	●	12.7	4.76	0.8	5.16
SNMG120412-MM	M	●	●	●	12.7	4.76	1.2	5.16
SNMG120416-MM	M	★	★	★	12.7	4.76	1.6	5.16
SNMG150608-MM	M		●	★	15.875	6.35	0.8	6.35
SNMG150612-MM	M	●	●	★	15.875	6.35	1.2	6.35
SNMG150616-MM	M		★		15.875	6.35	1.6	6.35
SNMG190612-MM	M		●	●	19.05	6.35	1.2	7.93
SNMG190616-MM	M		●	●	19.05	6.35	1.6	7.93
SNMG120404-MA	M		●	★	12.7	4.76	0.4	5.16
SNMG120408-MA	M		●	●	12.7	4.76	0.8	5.16
SNMG120412-MA	M		★	●	12.7	4.76	1.2	5.16
SNMG150608-MA	M		●	●	15.875	6.35	0.8	6.35
SNMG150612-MA	M		●	●	15.875	6.35	1.2	6.35
SNMG190616-MA	M		●	●	19.05	6.35	1.6	7.93
SNMG120404-GM	M		●	★	12.7	4.76	0.4	5.16
SNMG120408-GM	M		●	●	12.7	4.76	0.8	5.16
SNMG120412-GM	M		★	●	12.7	4.76	1.2	5.16
SNMG120408-GH	M			●	12.7	4.76	0.8	5.16
SNMG120412-GH	M			★	12.7	4.76	1.2	5.16
SNMG120416-GH	M			●	12.7	4.76	1.6	5.16
SNMG190612-GH	M			●	19.05	6.35	1.2	7.93
SNMG190616-GH	M			●	19.05	6.35	1.6	7.93
SNMG120408-RM	R	★	●	●	12.7	4.76	0.8	5.16
SNMG120412-RM	R	★	●	●	12.7	4.76	1.2	5.16
SNMG120416-RM	R	★	★	●	12.7	4.76	1.6	5.16
SNMG150612-RM	R	●	★	●	15.875	6.35	1.2	6.35
SNMG150616-RM	R	●			15.875	6.35	1.6	6.35
SNMG190612-RM	R	★	●	★	19.05	6.35	1.2	7.93
SNMG190616-RM	R	●	●	●	19.05	6.35	1.6	7.93
SNMM190612-HL	H		★		19.05	6.35	1.2	7.93
SNMM190616-HL	H		★		19.05	6.35	1.6	7.93
SNMM190612-HM	H		●		19.05	6.35	1.2	7.93
SNMM190616-HM	H		●		19.05	6.35	1.6	7.93
SNMM250732-HM	H		●		25.4	7.94	3.2	9.12

1/1

(10 inserts in one case)

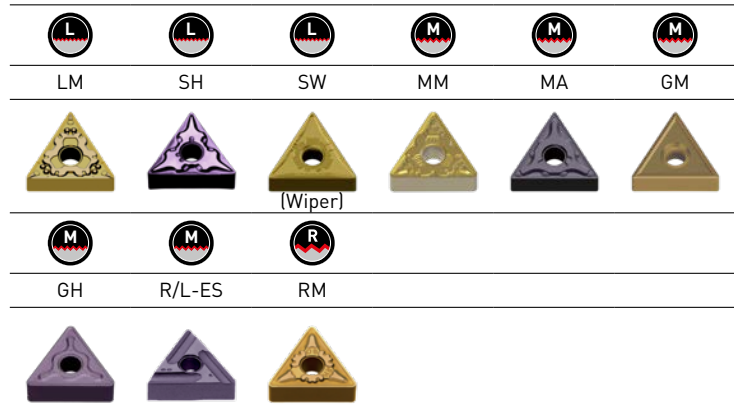
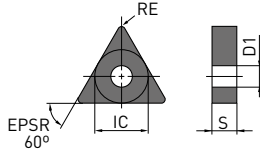
130 

TNMG, TNMX

NEGATIVE INSERTS (WITH HOLE)

M Class

TNMG, TNMX



Order number		MC7115	MC7125	MP7135	IC	S	RE	D1
TNMG160404-LM	L	●	●	●	9.525	4.76	0.4	3.81
TNMG160408-LM	L	★	●	●	9.525	4.76	0.8	3.81
TNMG160412-LM	L	★	★	★	9.525	4.76	1.2	3.81
TNMG160404-SH	L			●	9.525	4.76	0.4	3.81
TNMG160408-SH	L			●	9.525	4.76	0.8	3.81
TNMX160408-SW	L		★		9.525	4.76	0.8	3.81
TNMG160408-MM	M	●	●	●	9.525	4.76	0.8	3.81
TNMG160412-MM	M	★	★	★	9.525	4.76	1.2	3.81
TNMG220408-MM	M	★	●	★	12.7	4.76	0.8	5.16
TNMG220412-MM	M		★	★	12.7	4.76	1.2	5.16
TNMG220416-MM	M		●		12.7	4.76	1.6	5.16
TNMG160404-MA	M		●	●	9.525	4.76	0.4	3.81
TNMG160408-MA	M		●	●	9.525	4.76	0.8	3.81
TNMG160412-MA	M		★	●	9.525	4.76	1.2	3.81
TNMG220408-MA	M		●	●	12.7	4.76	0.8	5.16
TNMG220412-MA	M		★	●	12.7	4.76	1.2	5.16
TNMG160404-GM	M		●	●	9.525	4.76	0.4	3.81
TNMG160408-GM	M		●	●	9.525	4.76	0.8	3.81
TNMG160412-GM	M		●	★	9.525	4.76	1.2	3.81
TNMG220408-GM	M		★	★	12.7	4.76	0.8	5.16
TNMG160408-GH	M			●	9.525	4.76	0.8	3.81
TNMG220408-GH	M			●	12.7	4.76	0.8	5.16
TNMG220412-GH	M			●	12.7	4.76	1.2	5.16
TNMG160404R-ES	M		●	●	9.525	4.76	0.4	3.81
TNMG160404L-ES	M		●	●	9.525	4.76	0.8	3.81
TNMG160408R-ES	M		●	●	9.525	4.76	0.8	3.81
TNMG160408L-ES	M		●	●	9.525	4.76	0.8	3.81
TNMG220408R-ES	M			●	12.7	4.76	0.8	5.16
TNMG220408L-ES	M			●	12.7	4.76	0.8	5.16
TNMG160408-RM	R	★	●	★	9.525	4.76	0.8	3.81
TNMG160412-RM	R	★	★	●	9.525	4.76	1.2	3.81
TNMG220408-RM	R		●	★	12.7	4.76	0.8	5.16
TNMG220412-RM	R		★	★	12.7	4.76	1.2	5.16
TNMG220416-RM	R		●	★	12.7	4.76	1.6	5.16

1/1

(10 inserts in one case)

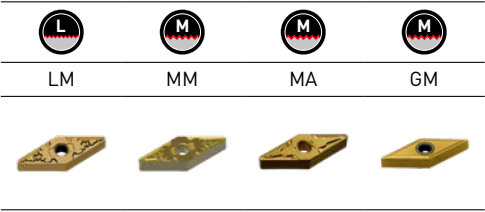
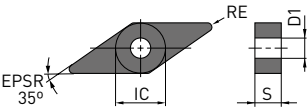
● : Inventory maintained. ★ : Inventory maintained in Japan.

VNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

VNMG



Order number	F L M R H		MC7115	MC7125	MP7135	IC	S	RE	D1
VNMG160404-LM	L		●	●	●	9.525	4.76	0.4	3.81
VNMG160408-LM	L		★	●	★	9.525	4.76	0.8	3.81
VNMG160408-MM	M		●	●	●	9.525	4.76	0.8	3.81
VNMG160404-MA	M			●	●	9.525	4.76	0.4	3.81
VNMG160408-MA	M			●	●	9.525	4.76	0.8	3.81
VNMG160404-GM	M			●	★	9.525	4.76	0.4	3.81
VNMG160408-GM	M			●	●	9.525	4.76	0.8	3.81

1/1

[10 inserts in one case]

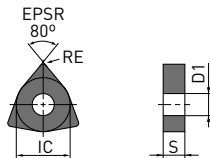
130 

WNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

WNMG



Order number		MC7115	MC7125	MP7135	IC	S	RE	D1
WNMG060404-LM	L	●	●	●	9.525	4.76	0.4	3.81
WNMG060408-LM	L	●	●	★	9.525	4.76	0.8	3.81
WNMG080404-LM	L	●	●	●	12.7	4.76	0.4	5.16
WNMG080408-LM	L	●	●	●	12.7	4.76	0.8	5.16
WNMG06T304-SH	L			●	9.525	3.97	0.4	3.81
WNMG06T308-SH	L			●	9.525	3.97	0.8	3.81
WNMG060404-SH	L			●	9.525	4.76	0.4	3.81
WNMG060408-SH	L			●	9.525	4.76	0.8	3.81
WNMG080404-SH	L			●	12.7	4.76	0.4	5.16
WNMG080408-SH	L			●	12.7	4.76	0.8	5.16
WNMG060408-MM	M	★	●	●	9.525	4.76	0.8	3.81
WNMG060412-MM	M		●	●	9.525	4.76	1.2	3.81
WNMG080408-MM	M	●	●	●	12.7	4.76	0.8	5.16
WNMG080412-MM	M	●	●	●	12.7	4.76	1.2	5.16
WNMG06T304-MA	M		●	●	9.525	3.97	0.4	3.81
WNMG06T308-MA	M		●	●	9.525	3.97	0.8	3.81
WNMG06T312-MA	M		★	★	9.525	3.97	1.2	3.81
WNMG060408-MA	M		●	●	9.525	4.76	0.8	3.81
WNMG060412-MA	M		★	●	9.525	4.76	1.2	3.81
WNMG080404-MA	M		●	●	12.7	4.76	0.4	5.16
WNMG080408-MA	M		●	●	12.7	4.76	0.8	5.16
WNMG080412-MA	M		●	●	12.7	4.76	1.2	5.16
WNMG060404-GM	M		●	●	9.525	4.76	0.4	3.81
WNMG060408-GM	M		●	●	9.525	4.76	0.8	3.81
WNMG080404-GM	M		●	●	12.7	4.76	0.4	5.16
WNMG080408-GM	M		●	●	12.7	4.76	0.8	5.16
WNMG080412-GM	M		●	●	12.7	4.76	1.2	5.16
WNMG080408-GH	M			●	12.7	4.76	0.8	5.16
WNMG080412-GH	M			●	12.7	4.76	1.2	5.16
WNMG060408-RM	R	●	★	★	9.525	4.76	0.8	3.81
WNMG060412-RM	R		★	●	9.525	4.76	1.2	3.81
WNMG080408-RM	R	●	●	●	12.7	4.76	0.8	5.16
WNMG080412-RM	R	●	●	●	12.7	4.76	1.2	5.16

1/1

(10 inserts in one case)

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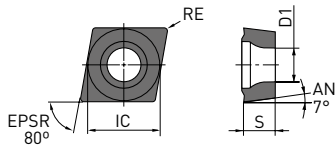
● : Inventory maintained. ★ : Inventory maintained in Japan.

CCMT, CCMH, CPMH

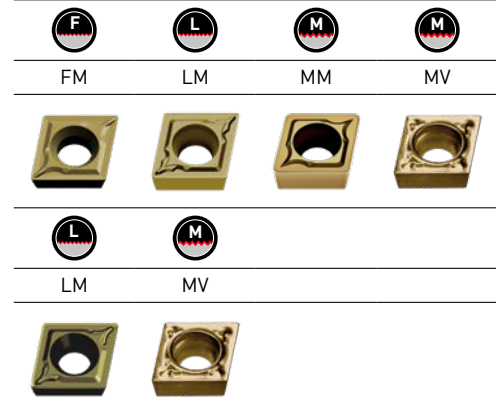
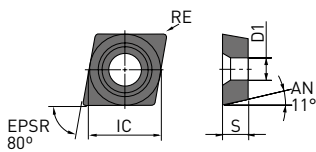
7°, 11° POSITIVE INSERTS (WITH HOLE)

M Class

CCMT, CCMH



CPMH



Order number	F L M R H		MC7115	MC7125	MP7135	IC	S	RE	D1
CCMT060202-FM	F			★		6.35	2.38	0.2	2.8
CCMT060204-FM	F		★	★	★	6.35	2.38	0.4	2.8
CCMT09T302-FM	F			★		9.525	3.97	0.2	4.4
CCMT09T304-FM	F		★	★	★	9.525	3.97	0.4	4.4
CCMT09T308-FM	F		★	★	★	9.525	3.97	0.8	4.4
CCMT060204-LM	L		●	●	●	6.35	2.38	0.4	2.8
CCMT060208-LM	L		●	●	★	6.35	2.38	0.8	2.8
CCMT09T304-LM	L		●	●	●	9.525	3.97	0.4	4.4
CCMT09T308-LM	L		●	●	●	9.525	3.97	0.8	4.4
CCMT060202-MM	M			●	●	6.35	2.38	0.2	2.8
CCMT060204-MM	M		●	●	●	6.35	2.38	0.4	2.8
CCMT060208-MM	M		●	●	●	6.35	2.38	0.8	2.8
CCMT09T302-MM	M			●	●	9.525	3.97	0.2	4.4
CCMT09T304-MM	M		●	●	●	9.525	3.97	0.4	4.4
CCMT09T308-MM	M		●	●	●	9.525	3.97	0.8	4.4
CCMT120404-MM	M		●	●	●	12.7	4.76	0.4	5.5
CCMT120408-MM	M		●	●	●	12.7	4.76	0.8	5.5
CCMT120412-MM	M		●	●	★	12.7	4.76	1.2	5.5
CCMH060202-MV	M			●	●	6.35	2.38	0.2	2.8
CCMH060204-MV	M			●	●	6.35	2.38	0.4	2.8
CPMH080204-LM	L		●	●	●	7.94	2.38	0.4	3.5
CPMH080208-LM	L		●	●	●	7.94	2.38	0.8	3.5
CPMH090304-LM	L		●	●	●	9.525	3.18	0.4	4.4
CPMH090308-LM	L		●	●	●	9.525	3.18	0.8	4.4
CPMH080204-MV	M			●	●	7.94	2.38	0.4	3.5
CPMH080208-MV	M			●	●	7.94	2.38	0.8	3.5
CPMH090304-MV	M			●	●	9.525	3.18	0.4	4.4
CPMH090308-MV	M			●	●	9.525	3.18	0.8	4.4

1/1

(10 inserts in one case)

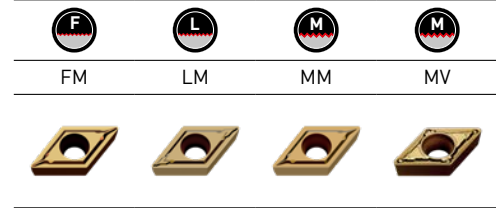
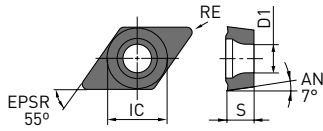
130 

DCMT

7° POSITIVE INSERTS (WITH HOLE)

M Class

DCMT



Order number	F L M R H	MC7115	MC7125	MP7135	IC	S	RE	D1
DCMT070202-FM	F		★		6.35	2.38	0.2	2.8
DCMT070204-FM	F	★	★		6.35	2.38	0.4	2.8
DCMT11T302-FM	F		★		9.525	3.97	0.2	4.4
DCMT11T304-FM	F	★	★	★	9.525	3.97	0.4	4.4
DCMT11T308-FM	F	★	★	★	9.525	3.97	0.8	4.4
DCMT070202-LM	L		★		6.35	2.38	0.2	2.8
DCMT070204-LM	L	●	●	●	6.35	2.38	0.4	2.8
DCMT070208-LM	L	●	●	●	6.35	2.38	0.8	2.8
DCMT11T302-LM	L		★		9.525	3.97	0.2	4.4
DCMT11T304-LM	L	★	●	●	9.525	3.97	0.4	4.4
DCMT11T308-LM	L	●	●	●	9.525	3.97	0.8	4.4
DCMT070202-MM	M		●	●	6.35	2.38	0.2	2.8
DCMT070204-MM	M	●	●	●	6.35	2.38	0.4	2.8
DCMT070208-MM	M	●	●	★	6.35	2.38	0.8	2.8
DCMT11T302-MM	M		●		9.525	3.97	0.2	4.4
DCMT11T304-MM	M	●	●	●	9.525	3.97	0.4	4.4
DCMT11T308-MM	M	●	●	●	9.525	3.97	0.8	4.4
DCMT150404-MM	M	●	●	★	12.7	4.76	0.4	5.5
DCMT150408-MM	M	●	●	●	12.7	4.76	0.8	5.5
DCMT070202-MV	M		●	●	6.35	2.38	0.2	2.8
DCMT070204-MV	M		●	●	6.35	2.38	0.4	2.8
DCMT070208-MV	M		●	●	6.35	2.38	0.8	2.8
DCMT11T302-MV	M		●		9.525	3.97	0.2	4.4
DCMT11T304-MV	M		●	●	9.525	3.97	0.4	4.4
DCMT11T308-MV	M		●	●	9.525	3.97	0.8	4.4

1/1

(10 inserts in one case)

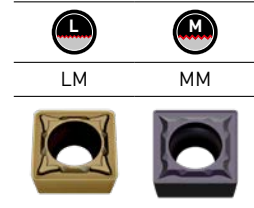
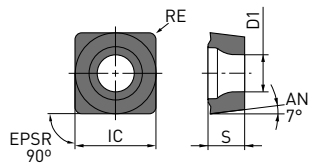
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SCMT

7° POSITIVE INSERTS (WITH HOLE)

M Class

SCMT



Order number	 		MC7115	MC7125	MP7135	IC	S	RE	D1
SCMT09T304-LM	L		●	★	★	9.525	3.97	0.4	4.4
SCMT09T308-LM	L		●	★	★	9.525	3.97	0.8	4.4
SCMT09T304-MM	M		●	●	★	9.525	3.97	0.4	4.4
SCMT09T308-MM	M		●	●	★	9.525	3.97	0.8	4.4
SCMT120404-MM	M		●	●	★	12.7	4.76	0.4	5.5
SCMT120408-MM	M		●	●	●	12.7	4.76	0.8	5.5

1/1

[10 inserts in one case]

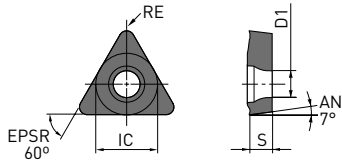
130 

TCMT, TPMH

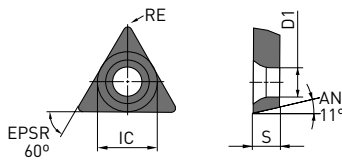
7°, 11° POSITIVE INSERTS (WITH HOLE)

M Class

TCMT



TPMH



Order number	F L M R H		MC7115	MC7125	MP7135	IC	S	RE	D1
TCMT090204-FM	F	★	★	★	5.56	2.38	0.4	2.5	
TCMT090204-LM	L		●	★	5.56	2.38	0.4	2.5	
TCMT110204-LM	L		●	●	6.35	2.38	0.4	2.8	
TCMT110208-LM	L		●	●	6.35	2.38	0.8	2.8	
TCMT16T304-LM	L	●	●	★	9.525	3.97	0.4	4.4	
TCMT16T308-LM	L	●	●	★	9.525	3.97	0.8	4.4	
TCMT090204-MM	M		●	★	5.56	2.38	0.4	2.5	
TCMT090208-MM	M			★	5.56	2.38	0.8	2.5	
TCMT110204-MM	M		●	●	6.35	2.38	0.4	2.8	
TCMT110208-MM	M	★	●	★	6.35	2.38	0.8	2.8	
TCMT130304-MM	M			★	7.94	3.18	0.4	3.4	
TCMT16T304-MM	M	●	●	●	9.525	3.97	0.4	4.4	
TCMT16T308-MM	M	●	●	●	9.525	3.97	0.8	4.4	
TCMT16T312-MM	M		●	●	9.525	3.97	1.2	4.4	
TPMH090204-LM	L		●	●	5.56	2.38	0.4	2.9	
TPMH110304-LM	L		●	●	6.35	3.18	0.4	3.4	
TPMH110308-LM	L		●	●	6.35	3.18	0.8	3.4	
TPMH160304-LM	L		●	●	9.525	3.18	0.4	4.4	
TPMH160308-LM	L		●	●	9.525	3.18	0.8	4.4	
TPMH080202-MV	M		●	●	4.76	2.38	0.2	2.4	
TPMH080204-MV	M		●	●	4.76	2.38	0.4	2.4	
TPMH090204-MV	M		●	●	5.56	2.38	0.4	2.9	
TPMH090208-MV	M		★	★	5.56	2.38	0.8	2.9	
TPMH110302-MV	M		★	★	6.35	3.18	0.2	3.4	
TPMH110304-MV	M		●	●	6.35	3.18	0.4	3.4	
TPMH110308-MV	M		★	●	6.35	3.18	0.8	3.4	
TPMH160304-MV	M		●	●	9.525	3.18	0.4	4.4	
TPMH160308-MV	M		●	●	9.525	3.18	0.8	4.4	

1/1

(10 inserts in one case)

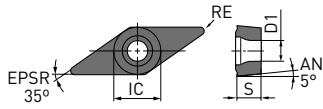
130 

VBMT, VCMT

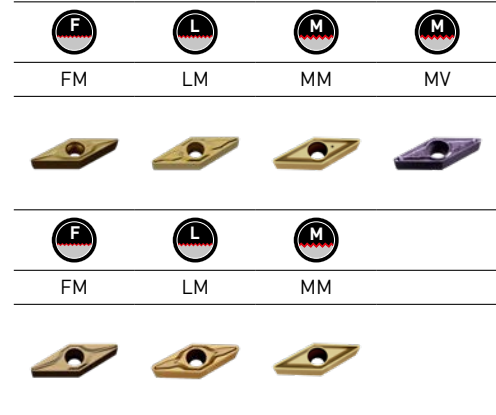
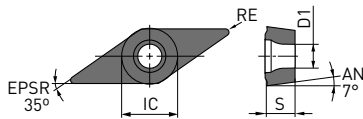
5°, 7° POSITIVE INSERTS (WITH HOLE)

M Class

VBMT



VCMT



Order number		MC7115	MC7125	MP7135	IC	S	RE	D1
VBMT110302-FM	F		★	★	6.35	3.18	0.2	2.9
VBMT110304-FM	F	★	★	★	6.35	3.18	0.4	2.9
VBMT110308-FM	F	★	★		6.35	3.18	0.8	2.9
VBMT160404-FM	F	★	★	★	9.525	4.76	0.4	4.4
VBMT160408-FM	F	★	★		9.525	4.76	0.8	4.4
VBMT110304-LM	L	●	●	●	6.35	3.18	0.4	2.9
VBMT110308-LM	L	●	★	★	6.35	3.18	0.8	2.9
VBMT160404-LM	L	●	●	●	9.525	4.76	0.4	4.4
VBMT160408-LM	L	●	●	★	9.525	4.76	0.8	4.4
VBMT160404-MM	M	●	●	●	9.525	4.76	0.4	4.4
VBMT160408-MM	M	●	●	●	9.525	4.76	0.8	4.4
VBMT110304-MV	M		●	●	6.35	3.18	0.4	2.9
VBMT110308-MV	M		★	★	6.35	3.18	0.8	2.9
VBMT160404-MV	M		●	●	9.525	4.76	0.4	4.4
VBMT160408-MV	M		●	●	9.525	4.76	0.8	4.4
VCMT110302-FM	F		★	★	6.35	3.18	0.2	2.8
VCMT110304-FM	F	★	★	★	6.35	3.18	0.4	2.8
VCMT160404-FM	F	★	★	★	9.525	4.76	0.4	4.4
VCMT110304-LM	L	●	●	●	6.35	3.18	0.4	2.8
VCMT110308-LM	L	●	●	●	6.35	3.18	0.8	2.8
VCMT160404-LM	L	●	●	●	9.525	4.76	0.4	4.4
VCMT160408-LM	L	●	●	★	9.525	4.76	0.8	4.4
VCMT160404-MM	M	●	●	●	9.525	4.76	0.4	4.4
VCMT160408-MM	M	●	●	●	9.525	4.76	0.8	4.4
VCMT160412-MM	M		★	★	9.525	4.76	1.2	4.4
VCMT080202-MV	M		●	●	4.76	2.38	0.2	2.4
VCMT080204-MV	M		●	●	4.76	2.38	0.4	2.4

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(10 inserts in one case)

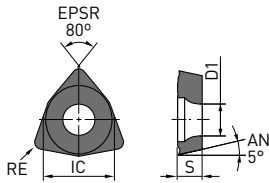
130

WBMT, WCMT, WPMT

5°, 7°, 11° POSITIVE INSERTS (WITH HOLE)

M Class

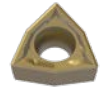
WBMT



L-MV



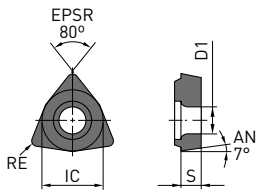
MM



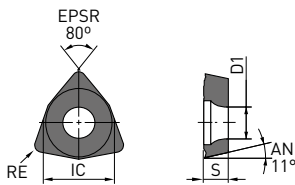
MV



WCMT



WPMT



Order number			MC7115	MC7125	MP7135	IC	S	RE	D1
WBMTL30202L-MV	M			★		4.76	2.38	0.2	2.3
WBMTL30204L-MV	M			★		4.76	2.38	0.4	2.3
WCMT020102-MM	M			●	●	3.97	1.59	0.2	2.3
WCMT020104-MM	M			●	●	3.97	1.59	0.4	2.3
WCMTL30202-MM	M			●	●	4.76	2.38	0.2	2.3
WCMTL30204-MM	M			●	●	4.76	2.38	0.4	2.3
WCMT040202-MM	M			●	●	6.35	2.38	0.2	2.8
WCMT040204-MM	M			●	●	6.35	2.38	0.4	2.8
WCMT06T304-MM	M			●	●	9.525	3.97	0.4	4.4
WCMT06T308-MM	M			●	●	9.525	3.97	0.8	4.4
WPMT040204-MV	M			●	●	6.35	2.38	0.4	2.8
WPMT060304-MV	M			●	●	9.525	3.18	0.4	4.4
WPMT060308-MV	M			●	●	9.525	3.18	0.8	4.4

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(10 inserts in one case)

130 

MC/MP7100 SERIES

RECOMMENDED CUTTING CONDITIONS

NEGATIVE INSERTS (FOR EXTERNAL TURNING)

Material	Hardness	Cutting mode		Priority	Grade		Vc	f	ap
M Austenitic stainless steel	<200 HB		L	1	MC7115	LM	185 – 295	0.10 – 0.35	0.3 – 2.0
			L	2	MC7125	LM	175 – 240	0.10 – 0.35	0.3 – 2.0
			L	3	MC7125	SW	175 – 240	0.10 – 0.50	0.3 – 2.5
			M	1	MC7115	MM	170 – 270	0.15 – 0.45	0.7 – 5.0
			R	1	MC7115	RM	160 – 255	0.25 – 0.55	1.5 – 6.0
			H	1	MC7125	HL	135 – 185	0.30 – 0.70	3.0 – 7.5
			L	1	MC7125	LM	175 – 240	0.10 – 0.35	0.3 – 2.0
			M	1	MC7125	MM	160 – 220	0.15 – 0.45	0.7 – 5.0
			M	2	MC7125	GM	160 – 220	0.16 – 0.50	0.5 – 4.0
			M	3	MC7125	MA	160 – 220	0.20 – 0.50	0.3 – 4.0
			M	4	MC7125	R/L-ES	160 – 220	0.20 – 0.50	0.8 – 4.0
			M	5	MP7135	GM	120 – 155	0.16 – 0.50	0.5 – 4.0
			M	6	MP7135	MM	120 – 155	0.15 – 0.45	0.7 – 5.0
			M	7	MP7135	MA	120 – 155	0.20 – 0.50	0.3 – 4.0
			R	1	MC7125	RM	150 – 205	0.25 – 0.55	1.5 – 6.0
			R	2	MP7135	RM	110 – 145	0.25 – 0.55	1.5 – 6.0
			R	3	MP7135	GH	110 – 145	0.25 – 0.60	1.5 – 6.0
			H	1	MC7125	HL	135 – 185	0.30 – 0.70	3.0 – 7.5
			H	2	MC7125	HM	135 – 185	0.50 – 1.10	2.0 – 10.0
			L	1	MP7135	LM	130 – 170	0.10 – 0.35	0.3 – 2.0
			L	2	MP7135	SH	130 – 170	0.10 – 0.40	0.3 – 2.0
			M	1	MP7135	GM	120 – 155	0.16 – 0.50	0.5 – 4.0
			M	2	MP7135	MM	120 – 155	0.15 – 0.45	0.7 – 5.0
			M	3	MP7135	MA	120 – 155	0.20 – 0.50	0.3 – 4.0
			M	4	MC7125	R/L-ES	160 – 220	0.20 – 0.50	0.8 – 4.0
			R	1	MP7135	RM	110 – 145	0.25 – 0.55	1.5 – 6.0
			R	2	MP7135	GH	110 – 145	0.25 – 0.60	1.5 – 6.0
			H	1	MC7125	HL	135 – 185	0.30 – 0.70	3.0 – 7.5
			H	2	MC7125	HM	135 – 185	0.50 – 1.10	2.0 – 10.0
	200 HB		L	1	MC7115	LM	155 – 245	0.10 – 0.35	0.3 – 2.0
			L	2	MC7125	LM	145 – 200	0.10 – 0.35	0.3 – 2.0
			M	1	MC7115	MM	140 – 225	0.15 – 0.45	0.7 – 0.5
			R	1	MC7115	RM	135 – 215	0.25 – 0.55	1.5 – 6.0
			H	1	MC7125	HL	110 – 155	0.30 – 0.70	3.0 – 7.5
			H	2	MC7125	HM	110 – 155	0.50 – 1.10	2.0 – 10.0
			L	1	MC7125	LM	145 – 200	0.10 – 0.35	0.3 – 2.0
			M	1	MC7125	MM	130 – 180	0.15 – 0.45	0.7 – 5.0
			M	2	MC7125	GM	130 – 180	0.16 – 0.50	0.5 – 4.0
			M	3	MC7125	MA	130 – 180	0.20 – 0.50	0.3 – 4.0
			M	4	MP7135	GM	100 – 130	0.16 – 0.50	0.5 – 4.0
			M	5	MP7135	MM	100 – 130	0.15 – 0.45	0.7 – 5.0
			M	6	MP7135	MA	100 – 130	0.20 – 0.50	0.3 – 4.0
			R	1	MC7125	RM	125 – 175	0.25 – 0.55	1.5 – 6.0
			R	2	MP7135	RM	95 – 120	0.25 – 0.55	1.5 – 6.0
			R	3	MP7135	GH	95 – 120	0.25 – 0.60	1.5 – 6.0
			H	1	MC7125	HL	110 – 155	0.30 – 0.70	3.0 – 7.5
			H	2	MC7125	HM	110 – 155	0.50 – 1.10	2.0 – 10.0

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1. Recommended cutting conditions for 5° / 7° / 11° positive inserts are provided as a guideline only.
Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.

MC/MP7100 SERIES – NEGATIVE INSERTS (FOR EXTERNAL TURNING)

Material	Hardness	Cutting mode		Priority	Grade		Vc	f	ap	
M Ferritic and martensitic Stainless steel	<200 HB		L	1	MC7115	LM	185 – 295	0.10 – 0.35	0.3 – 2.0	
			L	2	MC7125	LM	175 – 240	0.10 – 0.35	0.3 – 2.0	
			M	1	MC7115	MM	170 – 270	0.15 – 0.45	0.7 – 5.0	
			R	1	MC7115	RM	160 – 255	0.25 – 0.55	1.5 – 6.0	
			H	1	MC7125	HL	135 – 185	0.30 – 0.70	3.0 – 7.5	
			H	2	MC7125	HM	135 – 185	0.50 – 1.10	2.0 – 10.0	
			L	1	MC7125	LM	175 – 240	0.10 – 0.35	0.3 – 2.0	
			M	1	MC7125	MM	160 – 220	0.15 – 0.45	0.7 – 5.0	
			M	2	MC7125	GM	160 – 220	0.16 – 0.50	0.5 – 4.0	
			M	3	MC7125	MA	160 – 220	0.20 – 0.50	0.3 – 4.0	
			M	4	MP7135	GM	120 – 155	0.16 – 0.50	0.5 – 4.0	
			M	5	MP7135	MM	120 – 155	0.15 – 0.45	0.7 – 5.0	
			M	6	MP7135	MA	120 – 155	0.20 – 0.50	0.3 – 4.0	
			R	1	MC7125	RM	150 – 205	0.25 – 0.55	1.5 – 6.0	
			R	2	MP7135	RM	110 – 145	0.25 – 0.55	1.5 – 6.0	
			R	3	MP7135	GH	110 – 145	0.25 – 0.60	1.5 – 6.0	
			H	1	MC7125	HL	135 – 185	0.30 – 0.70	3.0 – 7.5	
			H	2	MC7125	HM	135 – 185	0.50 – 1.10	2.0 – 10.0	
			L	1	MP7135	LM	130 – 170	0.10 – 0.35	0.3 – 2.0	
			L	2	MP7135	SH	130 – 170	0.10 – 0.40	0.3 – 2.0	
			M	1	MP7135	GM	120 – 155	0.16 – 0.50	0.5 – 4.0	
			M	2	MP7135	MM	120 – 155	0.15 – 0.45	0.7 – 5.0	
			M	3	MP7135	MA	120 – 155	0.20 – 0.50	0.3 – 4.0	
			R	1	MP7135	RM	110 – 145	0.25 – 0.55	1.5 – 6.0	
			R	2	MP7135	GH	110 – 145	0.25 – 0.60	1.5 – 6.0	
			H	1	MC7125	HL	135 – 185	0.30 – 0.70	3.0 – 7.5	
			H	2	MC7125	HM	135 – 185	0.50 – 1.10	2.0 – 10.0	
		>200 HB		L	1	MC7115	LM	155 – 245	0.10 – 0.35	0.3 – 2.0
				L	2	MC7125	LM	145 – 200	0.10 – 0.35	0.3 – 2.0
				L	3	MC7125	SW	145 – 200	0.10 – 0.50	0.3 – 2.5
				M	1	MC7115	MM	140 – 225	0.15 – 0.45	0.7 – 5.0
				R	1	MC7115	RM	135 – 215	0.25 – 0.55	1.5 – 6.0
			H	1	MC7125	HL	110 – 155	0.30 – 0.70	3.0 – 7.5	
			H	2	MC7125	HM	110 – 155	0.50 – 1.10	2.0 – 10.0	
			L	1	MC7125	LM	145 – 200	0.10 – 0.35	0.3 – 2.0	
			M	1	MC7125	MM	130 – 180	0.15 – 0.45	0.7 – 5.0	
			M	2	MC7125	GM	130 – 180	0.16 – 0.50	0.5 – 4.0	
			M	3	MC7125	MA	130 – 180	0.20 – 0.50	0.3 – 4.0	
			M	4	MP7135	GM	100 – 130	0.16 – 0.50	0.5 – 4.0	
			M	5	MP7135	MM	100 – 130	0.15 – 0.45	0.7 – 5.0	
			M	6	MP7135	MA	100 – 130	0.20 – 0.50	0.3 – 4.0	
			M	7	MP7135	R/L-ES	100 – 130	0.20 – 0.50	0.8 – 4.0	
			R	1	MC7125	RM	125 – 175	0.25 – 0.55	1.5 – 6.0	
			H	1	MC7125	HL	110 – 155	0.30 – 0.70	3.0 – 7.5	
			H	2	MC7125	HM	110 – 155	0.50 – 1.10	2.0 – 10.0	
			L	1	MP7135	LM	110 – 140	0.10 – 0.35	0.3 – 2.0	
			L	2	MP7135	SH	110 – 140	0.10 – 0.40	0.3 – 2.0	
			M	1	MP7135	GM	100 – 130	0.16 – 0.50	0.5 – 4.0	
			M	2	MP7135	MM	100 – 130	0.15 – 0.45	0.7 – 5.0	
			M	3	MP7135	MA	100 – 130	0.20 – 0.50	0.3 – 4.0	
		M	4	MP7135	R/L-ES	100 – 130	0.20 – 0.50	0.8 – 4.0		
		R	1	MP7135	RM	95 – 120	0.25 – 0.55	1.5 – 6.0		
		R	2	MP7135	GH	95 – 120	0.25 – 0.60	1.5 – 6.0		
		H	1	MC7125	HL	110 – 155	0.30 – 0.70	3.0 – 7.5		
		H	2	MC7125	HM	110 – 155	0.50 – 1.10	2.0 – 10.0		

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1. Recommended cutting conditions for 5° / 7° / 11° positive inserts are provided as a guideline only.
Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.

Cutting Conditions : ● : Stable cutting ● : General cutting ✖ : Unstable cutting

MC/MP7100 SERIES – NEGATIVE INSERTS (FOR EXTERNAL TURNING)

Material	Hardness	Cutting mode		Priority	Grade		Vc	f	ap
M Two-phase stainless steel	<280 HB		L	1	MP7135	LM	85 – 115	0.10 – 0.35	0.3 – 2.0
			L	2	MP7135	SH	85 – 115	0.10 – 0.40	0.3 – 2.0
			L	3	MC7125	LM	115 – 160	0.10 – 0.35	0.3 – 2.0
			L	4	MC7125	SW	115 – 160	0.10 – 0.50	0.3 – 2.5
			L	5	MC7115	LM	125 – 200	0.10 – 0.35	0.3 – 2.0
			M	1	MP7135	GM	80 – 105	0.16 – 0.50	0.5 – 4.0
			M	2	MP7135	MM	80 – 105	0.15 – 0.45	0.7 – 5.0
			M	3	MP7135	MA	80 – 105	0.20 – 0.50	0.3 – 4.0
			M	4	MC7125	MM	105 – 145	0.15 – 0.45	0.7 – 5.0
			M	5	MC7125	GM	105 – 145	0.16 – 0.50	0.5 – 4.0
			M	6	MC7125	MA	105 – 145	0.20 – 0.50	0.3 – 4.0
			M	7	MC7115	MM	115 – 180	0.15 – 0.45	0.7 – 5.0
			R	1	MP7135	RM	75 – 100	0.25 – 0.55	1.5 – 6.0
			R	2	MP7135	GH	75 – 100	0.25 – 0.60	1.5 – 6.0
			R	3	MC7125	RM	100 – 140	0.25 – 0.55	1.5 – 6.0
			H	1	MC7125	HL	90 – 125	0.30 – 0.70	3.0 – 7.5
			H	2	MC7125	HM	90 – 125	0.50 – 1.10	2.0 – 10.0
			L	1	MP7135	LM	85 – 115	0.10 – 0.35	0.3 – 2.0
			L	2	MP7135	SH	85 – 115	0.10 – 0.40	0.3 – 2.0
			L	3	MC7125	LM	115 – 160	0.10 – 0.35	0.3 – 2.0
			M	1	MP7135	GM	80 – 105	0.16 – 0.50	0.5 – 4.0
			M	2	MP7135	MM	80 – 105	0.15 – 0.45	0.7 – 5.0
			M	3	MP7135	MA	80 – 105	0.20 – 0.50	0.3 – 4.0
			M	4	MP7135	R/L-ES	80 – 105	0.20 – 0.50	0.8 – 4.0
			M	5	MC7125	MM	105 – 145	0.15 – 0.45	0.7 – 5.0
			M	6	MC7125	GM	105 – 145	0.16 – 0.50	0.5 – 4.0
			M	7	MC7125	MA	105 – 145	0.20 – 0.50	0.3 – 4.0
			R	1	MP7135	RM	75 – 100	0.25 – 0.55	1.5 – 6.0
			R	2	MP7135	GH	75 – 100	0.25 – 0.60	1.5 – 6.0
			R	3	MC7125	RM	100 – 140	0.25 – 0.55	1.5 – 6.0
			H	1	MC7125	HL	90 – 125	0.30 – 0.70	3.0 – 7.5
			H	2	MC7125	HM	90 – 125	0.50 – 1.10	2.0 – 10.0
			L	1	MP7135	LM	85 – 115	0.10 – 0.35	0.3 – 2.0
			L	2	MP7135	SH	85 – 115	0.10 – 0.40	0.3 – 2.0
			M	1	MP7135	GM	80 – 105	0.16 – 0.50	0.5 – 4.0
			M	2	MP7135	MM	80 – 105	0.15 – 0.45	0.7 – 5.0
			M	3	MP7135	MA	80 – 105	0.20 – 0.50	0.3 – 4.0
			M	4	MP7135	R/L-ES	80 – 105	0.20 – 0.50	0.8 – 4.0
			R	1	MP7135	RM	75 – 100	0.25 – 0.55	1.5 – 6.0
			R	2	MP7135	GH	75 – 100	0.25 – 0.60	1.5 – 6.0
			H	1	MC7125	HL	90 – 125	0.30 – 0.70	3.0 – 7.5
			H	2	MC7125	HM	90 – 125	0.50 – 1.10	2.0 – 10.0

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1. Recommended cutting conditions for 5° / 7° / 11° positive inserts are provided as a guideline only.
Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.

MC/MP7100 SERIES – NEGATIVE INSERTS (FOR EXTERNAL TURNING)

Material	Hardness	Cutting mode				Priority	Grade		Vc	f	ap
M Precipitation-hardening stainless steel	450 HB		L	1	MC7115	LM	110 – 165	0.10 – 0.35	0.3 – 2.0		
			L	2	MC7125	LM	95 – 120	0.10 – 0.35	0.3 – 2.0		
			L	3	MC7125	SW	95 – 120	0.10 – 0.50	0.3 – 2.5		
			M	1	MC7115	MM	100 – 150	0.15 – 0.45	0.7 – 5.0		
			R	1	MC7115	RM	95 – 140	0.25 – 0.55	1.5 – 6.0		
			H	1	MC7125	HL	75 – 90	0.40 – 1.00	1.5 – 8.0		
			H	2	MC7125	HM	75 – 90	0.50 – 1.10	2.0 – 10.0		
			L	1	MC7125	LM	95 – 120	0.10 – 0.35	0.3 – 2.0		
			L	2	MP7135	LM	70 – 95	0.10 – 0.35	0.3 – 2.0		
			L	3	MP7135	SH	70 – 95	0.10 – 0.40	0.3 – 2.0		
			M	1	MC7125	MM	90 – 110	0.15 – 0.45	0.7 – 5.0		
			M	2	MC7125	GM	90 – 110	0.16 – 0.50	0.5 – 4.0		
			M	3	MC7125	MA	90 – 110	0.10 – 0.30	0.5 – 3.0		
			M	4	MC7125	R/L-ES	90 – 110	0.20 – 0.50	0.8 – 3.0		
			M	5	MP7135	GM	65 – 90	0.16 – 0.50	0.5 – 4.0		
			M	6	MP7135	MM	65 – 90	0.15 – 0.45	0.7 – 5.0		
			M	7	MP7135	MA	65 – 90	0.10 – 0.30	0.5 – 3.0		
			R	1	MC7125	RM	85 – 100	0.25 – 0.55	1.5 – 6.0		
			R	2	MP7135	RM	60 – 85	0.25 – 0.55	1.5 – 6.0		
			R	3	MP7135	GH	60 – 85	0.25 – 0.60	1.5 – 6.0		
			H	1	MC7125	HL	75 – 90	0.40 – 1.00	1.5 – 8.0		
			H	2	MC7125	HM	75 – 90	0.50 – 1.00	2.0 – 10.0		
			L	1	MP7135	LM	70 – 95	0.10 – 0.35	0.3 – 2.0		
			L	2	MP7135	SH	70 – 95	0.10 – 0.40	0.3 – 2.0		
			M	1	MP7135	GM	65 – 90	0.16 – 0.50	0.5 – 4.0		
			M	2	MP7135	MM	65 – 90	0.15 – 0.45	0.7 – 5.0		
			M	3	MP7135	MA	65 – 90	0.10 – 0.30	0.5 – 3.0		
			R	1	MP7135	RM	60 – 85	0.25 – 0.55	1.5 – 6.0		
			R	2	MP7135	GH	60 – 85	0.25 – 0.60	1.5 – 6.0		
			H	1	MC7125	HL	75 – 90	0.40 – 1.00	1.5 – 8.0		
			H	2	MC7125	HM	75 – 90	0.50 – 1.10	2.0 – 10.0		

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1. Recommended cutting conditions for 5° / 7° / 11° positive inserts are provided as a guideline only.
Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.

MC/MP7100 SERIES – 7° POSITIVE INSERTS (FOR EXTERNAL TURNING)

Material	Hardness	Cutting mode	F L M R H	Priority	Grade		Vc	f	ap
Austenitic stainless steel	<200 HB		F	1	MC7115	FM	160 – 255	0.04 – 0.20	0.2 – 0.9
			F	2	MC7125	FM	150 – 210	0.04 – 0.20	0.2 – 0.9
			L	1	MC7125	LM	150 – 210	0.06 – 0.25	0.2 – 1.0
			L	2	MC7115	LM	160 – 255	0.06 – 0.25	0.2 – 1.0
			M	1	MC7125	MM	125 – 175	0.08 – 0.30	0.3 – 2.0
			M	2	MC7125	MV	125 – 175	0.08 – 0.30	0.3 – 2.0
			M	3	MC7115	MM	135 – 215	0.08 – 0.30	0.3 – 2.0
			F	1	MC7125	FM	150 – 210	0.04 – 0.20	0.2 – 0.9
			L	1	MC7125	LM	150 – 210	0.06 – 0.25	0.2 – 1.0
			L	2	MP7135	LM	115 – 145	0.06 – 0.25	0.2 – 1.0
			M	1	MC7125	MM	125 – 175	0.08 – 0.30	0.3 – 2.0
			M	2	MC7125	MV	125 – 175	0.08 – 0.30	0.3 – 2.0
			F	1	MP7135	FM	115 – 145	0.04 – 0.20	0.2 – 0.9
			L	1	MP7135	LM	115 – 145	0.06 – 0.25	0.2 – 1.0
			M	1	MP7135	MM	95 – 120	0.08 – 0.30	0.3 – 2.0
			M	2	MP7135	MV	95 – 120	0.08 – 0.30	0.3 – 2.0
	200 HB		F	1	MC7115	FM	135 – 215	0.04 – 0.20	0.2 – 0.9
			F	2	MC7125	FM	125 – 175	0.04 – 0.20	0.2 – 0.9
			L	1	MC7125	LM	125 – 175	0.06 – 0.25	0.2 – 1.0
			L	2	MC7115	LM	135 – 215	0.06 – 0.25	0.2 – 1.0
			M	1	MC7125	MM	105 – 145	0.08 – 0.30	0.3 – 2.0
			M	2	MC7125	MV	105 – 145	0.08 – 0.30	0.3 – 2.0
			M	3	MC7115	MM	110 – 180	0.08 – 0.30	0.3 – 2.0
			F	1	MC7125	FM	125 – 175	0.04 – 0.20	0.2 – 0.9
			L	1	MC7125	LM	125 – 175	0.06 – 0.25	0.2 – 1.0
			L	2	MP7135	LM	95 – 120	0.06 – 0.25	0.2 – 1.0
			M	1	MC7125	MM	105 – 145	0.08 – 0.30	0.3 – 2.0
			M	2	MC7125	MV	105 – 145	0.08 – 0.30	0.3 – 2.0
			F	1	MP7135	FM	95 – 120	0.04 – 0.20	0.2 – 0.9
			L	1	MP7135	LM	95 – 120	0.06 – 0.25	0.2 – 1.0
			M	1	MP7135	MM	80 – 100	0.08 – 0.30	0.3 – 2.0
			M	2	MP7135	MV	80 – 100	0.08 – 0.30	0.3 – 2.0
Ferritic and martensitic stainless steel	<200 HB		F	1	MC7125	FM	150 – 210	0.04 – 0.20	0.2 – 0.9
			L	1	MC7125	LM	150 – 210	0.06 – 0.25	0.2 – 1.0
			L	2	MC7115	LM	160 – 255	0.06 – 0.25	0.2 – 1.0
			M	1	MC7125	MM	125 – 175	0.08 – 0.30	0.3 – 2.0
			M	2	MC7125	MV	125 – 175	0.08 – 0.30	0.3 – 2.0
			M	3	MC7115	MM	135 – 215	0.08 – 0.30	0.3 – 2.0
			F	1	MC7125	FM	150 – 210	0.04 – 0.20	0.2 – 0.9
			L	1	MC7125	LM	150 – 210	0.06 – 0.25	0.2 – 1.0
			L	2	MP7135	LM	115 – 145	0.06 – 0.25	0.2 – 1.0
			M	1	MC7125	MM	125 – 175	0.08 – 0.30	0.3 – 2.0
			M	2	MC7125	MV	125 – 175	0.08 – 0.30	0.3 – 2.0
			F	1	MP7135	FM	115 – 145	0.04 – 0.20	0.2 – 0.9
			L	1	MP7135	LM	115 – 145	0.06 – 0.25	0.2 – 1.0
			M	1	MP7135	MM	95 – 120	0.08 – 0.30	0.3 – 2.0
			M	2	MP7135	MV	95 – 120	0.08 – 0.30	0.3 – 2.0

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1. Recommended cutting conditions for 5° / 7° / 11° positive inserts are provided as a guideline only.
Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.

MC/MP7100 SERIES – 7° POSITIVE INSERTS (FOR EXTERNAL TURNING)

Material	Hardness	Cutting mode	F L M R H	Priority	Grade		Vc	f	ap
Ferritic and martensitic stainless steel	>200 HB		F	1	MC7125	FM	125 – 175	0.04 – 0.20	0.2 – 0.9
			F	2	MC7115	FM	135 – 215	0.04 – 0.20	0.2 – 0.9
			L	1	MC7125	LM	125 – 175	0.06 – 0.25	0.2 – 1.0
			L	2	MC7115	LM	135 – 215	0.06 – 0.25	0.2 – 1.0
			M	1	MC7125	MM	105 – 145	0.08 – 0.30	0.3 – 2.0
			M	2	MC7125	MV	105 – 145	0.08 – 0.30	0.3 – 2.0
			M	3	MC7115	MM	110 – 180	0.08 – 0.30	0.3 – 2.0
			F	1	MC7125	FM	125 – 175	0.04 – 0.20	0.2 – 0.9
			L	1	MC7125	LM	125 – 175	0.06 – 0.25	0.2 – 1.0
			L	2	MP7135	LM	95 – 120	0.06 – 0.25	0.2 – 1.0
			M	1	MC7125	MM	105 – 145	0.08 – 0.30	0.3 – 2.0
			M	2	MC7125	MV	105 – 145	0.08 – 0.30	0.3 – 2.0
			F	1	MP7135	FM	95 – 120	0.04 – 0.20	0.2 – 0.9
			L	1	MP7135	LM	95 – 120	0.06 – 0.25	0.2 – 1.0
			M	1	MP7135	MM	80 – 100	0.08 – 0.30	0.3 – 2.0
			M	2	MP7135	MV	80 – 100	0.08 – 0.30	0.3 – 2.0
Two-phase stainless steel	<280 HB		F	1	MP7135	FM	75 – 100	0.04 – 0.20	0.2 – 0.9
			L	1	MP7135	LM	75 – 100	0.06 – 0.25	0.2 – 1.0
			L	2	MC7125	LM	100 – 140	0.06 – 0.25	0.2 – 1.0
			L	3	MC7115	LM	110 – 175	0.06 – 0.25	0.2 – 1.0
			M	1	MP7135	MM	65 – 80	0.08 – 0.30	0.3 – 2.0
			M	2	MC7125	MM	85 – 115	0.08 – 0.30	0.3 – 2.0
			M	3	MC7125	MV	85 – 115	0.08 – 0.30	0.3 – 2.0
			M	4	MC7115	MM	90 – 145	0.08 – 0.30	0.3 – 2.0
			F	1	MC7125	FM	100 – 140	0.04 – 0.20	0.2 – 0.9
			L	1	MC7125	LM	100 – 140	0.06 – 0.25	0.2 – 1.0
			M	1	MC7125	MM	85 – 115	0.08 – 0.30	0.3 – 2.0
			M	2	MC7125	MV	85 – 115	0.08 – 0.30	0.3 – 2.0
			F	1	MP7135	FM	75 – 100	0.04 – 0.20	0.2 – 0.9
			L	1	MP7135	LM	75 – 100	0.06 – 0.25	0.2 – 1.0
			M	1	MP7135	MM	65 – 80	0.08 – 0.30	0.3 – 2.0
			M	2	MP7135	MV	65 – 80	0.08 – 0.30	0.3 – 2.0
Precipitation-hardening stainless steel	450 HB		F	1	MC7115	FM	95 – 140	0.04 – 0.20	0.2 – 0.9
			L	1	MC7115	LM	95 – 140	0.06 – 0.20	0.2 – 1.0
			L	2	MC7125	LM	85 – 105	0.06 – 0.20	0.2 – 1.0
			M	1	MC7115	MM	80 – 120	0.08 – 0.25	0.3 – 2.0
			M	2	MC7125	MM	70 – 85	0.08 – 0.25	0.3 – 2.0
			F	1	MC7125	FM	85 – 105	0.04 – 0.20	0.2 – 0.9
			F	2	MP7135	FM	60 – 85	0.04 – 0.20	0.2 – 0.9
			L	1	MC7125	LM	85 – 105	0.06 – 0.20	0.2 – 1.0
			L	2	MP7135	LM	60 – 85	0.06 – 0.20	0.2 – 1.0
			M	1	MC7125	MM	70 – 85	0.08 – 0.25	0.3 – 2.0
			M	2	MC7125	MV	70 – 85	0.08 – 0.30	0.3 – 2.0
			M	3	MP7135	MM	50 – 70	0.08 – 0.25	0.3 – 2.0
			F	1	MP7135	FM	60 – 85	0.04 – 0.20	0.2 – 0.9
			L	1	MP7135	LM	60 – 85	0.06 – 0.20	0.2 – 1.0
			M	1	MP7135	MM	50 – 70	0.08 – 0.25	0.3 – 2.0
			M	2	MP7135	MV	50 – 70	0.08 – 0.30	0.3 – 2.0

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1. Recommended cutting conditions for 5° / 7° / 11° positive inserts are provided as a guideline only.
Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.

Cutting Conditions : ● : Stable cutting ● : General cutting ✖ : Unstable cutting

MC/MP7100 SERIES – 11° POSITIVE INSERTS (FOR EXTERNAL TURNING)

Material	Hardness	Cutting mode	F L M R H	Priority	Grade		Vc	f	ap
Austenitic stainless steel	<200 HB		L	1	MC7125	LM	150 – 210	0.06 – 0.25	0.2 – 1.0
			L	2	MC7115	LM	160 – 255	0.06 – 0.25	0.2 – 1.0
			M	1	MC7125	MM	125 – 175	0.08 – 0.30	0.3 – 2.0
			M	2	MC7115	MM	135 – 215	0.08 – 0.30	0.3 – 2.0
			L	1	MC7125	LM	150 – 210	0.06 – 0.25	0.2 – 1.0
			M	1	MC7125	MM	125 – 175	0.08 – 0.30	0.3 – 2.0
			M	2	MC7125	MV	125 – 175	0.08 – 0.30	0.3 – 2.0
			L	1	MP7135	LM	115 – 145	0.06 – 0.25	0.2 – 1.0
			M	1	MP7135	MM	95 – 120	0.08 – 0.30	0.3 – 2.0
			M	2	MP7135	MV	95 – 120	0.08 – 0.30	0.3 – 2.0
	200 HB		L	1	MC7125	LM	125 – 175	0.06 – 0.25	0.2 – 1.0
			L	2	MC7115	LM	135 – 215	0.06 – 0.25	0.2 – 1.0
			M	1	MC7125	MM	105 – 145	0.08 – 0.30	0.3 – 2.0
			M	2	MC7125	MV	105 – 145	0.08 – 0.30	0.3 – 2.0
			M	3	MC7115	MM	110 – 180	0.08 – 0.30	0.3 – 2.0
			L	1	MC7125	LM	125 – 175	0.06 – 0.25	0.2 – 1.0
			M	1	MC7125	MM	105 – 145	0.08 – 0.30	0.3 – 2.0
			M	2	MC7125	MV	105 – 145	0.08 – 0.30	0.3 – 2.0
			L	1	MP7135	LM	95 – 120	0.06 – 0.25	0.2 – 1.0
			M	1	MP7135	MM	80 – 100	0.08 – 0.30	0.3 – 2.0
			M	2	MP7135	MV	80 – 100	0.08 – 0.30	0.3 – 2.0
Ferritic and martensitic stainless steel	<200 HB		L	1	MC7125	LM	150 – 210	0.06 – 0.25	0.2 – 1.0
			L	2	MC7115	LM	160 – 255	0.06 – 0.25	0.2 – 1.0
			M	1	MC7125	MM	125 – 175	0.08 – 0.30	0.3 – 2.0
			M	2	MC7125	MV	125 – 175	0.08 – 0.30	0.3 – 2.0
			M	3	MC7115	MM	135 – 215	0.08 – 0.30	0.3 – 2.0
			L	1	MC7125	LM	150 – 210	0.06 – 0.25	0.2 – 1.0
			M	1	MC7125	MM	125 – 175	0.08 – 0.30	0.3 – 2.0
			M	2	MC7125	MV	125 – 175	0.08 – 0.30	0.3 – 2.0
			L	1	MP7135	LM	115 – 145	0.06 – 0.25	0.2 – 1.0
			M	1	MP7135	MM	95 – 120	0.08 – 0.30	0.3 – 2.0
			M	2	MP7135	MV	95 – 120	0.08 – 0.30	0.3 – 2.0
	>200 HB		L	1	MC7125	LM	125 – 175	0.06 – 0.25	0.2 – 1.0
			L	2	MC7115	LM	135 – 215	0.06 – 0.25	0.2 – 1.0
			M	1	MC7125	MM	105 – 145	0.08 – 0.30	0.3 – 2.0
			M	2	MC7125	MV	105 – 145	0.08 – 0.30	0.3 – 2.0
			M	3	MC7115	MM	110 – 180	0.08 – 0.30	0.3 – 2.0
			L	1	MC7125	LM	125 – 175	0.06 – 0.25	0.2 – 1.0
			M	1	MC7125	MM	105 – 145	0.08 – 0.30	0.3 – 2.0
			L	1	MP7135	LM	95 – 120	0.06 – 0.25	0.2 – 1.0
			M	1	MP7135	MM	80 – 100	0.08 – 0.30	0.3 – 2.0
			M	2	MP7135	MV	80 – 100	0.08 – 0.30	0.3 – 2.0

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1. Recommended cutting conditions for 5° / 7° / 11° positive inserts are provided as a guideline only.
Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.

MC/MP7100 SERIES – 11° POSITIVE INSERTS (FOR EXTERNAL TURNING)

Material	Hardness	Cutting mode				Priority	Grade		Vc	f	ap
M	Two-phase stainless steel	<280 HB		L	1	MC7125	LM	100 – 140	0.06 – 0.25	0.2 – 1.0	
				L	2	MC7115	LM	110 – 175	0.06 – 0.25	0.2 – 1.0	
				M	1	MC7125	MM	85 – 115	0.08 – 0.30	0.3 – 2.0	
				M	2	MC7125	MV	85 – 115	0.08 – 0.30	0.3 – 2.0	
				M	3	MC7115	MM	90 – 145	0.08 – 0.30	0.3 – 2.0	
				L	1	MP7135	LM	75 – 100	0.06 – 0.25	0.2 – 1.0	
				L	2	MC7125	LM	100 – 140	0.06 – 0.25	0.2 – 1.0	
				M	1	MC7125	MM	85 – 115	0.08 – 0.30	0.3 – 2.0	
				M	2	MC7125	MV	85 – 115	0.08 – 0.30	0.3 – 2.0	
				L	1	MP7135	LM	75 – 100	0.06 – 0.25	0.2 – 1.0	
				M	1	MP7135	MM	65 – 80	0.08 – 0.30	0.3 – 2.0	
				M	2	MP7135	MV	65 – 80	0.08 – 0.30	0.3 – 2.0	
	Precipitation-hardening stainless steel	450 HB		L	1	MC7125	LM	85 – 105	0.06 – 0.20	0.2 – 1.0	
				L	2	MC7115	LM	95 – 140	0.06 – 0.20	0.2 – 1.0	
				M	1	MC7125	MM	70 – 85	0.08 – 0.25	0.3 – 2.0	
				M	2	MC7125	MV	70 – 85	0.08 – 0.30	0.3 – 2.0	
				L	1	MC7125	LM	85 – 105	0.06 – 0.20	0.2 – 1.0	
				M	1	MC7125	MM	70 – 85	0.08 – 0.25	0.3 – 2.0	
				M	2	MC7125	MV	70 – 85	0.08 – 0.30	0.3 – 2.0	
				L	1	MP7135	LM	60 – 85	0.06 – 0.20	0.2 – 1.0	
				M	1	MC7125	MM	70 – 85	0.08 – 0.25	0.3 – 2.0	
				M	2	MC7125	MV	70 – 85	0.08 – 0.30	0.3 – 2.0	

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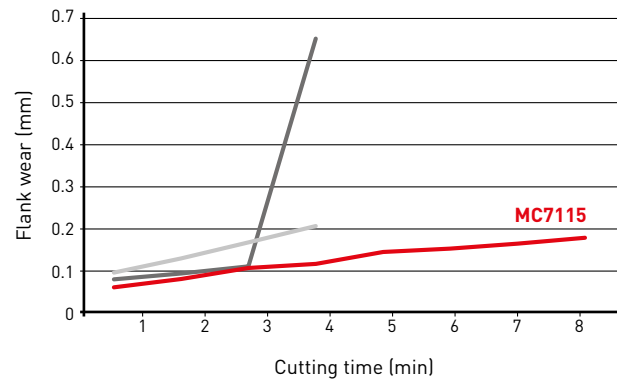
1. Recommended cutting conditions for 5° / 7° / 11° positive inserts are provided as a guideline only.
Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.

MC/MP7100

APPLICATION EXAMPLES

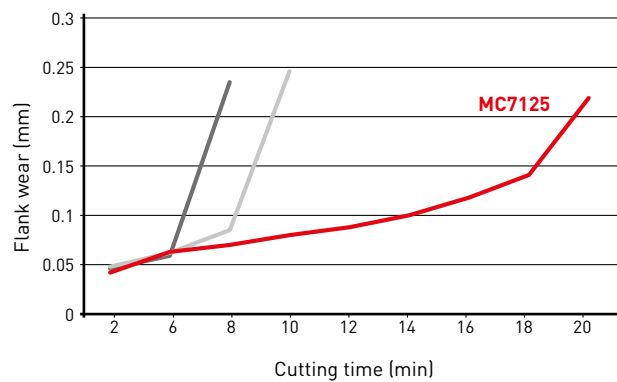
MC7115: COMPARISON OF WEAR RESISTANCE DURING WET CUTTING

Tool	CNMG120408- 
Material	DIN X5CrNi189
Vc (m/min)	250
f (mm/rev)	0.30
ap (mm)	1.5
Cutting mode	Wet cutting
Results	Tool life doubled



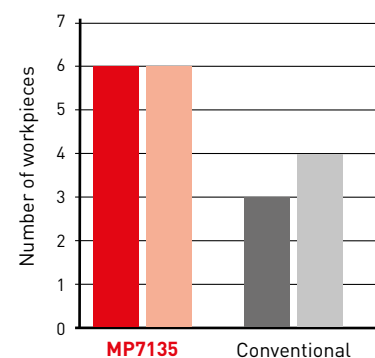
MC7125: COMPARISON OF WEAR RESISTANCE DURING WET CUTTING

Tool	CNMG120408- 
Material	DIN X2CrNiMo1812
Vc (m/min)	250
f (mm/rev)	0.30
ap (mm)	1.5
Cutting mode	Wet cutting
Results	Tool life doubled



MP7135: INTERMITTENT CUTTING COMPARISON

Tool	CNMG120408- 
Material	DIN X5CrNi189
Vc (m/min)	120
f (mm/rev)	0.25
ap (mm)	2.0 x 2 pass
Cutting mode	Wet cutting
Results	Almost double tool life

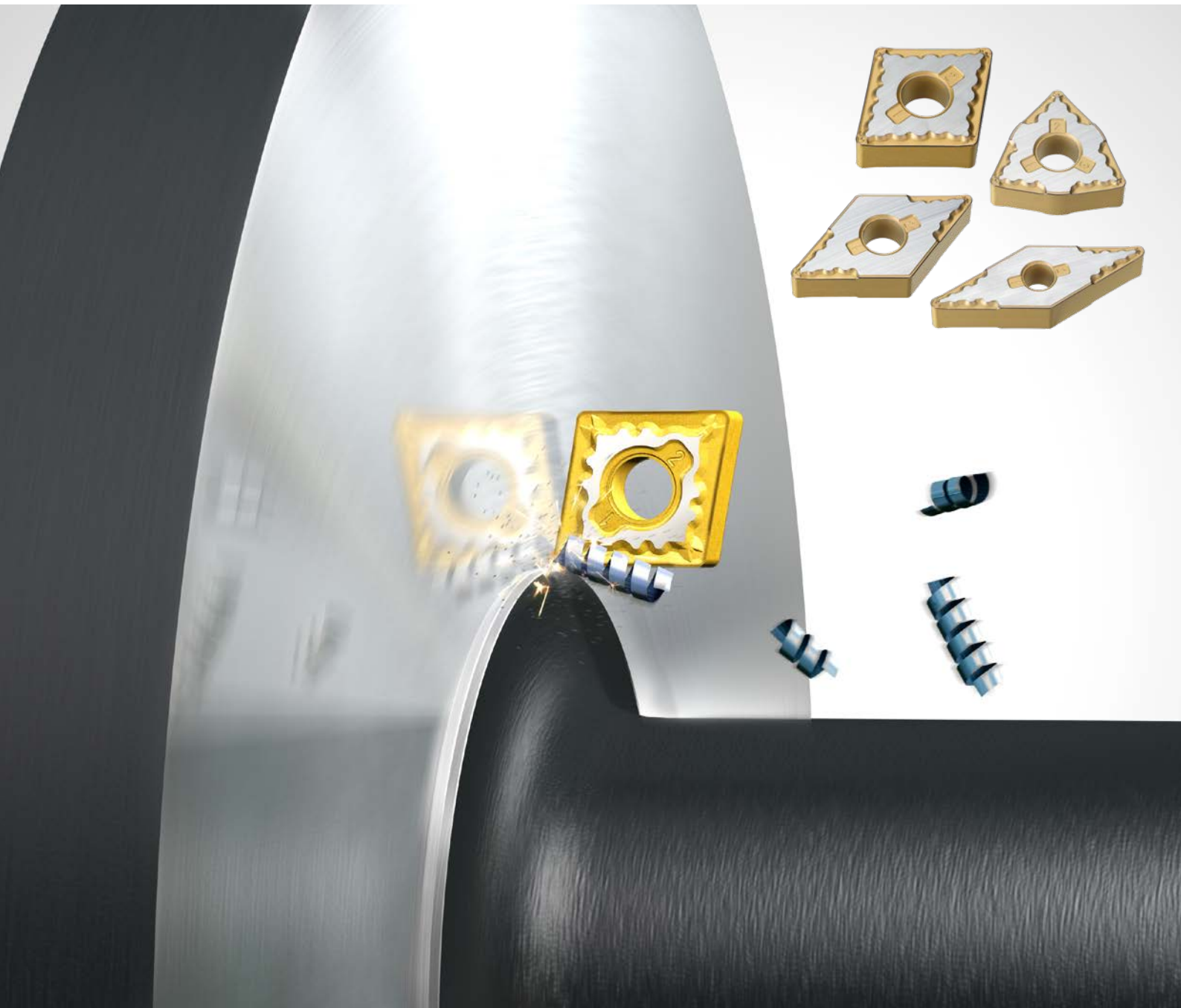


■ : MC/MP7100 ■ A ■ B : Conventional tool

The examples shown are customer's applications, therefore can differ from the recommended conditions.

MC6100 SERIES

BRINGING THE ULTIMATE HIGH SPEED
CUTTING PERFORMANCE



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 **MITSUBISHI MATERIALS**

FPH CHIPBREAKER

FOR LOW DEPTHS OF CUT AND HIGH FEED FINISHING

The combination of a positive land cutting edge shape and a two-stage protrusion optimises chip generation at low depths of cut, high feed conditions, thereby reducing machining times.

Main Convex

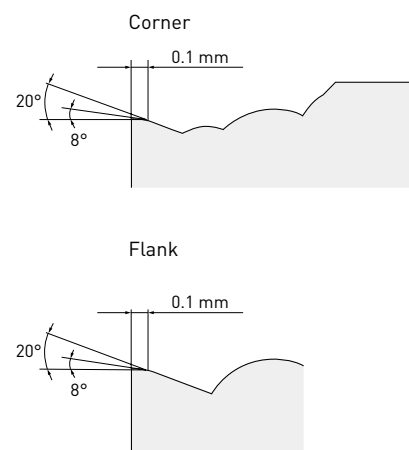
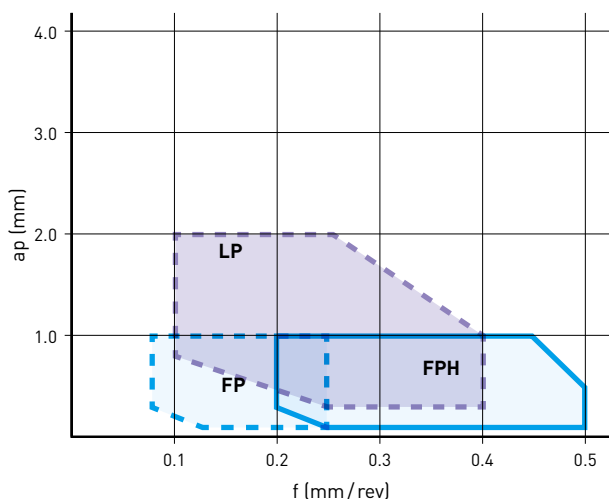
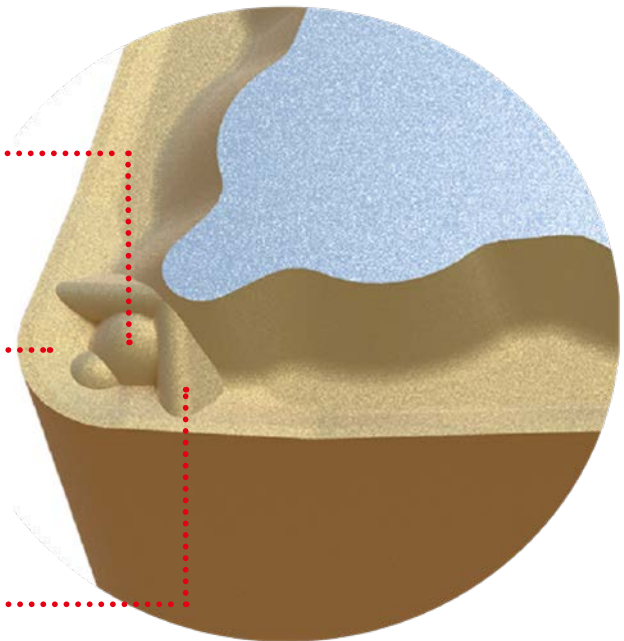
Provides consistent chip curling effect even for the thicker chips produced at high feed rates.

Positive Land

Optimum balance of sharpness and fracture resistance.

Sub Convex

Enables good chip breaking when copy turning with varying depths of cut.



HOW TO USE

1. When using the FPH chipbreaker, keep the depth of cut to 1 mm or less and the feed rate per revolution to 0.2 mm/rev or more.
2. If the depth of cut is 1 mm or more, we recommend using an LP chipbreaker.
3. If the feed rate per revolution is less than 0.2 mm/rev, we recommend an FP chipbreaker.

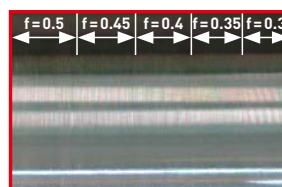
FPH CHIPBREAKER

CUTTING PERFORMANCE

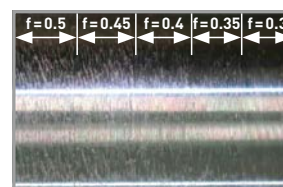
DIN 1.7225 (42CRM04): COMPARISON OF CHIPS AND FINISHED SURFACE

The FPH chipbreaker has excellent chip breaking properties, therefore a good component surface finish can always be expected.

Material	DIN 1.7225 (42CrMo4)
Insert	CNMG120408-  MC6125
Vc (m/min)	200
f (mm/rev)	The fluctuation values are shown in the image.
ap (mm)	0.2
Cutting mode	Wet cutting



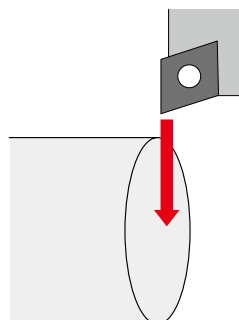
MC6125 + FPH

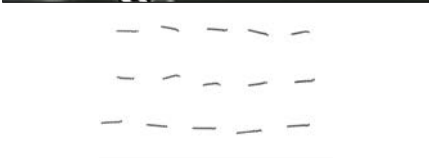


Conventional

CHIP COMPARISON

Material	DIN 1.7225 (42CrMo4)
Insert	DNMG150408- 
Vc (m/min)	200
f (mm/rev)	0.3
ap (mm)	0.2
Cutting mode	Dry cutting



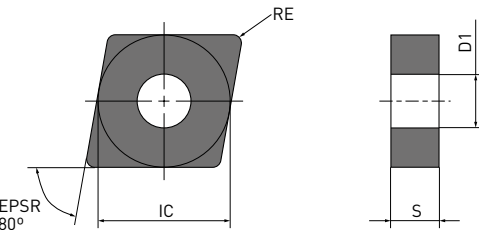
FPH	Conventional finish cutting chipbreaker	Conventional light cutting chipbreaker
		
		
Broken into pieces of ideal length.	Excessive division. This is a condition where the finished surface is prone to scratches.	Long chips are being generated. There is a high risk of it wrapping around the workpiece and interrupting the machining process.

CNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

CNMG



Order number					IC	S	RE	D1
		MC6115	MC6125	MC6135				
CNMG120404-FPH	F	●	●	●	12.7	4.76	0.4	5.16
CNMG120408-FPH	F	●	●	●	12.7	4.76	0.8	5.16
CNMG120412-FPH	F	●	●	●	12.7	4.76	1.2	5.16
								1/1

[10 inserts in one case]

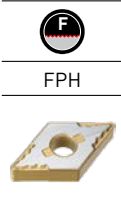
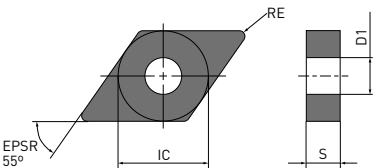


DNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

DNMG



Order number					IC	S	RE	D1
		MC6115	MC6125	MC6135				
DNMG150404-FPH	F	★	★	★	12.7	4.76	0.4	5.16
DNMG150408-FPH	F	★	★	★	12.7	4.76	0.8	5.16
DNMG150412-FPH	F	★	★	★	12.7	4.76	1.2	5.16
DNMG150604-FPH	F	●	●	●	12.7	6.35	0.4	5.16
DNMG150608-FPH	F	●	●	●	12.7	6.35	0.8	5.16
DNMG150612-FPH	F	●	●	●	12.7	6.35	1.2	5.16
								1/1

[10 inserts in one case]



● / ★ = Expansion

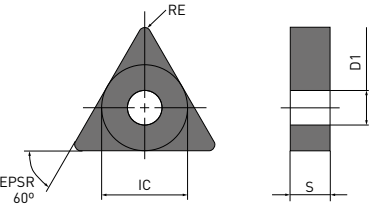
● : Inventory maintained. ★ : Inventory maintained in Japan.

TNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

TNMG



Order number		MC6115	MC6125	MC6135	IC	S	RE	D1
TNMG160404-FPH	F	●	●	●	9.525	4.76	0.4	3.81
TNMG160408-FPH	F	●	●	●	9.525	4.76	0.8	3.81
TNMG160412-FPH	F	●	●	●	9.525	4.76	1.2	3.81
1/1								

(10 inserts in one case)

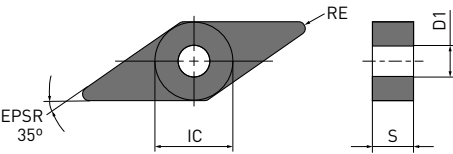


VNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

VNMG



Order number		MC6115	MC6125	MC6135	IC	S	RE	D1
VNMG160404-FPH	F	●	●	●	9.525	4.76	0.4	3.81
VNMG160408-FPH	F	●	●	●	9.525	4.76	0.8	3.81
VNMG160412-FPH	F	●	●	●	9.525	4.76	1.2	3.81
1/1								

(10 inserts in one case)



● / ★ = Expansion

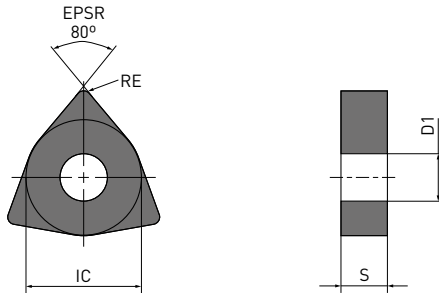
● : Inventory maintained. ★ : Inventory maintained in Japan.

WNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

WNMG



Order number		MC6115	MC6125	MC6135	IC	S	RE	D1
WNMG080404-FPH	F	●	●	●	12.7	4.76	0.4	5.16
WNMG080408-FPH	F	●	●	●	12.7	4.76	0.8	5.16
WNMG080412-FPH	F	●	●	●	12.7	4.76	1.2	5.16

1/1

[10 inserts in one case]

144

MC6100 SERIES

RECOMMENDED CUTTING CONDITIONS

NEGATIVE INSERTS (FOR EXTERNAL TURNING)

Material	Properties	Conditions		Priority	Grade		Vc	f	ap
P Carbon and alloy steel	180 – 280 HB	●	F	1	MC6115	FPH	275 – 525	0.20 – 0.50	0.10 – 1.00
		●	F	1	MC6125	FPH	300 – 465	0.20 – 0.50	0.10 – 1.00
		✚	F	3	MC6135	FPH	245 – 370	0.20 – 0.50	0.10 – 1.00

1/1

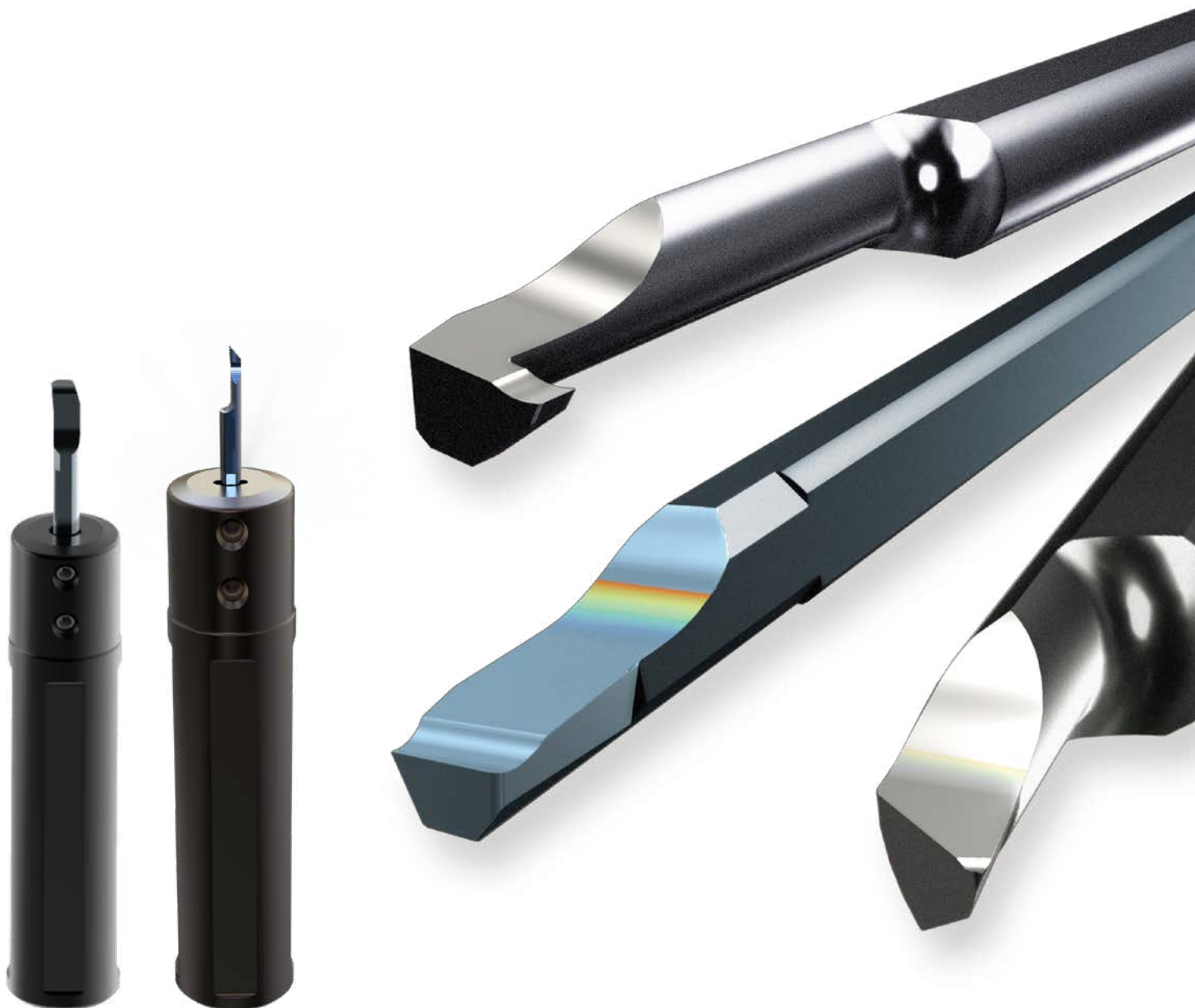
Cutting conditions: ●: Stable cutting ●: General cutting ✚: Unstable cutting

● / ★ = Expansion

●: Inventory maintained. ★: Inventory maintained in Japan.

MICRO-MINI TWIN

BORING BAR FOR HIGH PRECISION
AND SMALL PARTS MACHINING



Interested in more...

B042-G

www.mhg-mediastore.net

 **MITSUBISHI MATERIALS**

MICRO-MINI TWIN

IDEAL FOR SMALL DIAMETER BORING OF STEELS AND STAINLESS STEEL

ECONOMICAL, SOLID SHANK TYPE WITH TWO CUTTING EDGES

A cutting edge on each end provides reduced tooling costs.

MULTI PURPOSE BORING BAR

The multi-functionality of the MICRO-MINI TWIN enables a wide application range that covers boring, grooving and threading and is available with or without a chipbreaker.

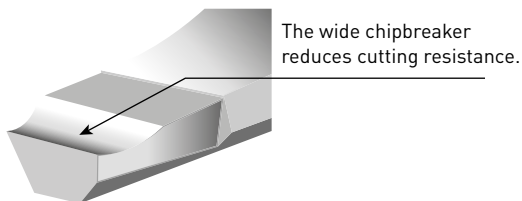
MINIMUM CUTTING DIAMETER:

Boring:	Ø 2.2 mm ~ RE: 0.05, 0.1, 0.15, 0.2
Copying:	Ø 3.5 mm ~
Grooving:	Ø 3 mm ~
Threading:	Ø 3 mm ~

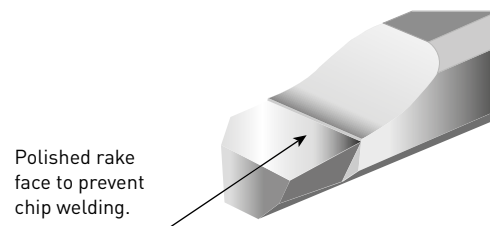


AVAILABLE WITH OR WITHOUT A CHIPBREAKER

With chipbreaker



Without chipbreaker



The highly polished rake face and smooth cutting edge surface provides a superior product than conventional boring bars.

CUTTING PERFORMANCE

POLISHED RAKE FACE

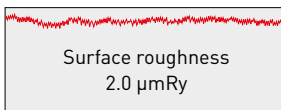
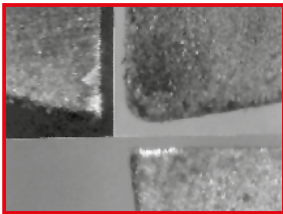
MACHINING OF STAINLESS STEEL

Insert	CB05RS, VP15TF
Material	1.4301 (X5CrNi18-9)
Vc (m/min)	100
fr (mm/rev)	0.02
ap (mm)	0.1
Coolant	Wet cutting

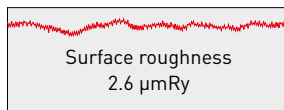
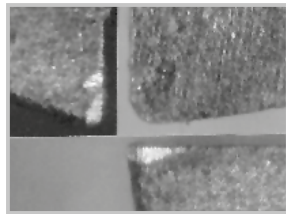
The polished rake face prevents chip welding and enables excellent component surface finishes.

CUTTING EDGE WEAR

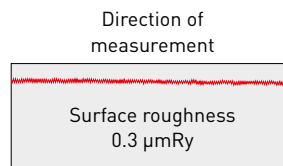
MICRO-MINI TWIN
(Polished rake face)



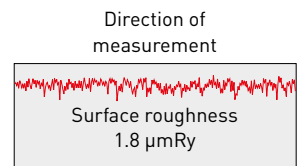
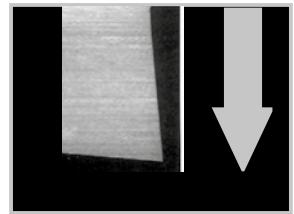
Conventional



MICRO-MINI TWIN
(Polished rake face)



Conventional



NEW

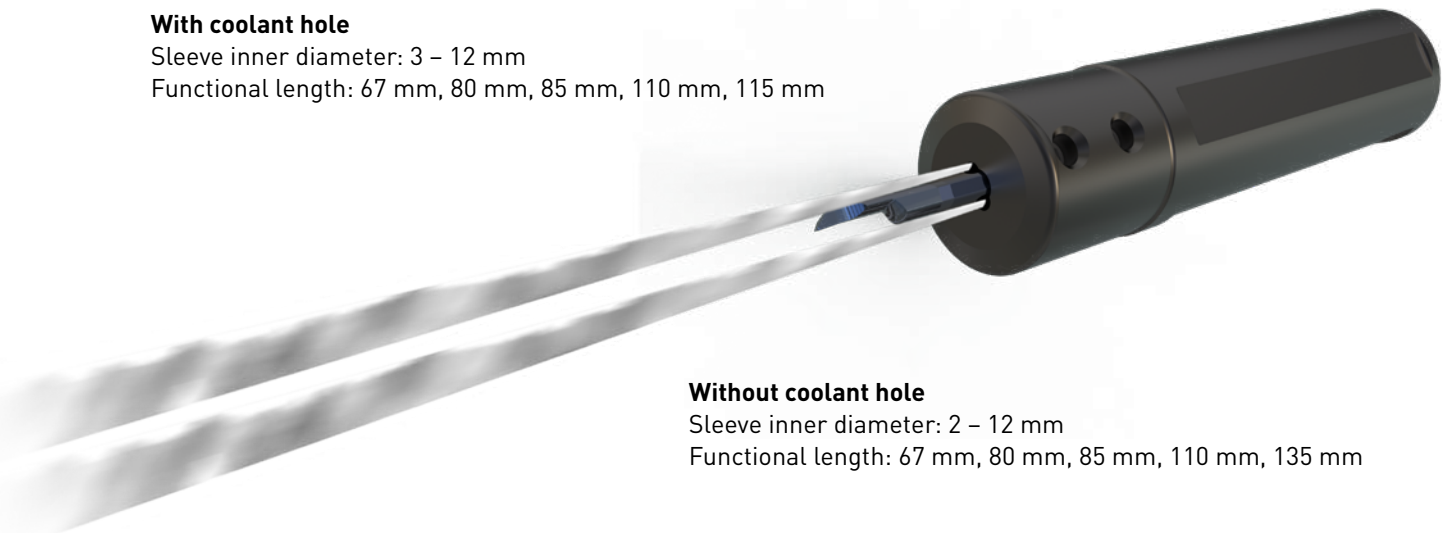
SLEEVE

A sleeve specially designed for the MICRO-MINI TWIN for optimum use on Swiss-Type lathes.

With coolant hole

Sleeve inner diameter: 3 – 12 mm

Functional length: 67 mm, 80 mm, 85 mm, 110 mm, 115 mm



Without coolant hole

Sleeve inner diameter: 2 – 12 mm

Functional length: 67 mm, 80 mm, 85 mm, 110 mm, 135 mm

MS9025

PVD COATED GRADES FOR HIGH PRECISION AND SMALL PARTS MACHINING

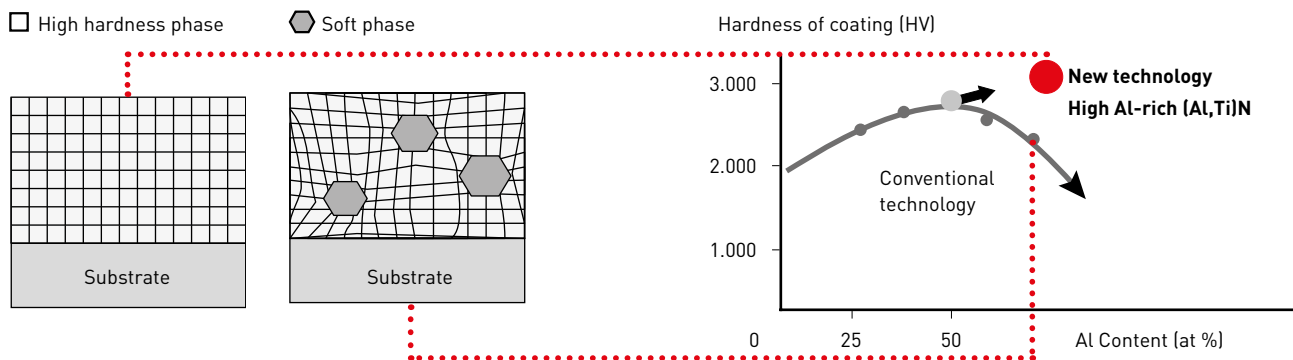
Effectively reduces notch wear whilst also providing fracture resistance.



HIGH AL-RICH (Al, Ti)N SINGLE LAYER COATING TECHNOLOGY

HIGH AL AND CONVENTIONAL COATING COMPARISON

The high Al-rich (Al,Ti)N single layer coating provides stabilisation of the high hardness phase and succeeds in dramatically improving wear, cratering and welding resistance.

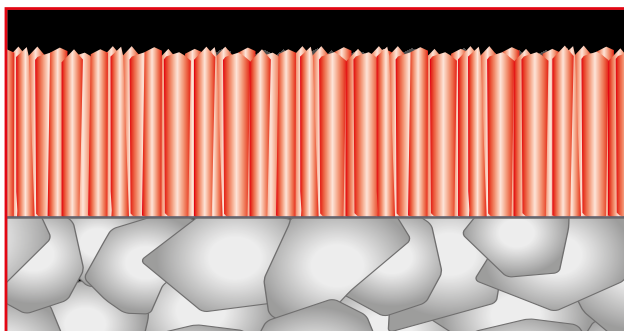


SMOOTH SURFACE OF THE COATING

The even surface of the coating has been achieved by first making the carbide substrate smooth then by promoting straight growth of the coating crystals. This leads to excellent welding resistance.

Smooth Cemented Carbide

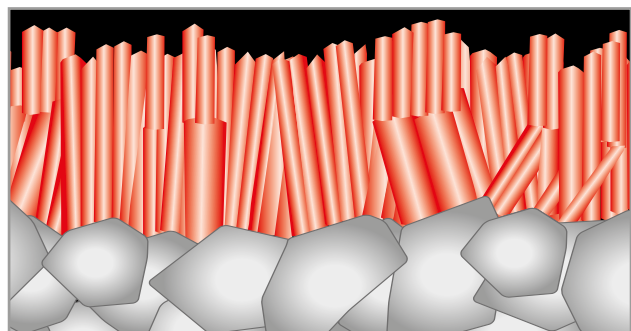
- Straight crystal growth
- Smooth carbide surface
- Excellent welding resistance



MS9025

Rough Cemented Carbide

- Random crystal growth direction
- Performance is variable due to defects and voids in the surface



Conventional

MS9025 grade for stainless steel added to the series MICRO-MINI TWIN.

MS7025

PVD COATED GRADES FOR HIGH PRECISION AND SMALL PARTS MACHINING

A precise nano-multilayer coating provides dramatically improved welding and wear resistance.



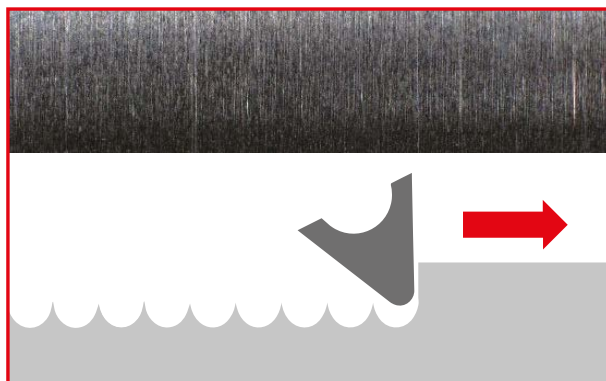
NANO-MULTILAYER COATING

By combining the high lubrication layer with excellent welding resistance, and the high hardness layer with a greater wear resistance that suppresses the progress of wear at the nano-level, damage when machining is significantly reduced. Additionally, machining marks on the component surface are reduced.

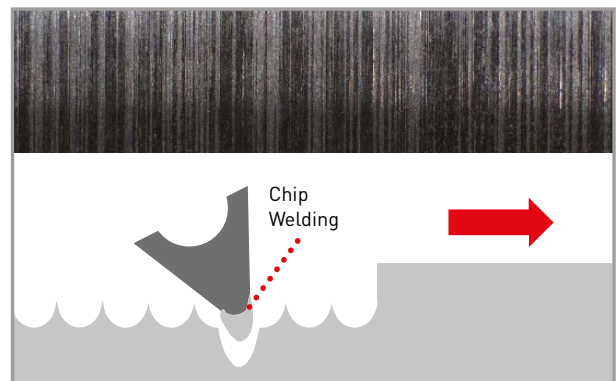
IMPROVED QUALITY OF THE MACHINED SURFACE

The nano-level, high lubrication layer suppresses built-up edge caused by chip welding which tends to occur in low feed machining and in addition reduces machining marks on the component surface.

SURFACE FINISH



MS7025



Conventional

IMPROVED MACHINED SURFACE QUALITY

MS7025 improves machining accuracy and suppresses burrs and sudden chipping by maintaining uniform, sharp cutting edges.



MS7025

Enlarged photo of the cutting edge

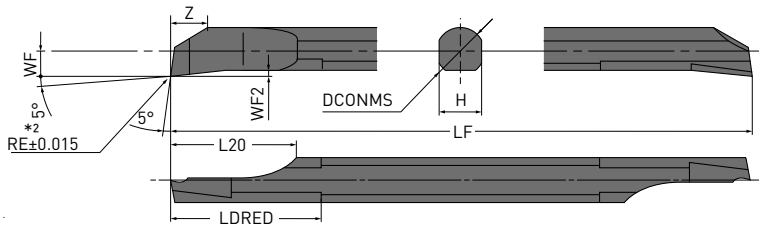


Conventional

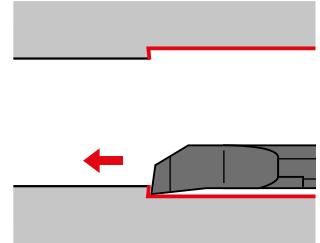
MS7025 grade for stainless steel added to the series MICRO-MINI TWIN.

CB-TYPE

MICRO-MINI TWIN FOR INTERNAL MACHINING



Right hand tool only.



Order number	MS7025	MS9025	VP15TF	TF15		DMIN* ¹		RE* ²	DCONMS	LF	L20	LDRED	WF	WF2	H	Z
						l/d ≤ 3	l/d ≥ 3									
CB02RS			●	●	without	2.2	3.6	0.05	2.0	50	5.0	6.0	1.0	0.25	1.8	1.4
CB02RS-B	●	●	●	●	with	2.2	4.6	0.05	2.0	50	5.0	6.0	1.0	0.25	1.8	1.4
CB02RS-01			●	●	without	2.2	3.6	0.1	2.0	50	5.0	6.0	1.0	0.25	1.8	1.4
CB02RS-01B	●	●	●	●	with	2.2	4.6	0.1	2.0	50	5.0	6.0	1.0	0.25	1.8	1.4
CB02RS-015B	●	●			with	2.2	4.6	0.15	2.0	50	5.0	6.0	1.0	0.25	1.8	1.4
CB02RS-02			●	●	without	2.2	3.6	0.2	2.0	50	5.0	6.0	1.0	0.25	1.8	1.4
CB02RS-02B	●	●	●	●	with	2.2	4.6	0.2	2.0	50	5.0	6.0	1.0	0.25	1.8	1.4
CB025RS-B	●	●			with	2.7	4.7	0.05	2.5	50	6.25	7.5	1.25	0.30	2.25	1.8
CB025RS-01B	●	●			with	2.7	4.7	0.1	2.5	50	6.25	7.5	1.25	0.30	2.25	1.8
CB025RS-015B	●	●			with	2.7	4.7	0.15	2.5	50	6.25	7.5	1.25	0.30	2.25	1.8
CB025RS-02B	●	●			with	2.7	4.7	0.2	2.5	50	6.25	7.5	1.25	0.30	2.25	1.8
CB03RS			●	●	without	3.2	4.2	0.05	3.0	50	7.5	9.0	1.5	0.35	2.7	2.3
CB03RS-B	●	●	●	●	with	3.2	4.8	0.05	3.0	50	7.5	9.0	1.5	0.35	2.7	2.3
CB03RS-01			●	●	without	3.2	4.2	0.1	3.0	50	7.5	9.0	1.5	0.35	2.7	2.3
CB03RS-01B	●	●	●	●	with	3.2	4.8	0.1	3.0	50	7.5	9.0	1.5	0.35	2.7	2.3
CB03RS-015B	●	●			with	3.2	4.8	0.15	3.0	50	7.5	9.0	1.5	0.35	2.7	2.3
CB03RS-02			●	●	without	3.2	4.2	0.2	3.0	50	7.5	9.0	1.5	0.35	2.7	2.3
CB03RS-02B	●	●	●	●	with	3.2	4.8	0.2	3.0	50	7.5	9.0	1.5	0.35	2.7	2.3
CB035RS-B	●	●			with	3.7	5.2	0.05	3.5	60	8.75	10.5	1.75	0.40	3.15	2.6
CB035RS-01B	●	●			with	3.7	5.2	0.1	3.5	60	8.75	10.5	1.75	0.40	3.15	2.6
CB035RS-015B	●	●			with	3.7	5.2	0.15	3.5	60	8.75	10.5	1.75	0.40	3.15	2.6
CB035RS-02B	●	●			with	3.7	5.2	0.2	3.5	60	8.75	10.5	1.75	0.40	3.15	2.6
CB04RS			●	●	without	4.2	5.1	0.05	4.0	60	10.0	12.0	2.0	0.45	3.6	3.1
CB04RS-B	●	●	●	●	with	4.2	5.5	0.05	4.0	60	10.0	12.0	2.0	0.45	3.6	3.1
CB04RS-01			●	●	without	4.2	5.1	0.1	4.0	60	10.0	12.0	2.0	0.45	3.6	3.1
CB04RS-01B	●	●	●	●	with	4.2	5.5	0.1	4.0	60	10.0	12.0	2.0	0.45	3.6	3.1
CB04RS-015B	●	●			with	4.2	5.5	0.15	4.0	60	10.0	12.0	2.0	0.45	3.6	3.1
CB04RS-02			●	●	without	4.2	5.1	0.2	4.0	60	10.0	12.0	2.0	0.45	3.6	3.1
CB04RS-02B	●	●	●	●	with	4.2	5.5	0.2	4.0	60	10.0	12.0	2.0	0.45	3.6	3.1
CB045RS-B	●	●			with	4.7	6.0	0.05	4.5	70	11.25	13.5	2.25	0.50	4.05	3.4
CB045RS-01B	●	●			with	4.7	6.0	0.1	4.5	70	11.25	13.5	2.25	0.50	4.05	3.4
CB045RS-015B	●	●			with	4.7	6.0	0.15	4.5	70	11.25	13.5	2.25	0.50	4.05	3.4
CB045RS-02B	●	●			with	4.7	6.0	0.2	4.5	70	11.25	13.5	2.25	0.50	4.05	3.4

1/2

*1 DMIN: Min. Cutting Diameter

*2 The RE dimension represents the size before grinding a chip breaker.

1. [MICRO-MINI TWIN is available in 1 piece in one pack.]



CB-TYPE, MICRO-MINI TWIN FOR INTERNAL MACHINING

Order number	MS7025	MS9025	VP15TF	TF15		DMIN* ¹		RE* ²	DCONMS	LF	L20	LDRED	WF	WF2	H	Z
						l/d ≤ 3	l/d ≥ 3									
CB05RS			●	●	without	5.2	6.0	0.05	5	70	12.5	15.0	2.5	0.55	4.5	3.9
CB05RS-B	●	●	●	●	with	5.2	6.4	0.05	5	70	12.5	15.0	2.5	0.55	4.5	3.9
CB05RS-015B	●	●			with	5.2	6.4	0.15	5	70	12.5	15.0	2.5	0.55	4.5	3.9
CB05RS-02			●	●	without	5.2	6.0	0.2	5	70	12.5	15.0	2.5	0.55	4.5	3.9
CB05RS-02B	●	●	●	●	with	5.2	6.4	0.2	5	70	12.5	15.0	2.5	0.55	4.5	3.9
CB06RS			●	●	without	6.2	7.2	0.05	6	75	12.5	18.0	3.0	0.65	5.4	4.7
CB06RS-B	●	●	●	●	with	6.2	7.3	0.05	6	75	12.5	18.0	3.0	0.65	5.4	4.7
CB06RS-02			●	●	without	6.2	7.2	0.2	6	75	12.5	18.0	3.0	0.65	5.4	4.7
CB06RS-02B	●	●	●	●	with	6.2	7.8	0.2	6	75	12.5	18.0	3.0	0.65	5.4	4.7
CB07RS			●	●	without	7.2	8.6	0.05	7	85	12.5	21.0	3.5	0.75	6.3	5.5
CB07RS-B	●	●	●	●	with	7.2	8.8	0.05	7	85	12.5	21.0	3.5	0.75	6.3	5.5
CB07RS-02			●	●	without	7.2	8.6	0.2	7	85	12.5	21.0	3.5	0.75	6.3	5.5
CB07RS-02B	●	●	●	●	with	7.2	9.2	0.2	7	85	12.5	21.0	3.5	0.75	6.3	5.5
CB08RS			●	●	without	8.2	9.5	0.05	8	95	15.0	24.0	4.0	0.85	7.2	6.3
CB08RS-B	●	●	●	●	with	8.2	9.6	0.05	8	95	15.0	24.0	4.0	0.85	7.2	6.3
CB08RS-02			●	●	without	8.2	9.5	0.2	8	95	15.0	24.0	4.0	0.85	7.2	6.3
CB08RS-02B	●	●	●	●	with	8.2	9.8	0.2	8	95	15.0	24.0	4.0	0.85	7.2	6.3
2/2																

*¹ DMIN: Min. Cutting Diameter*² The RE dimension represents the size before grinding a chipbreaker.

1. [MICRO-MINI TWIN is available in 1 piece in one pack.]

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CB-TYPE

RECOMMENDED CUTTING CONDITIONS

	Material	Properties	Grade	Vc	f	ap	Tool overhang L/D
P	Pure iron, Free cutting steel	—	MS7025	80 (40 – 120)	0.03 (0.01 – 0.05)	0.2 (0.1 – 0.3)	3 – 5
	Carbon steel, alloy steel	Hardness 180 – 350HB	MS7025, VP15TF	80 (40 – 120)	0.03 (0.01 – 0.05)	0.2 (0.1 – 0.3)	3 – 5
M	Stainless steel	Hardness ≤200HB	MS7025, MS9025, VP15TF	80 (40 – 120)	0.03 (0.01 – 0.05)	0.2 (0.1 – 0.3)	3 – 5
K	Gray cast iron	Tensile strength ≤350MPa	VP15TF	80 (40 – 120)	0.03 (0.01 – 0.05)	0.2 (0.1 – 0.3)	3 – 5
N	Non-ferrous metal	—	TF15	120 (80 – 160)	0.05 (0.01 – 0.08)	0.3 (0.1 – 0.5)	3 – 5
S	Heat resistant alloy	—	MS9025	60 (40 – 80)	0.02 (0.01 – 0.03)	0.2 (0.1 – 0.3)	3 – 5

1/1

1. Recommend wet cutting.

CORRECT USE OF MICRO-MINI TWIN GRADES

MS7025

P	M
Steel	Stainless steel

- Specially designed to enable good surface finishes when machining stainless steels.
- For general use on a wide range of materials.

MS9025

S	M
Heat resistant alloy	Stainless steel

- Ideal for stainless steels and high efficiency machining of difficult-to-cut materials.

VP15TF

P	M	K
Steel	Stainless steel	Gray cast iron

- For general use on a wide range of materials including cast iron.

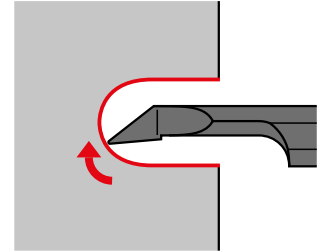
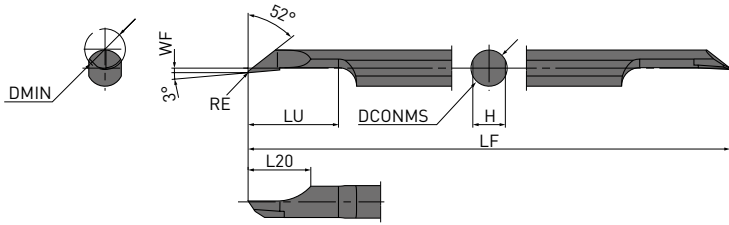
TF15

N
Non-ferrous metal

- For machining non-ferrous metals.

CR-TYPE

MICRO-MINI TWIN FOR INTERNAL COPYING



Right hand tool only.

Order number	MS7025	MS9025	VP15TF	TF15		DMIN	RE	DCONMS	LF	LU	L20	WF	H
CR03RS-01			●	●	without	3.5	0.1	3.0	50	8	6.0	0.15	2.7
CR03RS-01B	●	●	●	●	with	3.5	0.1	3.0	50	8	6.0	0.15	2.7
CR035RS-01B	●	●			with	4.0	0.1	3.5	60	8	6.5	0.15	3.15
CR04RS-01			●	●	without	4.5	0.1	4.0	60	10	7.0	0.15	3.6
CR04RS-01B	●	●	●	●	with	4.5	0.1	4.0	60	10	7.0	0.15	3.6
CR045RS-01B	●	●			with	5.0	0.1	4.5	70	10	7.5	0.15	4.05
CR05RS-01			●	●	without	5.5	0.1	5.0	70	12	8.0	0.15	4.5
CR05RS-01B	●	●	●	●	with	5.5	0.1	5.0	70	12	8.0	0.15	4.5

1/1

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RECOMMENDED CUTTING CONDITIONS

	Material	Properties	Grade	Vc	f		ap
					0.3 RS - 045 RS	05 RS	
P	Pure iron, Free cutting steel	—	MS7025	80 (40 - 120)	0.02 (0.01 - 0.03)	0.03 (0.01 - 0.05)	0.05
	Carbon steel, alloy steel	Hardness 180 - 350HB	MS7025, VP15TF	80 (40 - 120)	0.02 (0.01 - 0.03)	0.03 (0.01 - 0.05)	0.05
M	Stainless steel	Hardness ≤200HB	MS7025, MS9025, VP15TF	80 (40 - 120)	0.02 (0.01 - 0.03)	0.03 (0.01 - 0.05)	0.05
K	Gray cast iron	Tensile strength ≤350MPa	VP15TF	80 (40 - 120)	0.03 (0.01 - 0.05)	0.03 (0.01 - 0.05)	0.05
N	Non-ferrous metal	—	TF15	120 (80 - 160)	0.03 (0.01 - 0.05)	0.05 (0.01 - 0.08)	0.05
S	Heat resistant alloy	—	MS9025	60 (40 - 80)	0.02 (0.01 - 0.03)	0.02 (0.01 - 0.03)	0.05

1/1

1. Recommend wet cutting.
2. The recommended tool overhang of CR type is LU + 2 mm.

PRECAUTIONS WHEN USING THE MICRO-MINI TWIN

When using a holder for general purpose / small automatic lathe:

- ❑ To avoid chipping of the 2nd cutting edge take care when inserting the boring bar into the holder. Refer to fig.1. If the 2nd edge contacts the internal face of the holder there is a possibility that it may chip.

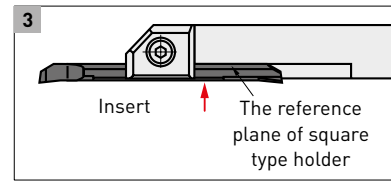
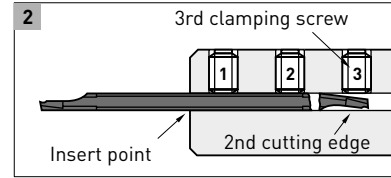
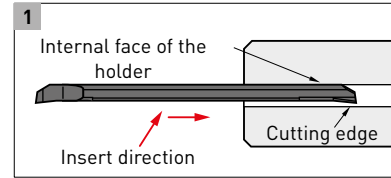
- ❑ When using this type of holder, there is a possibility that damage to the shank and the 2nd cutting edge can occur. Make sure that the clamping screws are tightened to the set torque value. Additionally make sure that there is no clamping screw near the 2nd cutting edge as this can break the boring bar.

When using Mitsubishi Materials holders:

When using holders with a tool overhang of recommended quantity, ensure that the 3rd clamping screw is removed prior to machining. (RBH1620N, RBH19020N, RBH2020N and RBH2520N do not have the 3rd screw.) The set torque value for clamping screw is 2.0 Nm.

When using a square type holder:

- ❑ When installing the boring bar into the holder, tighten the clamp screws after ensuring the flats on the tool holder are parallel to the reference flats on the MICRO-MINI bar. Refer to fig.3.
- ❑ Make sure that the clamping screws are tightened to the recommended values.
- ❑ Do not tighten the clamp screw without a bar in place, otherwise the bridge will be deformed.



Tighten the clamping screw ensuring the MICRO-MINI TWIN boring bars is in contact with the reference plane of square type holder.

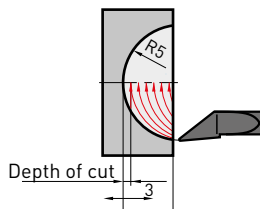
MACHINING METHODS OF THE CR-TYPE

By drilling a pre-prepared hole, the machining time will be shortened and chip control will be improved.

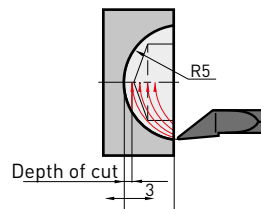
Insert	CR05RS-01B
Workpiece material	C20
Vc (m/min)	80
f (mm/rev)	0.05
ap (mm)	0.05
Coolant	Wet cutting

PROFILE TURNING

Machining a workpiece without a pre-prepared hole

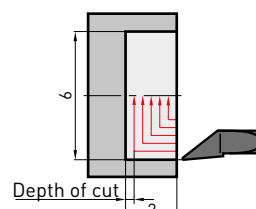


Machining a workpiece with a pre-prepared hole

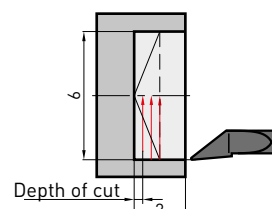


INNER END FACING

Machining a workpiece without a pre-prepared hole

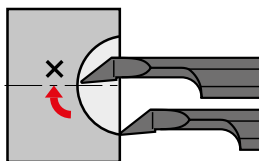


Machining a workpiece with a pre-prepared hole



NOTES FOR USE

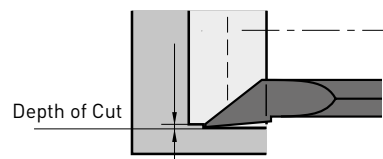
PROFILE TURNING, INNER END FACING



The cutting edge should not cross the centre line of the workpiece.

If the cutting edge crosses the centre line of a workpiece, the cutting edge can fracture.

COPYING

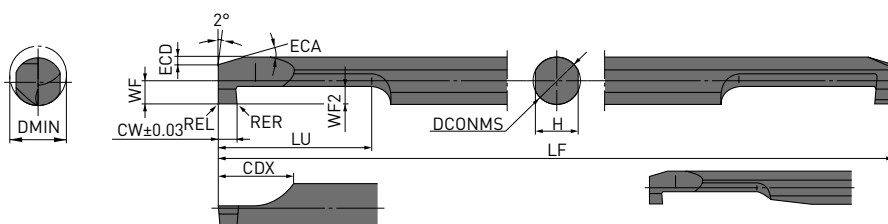


The depth of cut should be smaller than the corner radius value.

With depths of cut larger than the corner radius value, burrs will be formed.

CG-TYPE

MICRO-MINI TWIN FOR INTERNAL GROOVING



* CG0300RS-00B (VP15TF, TF15) only.

Order number	MS7025	MS7025	VP15TF	TF15		DMIN	CW	WF2	RER/L	DCONMS	LF	LU	CDX	WF	H	ECA	ECD
CG0305RS-10			●	★	without	3	1	1.0	0.05	3	50	5	6	1.3	2.7	15°	0.3
CG0305RS-10B	●	●	★	★	with	3	1	1.0	0.05	3	50	5	6	1.3	2.7	15°	0.3
CG0306RS-20			★	★	without	3	2	1.0	0.1	3	50	6	6	1.3	2.7	15°	0.3
CG0306RS-20B	●	●	★	★	with	3	2	1.0	0.1	3	50	6	6	1.3	2.7	15°	0.3
CG03RS-10			●	★	without	3	1	1.0	0.05	3	50	10	6	1.3	2.7	15°	0.3
CG03RS-10B	●	●	★	★	with	3	1	1.0	0.05	3	50	10	6	1.3	2.7	15°	0.3
CG03RS-20			★	★	without	3	2	1.0	0.1	3	50	11	6	1.3	2.7	15°	0.3
CG03RS-20B	●	●	★	★	with	3	2	1.0	0.1	3	50	11	6	1.3	2.7	15°	0.3
CG0407RS-10			★	★	without	4	1	1.5	0.05	4	60	7	7	1.8	3.6	15°	0.5
CG0407RS-10B	●	●	★	★	with	4	1	1.5	0.05	4	60	7	7	1.8	3.6	15°	0.5
CG0408RS-20			★	★	without	4	2	1.5	0.1	4	60	8	7	1.8	3.6	15°	0.5
CG0408RS-20B	●	●	★	★	with	4	2	1.5	0.1	4	60	8	7	1.8	3.6	15°	0.5
CG04RS-10			●	★	without	4	1	1.5	0.05	4	60	15	7	1.8	3.6	15°	0.5
CG04RS-10B	●	●	★	★	with	4	1	1.5	0.05	4	60	15	7	1.8	3.6	15°	0.5
CG04RS-20			★	★	without	4	2	1.5	0.1	4	60	16	7	1.8	3.6	15°	0.5
CG04RS-20B	●	●	●	★	with	4	2	1.5	0.1	4	60	16	7	1.8	3.6	15°	0.5
CG0510RS-10			●	★	without	5	1	2.0	0.05	5	70	10	8	2.3	4.5	15°	0.7
CG0510RS-10B	●	●	●	★	with	5	1	2.0	0.05	5	70	10	8	2.3	4.5	15°	0.7
CG0511RS-20			●	★	without	5	2	2.0	0.1	5	70	11	8	2.3	4.5	15°	0.7
CG0511RS-20B	●	●	★	★	with	5	2	2.0	0.1	5	70	11	8	2.3	4.5	15°	0.7
CG05RS-10			●	★	without	5	1	2.0	0.05	5	70	20	8	2.3	4.5	15°	0.7
CG05RS-10B	●	●	★	★	with	5	1	2.0	0.05	5	70	20	8	2.3	4.5	15°	0.7
CG05RS-20			★	●	without	5	2	2.0	0.1	5	70	21	8	2.3	4.5	15°	0.7
CG05RS-20B	●	●	●	★	with	5	2	2.0	0.1	5	70	21	8	2.3	4.5	15°	0.7
CG0610RS-10			●	★	without	6	1	2.0	0.05	6	75	10	8	2.8	5.4	15°	0.7
CG0610RS-10B	●	●	●	★	with	6	1	2.0	0.05	6	75	10	8	2.8	5.4	15°	0.7
CG0611RS-20			●	★	without	6	2	2.0	0.1	6	75	11	8	2.8	5.4	15°	0.7
CG0611RS-20B	●	●	●	★	with	6	2	2.0	0.1	6	75	11	8	2.8	5.4	15°	0.7
CG06RS-10			●	★	without	6	1	2.0	0.05	6	75	20	8	2.8	5.4	15°	0.7
CG06RS-10B	●	●	●	●	with	6	1	2.0	0.05	6	75	20	8	2.8	5.4	15°	0.7
CG06RS-20			●	★	without	6	2	2.0	0.1	6	75	21	8	2.8	5.4	15°	0.7
CG06RS-20B	●	●	●	●	with	6	2	2.0	0.1	6	75	21	8	2.8	5.4	15°	0.7
CG0712RS-10			●	★	without	7	1	2.0	0.05	7	85	12	8	3.3	6.4	15°	0.7
CG0712RS-10B	●	●	●	★	with	7	1	2.0	0.05	7	85	12	8	3.3	6.4	15°	0.7
CG0713RS-20			★	★	without	7	2	2.0	0.1	7	85	13	8	3.3	6.4	15°	0.7
CG0713RS-20B	●	●	★	★	with	7	2	2.0	0.1	7	85	13	8	3.3	6.4	15°	0.7
CG07RS-10			★	★	without	7	1	2.0	0.05	7	85	25	8	3.3	6.4	15°	0.7
CG07RS-10B	●	●	●	★	with	7	1	2.0	0.05	7	85	25	8	3.3	6.4	15°	0.7
CG07RS-20			●	★	without	7	2	2.0	0.1	7	85	26	8	3.3	6.4	15°	0.7
CG07RS-20B	●	●	●	●	with	7	2	2.0	0.1	7	85	26	8	3.3	6.4	15°	0.7

1/1

- The maximum groove depth is WF2 dimension - 0.1 mm.
- [MICRO-MINI TWIN is available in 1 piece in one pack.]

CG-TYPE

RECOMMENDED CUTTING CONDITIONS

	Material	Properties	Grade	Vc	f		Recommended tool overhang (mm)
					03RS/04RS	05RS/06RS/07RS	
P	Pure iron, Free cutting steel	—	MS7025	80 (40 – 120)	0.02 (0.01 – 0.03)	0.03 (0.01 – 0.05)	LU + 2 mm
	Carbon steel, alloy steel	Hardness 180 – 350HB	MS7025, VP15TF	80 (40 – 120)	0.02 (0.01 – 0.03)	0.03 (0.01 – 0.05)	LU + 2 mm
M	Stainless steel	Hardness ≤200HB	MS7025, MS9025, VP15TF	80 (40 – 120)	0.02 (0.01 – 0.03)	0.03 (0.01 – 0.05)	LU + 2 mm
K	Gray cast iron	Tensile strength ≤350MPa	VP15TF	80 (40 – 120)	0.03 (0.01 – 0.05)	0.03 (0.01 – 0.05)	LU + 2 mm
N	Non-ferrous metal	—	TF15	120 (80 – 160)	0.03 (0.01 – 0.05)	0.05 (0.01 – 0.08)	LU + 2 mm
S	Heat resistant alloy	—	MS9025	60 (40 – 80)	0.02 (0.01 – 0.03)	0.02 (0.01 – 0.03)	LU + 2 mm

1/1

1. Recommend wet machining.

PRECAUTIONS WHEN USING THE MICRO-MINI TWIN

When using a holder for general purpose / small automatic lathe:

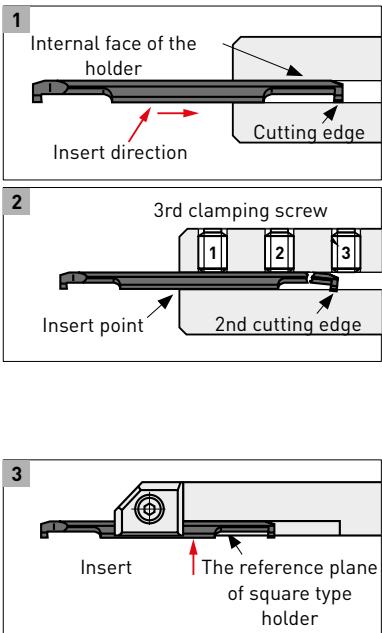
- ❑ To avoid chipping of the 2nd cutting edge take care when inserting the boring bar into the holder. Refer to fig.1. If the 2nd edge contacts the internal face of the holder there is a possibility that it may chip.
- ❑ When using this type of holder, there is a possibility that damage to the shank and the 2nd cutting edge can occur. Make sure that the clamping screws are tightened to the set torque value. Additionally make sure that there is no clamping screw near the 2nd cutting edge as this can break the boring bar.

When using Mitsubishi Materials holders:

When using holders with a tool overhang of recommended quantity, ensure that the 3rd clamping screw is removed prior to machining. The set torque value for clamping screw is 2.0 Nm.

When using a square type holder:

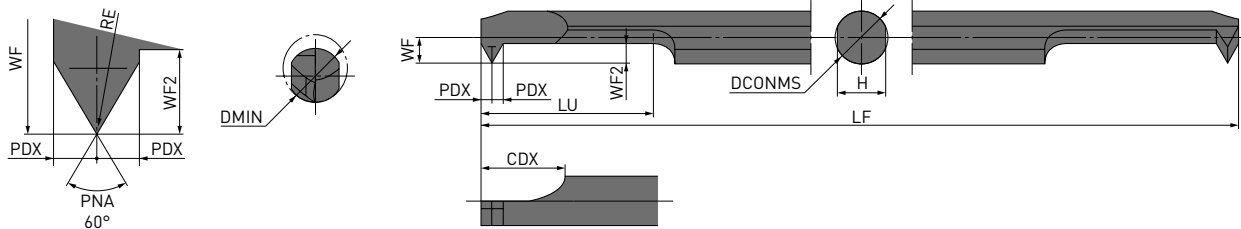
- ❑ When installing the boring bar into the holder, tighten the clamp screws after ensuring the flats on the tool holder are parallel to the reference flats on the MICRO-MINI bar. Refer to fig.3.
- ❑ Make sure that the clamping screws are tightened to the recommended values.
- ❑ Do not tighten the clamp screw without a bar in place, otherwise the bridge will be deformed.



Tighten the clamping screw ensuring making the micro-mini twin boring bars in contact with the reference plane of square type holder.

CT-TYPE

MICRO-MINI TWIN



Order number	MS7025	MS9025	VP15TF	TF15		DMIN	RE	DCONMS	LF	LU	CDX	WF	PDX	WF2	H
CT0305RS-M4			★	★	without	3.0	0.03	3.0	50	5.2	6.0	1.3	0.6	1.2	2.7
CT03RS-M4			●	●	without	3.0	0.03	3.0	50	10.2	6.0	1.3	0.6	1.2	2.7
CT03RS-M4B	●	●	●	●	with	3.0	0.03	3.0	50	10.2	6.0	1.3	0.6	1.2	2.7
CT035RS-M5B	●	●			with	4.0	0.03	3.5	60	10.4	6.5	1.55	0.7	1.45	3.15
CT0407RS-M6			★	★	without	4.5	0.05	4.0	60	7.6	7.0	1.8	0.8	1.7	3.6
CT04RS-M6			●	●	without	4.5	0.05	4.0	60	15.6	7.0	1.8	0.8	1.7	3.6
CT04RS-M6B	●	●	●	●	with	4.5	0.05	4.0	60	15.6	7.0	1.8	0.8	1.7	3.6
CT045RS-M7B	●	●			with	5.0	0.05	4.5	70	15.8	7.5	2.05	0.9	1.95	4.05
CT0511RS-M8			★	★	without	6.0	0.05	5.0	70	11	8.0	2.3	1.0	2.2	4.5
CT05RS-M8			●	●	without	6.0	0.05	5.0	70	21	8.0	2.3	1.0	2.2	4.5
CT05RS-M8B	●	●	●	●	with	6.0	0.05	5.0	70	21	8.0	2.3	1.0	2.2	4.5
CT0611RS-M10			★	★	without	7.0	0.05	6.0	75	11	8.0	2.8	1.0	2.2	5.4
CT06RS-M10			●	●	without	7.0	0.05	6.0	75	21	8.0	2.8	1.0	2.2	5.4
CT06RS-M10B	●	●	●	●	with	7.0	0.05	6.0	75	21	8.0	2.8	1.0	2.2	5.4

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1. [MICRO-MINI TWIN is available in 1 piece in one pack.]



STANDARDS FOR THREADING

Tool type	Threads			
	Metric screw		Unified coarse screw	
	Thread	Pitch (mm)	Thread	Pitch (thread/inch)
CT03	≥ M4	0.50 - 1.00	≥ No.8 - 32UNC ≥ No.8 - 36UNF	36 - 24
CT035	≥ M5	0.50 - 1.00	≥ No.10 - 24UNC ≥ No.10 - 32UNF	32 - 24
CT04	≥ M6	0.75 - 1.25	≥ 1/4 - 20UNC ≥ 1/4 - 28UNF	28 - 20
CT045	≥ M7	0.75 - 1.25	≥ 1/4 - 20UNC ≥ 1/4 - 28UNF	28 - 20
CT05	≥ M8	0.75 - 1.50	≥ 5/16 - 18UNC ≥ 5/16 - 24UNF	24 - 18
CT06	≥ M10	0.75 - 1.75	≥ 3/8 - 16UNC ≥ 3/8 - 24UNF	24 - 16

CT-TYPE

RECOMMENDED CUTTING CONDITIONS

	Material	Properties	Grade	Vc	Recommended tool overhang (mm)
P	Pure iron, Free cutting steel	—	MS7025	50 (30 – 80)	LU + 2 mm
	Carbon steel, alloy steel	Hardness 180 – 350HB	MS7025, VP15TF	50 (30 – 80)	LU + 2 mm
M	Stainless steel	Hardness ≤200HB	MS7025, MS9025, VP15TF	50 (30 – 80)	LU + 2 mm
K	Gray cast iron	Tensile strength ≤350MPa	VP15TF	50 (30 – 80)	LU + 2 mm
N	Non-ferrous metal	—	TF15	80 (50 – 100)	LU + 2 mm
S	Heat resistant alloy	—	MS9025	40 (30 – 60)	LU + 2 mm

1/1

1. Recommend wet machining.
2. Pay special attention to machining of small diameters at high revolutions as the feed rate cannot keep up with the speed.

STANDARD DEPTH OF CUT

The chart shows the cutting depths when machining external ISO metric screw threads.

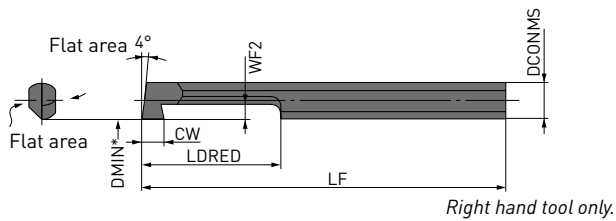
METRIC

P (Pitch)		0.50	0.75	1.00	1.25	1.50	1.75
Total cutting depth		0.29	0.43	0.58	0.72	0.87	1.01
Number of passes	1	0.06	0.06	0.07	0.07	0.07	0.07
	2	0.05	0.06	0.06	0.07	0.07	0.07
	3	0.05	0.05	0.06	0.07	0.07	0.07
	4	0.04	0.05	0.05	0.07	0.07	0.07
	5	0.03	0.04	0.05	0.06	0.06	0.07
	6	0.03	0.04	0.05	0.06	0.06	0.06
	7	0.02	0.04	0.04	0.05	0.06	0.06
	8	0.01	0.03	0.04	0.05	0.06	0.06
	9	—	0.03	0.04	0.05	0.05	0.06
	10	—	0.02	0.03	0.04	0.05	0.05
	11	—	0.01	0.03	0.04	0.05	0.05
	12	—	—	0.03	0.03	0.04	0.05
	13	—	—	0.02	0.03	0.04	0.04
	14	—	—	0.01	0.02	0.03	0.04
	15	—	—	—	0.01	0.03	0.04
	16	—	—	—	—	0.03	0.03
	17	—	—	—	—	0.02	0.03
	18	—	—	—	—	0.01	0.03
	19	—	—	—	—	—	0.03
	20	—	—	—	—	—	0.02
	21	—	—	—	—	—	0.01

MICRO-MINI BORING BARS

STANDARD MICRO-MINI BORING BARS (SOLID CARBIDE BORING BAR)

- Solid carbide type with minimum cutting diameter $\varnothing 3.2$ mm.
- l/d is 5 times the diameter.
- Cutting edge can be shaped according to the application thus, it covers a wide application range (threading, grooving, copying, etc).



Order number	TF15	CW	DCONMS	LF	LDRED	DMIN	WF2
C03FR-BLS	★	2.0	3	80	15	3.2	1.0
C04FR-BLS	★	2.5	4	80	20	4.2	1.5
C05HR-BLS	★	3.0	5	100	25	5.2	2.0
1/1							

* DMIN : Min. cutting diameter

1. (MICRO-MINI TWIN is available in 1 piece in one pack.)

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MICRO-MINI BORING BARS

RECOMMENDED CUTTING CONDITIONS

	Material	Properties	Vc	f	ap	l/d	Edge condition (mm)	
							*Corner radius or BCH	*Honing
P	Carbon steel, alloy steel	Hardness 180 – 350HB	40 (30 – 50)	0.05 (– 0.1)	0.2 (0.1 – 0.3)	5	0.1 – 0.5	0.01 – 0.05
M	Stainless steel	Hardness ≤200HB	40 (30 – 50)	0.05 (– 0.1)	0.2 (0.1 – 0.3)	5	<0.4	<0.03 (Honing not required)
K	Gray cast iron	Tensile strength ≤350MPa	40 (30 – 50)	0.05 (– 0.05)	0.2 (0.1 – 0.3)	5	0.1 – 0.5	0.01 – 0.05
N	Non-ferrous metal	—	80 (60 – 100)	0.05 (– 0.1)	0.3 (0.1 – 0.5)	5	0.1 – 0.5	<0.03 (Honing not required)

1/1

* Cutting edge is not honed. Please hone according to the workpiece before machining.

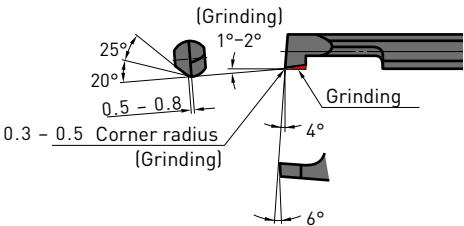
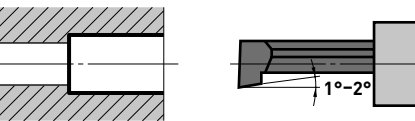
GRINDING THE CUTTING EDGE OF MICRO-MINI BORING BAR

- MICRO-MINI boring bars can be used for boring and grooving without any modifications. It can also be reground as shown below.
- For shaping and regrounding, use a diamond whetstone approximately #250 – #400.
- Please grind according to the application using the figure below as a reference.

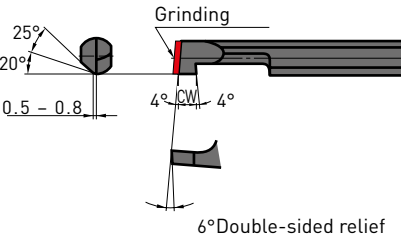
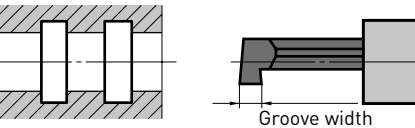
APPLICATION

GRINDING EXAMPLES

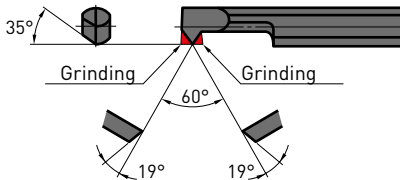
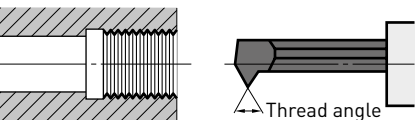
BORING



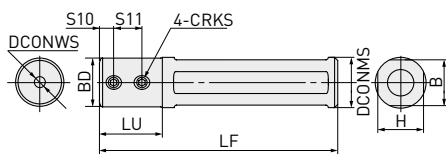
GROOVING



THREADING



ROUND TYPE HOLDER



WITHOUT COOLANT HOLE

Order number		Stock	DCONMS	DCONWS	BD	LF	LU	H	B	S10	S11
NEW	SLV160085020N	★	16.0	2.0	15.5	85	20	14.4	14.4	4.5	9
NEW	SLV160085025N	★	16.0	2.5	15.5	85	20	14.4	14.4	4.5	9
NEW	SLV160085030N	★	16.0	3.0	15.5	85	20	14.4	14.4	4.5	9
NEW	SLV160085035N	★	16.0	3.5	15.5	85	20	14.4	14.4	4.5	9
NEW	SLV160085040N	★	16.0	4.0	15.5	85	20	14.4	14.4	4.5	9
NEW	SLV160085045N	★	16.0	4.5	15.5	85	20	14.4	14.4	4.5	9
NEW	SLV160085050N	★	16.0	5.0	15.5	85	20	14.4	14.4	4.5	9
NEW	SLV160085060N	★	16.0	6.0	15.5	85	20	14.4	14.4	5.0	10
NEW	SLV160085070N	★	16.0	7.0	15.5	85	20	14.4	14.4	5.0	10
NEW	SLV160085080N	★	16.0	8.0	15.5	85	20	14.4	14.4	5.0	10
NEW	SLV190085020N	★	19.05	2.0	18.5	85	20	17.8	17.8	4.5	9
	SLV190085025N	●	19.05	2.5	18.5	85	20	17.8	17.8	4.5	9
NEW	SLV190085030N	★	19.05	3.0	18.5	85	20	17.8	17.8	4.5	9
	SLV190085035N	●	19.05	3.5	18.5	85	20	17.8	17.8	4.5	9
NEW	SLV190085040N	★	19.05	4.0	18.5	85	20	17.8	17.8	4.5	9
	SLV190085045N	●	19.05	4.5	18.5	85	20	17.8	17.8	4.5	9
NEW	SLV190085050N	★	19.05	5.0	18.5	85	20	17.8	17.8	4.5	9
NEW	SLV190080060N	★	19.05	6.0	18.5	80	20	17.8	17.8	5.0	10
NEW	SLV190080070N	★	19.05	7.0	18.5	80	20	17.8	17.8	5.0	10
NEW	SLV190080080N	★	19.05	8.0	18.5	80	20	17.8	17.8	5.0	10
NEW	SLV190110020N	★	19.05	2.0	18.5	110	20	17.8	17.8	4.5	9
	SLV190110025N	●	19.05	2.5	18.5	110	20	17.8	17.8	4.5	9
NEW	SLV190110030N	★	19.05	3.0	18.5	110	20	17.8	17.8	4.5	9
	SLV190110035N	●	19.05	3.5	18.5	110	20	17.8	17.8	4.5	9
NEW	SLV190110040N	★	19.05	4.0	18.5	110	20	17.8	17.8	4.5	9
	SLV190110045N	●	19.05	4.5	18.5	110	20	17.8	17.8	4.5	9
NEW	SLV190110050N	★	19.05	5.0	18.5	110	20	17.8	17.8	4.5	9
NEW	SLV190110060N	★	19.05	6.0	18.5	110	20	17.8	17.8	5.0	10
NEW	SLV190110070N	★	19.05	7.0	18.5	110	20	17.8	17.8	5.0	10
NEW	SLV190110080N	★	19.05	8.0	18.5	110	20	17.8	17.8	5.0	10
NEW	SLV200085020N	★	20.0	2.0	19.0	85	20	18.8	18.8	4.5	9
	SLV200085025N	●	20.0	2.5	19.0	85	20	18.8	18.8	4.5	9
NEW	SLV200085030N	★	20.0	3.0	19.0	85	20	18.8	18.8	4.5	9
	SLV200085035N	●	20.0	3.5	19.0	85	20	18.8	18.8	4.5	9
NEW	SLV200085040N	★	20.0	4.0	19.0	85	20	18.8	18.8	4.5	9
	SLV200085045N	●	20.0	4.5	19.0	85	20	18.8	18.8	4.5	9
NEW	SLV200085050N	★	20.0	5.0	19.0	85	20	18.8	18.8	4.5	9
NEW	SLV200080060N	★	20.0	6.0	19.0	80	20	18.8	18.8	5.0	10
NEW	SLV200080070N	★	20.0	7.0	19.0	80	20	18.8	18.8	5.0	10
NEW	SLV200080080N	★	20.0	8.0	19.0	80	20	18.8	18.8	5.0	10
NEW	SLV220135020N	★	22.0	2.0	20.0	135	20	20.8	20.8	4.5	9
	SLV220135025N	●	22.0	2.5	20.0	135	20	20.8	20.8	4.5	9
NEW	SLV220135030N	★	22.0	3.0	20.0	135	20	20.8	20.8	4.5	9

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ROUND TYPE HOLDER

WITHOUT COOLANT HOLE

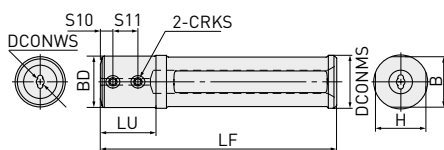
	Order number	Stock	DCONMS	DCONWS	BD	LF	LU	H	B	S10	S11
	SLV220135035N	●	22.0	3.5	20.0	135	20	20.8	20.8	4.5	9
NEW	SLV220135040N	★	22.0	4.0	20.0	135	20	20.8	20.8	4.5	9
	SLV220135045N	●	22.0	4.5	20.0	135	20	20.8	20.8	4.5	9
NEW	SLV220135050N	★	22.0	5.0	20.0	135	20	20.8	20.8	4.5	9
NEW	SLV220135060N	★	22.0	6.0	20.0	135	20	20.8	20.8	5.0	10
NEW	SLV220135070N	★	22.0	7.0	20.0	135	20	20.8	20.8	5.0	10
NEW	SLV220135080N	★	22.0	8.0	20.0	135	20	20.8	20.8	5.0	10
NEW	SLV220135100N	★	22.0	10.0	20.0	135	20	20.8	20.8	5.0	10
NEW	SLV220135120N	★	22.0	12.0	20.0	135	20	20.8	20.8	5.0	10
NEW	SLV250067020N	★	25.0	2.0	20.0	67	20	23.9	23.9	4.5	9
	SLV250067025N	●	25.0	2.5	20.0	67	20	23.9	23.9	4.5	9
NEW	SLV250067030N	★	25.0	3.0	20.0	67	20	23.9	23.9	4.5	9
	SLV250067035N	●	25.0	3.5	20.0	67	20	23.9	23.9	4.5	9
NEW	SLV250067040N	★	25.0	4.0	20.0	67	20	23.9	23.9	4.5	9
	SLV250067045N	●	25.0	4.5	20.0	67	20	23.9	23.9	4.5	9
NEW	SLV250067050N	★	25.0	5.0	20.0	67	20	23.9	23.9	4.5	9
NEW	SLV250067060N	★	25.0	6.0	20.0	67	20	23.9	23.9	5.0	10
NEW	SLV250067070N	★	25.0	7.0	20.0	67	20	23.9	23.9	5.0	10
NEW	SLV250067080N	★	25.0	8.0	20.0	67	20	23.9	23.9	5.0	10
NEW	SLV250067100N	★	25.0	10.0	22.0	67	20	23.9	23.9	5.0	10
NEW	SLV250067120N	★	25.0	12.0	22.0	67	20	23.9	23.9	5.0	10
NEW	SLV250110020N	★	25.0	2.0	20.0	110	20	23.9	23.9	4.5	9
	SLV250110025N	●	25.0	2.5	20.0	110	20	23.9	23.9	4.5	9
NEW	SLV250110030N	★	25.0	3.0	20.0	110	20	23.9	23.9	4.5	9
	SLV250110035N	●	25.0	3.5	20.0	110	20	23.9	23.9	4.5	9
NEW	SLV250110040N	★	25.0	4.0	20.0	110	20	23.9	23.9	4.5	9
	SLV250110045N	●	25.0	4.5	20.0	110	20	23.9	23.9	4.5	9
NEW	SLV250110050N	★	25.0	5.0	20.0	110	20	23.9	23.9	4.5	9
NEW	SLV250110060N	★	25.0	6.0	20.0	110	20	23.9	23.9	5.0	10
NEW	SLV250110070N	★	25.0	7.0	20.0	110	20	23.9	23.9	5.0	10
NEW	SLV250110080N	★	25.0	8.0	20.0	110	20	23.9	23.9	5.0	10
NEW	SLV250110100N	★	25.0	10.0	22.0	110	20	23.9	23.9	5.0	10
NEW	SLV250110120N	★	25.0	12.0	22.0	110	20	23.9	23.9	5.0	10
NEW	SLV254085020N	★	25.4	2.0	20.0	85	20	24.4	24.4	4.5	9
	SLV254085025N	●	25.4	2.5	20.0	85	20	24.4	24.4	4.5	9
NEW	SLV254085030N	★	25.4	3.0	20.0	85	20	24.4	24.4	4.5	9
	SLV254085035N	●	25.4	3.5	20.0	85	20	24.4	24.4	4.5	9
NEW	SLV254085040N	★	25.4	4.0	20.0	85	20	24.4	24.4	4.5	9
	SLV254085045N	●	25.4	4.5	20.0	85	20	24.4	24.4	4.5	9
NEW	SLV254085050N	★	25.4	5.0	20.0	85	20	24.4	24.4	4.5	9
NEW	SLV254080060N	★	25.4	6.0	20.0	80	20	24.4	24.4	5.0	10
NEW	SLV254080070N	★	25.4	7.0	20.0	80	20	24.4	24.4	5.0	10
NEW	SLV254080080N	★	25.4	8.0	20.0	80	20	24.4	24.4	5.0	10
NEW	SLV254080100N	★	25.4	10.0	22.0	80	20	24.4	24.4	5.0	10
NEW	SLV254080120N	★	25.4	12.0	22.0	80	20	24.4	24.4	5.0	10
NEW	SLV254110020N	★	25.4	2.0	20.0	110	20	24.4	24.4	4.5	9

ROUND TYPE HOLDER

WITHOUT COOLANT HOLE

	Order number	Stock	DCONMS	DCONWS	BD	LF	LU	H	B	S10	S11
	SLV254110025N	●	25.4	2.5	20.0	110	20	24.4	24.4	4.5	9
NEW	SLV254110030N	★	25.4	3.0	20.0	110	20	24.4	24.4	4.5	9
	SLV254110035N	●	25.4	3.5	20.0	110	20	24.4	24.4	4.5	9
NEW	SLV254110040N	★	25.4	4.0	20.0	110	20	24.4	24.4	4.5	9
	SLV254110045N	●	25.4	4.5	20.0	110	20	24.4	24.4	4.5	9
NEW	SLV254110050N	★	25.4	5.0	20.0	110	20	24.4	24.4	4.5	9
NEW	SLV254110060N	★	25.4	6.0	20.0	110	20	24.4	24.4	5.0	10
NEW	SLV254110070N	★	25.4	7.0	20.0	110	20	24.4	24.4	5.0	10
NEW	SLV254110080N	★	25.4	8.0	20.0	110	20	24.4	24.4	5.0	10
NEW	SLV254110100N	★	25.4	10.0	22.0	110	20	24.4	24.4	5.0	10
NEW	SLV254110120N	★	25.4	12.0	22.0	110	20	24.4	24.4	5.0	10
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ROUND TYPE HOLDER



WITH COOLANT HOLE

Order number	Stock	DCONMS	DCONWS	BD	LF	LU	H	B	S10	S11
SLV190085030A	●	19.05	3.0	18.5	85	20	17.8	17.8	4.5	9
SLV190085035A	●	19.05	3.5	18.5	85	20	17.8	17.8	4.5	9
SLV190085040A	●	19.05	4.0	18.5	85	20	17.8	17.8	4.5	9
SLV190085045A	●	19.05	4.5	18.5	85	20	17.8	17.8	4.5	9
SLV190085050A	●	19.05	5.0	18.5	85	20	17.8	17.8	4.5	9
SLV190080060A	●	19.05	6.0	18.5	80	20	17.8	17.8	5.0	10
SLV190080070A	●	19.05	7.0	18.5	80	20	17.8	17.8	5.0	10
SLV190080080A	●	19.05	8.0	18.5	80	20	17.8	17.8	5.0	10
SLV190110030A	●	19.05	3.0	18.5	110	20	17.8	17.8	4.5	9
SLV190110035A	●	19.05	3.5	18.5	110	20	17.8	17.8	4.5	9
SLV190110040A	●	19.05	4.0	18.5	110	20	17.8	17.8	4.5	9
SLV190110045A	●	19.05	4.5	18.5	110	20	17.8	17.8	4.5	9
SLV190110050A	●	19.05	5.0	18.5	110	20	17.8	17.8	4.5	9
SLV190110060A	●	19.05	6.0	18.5	110	20	17.8	17.8	5.0	10
SLV190110070A	●	19.05	7.0	18.5	110	20	17.8	17.8	5.0	10
SLV190110080A	●	19.05	8.0	18.5	110	20	17.8	17.8	5.0	10
SLV200085030A	●	20.0	3.0	19.0	85	20	18.8	18.8	4.5	9
SLV200085035A	●	20.0	3.5	19.0	85	20	18.8	18.8	4.5	9
SLV200085040A	●	20.0	4.0	19.0	85	20	18.8	18.8	4.5	9
SLV200085045A	●	20.0	4.5	19.0	85	20	18.8	18.8	4.5	9
SLV200085050A	●	20.0	5.0	19.0	85	20	18.8	18.8	4.5	9
SLV200080060A	●	20.0	6.0	19.0	80	20	18.8	18.8	5.0	10
SLV200080070A	●	20.0	7.0	19.0	80	20	18.8	18.8	5.0	10
SLV200080080A	●	20.0	8.0	19.0	80	20	18.8	18.8	5.0	10
SLV220115030A	●	22.0	3.0	20.0	115	20	20.8	20.8	4.5	9
SLV220115035A	●	22.0	3.5	20.0	115	20	20.8	20.8	4.5	9
SLV220115040A	●	22.0	4.0	20.0	115	20	20.8	20.8	4.5	9
SLV220115045A	●	22.0	4.5	20.0	115	20	20.8	20.8	4.5	9
SLV220115050A	●	22.0	5.0	20.0	115	20	20.8	20.8	4.5	9
SLV220115060A	●	22.0	6.0	20.0	115	20	20.8	20.8	5.0	10
SLV220115070A	●	22.0	7.0	20.0	115	20	20.8	20.8	5.0	10
SLV220115080A	●	22.0	8.0	20.0	115	20	20.8	20.8	5.0	10
SLV250067030A	●	25.0	3.0	20.0	67	20	23.9	23.9	4.5	9
SLV250067035A	●	25.0	3.5	20.0	67	20	23.9	23.9	4.5	9
SLV250067040A	●	25.0	4.0	20.0	67	20	23.9	23.9	4.5	9
SLV250067045A	●	25.0	4.5	20.0	67	20	23.9	23.9	4.5	9
SLV250067050A	●	25.0	5.0	20.0	67	20	23.9	23.9	4.5	9
SLV250067060A	●	25.0	6.0	20.0	67	20	23.9	23.9	5.0	10
SLV250067070A	●	25.0	7.0	20.0	67	20	23.9	23.9	5.0	10
SLV250067080A	●	25.0	8.0	20.0	67	20	23.9	23.9	5.0	10
SLV250110030A	●	25.0	3.0	20.0	110	20	23.9	23.9	4.5	9
SLV250110035A	●	25.0	3.5	20.0	110	20	23.9	23.9	4.5	9
SLV250110040A	●	25.0	4.0	20.0	110	20	23.9	23.9	4.5	9

ROUND TYPE HOLDER

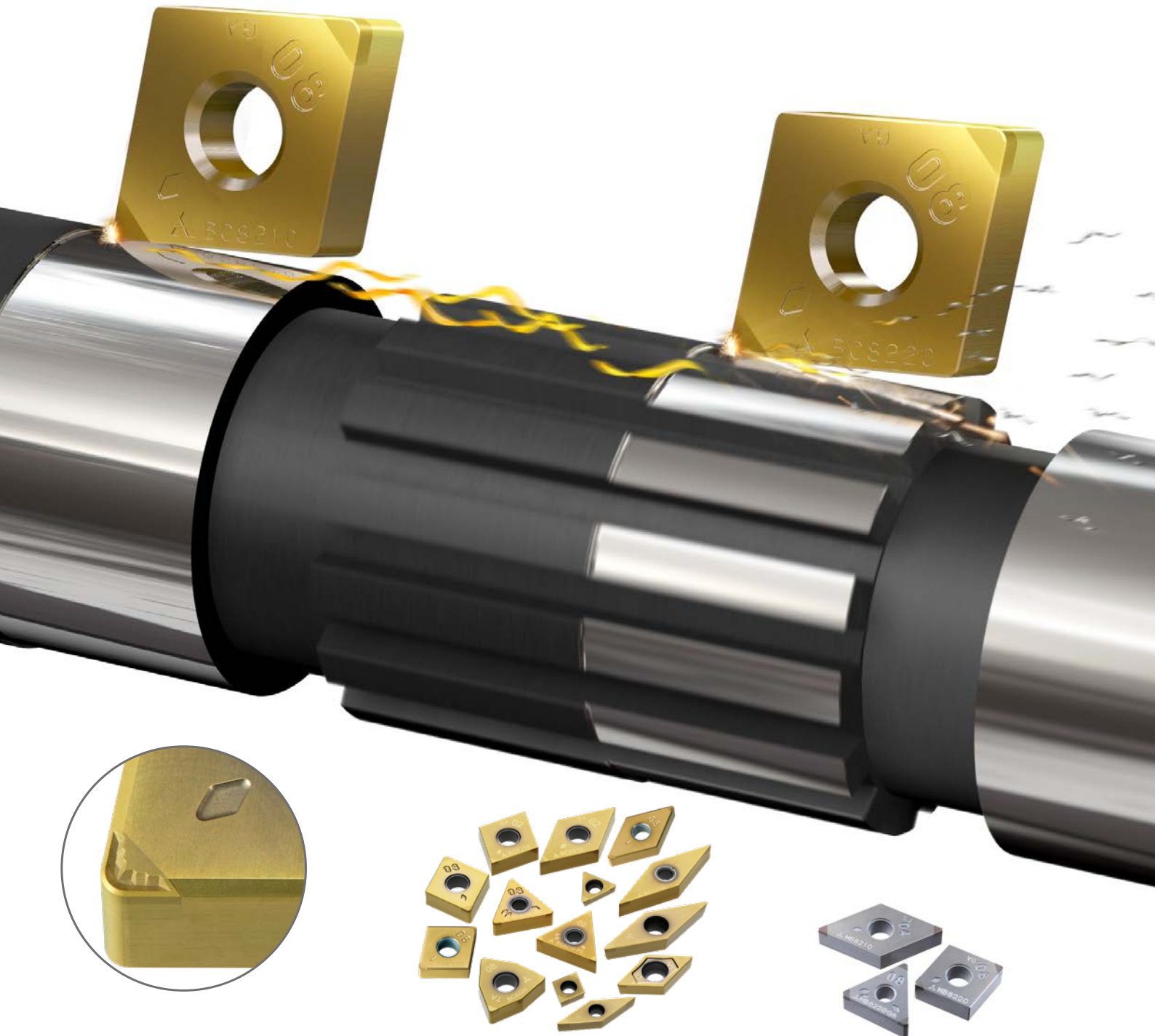
WITH COOLANT HOLE

Order number	Stock	DCONMS	DCONWS	BD	LF	LU	H	B	S10	S11
SLV250110045A	●	25.0	4.5	20.0	110	20	23.9	23.9	4.5	9
SLV250110050A	●	25.0	5.0	20.0	110	20	23.9	23.9	4.5	9
SLV250110060A	●	25.0	6.0	20.0	110	20	23.9	23.9	5.0	10
SLV250110070A	●	25.0	7.0	20.0	110	20	23.9	23.9	5.0	10
SLV250110080A	●	25.0	8.0	20.0	110	20	23.9	23.9	5.0	10
SLV254085030A	●	25.4	3.0	20.0	85	20	24.4	24.4	4.5	9
SLV254085035A	●	25.4	3.5	20.0	85	20	24.4	24.4	4.5	9
SLV254085040A	●	25.4	4.0	20.0	85	20	24.4	24.4	4.5	9
SLV254085045A	●	25.4	4.5	20.0	85	20	24.4	24.4	4.5	9
SLV254085050A	●	25.4	5.0	20.0	85	20	24.4	24.4	4.5	9
SLV254080060A	●	25.4	6.0	20.0	80	20	24.4	24.4	5.0	10
SLV254080070A	●	25.4	7.0	20.0	80	20	24.4	24.4	5.0	10
SLV254080080A	●	25.4	8.0	20.0	80	20	24.4	24.4	5.0	10
SLV254110030A	●	25.4	3.0	20.0	110	20	24.4	24.4	4.5	9
SLV254110035A	●	25.4	3.5	20.0	110	20	24.4	24.4	4.5	9
SLV254110040A	●	25.4	4.0	20.0	110	20	24.4	24.4	4.5	9
SLV254110045A	●	25.4	4.5	20.0	110	20	24.4	24.4	4.5	9
SLV254110050A	●	25.4	5.0	20.0	110	20	24.4	24.4	4.5	9
SLV254110060A	●	25.4	6.0	20.0	110	20	24.4	24.4	5.0	10
SLV254110070A	●	25.4	7.0	20.0	110	20	24.4	24.4	5.0	10
SLV254110080A	●	25.4	8.0	20.0	110	20	24.4	24.4	5.0	10
SLV320110050A	●	32.0	5.0	20.0	110	22	31.1	31.1	4.5	9
SLV320110060A	●	32.0	6.0	20.0	110	22	31.1	31.1	5.0	10
SLV320110070A	●	32.0	7.0	20.0	110	22	31.1	31.1	5.0	10
SLV320110080A	●	32.0	8.0	20.0	110	22	31.1	31.1	5.0	10
SLV320110100A	●	32.0	10.0	25.0	110	22	31.1	31.1	5.0	10
SLV320110120A	●	32.0	12.0	25.0	110	22	31.1	31.1	5.0	10

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BC8200 / MB8200 SERIES

THE NEXT GENERATION OF COATED AND UNCOATED
PCBN GRADES FOR MACHINING HARDENED STEELS



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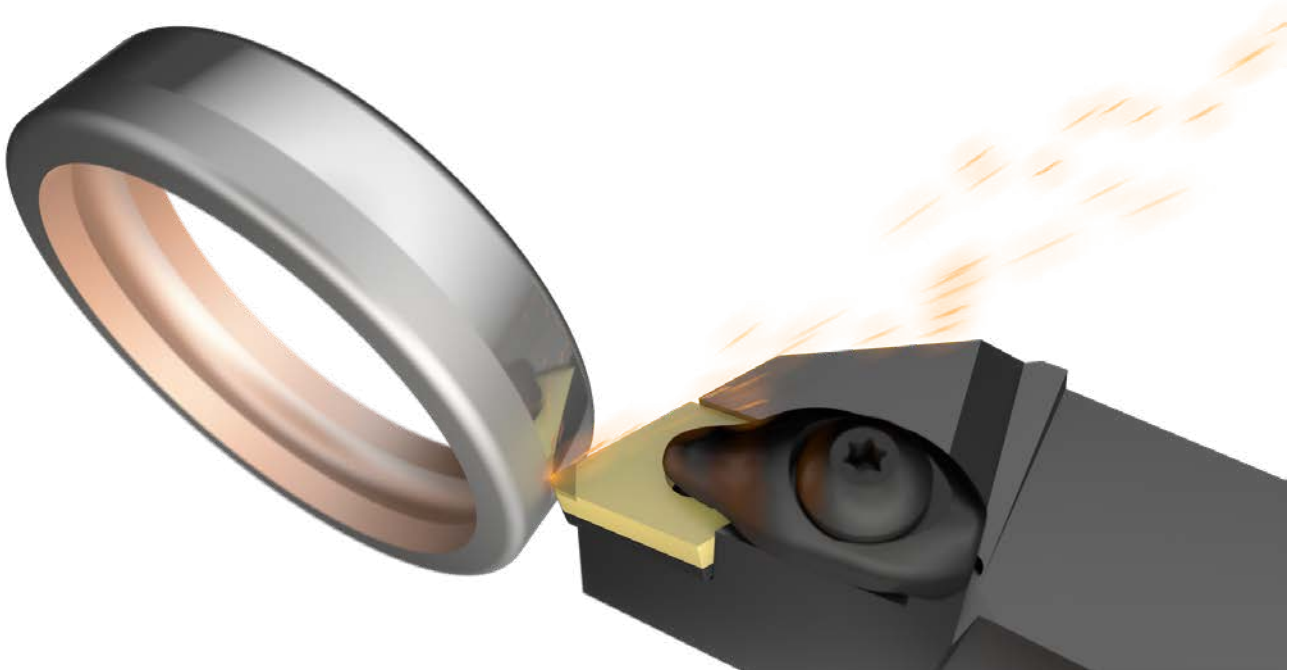
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BC8200 SERIES

BC8210

FOR CONTINUOUS AND LIGHT INTERRUPTED CUTTING



HIGH-SPEED MACHINING WITH OUTSTANDING TOOL LIFE

Suitable for continuous through to light interrupted cutting. BC8210 exhibits excellent chipping, flank and crater wear resistance, thereby providing a stable machining process at high speed cutting conditions.

NEW PVD COATING FOR LONG TOOL LIFE

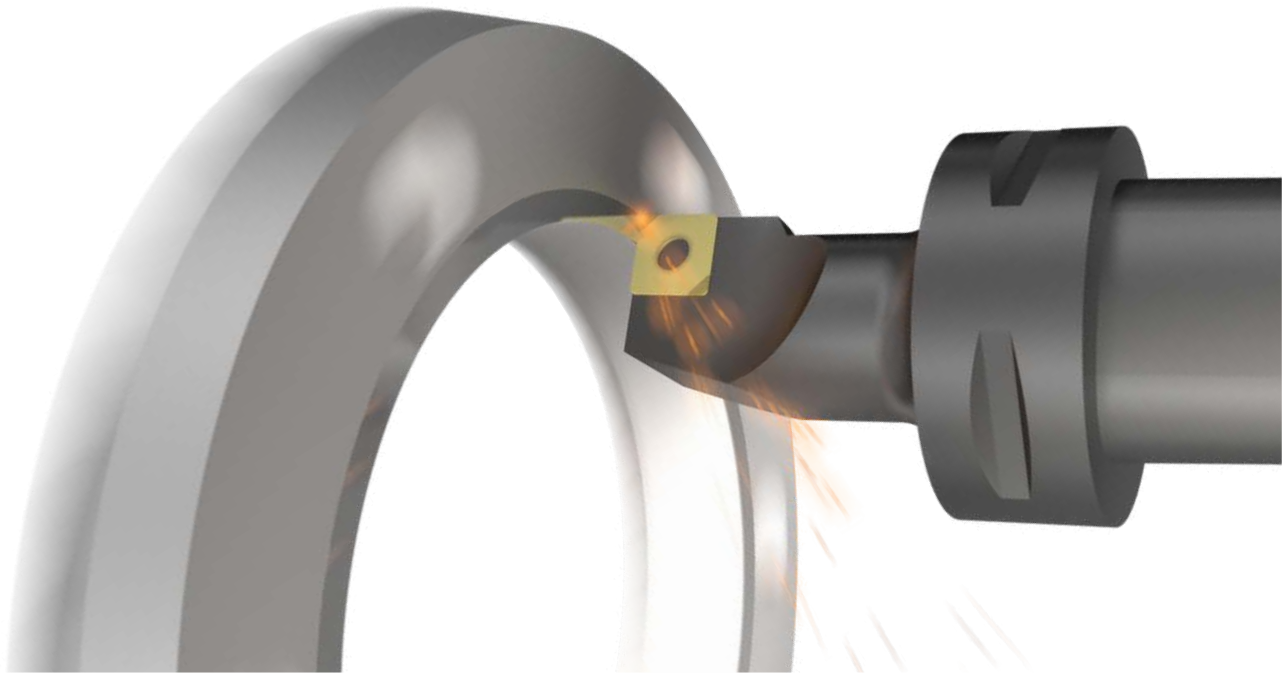
A combination of the newly developed AlCrSiN-base coating that absorbs impacts, and the TiAlSiN-base coating which has excellent wear resistance, provide stability during continuous through to low interrupted cutting applications.



BC8200 SERIES

BC8220

FOR GENERAL APPLICATIONS



ACHIEVES IMPRESSIVE TOOL LIFE OVER A WIDE RANGE OF CUTTING CONDITIONS

Highly suited to a wide application area from continuous through to heavy interrupted cutting. It also has excellent crater wear and fracture resistance due to the new PcBN base material and together with a new coating, tool life is dramatically extended.

NEW PVD COATING WITH IDEAL BALANCE OF WEAR AND CHIPPING RESISTANCE

BC8220 utilises a new specially developed, super multi-layer PVD coating. The high level of both chipping and wear resistance is achieved by a much improved adhesion between the substrate and coating. Together with the easy identification of edges used due to the gold coloured TiN top coating layer, BC8220 achieves high performance and reliability over a wide range of hardened steel machining applications.



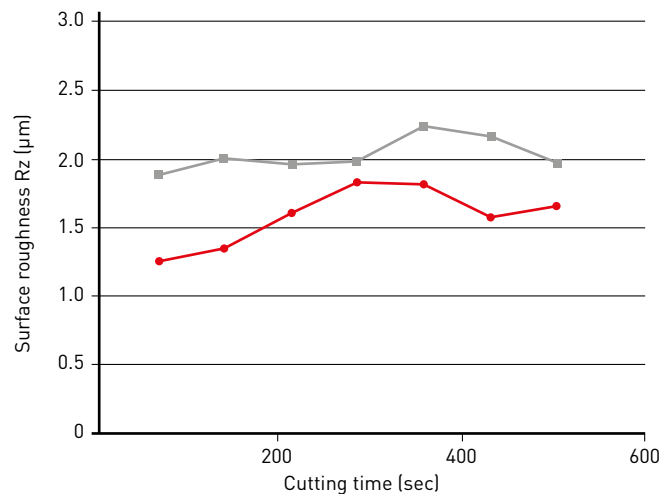
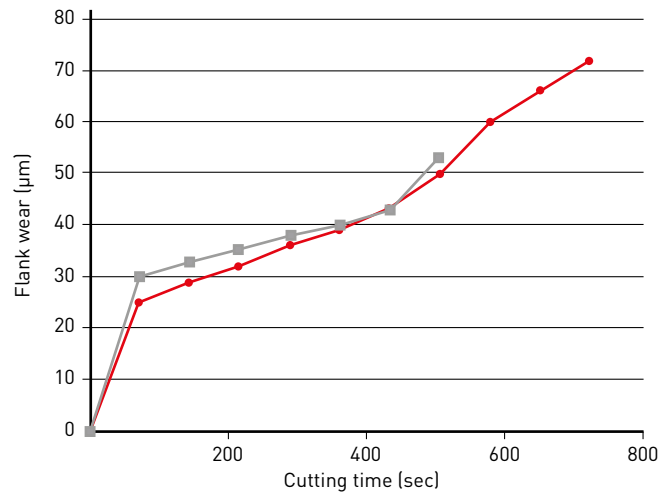
BC8210

CUTTING PERFORMANCE

COMPARISON OF CONTINUOUS CUTTING

BC8210 reduces flank wear and maintains good surface finishes.

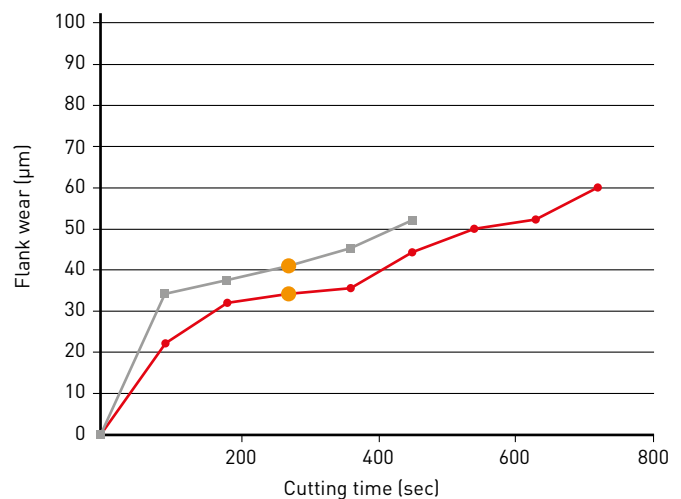
Insert	NP-CNGA120408GS2 BC8210
Material	DIN 20Cr4
Vc (m/min)	200
f (mm/rev)	0.1
ap (mm)	0.2
Cutting mode	Dry cutting



COMPARISON OF LIGHT INTERRUPTED CUTTING

BC8210 provides excellent chipping resistance.

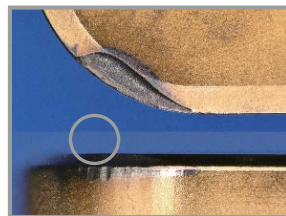
Insert	NP-CNGA120408VA2 BC8210
Material	DIN 20Cr4
Vc (m/min)	160
f (mm/rev)	0.1
ap (mm)	0.2
Cutting mode	Dry cutting



CHIPPING AFTER MACHINING 360 SECONDS



BC8210



Conventional

BC8220

CUTTING PERFORMANCE

COMPARISON OF FRACTURE RESISTANCE DURING MEDIUM INTERRUPTED CUTTING

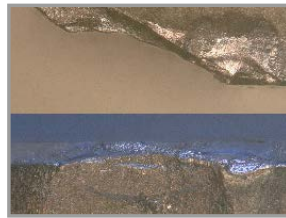
BC8220 has excellent chipping and fracture resistance.

Insert	NP-CNGA120408VA2 BC8220
Material	DIN 20Cr4
Vc (m/min)	250
f (mm/rev)	0.15
ap (mm)	0.1
Cutting mode	Dry cutting

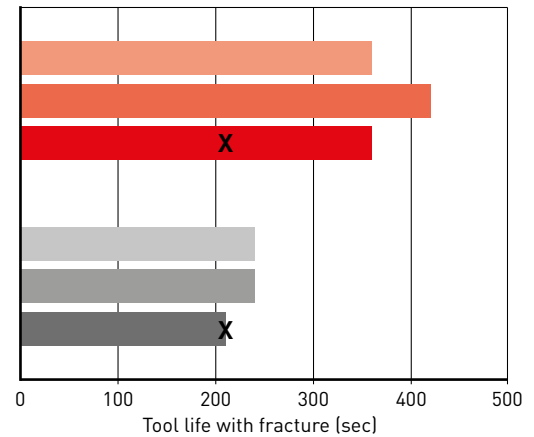
FRACTURE AFTER MACHINING 210 SECONDS



BC8220



Conventional



COMPARISON OF FRACTURE RESISTANCE DURING HEAVY INTERRUPTED CUTTING

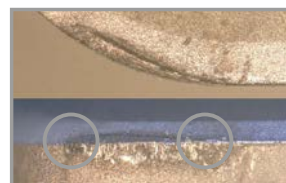
BC8220 has improved chipping resistance when compared to conventional products.

Insert	NP-CNGA120408VA2 BC8220
Material	DIN 20Cr4
Vc (m/min)	200
f (mm/rev)	0.05
ap (mm)	0.1
Cutting mode	Wet cutting

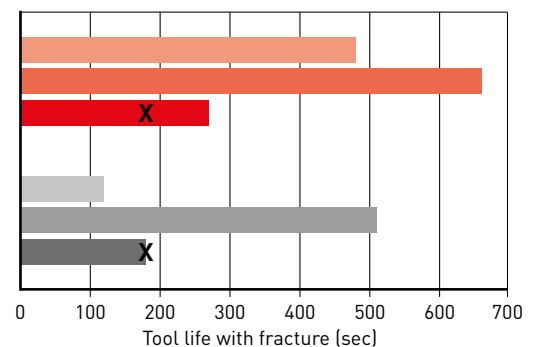
CHIPPING AFTER MACHINING 180 SECONDS



BC8220

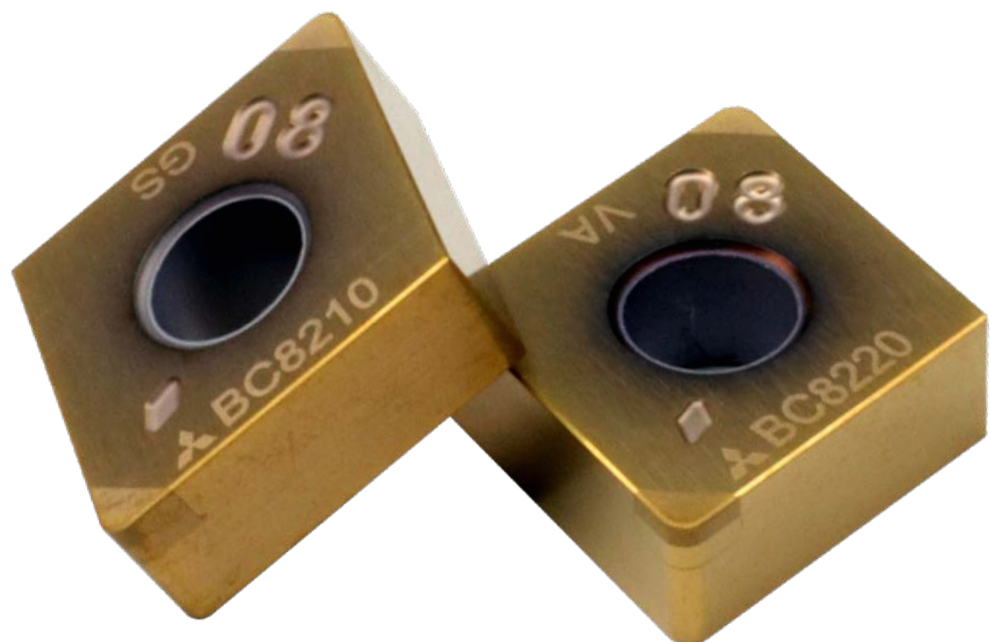
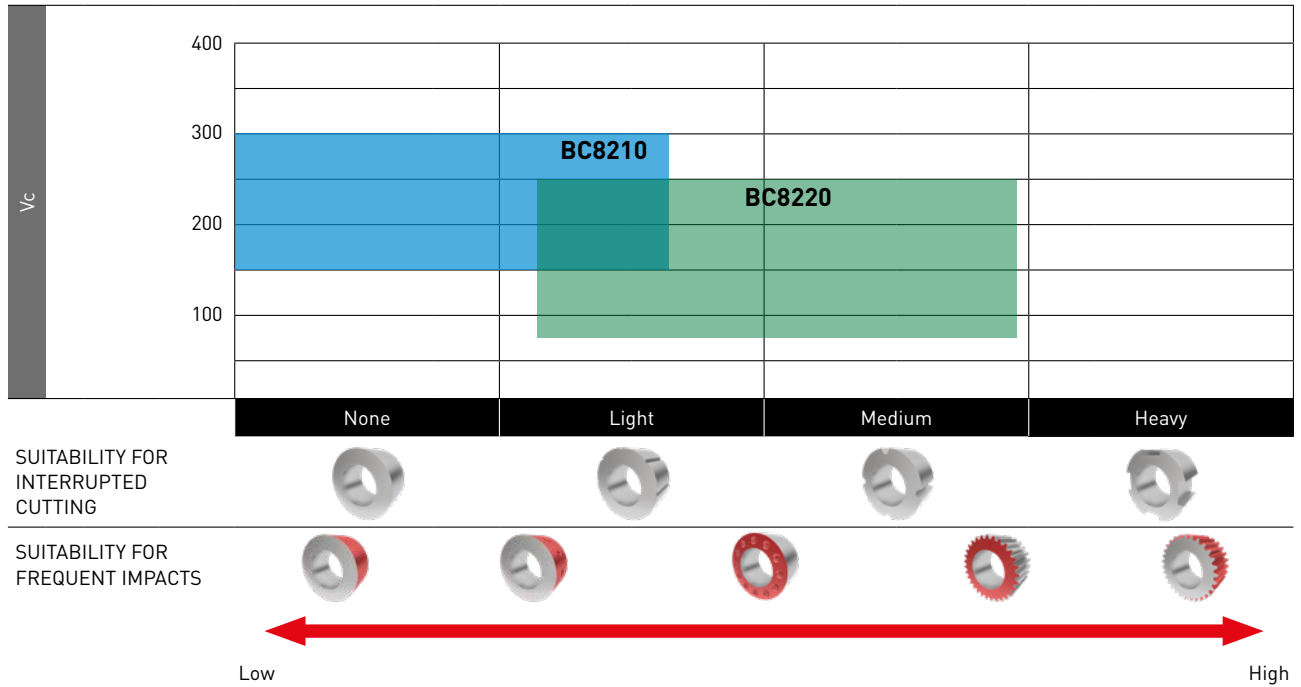


Conventional



BC8200 SERIES

BC8200 COATED PCBN SERIES

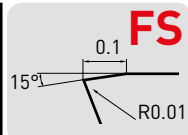
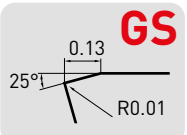
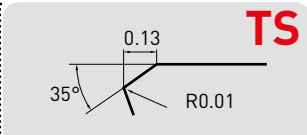
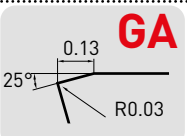
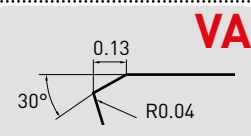
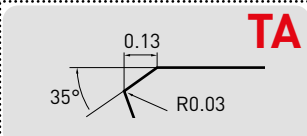
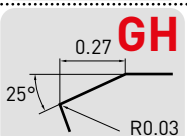
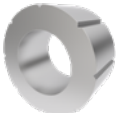


BC8200 SERIES

EDGE PREPARATION (HONING)

A wide variety of cutting edge preparations are available for all applications.

VA honing type with improved fracture resistance for high speeds and feeds.

For very small depths of cut	 FS	 GS	 TS	
For general purpose machining		 GA	 VA	 TA
Heavy interrupted cutting		 GH		 TH
Suitability for interrupted cutting	 None	 Light	 Medium	 Heavy

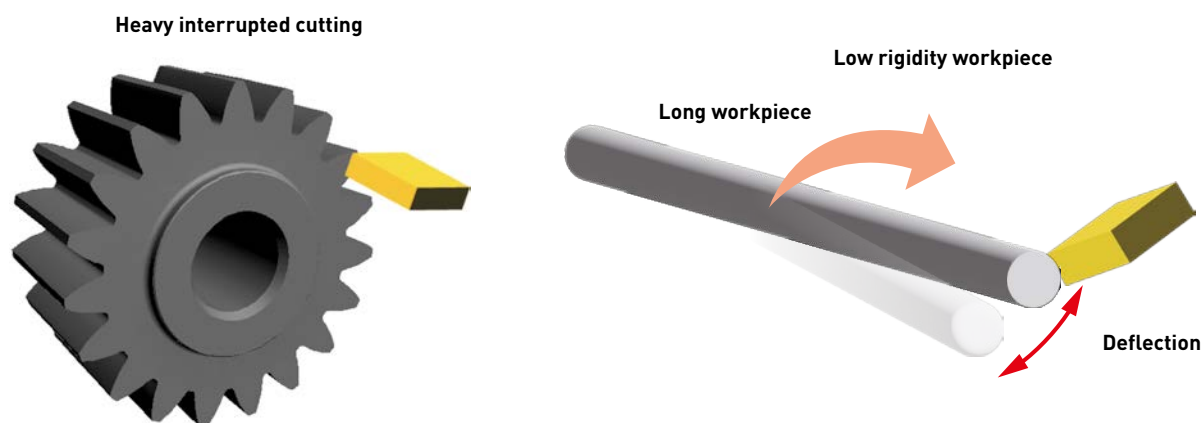
	Continuous cutting	General purpose		For fracture resistance	Interrupted cutting	
	General cutting	General cutting	High feed and depth	High speed and feed	General cutting	High feed and depth
BC8210	FS	GS	GH		TS	
BC8220		GA	GH	VA	TA	TH

MB8200 SERIES

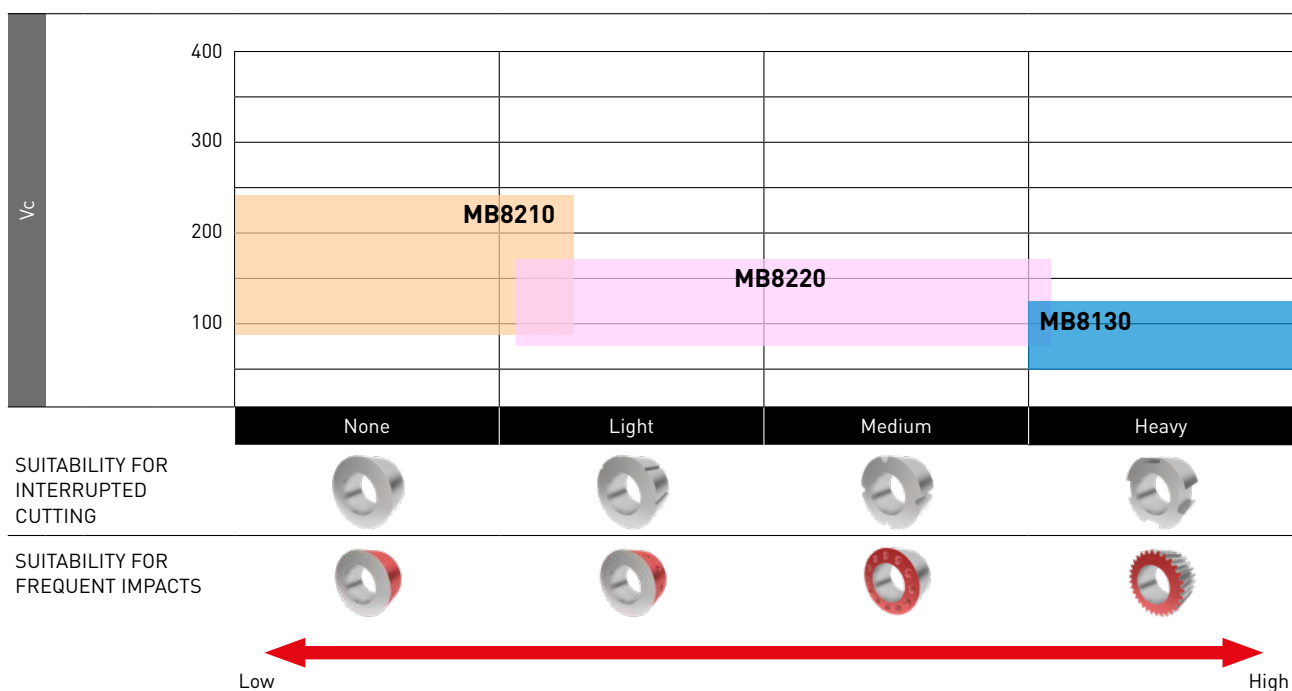
UNCOATED PCBN GRADE FOR TURNING HARDENED STEEL

DISPLAYS EXCELLENT CUTTING PERFORMANCE DURING MEDIUM INTERRUPTED MACHINING

RECOMMENDED MACHINING



RECOMMENDED APPLICATION AREA



MB8210

Enables stable machining during continuous and light intermittent cutting of low rigidity applications.

MB8220

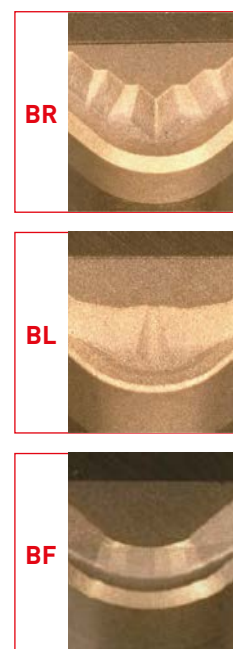
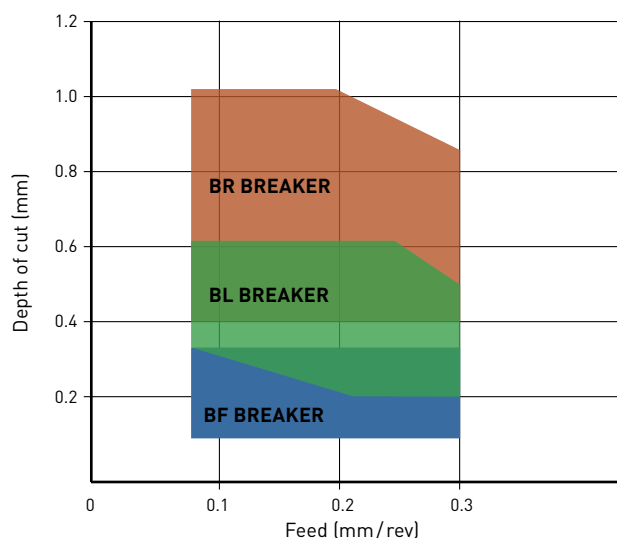
Displays excellent cutting performance during medium interrupted machining.

BC8200 SERIES

FEATURES OF THE INSERT

CHIPBREAKER

The new BL chipbreaker provides good chip control at medium to light depths of cut. A versatile range of chipbreakers are available for a wide range of applications.



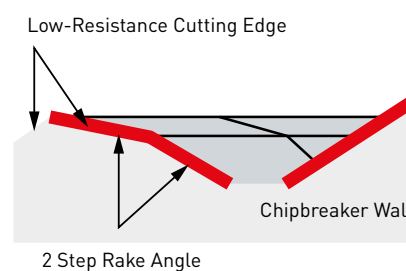
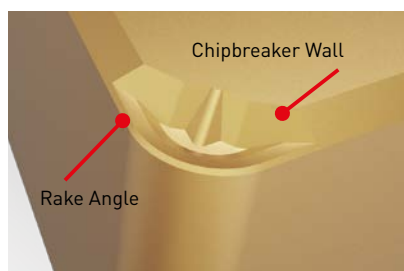
Breaker system for excellent chip control when finishing, removing carburized layers, high load machining and for hard-soft machining.

BL BREAKER (BC8220)

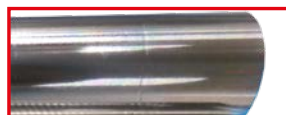
It exhibits excellent chip control performance at cutting depths of 0.2 to 0.6 mm. Combined with the dedicated honing, a low resistance cutting edge is created that suppresses chatter and vibration.

Cutting Performance

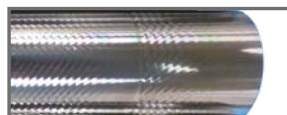
Material	20Cr4 (60HRC)
Insert	BL-CNGM120412TN2
Vc (m/min)	150
f (mm/rev)	0.2
ap (mm)	0.4
Cutting mode	Dry cutting



CONDITION OF THE FINISHED SURFACE



BL



Conventional A



Conventional B

CHIP SHAPE



BL



Conventional A



Conventional B

BC8200 SERIES

FEATURES OF THE INSERT

BR BREAKER (BC8220)

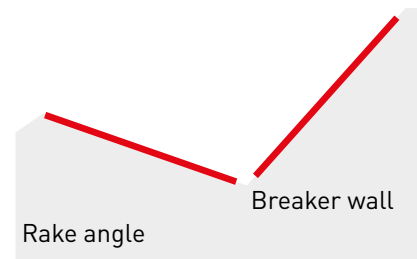
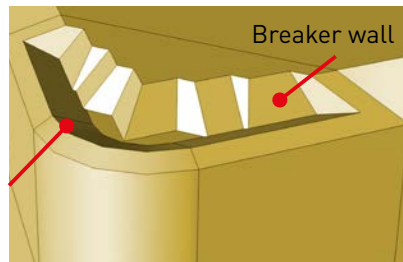
A reduced number of passes needed and improved chip control during high depths of cut.

Chips are formed with the effect from the rake angle and the multi stage breaker wall supports a wide range of cuts.

Recommended cutting conditions:

Vc (m/min)	80 – 200
f (mm/rev)	<0.3
ap (mm)	0.6 – 1.0

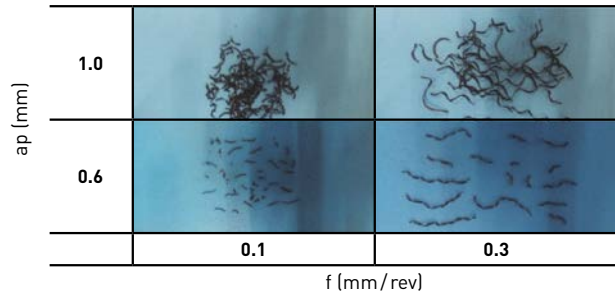
Rake angle



Achieves ideal chip control even at high depths of cut.

Cutting Performance

Material	DIN 20Cr4 (60 HRC)
Insert	BR-CNGM120408TA2
Vc (m/min)	200
f (mm/rev)	0.1 / 0.3
ap (mm)	0.6 / 1.0
Cutting mode	Dry cutting

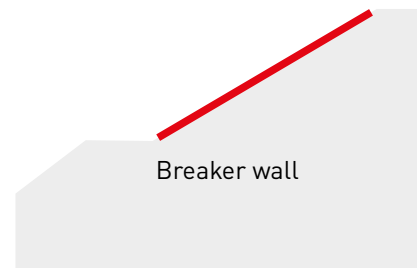
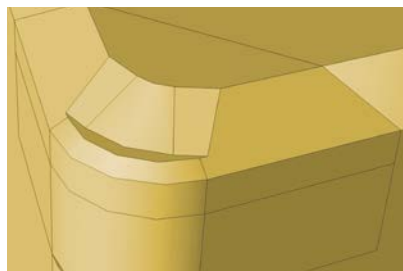


BM BREAKER (BC8220)

Great chip control when machining at medium depths of cut. (0.3–0.8 mm)

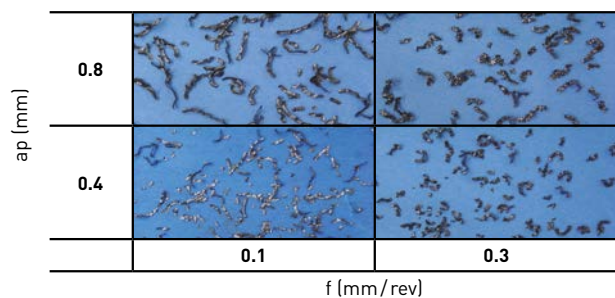
Recommended cutting conditions:

Vc (m/min)	80 – 200
f (mm/rev)	<0.3
ap (mm)	0.3–0.8



Cutting Performance

Material	DIN 15Cr3 (60 HRC)
Insert	BM-CNGM120408TA2
Vc (m/min)	160
f (mm/rev)	0.1 / 0.3
ap (mm)	0.4 / 0.8
Cutting mode	Dry cutting



BC8200 SERIES

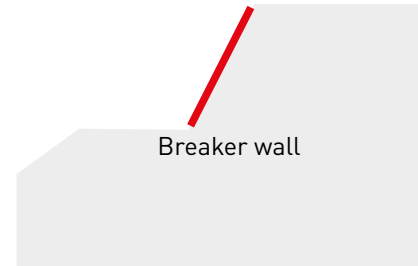
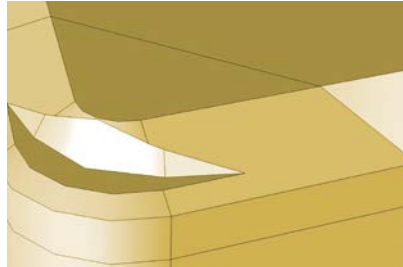
FEATURES OF THE INSERT

BF BREAKER (BC8210, BC8220)

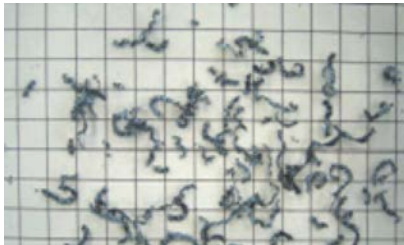
Achieves excellent chip control while finish cutting at depths of 0.3 mm or less.

Recommended cutting conditions:

Vc (m/min)	80 – 200
f (mm/rev)	<0.3
ap (mm)	0.1 – 0.3

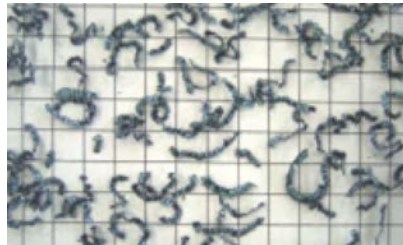


External turning



Vc (m/min)	100
f (mm/rev)	0.3
ap (mm)	0.2

Boring



Vc (m/min)	120
f (mm/rev)	0.3
ap (mm)	0.2

Cutting Performance

Material	DIN 15Cr3 (60 HRC)
Insert	BF-CNGM120408TS2
Cutting mode	Dry cutting

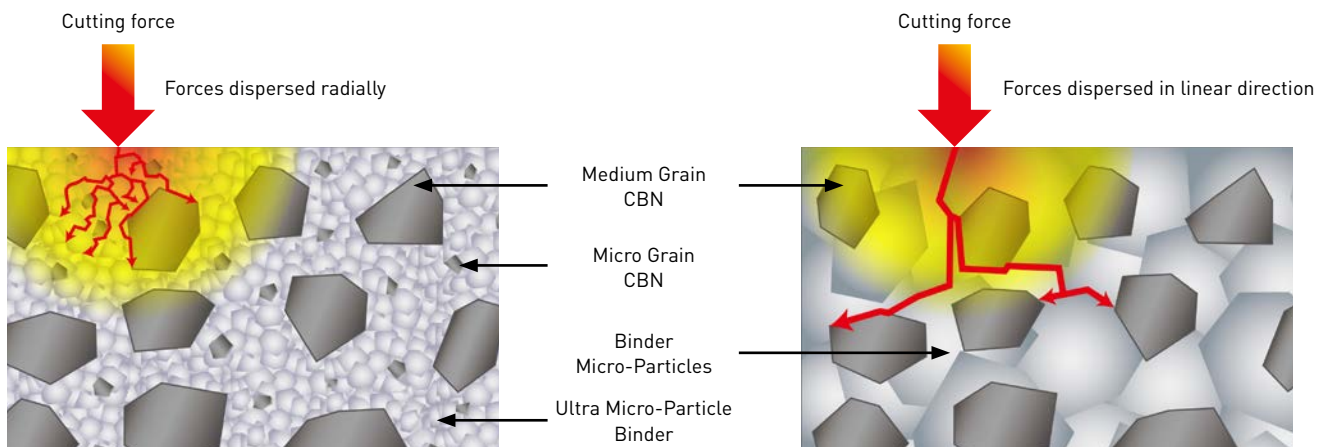
BC8200 / MB8200 SERIES

OPTIMISED SUBSTRATE TECHNOLOGY

PCBN SUBSTRATE FEATURING TOUGHNESS AND CRATER WEAR RESISTANCE

The PcBN substrate contains a ultra-fine grain, heat resistant binder.
This suppresses both chipping and crater wear and promotes longer tool life.

BC8200 / BC8100 SERIES

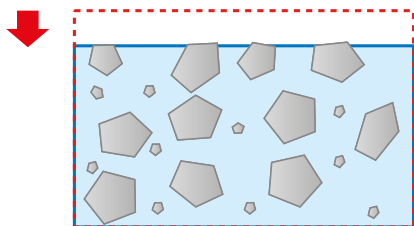


The ultra micro-particle binder for coated and uncoated PcBN inserts prevents linear crack development to avoid sudden fracturing.

POSITIVE EFFECT OF THE NEWLY DEVELOPED, HEAT RESISTANT BINDER

The progress of crater wear is greatly reduced due to the use of a heat resistant binder.
This suppresses chipping, crater wear and fracturing.

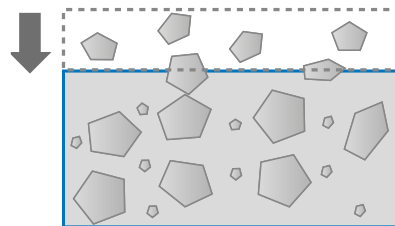
BC8200 / MB8200 SERIES



Reduce crater wear

Suppresses the binder wear caused by cutting heat.

CONVENTIONAL

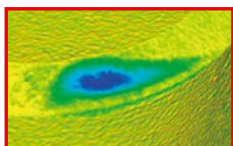


Crater wear progress

As binder wear progresses, the CBN particles are exposed and lost.

BC8200 / MB8200 SERIES

Small crater wear

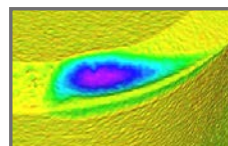


Crater wear

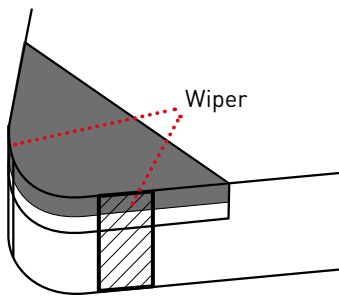
Small  Large

CONVENTIONAL

Large crater wear



WIPER INSERT



IMPROVING SURFACE FINISHES

Under the same machining conditions as conventional breakers, but with the feed rate increased, the surface finish of the workpiece can be improved.

MORE EFFICIENCY

High feed rates not only shorten machining times, but also make it possible to combine roughing and finishing operations.

INCREASED TOOL LIFE

When using in high feed conditions, the time required to cut one component is decreased, thus more parts can be machined with each insert. In addition, the high feed rate prevents rubbing which delays the progression of wear, thereby increasing tool life.

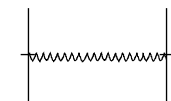
BETTER CHIP CONTROL

Under high feed conditions, the chips generated become thicker and are more easily broken, thereby improving chip control.

RECOMMENDED CUTTING CONDITIONS AND PERFORMANCE

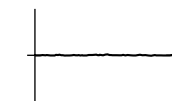
HIGH PRECISION FINISHING

Without wiper



Ry = 3.2 µm

With wiper

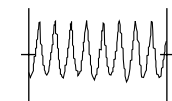


Ry = 1.0 µm

Vc (m/min)	100
f (mm/rev)	0.1
ap (mm)	0.1
Cutting mode	Dry cutting

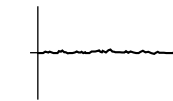
HIGH FEED MACHINING

Without wiper



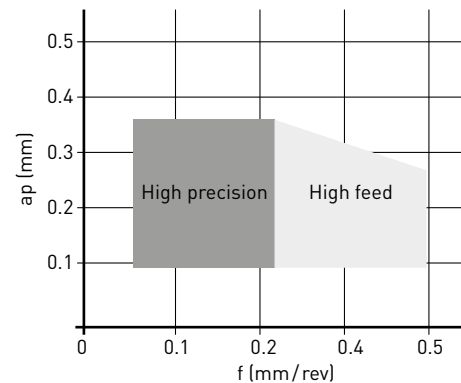
Ry = 12.2 µm

With wiper



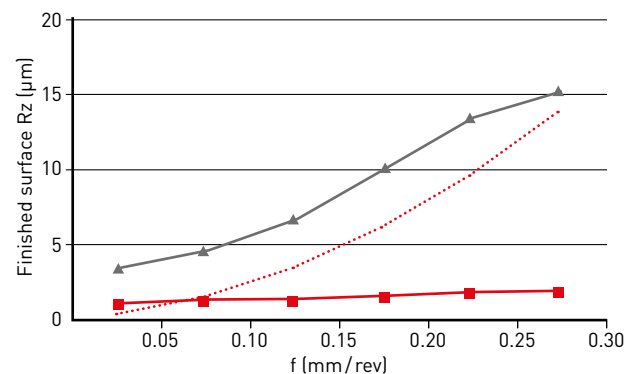
Ry = 1.2 µm

Vc (m/min)	100
f (mm/rev)	0.3
ap (mm)	0.1
Cutting mode	Dry cutting



CUTTING PERFORMANCE

Insert	NP-CNGA120408
Material	Hardened steel (HRC60)
Cutting mode	Continuous
Vc (m/min)	120
f (mm/rev)	Various
ap (mm)	0.1
Cutting mode	Dry cutting

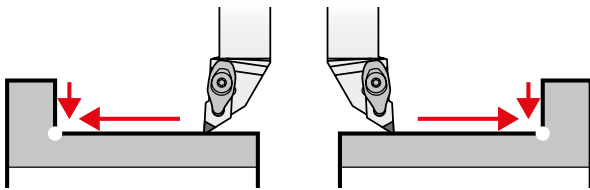


- WL-Wiper
- ▲ No wiper
- Theoretical finished surface roughness

COMBINATION OF BF BREAKER AND WS WIPER INSERT

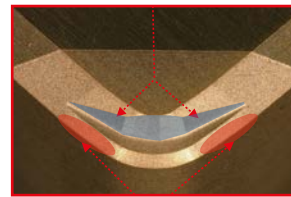
CNGM and DNGM types are now available with new inserts that combine a BF chipbreaker with a WS wiper Insert (BF-CNGM120408TSWS2). It is effective for chip control and improvement of finished surface roughness without concern about the hand of the tool even during continuous external turning or internal turning and facing.

Effect of chipbreaker and wiper insert



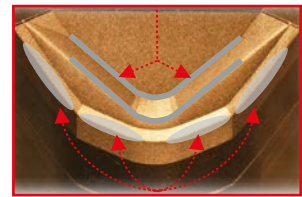
Demonstrates the effects of breaker and wiper Insert in both right handed and left handed cutting.

BF CHIPBREAKER



WS Wiper Insert (Neutral)
BF-CNGM120408TSWS2

BF CHIPBREAKER



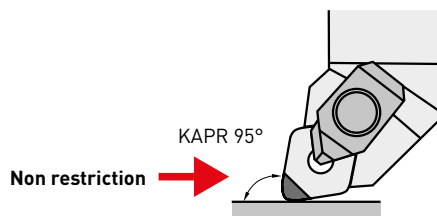
WS Wiper Insert (Neutral)
BF-DNGM150412TWS2

NOTES FOR USE

WHEN USING A CNGM TYPE

No Restriction for Holders

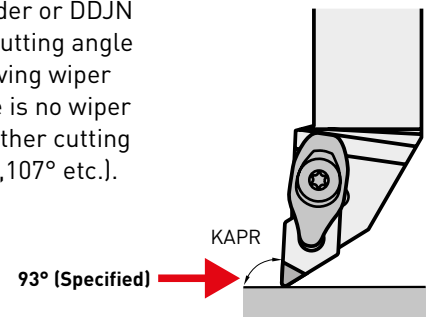
A standard holder can be used.
[*A double clamp, high rigidity tool is recommended.]



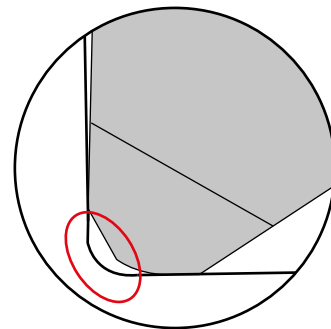
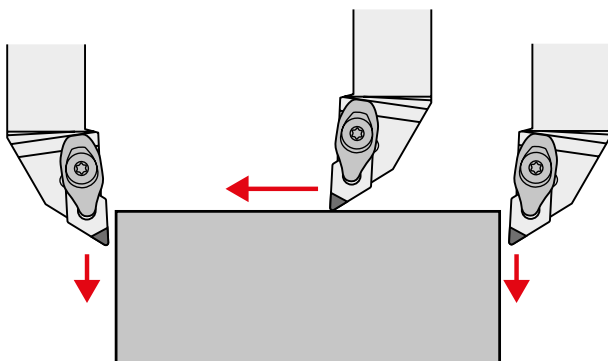
WHEN USING A DNGM TYPE

Restriction for Holders

Use a PDJN holder or DDJN holder with an cutting angle of 93° for improving wiper efficiency. There is no wiper efficiency with other cutting angles (60°, 90°, 107° etc.).

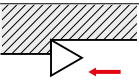
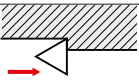
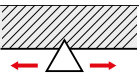


Displays great wiper efficiency when machining the end face and outer diameter in both right-hand and left-hand machining.



* The DNGM type is not suitable for machining the R that connects the end face and the outer diameter because it will leave uncut parts.

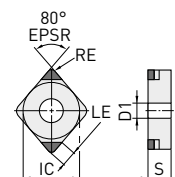
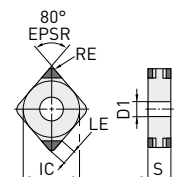
IDENTIFICATION

Insert geometry		Cutting edge preparation		Wiper		Cutting direction*	
BR	For high depth of cut chipbreaker	FS	Continuous cutting	WS	With wiper		JR Right
BL BM	For medium depth of cut chipbreaker	GS GA GH	General cutting	No mark	Without wiper		JL Left
BF	For finish cutting chipbreaker						No mark Neutral
NP	New petit cut	VA	For high speed, High feed cutting				
		TS TA TH	Interrupted cutting				

CNGA, CNGM

NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-CNGA120404GA4	●				4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GA4	●				4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GA4	●				4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404GS4	●				4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GS4	●				4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GS4	●				4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404GH4	★	★			4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GH4	★	★			4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GH4	●	★			4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404FS4	★				4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408FS4	★				4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412FS4	★				4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404VA4		●			4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408VA4		●			4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412VA4		●			4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404TA4		★			4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408TA4		●			4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412TA4		★			4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404TS4	★				4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408TS4	★				4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412TS4	★				4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120408TH4		★			4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412TH4		★			4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404FSWS4	●				4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408FSWS4	●				4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412FSWS4	●				4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404GAWS4		●			4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GAWS4		●			4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GAWS4		●			4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404GSWS4	●				4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GSWS4	●				4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GSWS4	●				4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120402GA2		★			2	12.7	4.76	0.2	5.16	1.7	
NP-CNGA120404GA2	●	●		●	2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GA2	●	●		●	2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GA2	●	●		●	2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120402GS2	★				2	12.7	4.76	0.2	5.16	1.7	
NP-CNGA120404GS2	●	●			2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GS2	●	●			2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GS2	●	●			2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404GH2	★	★			2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GH2	★	★			2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GH2	●	★			2	12.7	4.76	1.2	5.16	2.2	



1/2

● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

CNGA, CNGM – NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-CNGA120402FS2	★				2	12.7	4.76	0.2	5.16	1.7	
NP-CNGA120404FS2	●	●	●		2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408FS2	●	●	●		2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412FS2	●	●	●		2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404VA2		●			2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408VA2		●			2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412VA2		●			2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404TA2	●	●			2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408TA2	●	●			2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412TA2	●	●			2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404TS2	●	●			2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408TS2	●	●			2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412TS2	●	●			2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120408TH2	●	★			2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412TH2	●	★			2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404FSWS2	●		●		2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408FSWS2	●		●		2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412FSWS2	●		●		2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404GAWS2		●		●	2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GAWS2		●		★	2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GAWS2		●		●	2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404GSWS2	●				2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GSWS2	●				2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GSWS2	●				2	12.7	4.76	1.2	5.16	2.2	
BF-CNGM120408TAW2		●			2	12.7	4.76	0.8	5.16	2.0	
BF-CNGM120412TAW2		●			2	12.7	4.76	1.2	5.16	2.2	
BF-CNGM120404TS2	●				2	12.7	4.76	0.4	5.16	1.8	
BF-CNGM120408TS2	●				2	12.7	4.76	0.8	5.16	2.0	
BF-CNGM120412TS2	●				2	12.7	4.76	1.2	5.16	2.2	
BF-CNGM120408TSWS2	●				2	12.7	4.76	0.8	5.16	2.0	
BF-CNGM120412TSWS2	●				2	12.7	4.76	1.2	5.16	2.2	
NEW BL-CNGM120404TN2		●			2	12.7	4.76	0.4	5.16	1.8	
NEW BL-CNGM120408TN2		●			2	12.7	4.76	0.8	5.16	2.0	
NEW BL-CNGM120412TN2		●			2	12.7	4.76	1.2	5.16	2.2	
BM-CNGM120404TA2		●			2	12.7	4.76	0.4	5.16	1.8	
BM-CNGM120408TA2		●			2	12.7	4.76	0.8	5.16	2.0	
BM-CNGM120412TA2		●			2	12.7	4.76	1.2	5.16	2.2	
BR-CNGM120404TA2		●			2	12.7	4.76	0.4	5.16	1.8	
BR-CNGM120408TA2		●			2	12.7	4.76	0.8	5.16	2.0	
BR-CNGM120412TA2		●			2	12.7	4.76	1.2	5.16	2.2	

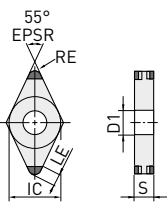
2/2

● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

DNGA, DNGM

NEGATIVE INSERTS (WITH HOLE)

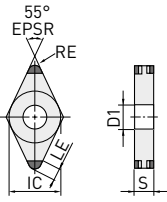
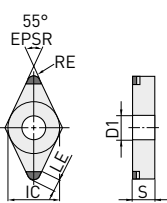
Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-DNGA150404GA4		★			4	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408GA4		★			4	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412GA4		★			4	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604GA4		●			4	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608GA4		●			4	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612GA4		●			4	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150404GS4	★				4	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408GS4	★				4	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412GS4	★				4	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604GS4	●				4	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608GS4	●				4	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612GS4	●				4	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150404GH4	★	★			4	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408GH4	★	★			4	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412GH4	★	★			4	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604GH4	★	★			4	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608GH4	★	★			4	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612GH4	★	★			4	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150404FS4	★				4	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408FS4	★				4	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412FS4	★				4	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604FS4	★				4	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608FS4	★				4	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612FS4	★				4	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150404VA4		★			4	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408VA4		★			4	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412VA4		★			4	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604VA4		★			4	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608VA4		★			4	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612VA4		★			4	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150404TA4		★			4	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408TA4		★			4	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412TA4		★			4	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604TA4		★			4	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608TA4		★			4	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612TA4		★			4	12.7	6.35	1.2	5.16	1.8	

1/4

● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

DNGA, DNGM – NEGATIVE INSERTS (WITH HOLE)

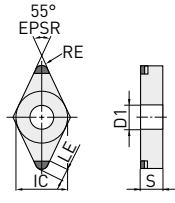
Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-DNGA150404TS4	★				4	12.7	4.76		5.16	2.1	
NP-DNGA150408TS4	★				4	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412TS4	★				4	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604TS4	★				4	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608TS4	★				4	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612TS4	★				4	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150408TH4		★			4	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412TH4		★			4	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150608TH4		★			4	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612TH4		★			4	12.7	6.35	1.2	5.16	1.8	
NP-DNGA110408GA2		●		●	2	9.525	4.76	0.8	3.81	2.0	
NP-DNGA150402GA2		★			2	12.7	4.76	0.2	5.16	2.2	
NP-DNGA150404GA2	★	★		●	2	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408GA2	★	★		●	2	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412GA2	★	★		★	2	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604GA2	●	●			2	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608GA2	●	●			2	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612GA2	●	●			2	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150402GS2	★				2	12.7	4.76	0.2	5.16	2.2	
NP-DNGA150404GS2	★	★			2	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408GS2	★	★			2	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412GS2	★	★			2	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604GS2	●	●			2	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608GS2	●	●			2	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612GS2	●	●			2	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150404GH2	★	★			2	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408GH2	★	★			2	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412GH2	★	★			2	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604GH2	★	★			2	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608GH2	★	★			2	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612GH2	★	★			2	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150402FS2	★		★		2	12.7	4.76	0.2	5.16	2.2	
NP-DNGA150404FS2	★	★	●		2	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408FS2	★	★	●		2	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412FS2	★	★	●		2	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604FS2	●	●			2	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608FS2	●	●			2	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612FS2	●	●			2	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150404VA2		★			2	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408VA2		★			2	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412VA2		★			2	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604VA2		●			2	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608VA2		●			2	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612VA2		●			2	12.7	6.35	1.2	5.16	1.8	

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● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

DNGA, DNGM – NEGATIVE INSERTS (WITH HOLE)

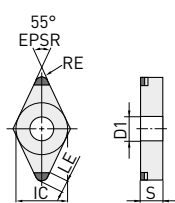
Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-DNGA150404TA2	★	★			2	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408TA2	★	★			2	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412TA2	★	★			2	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604TA2	●	●			2	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608TA2	●	●			2	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612TA2	●	●			2	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150404TS2	★	★			2	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408TS2	★	★			2	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412TS2	★	★			2	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604TS2	●	●			2	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608TS2	●	●			2	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612TS2	●	●			2	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150408TH2	★	★			2	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412TH2	★	★			2	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150608TH2	●	★			2	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612TH2	●	★			2	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150404GAWS2JR		★			2	12.7	4.76	0.4	5.16	1.8	
NP-DNGA150404GAWS2JL		★			2	12.7	4.76	0.4	5.16	1.8	
NP-DNGA150408GAWS2JR		★			2	12.7	4.76	0.8	5.16	1.7	
NP-DNGA150408GAWS2JL		★			2	12.7	4.76	0.8	5.16	1.7	
NP-DNGA150604GAWS2JR		●			2	12.7	6.35	0.4	5.16	1.8	
NP-DNGA150604GAWS2JL		●			2	12.7	6.35	0.4	5.16	1.8	
NP-DNGA150608GAWS2JR		●			2	12.7	6.35	0.8	5.16	1.7	
NP-DNGA150608GAWS2JL		●			2	12.7	6.35	0.8	5.16	1.7	
NP-DNGA150404GSWS2JR	★				2	12.7	4.76	0.4	5.16	1.8	
NP-DNGA150404GSWS2JL	★				2	12.7	4.76	0.4	5.16	1.8	
NP-DNGA150408GSWS2JR	★				2	12.7	4.76	0.8	5.16	1.7	
NP-DNGA150408GSWS2JL	★				2	12.7	4.76	0.8	5.16	1.7	
NP-DNGA150604GSWS2JR	●				2	12.7	6.35	0.4	5.16	1.8	
NP-DNGA150604GSWS2JL	●				2	12.7	6.35	0.4	5.16	1.8	
NP-DNGA150608GSWS2JR	●				2	12.7	6.35	0.8	5.16	1.7	
NP-DNGA150608GSWS2JL	●				2	12.7	6.35	0.8	5.16	1.7	

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● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

DNGA, DNGM – NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
BF-DNGM150408TAWs2		●			2	12.7	4.76	0.8	5.16	2.4	
BF-DNGM150412TAWs2		●			2	12.7	4.76	1.2	5.16	2.6	
BF-DNGM150404TS2	★				2	12.7	4.76	0.4	5.16	2.1	
BF-DNGM150408TS2	★				2	12.7	4.76	0.8	5.16	2.0	
BF-DNGM150412TS2	★				2	12.7	4.76	1.2	5.16	1.8	
BF-DNGM150408TSWS2	★				2	12.7	4.76	0.8	5.16	2.4	
BF-DNGM150412TSWS2	★				2	12.7	4.76	1.2	5.16	2.6	
NEW BL-DNGM150404TN2		●			2	12.7	4.76	0.4	5.16	2.1	
NEW BL-DNGM150408TN2		●			2	12.7	4.76	0.8	5.16	2.0	
NEW BL-DNGM150412TN2		●			2	12.7	4.76	1.2	5.16	1.8	
BM-DNGM150404TA2		★			2	12.7	4.76	0.4	5.16	2.1	
BM-DNGM150408TA2		★			2	12.7	4.76	0.8	5.16	2.0	
BM-DNGM150412TA2		★			2	12.7	4.76	1.2	5.16	1.8	
BR-DNGM150404TA2		●			2	12.7	4.76	0.4	5.16	2.1	
BR-DNGM150408TA2		★			2	12.7	4.76	0.8	5.16	2.0	
BR-DNGM150412TA2		★			2	12.7	4.76	1.2	5.16	1.8	
BR-DNGM150604TA2		●			2	12.7	6.35	0.4	5.16	2.1	
BR-DNGM150608TA2		●			2	12.7	6.35	0.8	5.16	2.0	
BR-DNGM150612TA2		●			2	12.7	6.35	1.2	5.16	1.8	

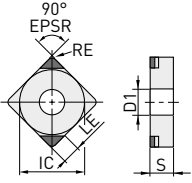
4/4

● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

SNGA

NEGATIVE INSERTS (WITH HOLE)

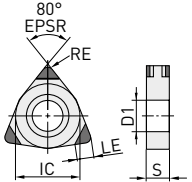
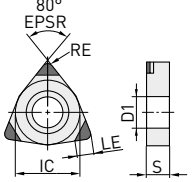
Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-SNGA120408GA2		●		★	2	12.7	4.76	0.8	5.16	2.2	
NP-SNGA120412GA2		★		●	2	12.7	4.76	1.2	5.16	2.5	

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WNGA

NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-WNGA080408GS6	●				6	12.7	4.76	0.8	5.16	2.0	
NP-WNGA080408FS6	★				6	12.7	4.76	0.8	5.16	2.0	
NP-WNGA080408TS6	★				6	12.7	4.76	0.8	5.16	2.0	
NP-WNGA080408GA3		★			3	12.7	4.76	0.8	5.16	2.0	
NP-WNGA080408GS3	★				3	12.7	4.76	0.8	5.16	2.0	
NP-WNGA080408FS3	★				3	12.7	4.76	0.8	5.16	2.0	
NP-WNGA080408TA3		★			3	12.7	4.76	0.8	5.16	2.0	
NP-WNGA080408TS3	★				3	12.7	4.76	0.8	5.16	2.0	
NP-WNGA080408GSWS3	●				3	12.7	4.76	0.8	5.16	2.0	

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● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

TNGA, TNGM

NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-TNGA160404GA6	●	●			6	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408GA6	●	●			6	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412GA6	●	●			6	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160404GS6	●				6	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408GS6	●				6	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412GS6	●				6	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160404GH6	★	★			6	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408GH6	★	★			6	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412GH6	★	★			6	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160404FS6	★				6	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408FS6	★				6	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412FS6	★				6	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160404VA6	★	★			6	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408VA6	★	★			6	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412VA6	★	★			6	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160404TA6	★	★			6	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408TA6	★	★			6	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412TA6	★	★			6	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160404TS6	★				6	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408TS6	★				6	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412TS6	★				6	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160408TH6	★	★			6	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412TH6	★	★			6	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160402GA3	★	★			3	9.525	4.76	0.2	3.81	1.5	
NP-TNGA160404GA3	●	●		★	3	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408GA3	●	●		●	3	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412GA3	★	★		●	3	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160402GS3	★				3	9.525	4.76	0.2	3.81	1.5	
NP-TNGA160404GS3	★				3	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408GS3	★				3	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412GS3	★				3	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160404GH3	★	★			3	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408GH3	★	★			3	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412GH3	★	★			3	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160402FS3	★				3	9.525	4.76	0.2	3.81	1.5	
NP-TNGA160404FS3	●	●	●		3	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408FS3	●	●	●		3	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412FS3	●	●	●		3	9.525	4.76	1.2	3.81	1.9	

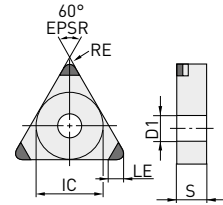
1/2

● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

TNGA, TNGM – NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE
NP-TNGA160404VA3		★			3	9.525	4.76	0.4	3.81	1.6
NP-TNGA160408VA3		●			3	9.525	4.76	0.8	3.81	1.7
NP-TNGA160412VA3		★			3	9.525	4.76	1.2	3.81	1.9
NP-TNGA160404TA3		●			3	9.525	4.76	0.4	3.81	1.6
NP-TNGA160408TA3		●			3	9.525	4.76	0.8	3.81	1.7
NP-TNGA160412TA3		●			3	9.525	4.76	1.2	3.81	1.9
NP-TNGA160404TS3	●				3	9.525	4.76	0.4	3.81	1.6
NP-TNGA160408TS3	●				3	9.525	4.76	0.8	3.81	1.7
NP-TNGA160412TS3	●				3	9.525	4.76	1.2	3.81	1.9
NP-TNGA160408TH3		★			3	9.525	4.76	0.8	3.81	1.7
NP-TNGA160412TH3		★			3	9.525	4.76	1.2	3.81	1.9
NEW BL-TNGM160404TN3		★			3	9.525	4.76	0.4	3.81	1.6
NEW BL-TNGM160408TN3		★			3	9.525	4.76	0.8	3.81	1.7
NEW BL-TNGM160412TN3		★			3	9.525	4.76	1.2	3.81	1.9



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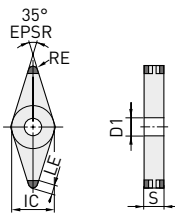
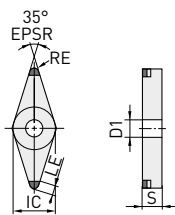
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● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

VNGA, VNGM

NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-VNGA160404GA4		●			4	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408GA4		●			4	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160412GA4		●			4	9.525	4.76	1.2	3.81	1.5	
NP-VNGA160404GS4	★				4	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408GS4	●				4	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160412GS4	★				4	9.525	4.76	1.2	3.81	1.5	
NP-VNGA160404GH4		★			4	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408GH4		★			4	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160404FS4	★				4	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408FS4	★				4	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160404VA4		★			4	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408VA4		★			4	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160412VA4		★			4	9.525	4.76	1.2	3.81	1.5	
NP-VNGA160404TA4		★			4	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408TA4		★			4	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160404TS4	★				4	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408TS4	★				4	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160404TH4		★			4	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408TH4		★			4	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160402GA2		●			2	9.525	4.76	0.2	3.81	2.5	
NP-VNGA160404GA2		●		●	2	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408GA2		●		●	2	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160412GA2		★		★	2	9.525	4.76	1.2	3.81	1.5	
NP-VNGA160402GS2	★				2	9.525	4.76	0.2	3.81	2.5	
NP-VNGA160404GS2	●				2	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408GS2	●				2	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160412GS2	★				2	9.525	4.76	1.2	3.81	1.5	
NP-VNGA160404GH2		★			2	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408GH2		★			2	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160402FS2	★		●		2	9.525	4.76	0.2	3.81	2.5	
NP-VNGA160404FS2	★		●		2	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408FS2	★		●		2	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160404VA2		●			2	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408VA2		●			2	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160412VA2		★			2	9.525	4.76	1.2	3.81	1.5	
NP-VNGA160404TA2		●			2	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408TA2		●			2	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160404TS2	★				2	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408TS2	★				2	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160404TH2		★			2	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408TH2		★			2	9.525	4.76	0.8	3.81	2.0	
NEW BL-VNGM160404TN2		●			2	9.525	4.76	0.4	3.81	2.5	
NEW BL-VNGM160408TN2		●			2	9.525	4.76	0.8	3.81	2.0	

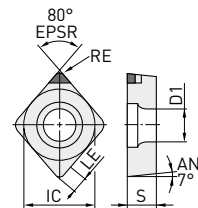
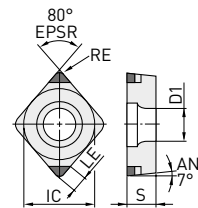
● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

CCGW 7°, CCGT 7°, CPGB 11°

POSITIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-CCGW060202GA2	●	●			2	6.35	2.38	0.2	2.8	1.7	
NP-CCGW060204GA2	●	●		●	2	6.35	2.38	0.4	2.8	1.8	
NP-CCGW060208GA2	●	●		●	2	6.35	2.38	0.8	2.8	2.0	
NP-CCGW09T302GA2	●	●			2	9.525	3.97	0.2	4.4	1.7	
NP-CCGW09T304GA2	●	●		●	2	9.525	3.97	0.4	4.4	1.8	
NP-CCGW09T308GA2	●	●		●	2	9.525	3.97	0.8	4.4	2.0	
NP-CCGW060202GS2	★				2	6.35	2.38	0.2	2.8	1.7	
NP-CCGW060204GS2	●				2	6.35	2.38	0.4	2.8	1.8	
NP-CCGW060208GS2	●				2	6.35	2.38	0.8	2.8	2.0	
NP-CCGW09T302GS2	★				2	9.525	3.97	0.2	4.4	1.7	
NP-CCGW09T304GS2	●	●			2	9.525	3.97	0.4	4.4	1.8	
NP-CCGW09T308GS2	●	●			2	9.525	3.97	0.8	4.4	2.0	
NP-CCGW060202FS2	●		●		2	6.35	2.38	0.2	2.8	1.7	
NP-CCGW060204FS2	●		●		2	6.35	2.38	0.4	2.8	1.8	
NP-CCGW060208FS2	●		●		2	6.35	2.38	0.8	2.8	2.0	
NP-CCGW09T302FS2	●		●		2	9.525	3.97	0.2	4.4	1.7	
NP-CCGW09T304FS2	●	●	●		2	9.525	3.97	0.4	4.4	1.8	
NP-CCGW09T308FS2	●	●	●		2	9.525	3.97	0.8	4.4	2.0	
NP-CCGW09T304VA2		●			2	9.525	3.97	0.4	4.4	1.8	
NP-CCGW09T308VA2		●			2	9.525	3.97	0.8	4.4	2.0	
NP-CCGW09T304TA2	●	●			2	9.525	3.97	0.4	4.4	1.8	
NP-CCGW09T308TA2	●	●			2	9.525	3.97	0.8	4.4	2.0	
NP-CCGW09T304FSWS2	●		●		2	9.525	3.97	0.4	4.4	1.8	
NP-CCGW09T308FSWS2	●		●		2	9.525	3.97	0.8	4.4	2.0	
NP-CCGW09T304GAWS2		●		●	2	9.525	3.97	0.4	4.4	1.8	
NP-CCGW09T308GAWS2		●		●	2	9.525	3.97	0.8	4.4	2.0	
NP-CCGW09T304GSWS2	●				2	9.525	3.97	0.4	4.4	1.8	
NP-CCGW09T308GSWS2	●				2	9.525	3.97	0.8	4.4	2.0	
BF-CCGT09T304TS2	●				2	9.525	3.97	0.4	4.4	1.8	
BF-CCGT09T308TS2	●				2	9.525	3.97	0.8	4.4	2.0	
NEW BL-CCGT09T304TN2		●			2	9.525	3.97	0.4	4.4	1.8	
NEW BL-CCGT09T308TN2		●			2	9.525	3.97	0.8	4.4	2.0	
BM-CCGT09T304TA2		●			2	9.525	3.97	0.4	4.4	1.8	
BM-CCGT09T308TA2		●			2	9.525	3.97	0.8	4.4	2.0	
NP-CCGW03S102FS	●		●		1	3.57*	1.39	0.2	2.0	1.1	
NP-CCGW03S104FS	●		●		1	3.57*	1.39	0.4	2.0	1.0	
NP-CCGW04T002FS	●		●		1	4.37*	1.79	0.2	2.4	1.5	
NP-CCGW04T004FS	●		●		1	4.37*	1.79	0.4	2.4	1.4	

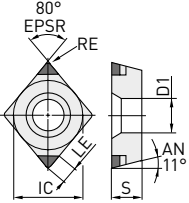


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● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

CCGW 7°, CCGT 7°, CPGB 11° - POSITIVE INSERTS (WITH HOLE)

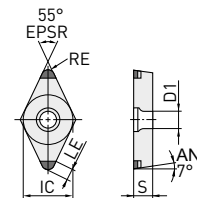
Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-CPGB080204GA2		●			2	7.94	2.38	0.4	3.5	1.8	
NP-CPGB080208GA2		●			2	7.94	2.38	0.8	3.5	2.0	
NP-CPGB080212GA2		★			2	7.94	2.38	1.2	3.5	2.2	
NP-CPGB090302GA2		★			2	9.525	3.18	0.2	4.5	1.7	
NP-CPGB090304GA2		●			2	9.525	3.18	0.4	4.5	1.8	
NP-CPGB090308GA2		●			2	9.525	3.18	0.8	4.5	2.0	
NP-CPGB090312GA2		★			2	9.525	3.18	1.2	4.5	2.2	
NP-CPGB080204GS2	★				2	7.94	2.38	0.4	3.5	1.8	
NP-CPGB080208GS2	★				2	7.94	2.38	0.8	3.5	2.0	
NP-CPGB090302GS2	★				2	9.525	3.18	0.2	4.5	1.7	
NP-CPGB090304GS2	★				2	9.525	3.18	0.4	4.5	1.8	
NP-CPGB090308GS2	★				2	9.525	3.18	0.8	4.5	2.0	
NP-CPGB090304VA2		●			2	9.525	3.18	0.4	4.5	1.8	
NP-CPGB090308VA2		●			2	9.525	3.18	0.8	4.5	2.0	
NP-CPGB090312VA2		★			2	9.525	3.18	1.2	4.5	2.2	
NP-CPGB090304TA2		★			2	9.525	3.18	0.4	4.5	1.8	
NP-CPGB090308TA2		★			2	9.525	3.18	0.8	4.5	2.0	
NP-CPGB090312TA2		★			2	9.525	3.18	1.2	4.5	2.2	

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DCGW 7°, DCGT 7°

POSITIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-DCGW070202GA2		●			2	6.35	2.38	0.2	2.8	2.2	
NP-DCGW070204GA2		●		●	2	6.35	2.38	0.4	2.8	2.1	
NP-DCGW070208GA2		★			2	6.35	2.38	0.8	2.8	2.0	
NP-DCGW11T302GA2		●			2	9.525	3.97	0.2	4.4	2.2	
NP-DCGW11T304GA2	●	●		●	2	9.525	3.97	0.4	4.4	2.1	
NP-DCGW11T308GA2	●	●		●	2	9.525	3.97	0.8	4.4	2.0	
NP-DCGW070202GS2	●				2	6.35	2.38	0.2	2.8	2.2	
NP-DCGW070204GS2	●				2	6.35	2.38	0.4	2.8	2.1	
NP-DCGW070208GS2	●				2	6.35	2.38	0.8	2.8	2.0	
NP-DCGW11T302GS2	●				2	9.525	3.97	0.2	4.4	2.2	
NP-DCGW11T304GS2	●	●			2	9.525	3.97	0.4	4.4	2.1	
NP-DCGW11T308GS2	●	●			2	9.525	3.97	0.8	4.4	2.0	
NP-DCGW070202FS2	●		●		2	6.35	2.38	0.2	2.8	2.2	
NP-DCGW070204FS2	●		●		2	6.35	2.38	0.4	2.8	2.1	
NP-DCGW070208FS2	★		●		2	6.35	2.38	0.8	2.8	2.0	
NP-DCGW11T302FS2	●		●		2	9.525	3.97	0.2	4.4	2.2	
NP-DCGW11T304FS2	●	●	●		2	9.525	3.97	0.4	4.4	2.1	
NP-DCGW11T308FS2	●	●	●		2	9.525	3.97	0.8	4.4	2.0	
NP-DCGW11T304VA2		●			2	9.525	3.97	0.4	4.4	2.1	
NP-DCGW11T308VA2		●			2	9.525	3.97	0.8	4.4	2.0	
NP-DCGW11T304TA2	●	★			2	9.525	3.97	0.4	4.4	2.1	
NP-DCGW11T308TA2	●	★			2	9.525	3.97	0.8	4.4	2.0	
BF-DCGT11T304TS2	●				2	9.525	3.97	0.4	4.4	2.1	
BF-DCGT11T308TS2	●				2	9.525	3.97	0.8	4.4	2.0	
NEW BL-DCGT11T304TN2		●			2	9.525	3.97	0.4	4.4	2.1	
NEW BL-DCGT11T308TN2		●			2	9.525	3.97	0.8	4.4	2.0	
BM-DCGT11T304TA2		●			2	9.525	3.97	0.4	4.4	2.1	
BM-DCGT11T308TA2		●			2	9.525	3.97	0.8	4.4	2.0	



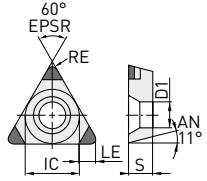
1/1

● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

TPGB 11°

POSITIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-TPGB090204GA3	★	★		●	3	5.56	2.38	0.4	2.9	1.6	
NP-TPGB090208GA3	★	★		★	3	5.56	2.38	0.8	2.9	1.7	
NP-TPGB110302GA3	★	★			3	6.35	3.18	0.2	3.4	1.5	
NP-TPGB110304GA3	●			●	3	6.35	3.18	0.4	3.4	1.6	
NP-TPGB110308GA3	●			★	3	6.35	3.18	0.8	3.4	1.7	
NP-TPGB160304GA3	●			★	3	9.525	3.18	0.4	4.4	1.6	
NP-TPGB160308GA3	●			★	3	9.525	3.18	0.8	4.4	1.7	
NP-TPGB080204GS3	★				3	4.76	2.38	0.4	2.4	1.6	
NP-TPGB080208GS3	★				3	4.76	2.38	0.8	2.4	1.7	
NP-TPGB090204GS3	★				3	5.56	2.38	0.4	2.9	1.6	
NP-TPGB090208GS3	★				3	5.56	2.38	0.8	2.9	1.7	
NP-TPGB110302GS3	★				3	6.35	3.18	0.2	3.4	1.5	
NP-TPGB110304GS3	★				3	6.35	3.18	0.4	3.4	1.6	
NP-TPGB110308GS3	★				3	6.35	3.18	0.8	3.4	1.7	
NP-TPGB160304GS3	★				3	9.525	3.18	0.4	4.4	1.6	
NP-TPGB160308GS3	★				3	9.525	3.18	0.8	4.4	1.7	
NP-TPGB110302FS3	★		★		3	6.35	3.18	0.2	3.4	1.5	
NP-TPGB110304FS3	★		●		3	6.35	3.18	0.4	3.4	1.6	
NP-TPGB110308FS3	★		●		3	6.35	3.18	0.8	3.4	1.7	
NP-TPGB110304VA3		●			3	6.35	3.18	0.4	3.4	1.6	
NP-TPGB110308VA3		●			3	6.35	3.18	0.8	3.4	1.7	
NP-TPGB110304TA3		★			3	6.35	3.18	0.4	3.4	1.6	
NP-TPGB110308TA3		★			3	6.35	3.18	0.8	3.4	1.7	

1/1

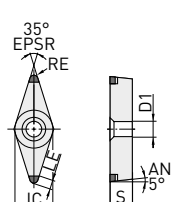
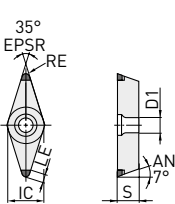
196 

● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

VBGW 5°, VBGT 5°, VCGW 7°

POSITIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-VBGW110302GA2	●	●			2	6.35	3.18	0.2	2.85	2.5	
NP-VBGW110304GA2	●	●		★	2	6.35	3.18	0.4	2.85	2.5	
NP-VBGW110308GA2	★	★		★	2	6.35	3.18	0.8	2.85	2.0	
NP-VBGW160402GA2	★	★			2	9.525	4.76	0.2	4.43	2.5	
NP-VBGW160404GA2	●	●		●	2	9.525	4.76	0.4	4.43	2.5	
NP-VBGW160408GA2	●	●		●	2	9.525	4.76	0.8	4.43	2.0	
NP-VBGW110302GS2	★	★			2	6.35	3.18	0.2	2.85	2.5	
NP-VBGW110304GS2	★	★			2	6.35	3.18	0.4	2.85	2.5	
NP-VBGW110308GS2	★	★			2	6.35	3.18	0.8	2.85	2.0	
NP-VBGW160402GS2	●	●			2	9.525	4.76	0.2	4.43	2.5	
NP-VBGW160404GS2	●	●			2	9.525	4.76	0.4	4.43	2.5	
NP-VBGW160408GS2	●	●			2	9.525	4.76	0.8	4.43	2.0	
NP-VBGW110302FS2	●	●	●		2	6.35	3.18	0.2	2.85	2.5	
NP-VBGW110304FS2	★	★	●		2	6.35	3.18	0.4	2.85	2.5	
NP-VBGW110308FS2	★	★	●		2	6.35	3.18	0.8	2.85	2.0	
NP-VBGW160402FS2	★	★	●		2	9.525	4.76	0.2	4.43	2.5	
NEW NP-VBGW160404FS2			●		2	9.525	4.76	0.4	4.43	2.5	
NEW NP-VBGW160408FS2			●		2	9.525	4.76	0.8	4.43	2.0	
NP-VBGW160404VA2	●	●			2	9.525	4.76	0.4	4.43	2.5	
NP-VBGW160408VA2	●	●			2	9.525	4.76	0.8	4.43	2.0	
NP-VBGW160404TA2	●	●			2	9.525	4.76	0.4	4.43	2.5	
NP-VBGW160408TA2	★	★			2	9.525	4.76	0.8	4.43	2.0	
NEW BL-VBGT110304TN2	●	●			2	6.35	3.18	0.4	2.85	2.5	
NEW BL-VBGT110304TN2	●	●			2	6.35	3.18	0.8	2.85	2.0	
NEW BL-VBGT160404TN2	●	●			2	9.525	4.76	0.4	4.43	2.5	
NEW BL-VBGT160408TN2	●	●			2	9.525	4.76	0.8	4.43	2.0	
NP-VCGW160404GA2	●	●			2	9.525	4.76	0.4	4.4	2.5	
NP-VCGW160408GA2	●	●			2	9.525	4.76	0.8	4.4	2.0	
NP-VCGW160404GS2	●	●			2	9.525	4.76	0.4	4.4	2.5	
NP-VCGW160408GS2	●	●			2	9.525	4.76	0.8	4.4	2.0	
NP-VCGW160404VA2	●	●			2	9.525	4.76	0.4	4.4	2.5	
NP-VCGW160408VA2	●	●			2	9.525	4.76	0.8	4.4	2.0	
NP-VCGW160404TA2	★	★			2	9.525	4.76	0.4	4.4	2.5	
NP-VCGW160408TA2	★	★			2	9.525	4.76	0.8	4.4	2.0	

1/1

● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

BC8200 / MB8200 SERIES

RECOMMENDED CUTTING CONDITIONS

Material	Grade	Cutting mode	Vc	f	ap	Coolant
H Hardened steels	BC8210	Continuous cutting	150 – 250 (90 – 300)	≤0.2	≤0.35	Dry, wet
		Light interrupted cutting	100 – 180 (50 – 200)	≤0.2	≤0.35	
	BC8220	Continuous cutting	150 – 200 (80 – 250)	≤0.2	≤0.5	
		Light to medium interrupted cutting	100 – 180 (50 – 200)	≤0.2	≤0.3	

1/1



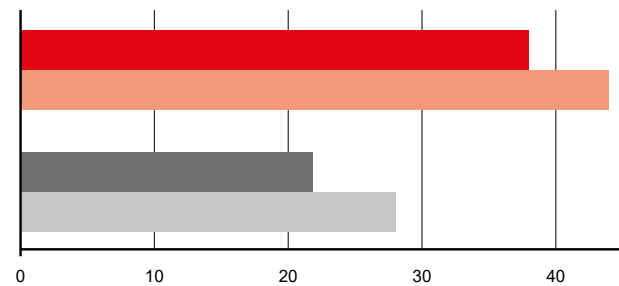
MB8200 SERIES

CUTTING PERFORMANCE

COMPARISON OF CONTINUOUS CUTTING : SCR420 (60HRC)

MB8210 achieves stable machining during continuous cutting.

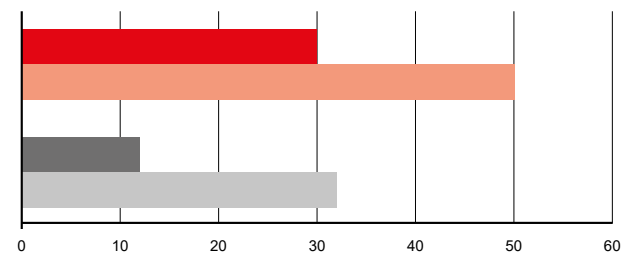
Material	20Cr4 (60HRC)
Insert	CNGA120408
Vc (m/min)	180
f (mm/rev)	0.15
ap (mm)	0.2
Cutting mode	Dry cutting



COMPARISON OF LIGHT INTERRUPTED CUTTING : SCR420 (60HRC)

MB8220 achieves stable cutting and is ideal for light interrupted cutting.

Material	20Cr4 (60HRC)
Insert	CNGA120408
Vc (m/min)	130
f (mm/rev)	0.15
ap (mm)	0.2
Cutting mode	Dry cutting



RECOMMENDED CUTTING CONDITIONS

Material	Grade	Cutting mode	Vc	f	ap	Coolant
H Hardened steels (Heat treated steels)	MB8210	External continuous cutting	100 ~ 250	-0.20	-0.30	Dry, wet
	MB8220	External interrupted cutting	100 ~ 150	-0.20	-0.50	

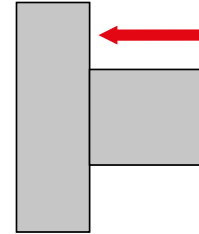
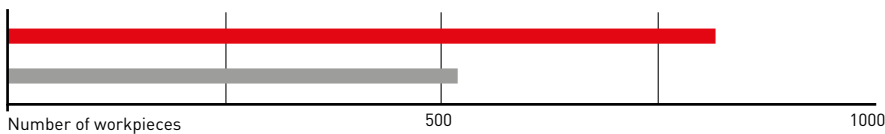
BC8200 SERIES

APPLICATION EXAMPLES

Insert	NP-CNGA120412GSWS2 BC8210
Material	Non-micro alloyed Steel
Cutting mode	External continuous cutting
Vc (m/min)	260
f (mm/rev)	0.20
ap (mm)	0.15
Cutting mode	Dry cutting

Result

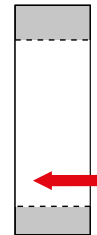
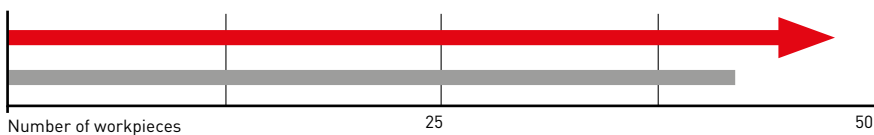
During continuous cutting, it was possible to maintain a good surface roughness and achieve a tool life of 1.6 x or more when compared to conventional products.



Insert	NP-DCGW11T304GS2 BC8210
Material	DIN 16MnCr5
Cutting mode	Internal continuous cutting
Vc (m/min)	240
f (mm/rev)	0.08
ap (mm)	0.20
Cutting mode	Dry cutting

Result

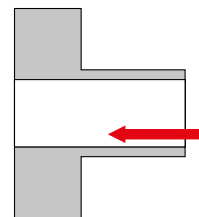
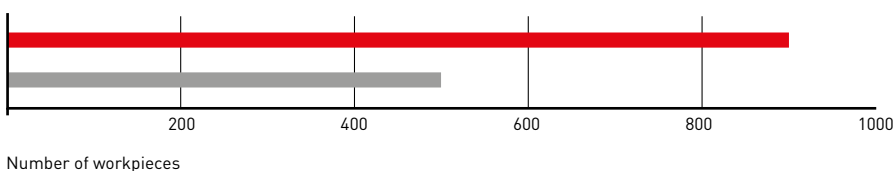
The same tool life as continuous cutting was achieved. Good surface roughness compared to conventional products was also maintained.



Insert	NP-CCGW09T308GS2 BC8210
Material	DIN 16MnCr5
Component	Automobile parts
Cutting mode	Internal continuous cutting
Vc (m/min)	140
f (mm/rev)	0.07
ap (mm)	0.10
Cutting mode	Dry cutting

Result

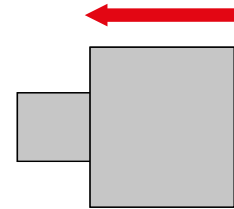
By significantly suppressing the deterioration of the surface of the insert, tool life was extended during continuous cutting to 1.8 x longer than that of conventional products.



BC8200 SERIES

APPLICATION EXAMPLES

Insert	NP-DNGA110416GA2 BC8220
Material	DIN Cf53 (58HRC)
Component	Automobile parts
Cutting mode	External continuous cutting
Vc (m/min)	140
f (mm/rev)	0.15
ap (mm)	0.15
Cutting mode	Dry cutting

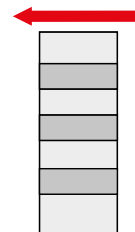


Result Tool life for continuous cutting is 1.2 x longer than that of conventional products.

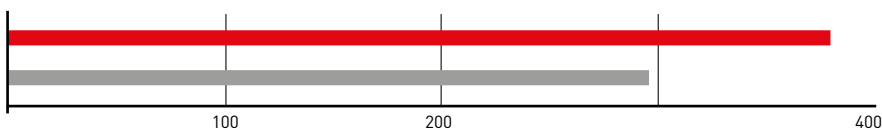


Number of workpieces

Insert	NP-TNGA160420TA3 BC8220
Material	DIN 16MnCr5
Cutting mode	Heavy interrupted boring
Vc (m/min)	130
f (mm/rev)	0.12
ap (mm)	0.25
Cutting mode	Dry cutting



Result BC8220 has excellent fracture resistance and a tool life 1.25 x longer than conventional products.

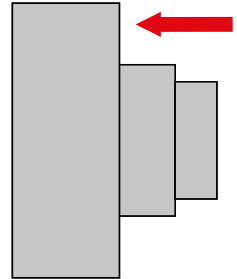


Number of workpieces

BC8200 SERIES

APPLICATION EXAMPLES

Insert	BR-CNGM120408TA2 BC8220
Material	Steel (62-64HRC)
Component	Gear
Cutting mode	External continuous cutting
Vc (m/min)	150 – 170
f (mm/rev)	0.1 – 0.2
ap (mm)	0.7
Cutting mode	Dry cutting

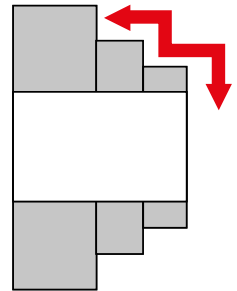


Result While conventional products can machine up to 300 pieces, BC8220 can machine up to 450 pieces.

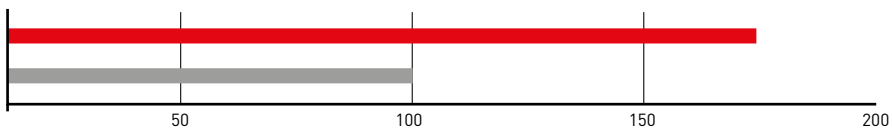


Number of workpieces

Insert	BR-DNGM150408TA2 BC8220
Material	SMnC420 (59-63HRC)
Component	Gear
Cutting mode	External continuous interrupted turning
Vc (m/min)	180
f (mm/rev)	0.03 – 0.13
ap (mm)	1.0 – 1.1
Cutting mode	Dry cutting



Result The BR breaker removed the required material in one pass compared to a conventional product that took 4 passes. This gave the BR breaker a tool life 1.5 x greater than the conventional product.



Number of workpieces

iMX

EXCHANGEABLE HEAD END MILLS



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BT30 MONO-BLOCK TYPE – STEEL TOOL HOLDER

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Double face contact type
(Taper + End face)

Compatible with internal,
through coolant tools

High rigidity design

Taper neck type

ER COLLET

EXCHANGEABLE HEAD END MILLS

Ideal for quick change applications such as Swiss-type automatic lathes, multi-turret processing machines and for high-efficiency machining that requires rigid tool mounting.

Compatible with internal,
through coolant tools

Double face contact type
(Taper + End face)

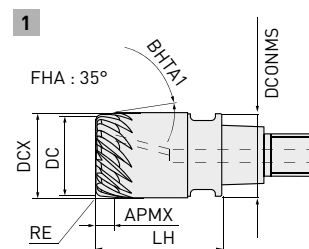
IMX-C8T-E/C10T-E/ C12T-E/C15T-E



CORNER RADIUS HEAD, TAPER HEAD, MULTI-FLUTE,
WITH COOLANT HOLES

M

S



RE

±0.015



DC<12

DC>12

0

0

- 0.020

- 0.030

Order number	EP7020	DC	RE	APMX	DCX	LH	DCONMS	BHTA1	ZEFP	Type
IMX10C8T080R10T080E	●	8	1	7.12	10	13	9.7	8°	8	1
IMX12C10T100R10T080E	●	10	1	7.12	12	19	11.7	8°	10	
IMX16C15T150R10T080E	●	15	1	3.56	16	21	15.5	8°	15	
IMX20C15T190R10T080E	●	19	1	3.56	20	27	19.5	8°	15	
IMX20C12T190R20T080E	●	19	2	3.56	20	27	19.5	8°	12	

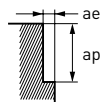
1/1

IMX-C8T-E/C10T-E/ C12T-E/C15T-E

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

Material	DC	ZEFP	Vc	n	fz	Vf	ap	ae
M Austenitic stainless steel, Ferritic and martensitic stainless steel	8	8	300	12000	0.10	9600	0.3	1.2
	10	10	300	9500	0.10	9500	0.3	1.5
	15	15	300	6400	0.10	9600	0.3	2.2
	19	12	300	5000	0.12	7200	0.3	2.8
	19	15	300	5000	0.10	7500	0.3	2.8
S Heat resistant alloy	8	8	60	2400	0.08	1500	0.3	0.8
	10	10	60	1900	0.08	1500	0.3	1.0
	15	15	60	1300	0.08	1600	0.3	1.5
	19	12	60	1000	0.10	1200	0.3	1.9
	19	15	60	1000	0.08	1200	0.3	1.9
M Precipitation hardening stainless steel,	8	8	200	8000	0.10	6400	0.3	1.2
	10	10	200	6400	0.10	6400	0.3	1.5
	15	15	200	4200	0.10	6300	0.3	2.2
S Titanium alloys	19	15	200	3400	0.12	4900	0.3	2.8
	19	15	200	3400	0.10	5100	0.3	2.8

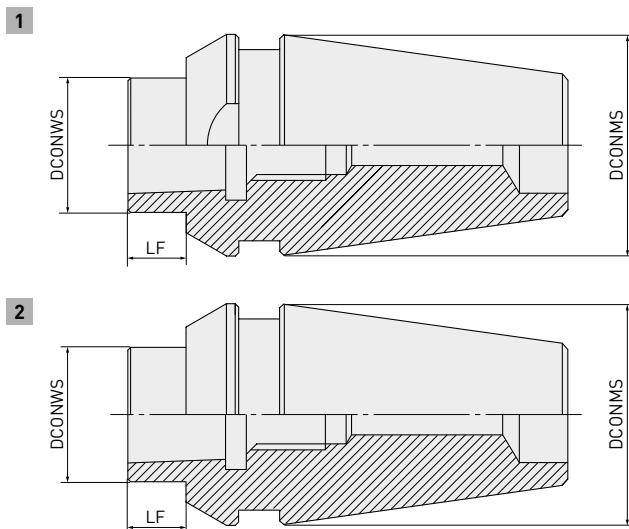


1/1

1. The use of water-soluble coolant is recommended.
2. Vibration may occur if the rigidity of the machine or workpiece is low.
In this case, please reduce the revolution and feed rate proportionately, or set a lower depth of cut.

iMX

ER COLLET



Order number	Stock	DCONWS	DCONMS	LF	Collet size	Suitable head	Type
IMX10-S04-ER16	★	9.7	16	4	ER16	IMX10:	1
IMX10-S04-ER20	★	9.7	20	4	ER20	IMX10:	2
IMX10-S04-ER25	★	9.7	25	4	ER25	IMX10:	2
IMX10-S04-ER32	★	9.7	32	4	ER32	IMX10:	2
IMX12-S05-ER16	★	11.7	16	5	ER16	IMX12:	1
IMX12-S05-ER20	★	11.7	20	5	ER20	IMX12:	2
IMX12-S05-ER25	★	11.7	25	5	ER25	IMX12:	2
IMX12-S05-ER32	★	11.7	32	5	ER32	IMX12:	2
IMX16-S08-ER25	★	15.5	25	8	ER25	IMX16:	2
IMX16-S08-ER32	★	15.5	32	8	ER32	IMX16:	2
IMX20-S10-ER32	★	19.5	32	10	ER32	IMX20:	2
IMX25-S12-ER32	★	24.5	32	12.5	ER32	IMX25:	2

1/1

1. The fastening size of the holder and the head should be the same.
2. Please use a special wrench that matches the fastening size. This part is sold separately.
3. The depth of cut should be 50 – 60% of the recommended conditions for each head.

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END MILL, MULTI-FLUTE, LONG NECK

MULTI-FLUTE

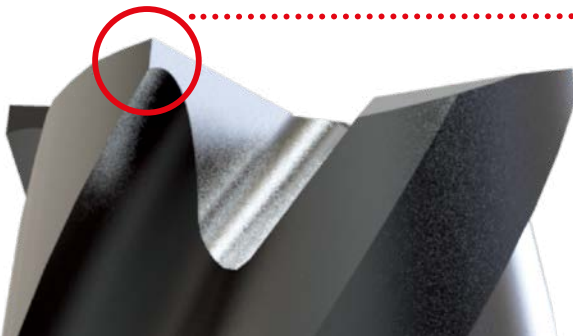
3 and 4-flute types provide more efficient machining than 2-flute types.



HIGH RIGIDITY LONG NECK

The optimised long neck shape maintains rigidity while avoiding interference with the workpiece, enabling stable machining.

VQ3XL/VQ4XL SQUARE



MICRO GASH LAND

Suppresses chipping by increasing the strength of the corners of the tool.

VQ4XLRB CORNER RADIUS



END CUTTING EDGE CHIP POCKET

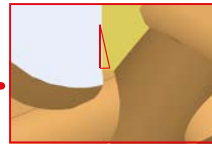
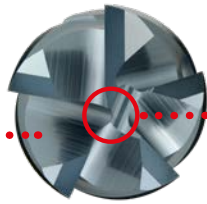
The geometry of the end cutting edge chip pocket has been optimised. For items with a large RE, the chip pocket is also increased in size, which provides excellent chip evacuation and reduces chip clogging.

VQLCS/VQELCS/ VQJCSRB/VQLCSRB/VQELCSRB

END MILL WITH IRREGULAR PITCH FLUTES AND CHIPBREAKER GEOMETRY

UNIQUE END CUTTING EDGE GEOMETRY

The unique end cutting edge geometry achieves high chipping resistance.



IRREGULAR PITCH FLUTES AND MICRO CLEARANCE ANGLE OF THE PERIPHERAL CUTTING EDGE

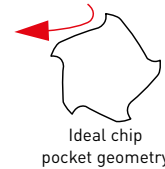
Due to its excellent vibration damping properties, chatter and vibration are suppressed making stable machining possible.

CHIPBREAKER FUNCTION

Prevents chip problems by combining great chip breaking capabilities and fracture resistance.

CHIP POCKET GEOMETRY FOR HIGH EFFICIENCY MACHINING

The rigid cross-sectional geometry with excellent chip evacuation properties is ideal for high efficiency machining such as trochoidal milling.



VQELCS
(5 x DC)



VQLCS
(4 x DC)



VQJCS
(3 x DC)



VQJCSRB
(3 x DC)



VQLCSRB
(4 x DC)



VQELCSRB
(5 x DC)

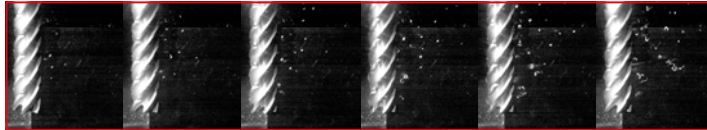


VQJCS / VQLCS

CHIPBREAKER FUNCTION: HIGH-SPEED CAMERA COMPARISON

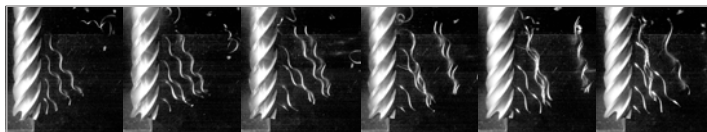
The excellent chip breaking properties reduces chip clogging and removes chips efficiently while also reducing the chips collecting together on the machine.

VQLCS



After machining with VQLCS

Without breaker



After machining with conventional

EVALUATION OF TROCHOIDAL MILLING

ae = 1.8 mm

ae = 2.4 mm

ae = 3.0 mm

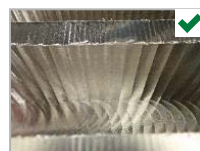
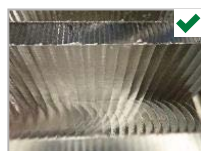
ae = 3.6 mm

ae = 6.0 mm

VQLCS



Conventional



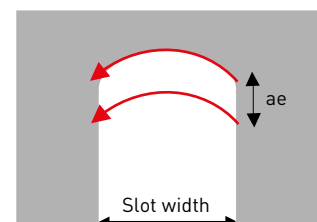
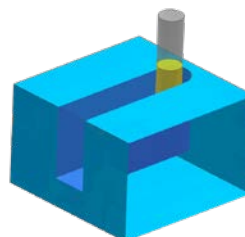
Conventional



✓ : Achieves stable machining

✗ : Problems caused by chips

Material	1.4301
Tool	VQJCS1200
Vc (m/min)	100
fz (mm)	0.05
ap (mm)	24 (DCx2)
ae Pitch (mm)	1.8 – 6.0
Slot width (mm)	18 (DCx1.5)
Overhang length (mm)	60 (DCx5)
Cutting mode	Trochoidal milling External coolant (Emulsion)



VQ3XL

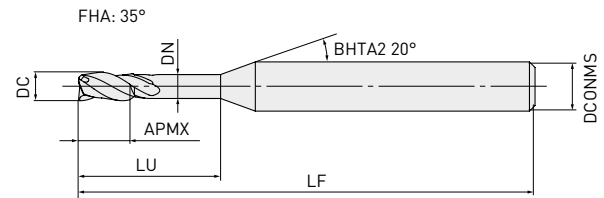


35°



END MILL, SHORT CUT LENGTH, LONG NECK, 3 FLUTE

P M N S



DC
0
-0.020



DCONMS
0
-0.005

- The use of SMART MIRACLE coating improves chip discharge dramatically.
- Small size, multi-flute end mills with a diameter of less than $\varnothing 0.6$ mm now available.

Order number	Stock	DC	APMX	LF	LU	DN	DCONMS	ZEFP
VQ3XLD0020N006	●	0.2	0.3	40	0.6	0.17	4	3
VQ3XLD0020N010	●	0.2	0.3	40	1.0	0.17	4	3
VQ3XLD0020N016	●	0.2	0.3	40	1.6	0.17	4	3
VQ3XLD0030N009	●	0.3	0.45	40	0.9	0.27	4	3
VQ3XLD0030N015	●	0.3	0.45	40	1.5	0.27	4	3
VQ3XLD0030N024	●	0.3	0.45	40	2.4	0.27	4	3

1/1

1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work.
When measuring the tool length, please use a mechanical contact type or a laser tool setter.

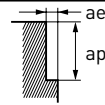
VQ3XL

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

Material	DC	LU	Vc	n	Vf	ap	ae
P Carbon steel,	0.2	0.6	25	40000	360	0.03	0.01
Alloy steel,	0.2	1	25	40000	240	0.03	0.01
M Austenitic stainless steel,	0.2	1.6	25	40000	120	0.02	0.01
Titanium alloy,	0.3	0.9	40	40000	480	0.045	0.015
N Cobalt chromium alloy,	0.3	1.5	40	40000	360	0.045	0.015
Copper,	0.3	2.4	40	40000	180	0.03	0.015
S Copper alloy	0.2	0.6	20	32000	290	0.03	0.01
	0.2	1	20	32000	190	0.03	0.01
	0.2	1.6	20	32000	96	0.02	0.01
S Heat resistant steel,	0.3	0.9	20	21000	250	0.045	0.015
Pre-hardened steel,	0.3	1.5	20	21000	190	0.045	0.015
Hardened steel	0.3	2.4	20	21000	95	0.03	0.015

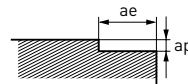
1/1



BOTTOM FACE MILLING

Material	DC	LU	Vc	n	Vf	ap	ae
P Carbon steel,	0.2	0.6	25	40000	360	0.015	≤0.2
Alloy steel,	0.2	1	25	40000	240	0.01	≤0.2
M Austenitic stainless steel,	0.2	1.6	25	40000	120	0.005	≤0.2
Titanium alloy,	0.3	0.9	40	40000	480	0.025	≤0.3
N Cobalt chromium alloy,	0.3	1.5	40	40000	360	0.02	≤0.3
S Copper,	0.3	2.4	40	40000	180	0.01	≤0.3
S Copper alloy	0.2	0.6	20	32000	290	0.015	≤0.1
	0.2	1	20	32000	190	0.01	≤0.1
	0.2	1.6	20	32000	96	0.005	≤0.1
S Heat resistant alloy,	0.3	0.9	20	21000	250	0.025	≤0.15
Pre-hardened steel,	0.3	1.5	20	21000	190	0.02	≤0.15
Hardened steel	0.3	2.4	20	21000	95	0.01	≤0.15

1/1

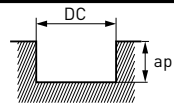


VQ3XL

SLOTTING

Material		DC	LU	Vc	n	Vf	ap
P	Carbon steel,	0.2	0.6	20	30000	270	0.015
	Alloy steel,	0.2	1	20	30000	180	0.01
M	Austenitic stainless steel,	0.2	1.6	20	30000	90	0.005
N	Titanium alloy,	0.3	0.9	30	30000	360	0.025
	Cobalt chromium alloy,	0.3	1.5	30	30000	270	0.02
S	Copper,	0.3	2.4	30	30000	140	0.01
	Copper alloy	0.2	0.6	15	24000	220	0.015
S	Heat resistant alloy, Pre-hardened steel, Hardened steel	0.2	1	15	24000	140	0.01
		0.2	1.6	15	24000	72	0.005
		0.3	0.9	15	16000	190	0.025
		0.3	1.5	15	16000	140	0.02
		0.3	2.4	15	16000	72	0.01

1/1

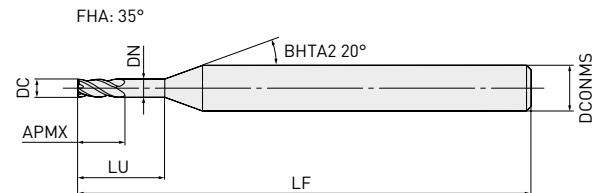


VQ4XL



END MILL, SHORT CUT LENGTH, LONG NECK, 4 FLUTE

P M N S



DC
0
-0.020



DCONMS
0
-0.005

- The use of SMART MIRACLE coating improves chip discharge dramatically.
- Small size, multi-flute end mills with a diameter of less than $\varnothing 1.0$ mm now available.

Order number	Stock	DC	APMX	LF	LU	DN	DCONMS	ZEFP
VQ4XLD0040N012	●	0.4	0.6	40	1.2	0.36	4	4
VQ4XLD0040N020	●	0.4	0.6	40	2	0.36	4	4
VQ4XLD0040N032	●	0.4	0.6	40	3.2	0.36	4	4
VQ4XLD0050N015	●	0.5	0.75	40	1.5	0.46	4	4
VQ4XLD0050N025	●	0.5	0.75	40	2.5	0.46	4	4
VQ4XLD0050N040	●	0.5	0.75	45	4	0.46	4	4
VQ4XLD0060N018	●	0.6	0.9	40	1.8	0.56	4	4
VQ4XLD0060N030	●	0.6	0.9	40	3	0.56	4	4
VQ4XLD0060N048	●	0.6	0.9	45	4.8	0.56	4	4
VQ4XLD0070N021	●	0.7	1.05	40	2.1	0.66	4	4
VQ4XLD0070N035	●	0.7	1.05	40	3.5	0.66	4	4
VQ4XLD0070N056	●	0.7	1.05	45	5.6	0.66	4	4
VQ4XLD0080N024	●	0.8	1.2	40	2.4	0.76	4	4
VQ4XLD0080N040	●	0.8	1.2	40	4	0.76	4	4
VQ4XLD0080N064	●	0.8	1.2	45	6.4	0.76	4	4
VQ4XLD0100N030	●	1.0	1.5	40	3	0.95	4	4
VQ4XLD0100N050	●	1.0	1.5	40	5	0.95	4	4
VQ4XLD0100N080	●	1.0	1.5	45	8	0.95	4	4

1/1

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When measuring the tool length, please use a mechanical contact type or a laser tool setter.

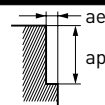
VQ4XL

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

Material	DC	LU	Vc	n	Vf	ap	ae
P	0.4	1.2	50	40000	800	0.06	0.02
	0.4	2	50	40000	560	0.06	0.02
	0.4	3.2	50	40000	320	0.04	0.02
	0.5	1.5	60	38000	910	0.075	0.025
	0.5	2.5	60	38000	610	0.075	0.025
	0.5	4	60	38000	380	0.05	0.025
M	0.6	1.8	60	32000	900	0.09	0.03
	0.6	3	60	32000	640	0.09	0.03
	0.6	4.8	60	32000	380	0.06	0.03
	0.7	2.1	60	27000	920	0.105	0.035
	0.7	3.5	60	27000	650	0.105	0.035
	0.7	5.6	60	27000	380	0.07	0.035
N	0.8	2.4	60	24000	960	0.12	0.04
	0.8	4	60	24000	670	0.12	0.04
	0.8	6.4	60	24000	380	0.08	0.04
	1	3	60	20000	960	0.15	0.05
	1	5	60	20000	800	0.15	0.05
	1	8	60	20000	400	0.1	0.05
S	0.4	1.2	20	16000	320	0.06	0.02
	0.4	2	20	16000	220	0.06	0.02
	0.4	3.2	20	16000	130	0.04	0.02
	0.5	1.5	20	13000	310	0.075	0.025
	0.5	2.5	20	13000	210	0.075	0.025
	0.5	4	20	13000	130	0.05	0.025
	0.6	1.8	20	11000	310	0.09	0.03
	0.6	3	20	11000	220	0.09	0.03
	0.6	4.8	20	11000	130	0.06	0.03
	0.7	2.1	20	9100	310	0.105	0.035
	0.7	3.5	20	9100	220	0.105	0.035
	0.7	5.6	20	9100	130	0.07	0.035
	0.8	2.4	20	8000	320	0.12	0.04
	0.8	4	20	8000	220	0.12	0.04
	0.8	6.4	20	8000	130	0.08	0.04
	1	3	20	6500	310	0.15	0.05
	1	5	20	6500	260	0.15	0.05
	1	8	20	6500	130	0.1	0.05
S	Heat resistant steel, Pre-hardened steel, Hardened steel						

1/1

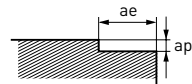


VQ4XL

BOTTOM FACE MILLING

Material	DC	LU	Vc	n	Vf	ap	ae
P	0.4	1.2	50	40000	800	0.03	≤0.4
	0.4	2	50	40000	560	0.02	≤0.4
	0.4	3.2	50	40000	320	0.01	≤0.4
	0.5	1.5	60	38000	910	0.04	≤0.5
	0.5	2.5	60	38000	610	0.03	≤0.5
M	0.5	4	60	38000	380	0.015	≤0.5
	0.6	1.8	60	32000	900	0.05	≤0.6
	0.6	3	60	32000	640	0.035	≤0.6
	0.6	4.8	60	32000	380	0.02	≤0.6
	0.7	2.1	60	27000	920	0.055	≤0.7
N	0.7	3.5	60	27000	650	0.035	≤0.7
	0.7	5.6	60	27000	380	0.02	≤0.7
	0.8	2.4	60	24000	960	0.06	≤0.8
	0.8	4	60	24000	670	0.04	≤0.8
	0.8	6.4	60	24000	380	0.025	≤0.8
S	1	3	60	20000	960	0.08	≤1
	1	5	60	20000	800	0.05	≤1
	1	8	60	20000	400	0.03	≤1
S	0.4	1.2	20	16000	320	0.03	≤0.2
	0.4	2	20	16000	220	0.02	≤0.2
	0.4	3.2	20	16000	130	0.01	≤0.2
	0.5	1.5	20	13000	310	0.04	≤0.25
	0.5	2.5	20	13000	210	0.03	≤0.25
	0.5	4	20	13000	130	0.015	≤0.25
	0.6	1.8	20	11000	310	0.05	≤0.3
	0.6	3	20	11000	220	0.035	≤0.3
	0.6	4.8	20	11000	130	0.02	≤0.3
	0.7	2.1	20	9100	310	0.055	≤0.35
	0.7	3.5	20	9100	220	0.035	≤0.35
	0.7	5.6	20	9100	130	0.02	≤0.35
	0.8	2.4	20	8000	320	0.06	≤0.4
	0.8	4	20	8000	220	0.04	≤0.4
	0.8	6.4	20	8000	130	0.025	≤0.4
	1	3	20	6500	310	0.08	≤0.5
	1	5	20	6500	260	0.05	≤0.5
	1	8	20	6500	130	0.03	≤0.5

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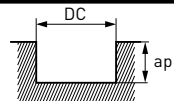


VQ4XL

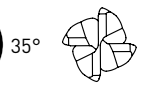
SLOTTING

Material	DC	LU	Vc	n	Vf	ap
P	0.4	1.2	40	30000	600	0.03
	0.4	2	40	30000	420	0.02
	0.4	3.2	40	30000	240	0.01
	0.5	1.5	45	28000	670	0.04
	0.5	2.5	45	28000	450	0.03
M	0.5	4	45	28000	280	0.015
	0.6	1.8	45	24000	670	0.05
	0.6	3	45	24000	480	0.035
	0.6	4.8	45	24000	290	0.02
	0.7	2.1	45	20000	680	0.055
N	0.7	3.5	45	20000	480	0.035
	0.7	5.6	45	20000	280	0.02
	0.8	2.4	45	18000	720	0.06
	0.8	4	45	18000	500	0.04
	0.8	6.4	45	18000	290	0.025
S	1	3	45	15000	720	0.08
	1	5	45	15000	600	0.05
	1	8	45	15000	300	0.03
S	0.4	1.2	15	12000	240	0.03
	0.4	2	15	12000	170	0.02
	0.4	3.2	15	12000	96	0.01
	0.5	1.5	15	9500	230	0.04
	0.5	2.5	15	9500	150	0.03
	0.5	4	15	9500	95	0.015
	0.6	1.8	15	8000	220	0.05
	0.6	3	15	8000	160	0.035
	0.6	4.8	15	8000	96	0.02
	0.7	2.1	15	6800	230	0.055
	0.7	3.5	15	6800	160	0.035
	0.7	5.6	15	6800	95	0.02
	0.8	2.4	15	6000	240	0.06
	0.8	4	15	6000	170	0.04
	0.8	6.4	15	6000	96	0.025
	1	3	15	4800	230	0.08
	1	5	15	4800	190	0.05
	1	8	15	4800	96	0.03

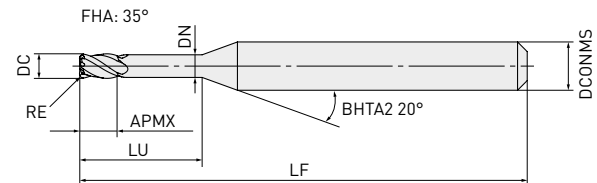
1/1



VQ4XLRB



CORNER RADIUS, SHORT CUT LENGTH,
4 FLUTE, LONG NECK



RE
+0.01



DC
0
-0.02



DCONMS
0
-0.005

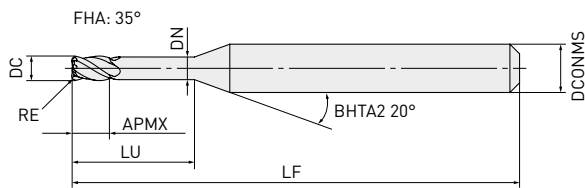
- The use of SMART MIRACLE coating improves chip discharge dramatically.
- Small size, multi-flute end mills with a diameter of less than Ø 1.0 mm now available.

Order number	Stock	DC	RE	APMX	LF	LU	DN	DCONMS	ZEFP
VQ4XLRBD0040R005N012	●	0.4	0.05	0.6	40	1.2	0.36	4	4
VQ4XLRBD0040R005N020	●	0.4	0.05	0.6	40	2.0	0.36	4	4
VQ4XLRBD0040R005N032	●	0.4	0.05	0.6	40	3.2	0.36	4	4
VQ4XLRBD0050R005N015	●	0.5	0.05	0.75	40	1.5	0.46	4	4
VQ4XLRBD0050R010N015	●	0.5	0.1	0.75	40	1.5	0.46	4	4
VQ4XLRBD0050R005N025	●	0.5	0.05	0.75	40	2.5	0.46	4	4
VQ4XLRBD0050R010N025	●	0.5	0.1	0.75	40	2.5	0.46	4	4
VQ4XLRBD0050R005N040	●	0.5	0.05	0.75	45	4.0	0.46	4	4
VQ4XLRBD0050R010N040	●	0.5	0.1	0.75	45	4.0	0.46	4	4
VQ4XLRBD0060R005N018	●	0.6	0.05	0.9	40	1.8	0.56	4	4
VQ4XLRBD0060R010N018	●	0.6	0.1	0.9	40	1.8	0.56	4	4
VQ4XLRBD0060R005N030	●	0.6	0.05	0.9	40	3.0	0.56	4	4
VQ4XLRBD0060R010N030	●	0.6	0.1	0.9	40	3.0	0.56	4	4
VQ4XLRBD0060R005N048	●	0.6	0.05	0.9	45	4.8	0.56	4	4
VQ4XLRBD0060R010N048	●	0.6	0.1	0.9	45	4.8	0.56	4	4
VQ4XLRBD0070R005N021	●	0.7	0.05	1.05	40	2.1	0.66	4	4
VQ4XLRBD0070R010N021	●	0.7	0.1	1.05	40	2.1	0.66	4	4
VQ4XLRBD0070R005N035	●	0.7	0.05	1.05	40	3.5	0.66	4	4

1/2

1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work.
When measuring the tool length, please use a mechanical contact type or a laser tool setter.

VQ4XLRB – CORNER RADIUS, SHORT CUT LENGTH, 4 FLUTE, LONG NECK



Order number	Stock	DC	RE	APMX	LF	LU	DN	DCONMS	ZEFP
VQ4XLRBD0070R010N035	●	0.7	0.1	1.05	40	3.5	0.66	4	4
VQ4XLRBD0070R005N056	●	0.7	0.05	1.05	45	5.6	0.66	4	4
VQ4XLRBD0070R010N056	●	0.7	0.1	1.05	45	5.6	0.66	4	4
VQ4XLRBD0080R005N024	●	0.8	0.05	1.2	40	2.4	0.76	4	4
VQ4XLRBD0080R010N024	●	0.8	0.1	1.2	40	2.4	0.76	4	4
VQ4XLRBD0080R005N040	●	0.8	0.05	1.2	40	4.0	0.76	4	4
VQ4XLRBD0080R010N040	●	0.8	0.1	1.2	40	4.0	0.76	4	4
VQ4XLRBD0080R005N064	●	0.8	0.05	1.2	45	6.4	0.76	4	4
VQ4XLRBD0080R010N064	●	0.8	0.1	1.2	45	6.4	0.76	4	4
VQ4XLRBD0100R010N030	●	1.0	0.1	1.5	40	3.0	0.95	4	4
VQ4XLRBD0100R020N030	●	1.0	0.2	1.5	40	3.0	0.95	4	4
VQ4XLRBD0100R010N050	●	1.0	0.1	1.5	40	5.0	0.95	4	4
VQ4XLRBD0100R020N050	●	1.0	0.2	1.5	40	5.0	0.95	4	4
VQ4XLRBD0100R010N080	●	1.0	0.1	1.5	45	8.0	0.95	4	4
VQ4XLRBD0100R020N080	●	1.0	0.2	1.5	45	8.0	0.95	4	4

2/2

1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work.
When measuring the tool length, please use a mechanical contact type or a laser tool setter.

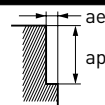
VQ4XLRB

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

Material	DC	LU	Vc	n	Vf	ap	ae
P	0.4	1.2	50	40000	800	0.06	0.02
	0.4	2.0	50	40000	560	0.06	0.02
	0.4	3.2	50	40000	320	0.04	0.02
	0.5	1.5	60	38000	910	0.075	0.025
	0.5	2.5	60	38000	610	0.075	0.025
	0.5	4.0	60	38000	380	0.05	0.025
M	0.6	1.8	60	32000	900	0.09	0.03
	0.6	3.0	60	32000	640	0.09	0.03
	0.6	4.8	60	32000	380	0.06	0.03
	0.7	2.1	60	27000	920	0.105	0.035
	0.7	3.5	60	27000	650	0.105	0.035
	0.7	5.6	60	27000	380	0.07	0.035
N	0.8	2.4	60	24000	960	0.12	0.04
	0.8	4.0	60	24000	670	0.12	0.04
	0.8	6.4	60	24000	380	0.08	0.04
	1.0	3.0	60	20000	960	0.15	0.05
	1.0	5.0	60	20000	800	0.15	0.05
	1.0	8.0	60	20000	400	0.1	0.05
S	0.4	1.2	20	16000	320	0.06	0.02
	0.4	2.0	20	16000	220	0.06	0.02
	0.4	3.2	20	16000	130	0.04	0.02
	0.5	1.5	20	13000	310	0.075	0.025
	0.5	2.5	20	13000	210	0.075	0.025
	0.5	4.0	20	13000	130	0.05	0.025
	0.6	1.8	20	11000	310	0.09	0.03
	0.6	3.0	20	11000	220	0.09	0.03
	0.6	4.8	20	11000	130	0.06	0.03
	0.7	2.1	20	9100	310	0.105	0.035
	0.7	3.5	20	9100	220	0.105	0.035
	0.7	5.6	20	9100	130	0.07	0.035
	0.8	2.4	20	8000	320	0.12	0.04
	0.8	4.0	20	8000	220	0.12	0.04
	0.8	6.4	20	8000	130	0.08	0.04
	1.0	3.0	20	6500	310	0.15	0.05
	1.0	5.0	20	6500	260	0.15	0.05
	1.0	8.0	20	6500	130	0.1	0.05

1/1

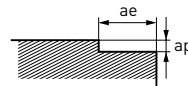


VQ4XLRB

BOTTOM FACE MILLING

Material	DC	LU	Vc	n	Vf	ap	ae
P	0.4	1.2	50	40000	800	0.03	≤0.4
	0.4	2.0	50	40000	560	0.02	≤0.4
	0.4	3.2	50	40000	320	0.01	≤0.4
	0.5	1.5	60	38000	910	0.04	≤0.5
M	0.5	2.5	60	38000	610	0.03	≤0.5
	0.5	4.0	60	38000	380	0.015	≤0.5
	0.6	1.8	60	32000	900	0.05	≤0.6
	0.6	3.0	60	32000	640	0.035	≤0.6
N	0.6	4.8	60	32000	380	0.02	≤0.6
	0.7	2.1	60	27000	920	0.055	≤0.7
	0.7	3.5	60	27000	650	0.035	≤0.7
	0.7	5.6	60	27000	380	0.02	≤0.7
S	0.8	2.4	60	24000	960	0.06	≤0.8
	0.8	4.0	60	24000	670	0.04	≤0.8
	0.8	6.4	60	24000	380	0.025	≤0.8
	1.0	3.0	60	20000	960	0.08	≤1
S	1.0	5.0	60	20000	800	0.05	≤1
	1.0	8.0	60	20000	400	0.03	≤1
S	0.4	1.2	20	16000	320	0.03	≤0.2
	0.4	2.0	20	16000	220	0.02	≤0.2
	0.4	3.2	20	16000	130	0.01	≤0.2
	0.5	1.5	20	13000	310	0.04	≤0.25
	0.5	2.5	20	13000	210	0.03	≤0.25
	0.5	4.0	20	13000	130	0.015	≤0.25
	0.6	1.8	20	11000	310	0.05	≤0.3
	0.6	3.0	20	11000	220	0.035	≤0.3
	0.6	4.8	20	11000	130	0.02	≤0.3
	0.7	2.1	20	9100	310	0.055	≤0.35
	0.7	3.5	20	9100	220	0.035	≤0.35
	0.7	5.6	20	9100	130	0.02	≤0.35
	0.8	2.4	20	8000	320	0.06	≤0.4
	0.8	4.0	20	8000	220	0.04	≤0.4
	0.8	6.4	20	8000	130	0.025	≤0.4
	1.0	3.0	20	6500	310	0.08	≤0.5
	1.0	5.0	20	6500	260	0.05	≤0.5
	1.0	8.0	20	6500	130	0.03	≤0.5

1/1

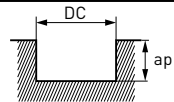


VQ4XLRB

SLOTTING

Material	DC	LU	Vc	n	Vf	ap
P	0.4	1.2	40	30000	600	0.030
	0.4	2.0	40	30000	420	0.020
	0.4	3.2	40	30000	240	0.010
	0.5	1.5	45	28000	670	0.040
M	0.5	2.5	45	28000	450	0.030
	0.5	4.0	45	28000	280	0.015
	0.6	1.8	45	24000	670	0.050
	0.6	3.0	45	24000	480	0.035
N	0.6	4.8	45	24000	290	0.020
	0.7	2.1	45	20000	680	0.055
	0.7	3.5	45	20000	480	0.035
	0.7	5.6	45	20000	280	0.020
S	0.8	2.4	45	18000	720	0.060
	0.8	4.0	45	18000	500	0.040
	0.8	6.4	45	18000	290	0.025
	1.0	3.0	45	15000	720	0.080
S	1.0	5.0	45	15000	600	0.050
	1.0	8.0	45	15000	300	0.030
S	0.4	1.2	15	12000	240	0.030
	0.4	2.0	15	12000	170	0.020
	0.4	3.2	15	12000	96	0.010
	0.5	1.5	15	9500	230	0.040
	0.5	2.5	15	9500	150	0.030
	0.5	4.0	15	9500	95	0.015
	0.6	1.8	15	8000	220	0.050
	0.6	3.0	15	8000	160	0.035
	0.6	4.8	15	8000	96	0.020
	0.7	2.1	15	6800	230	0.055
	0.7	3.5	15	6800	160	0.035
	0.7	5.6	15	6800	95	0.020
	0.8	2.4	15	6000	240	0.060
	0.8	4.0	15	6000	170	0.040
	0.8	6.4	15	6000	96	0.025
	1.0	3.0	15	4800	230	0.080
	1.0	5.0	15	4800	190	0.050
	1.0	8.0	15	4800	96	0.030

1/1



VQ2XLB

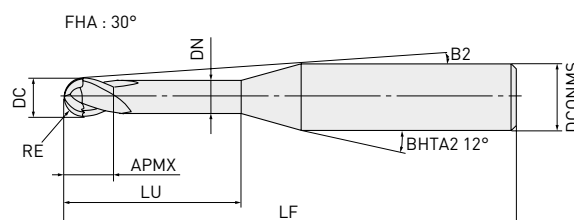


30°



BALL NOSE, SHORT CUT LENGTH, 2 FLUTE, LONG NECK

S



RE

±0.005



DCONMS

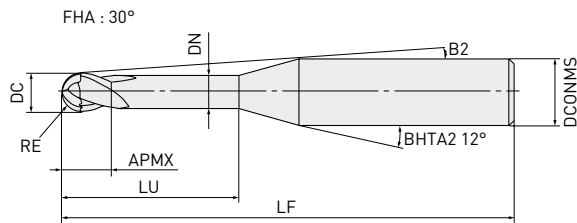
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-0.005

- Fracture resistance is improved by adopting a new S-shape, reinforced cutting edge geometry.
- SMART MIRACLE coating provides better wear resistance when machining difficult-to-cut materials.

Order number	Stock	DC	RE	APMX	LF	LU	DN	B2	DCONMS	ZEFP
NEW VQ2XLB0020N012	●	0.4	0.2	0.3	40	1.2	0.36	13.1°	4	2
NEW VQ2XLB0020N020	●	0.4	0.2	0.3	40	2	0.36	11.9°	4	2
NEW VQ2XLB0020N032	●	0.4	0.2	0.3	45	3.2	0.36	10.5°	4	2
NEW VQ2XLB0025N015	●	0.5	0.25	0.375	40	1.5	0.46	12.6°	4	2
NEW VQ2XLB0025N025	●	0.5	0.25	0.375	40	2.5	0.46	11.2°	4	2
NEW VQ2XLB0025N040	●	0.5	0.25	0.375	45	4	0.46	9.6°	4	2
NEW VQ2XLB0030N018	●	0.6	0.3	0.45	40	1.8	0.56	12.0°	4	2
NEW VQ2XLB0030N030	●	0.6	0.3	0.45	40	3	0.56	10.5°	4	2
NEW VQ2XLB0030N048	●	0.6	0.3	0.45	45	4.8	0.56	8.8°	4	2
NEW VQ2XLB0035N021	●	0.7	0.35	0.525	40	2.1	0.66	11.6°	4	2
NEW VQ2XLB0035N035	●	0.7	0.35	0.525	40	3.5	0.66	9.9°	4	2
NEW VQ2XLB0035N056	●	0.7	0.35	0.525	45	5.6	0.66	8.2°	4	2
NEW VQ2XLB0040N024	●	0.8	0.4	0.6	40	2.4	0.76	11.2°	4	2
NEW VQ2XLB0040N040	●	0.8	0.4	0.6	40	4	0.76	9.4°	4	2
NEW VQ2XLB0040N064	●	0.8	0.4	0.6	50	6.4	0.76	7.6°	4	2
NEW VQ2XLB0050N030	●	1	0.5	0.75	40	3	0.94	10.1°	4	2
NEW VQ2XLB0050N050	●	1	0.5	0.75	40	5	0.94	8.2°	4	2
VQ2XLB0050N080	●	1	0.5	0.75	50	8	0.94	6.4°	4	2
VQ2XLB0050N080S06	●	1	0.5	0.75	50	8	0.94	8.3°	6	2
VQ2XLB0050N100	●	1	0.5	0.75	50	10	0.94	5.6°	4	2
VQ2XLB0050N100S06	●	1	0.5	0.75	55	10	0.94	7.5°	6	2

1/2

VQ2XLB – BALL NOSE, SHORT CUT LENGTH, 2 FLUTE, LONG NECK

Order number	Stock	DC	RE	APMX	LF	LU	DN	B2	DCONMS	ZEFP
VQ2XLB0050N120S06	●	1	0.5	0.75	55	12	0.94	6.8°	6	2
VQ2XLB0075N100S06	●	1.5	0.75	1.1	55	10	1.44	7.2°	6	2
VQ2XLB0075N120S06	●	1.5	0.75	1.1	55	12	1.44	6.5°	6	2
VQ2XLB0100N100	●	2	1.0	1.5	50	10	1.9	4.5°	4	2
VQ2XLB0100N100S06	●	2	1.0	1.5	55	10	1.9	6.9°	6	2
VQ2XLB0100N120	●	2	1.0	1.5	50	12	1.9	3.9°	4	2
VQ2XLB0100N120S06	●	2	1.0	1.5	55	12	1.9	6.1°	6	2
VQ2XLB0150N120	●	3	1.5	2.3	55	12	2.9	5.3°	4	2
VQ2XLB0150N140	●	3	1.5	2.3	60	14	2.9	4.7°	4	2
VQ2XLB0150N160	●	3	1.5	2.3	60	16	2.9	4.3°	4	2

2/2

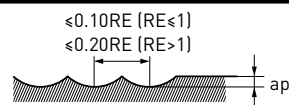


VQ2XLB

RECOMMENDED CUTTING CONDITIONS

Material	RE	LU	Vc	n	Vf	ap	ae
S Titanium alloy	0.20	1.2	50	40000	1200	0.02	0.04
	0.20	2.0	50	40000	960	0.02	0.04
	0.20	3.2	50	40000	660	0.02	0.04
	0.25	1.5	63	40000	2000	0.03	0.05
	0.25	2.5	63	40000	1500	0.03	0.05
	0.25	4.0	63	40000	1000	0.03	0.05
	0.30	1.8	75	40000	2600	0.03	0.06
	0.30	3.0	75	40000	2000	0.03	0.06
	0.30	4.8	75	40000	1400	0.03	0.06
	0.35	2.1	87	40000	3200	0.04	0.07
	0.35	3.5	87	40000	2500	0.04	0.07
	0.35	5.6	87	40000	1700	0.04	0.07
	0.40	2.4	100	40000	3500	0.04	0.08
	0.40	4.0	100	40000	3000	0.04	0.08
	0.40	6.4	100	40000	2100	0.04	0.08
	0.50	3.0	100	32000	3500	0.05	0.1
	0.50	5.0	100	32000	3000	0.05	0.1
	0.50	8.0	100	32000	2500	0.05	0.1
	0.50	10.0	75	24000	1500	0.05	0.1
	0.50	12.0	75	24000	1500	0.03	0.1
	0.75	10.0	100	21000	2100	0.13	0.3
	0.75	12.0	75	16000	1500	0.13	0.3
	1.00	10.0	100	16000	1800	0.2	0.5
	1.00	12.0	100	16000	1800	0.2	0.5
	1.50	12.0	100	10000	1600	0.3	0.8
	1.50	14.0	100	10000	1600	0.3	0.8
	1.50	16.0	100	10000	1600	0.3	0.8

1/3

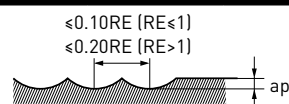


1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work.
When measuring the tool length, please use a mechanical contact type or a laser tool setter.
2. When machining titanium alloys, the use of water-soluble cutting fluid is effective.
3. If the depth of cut is smaller, the revolution and the feed rate can be increased.

VQ2XLB

Material	RE	LU	Vc	n	Vf	ap	ae
S Cobalt chromium alloy	0.20	1.2	50	40000	1200	0.02	0.04
	0.20	2.0	50	40000	960	0.02	0.04
	0.20	3.2	50	40000	660	0.02	0.04
	0.25	1.5	63	40000	2000	0.03	0.05
	0.25	2.5	63	40000	1500	0.03	0.05
	0.25	4.0	63	40000	1000	0.03	0.05
	0.30	1.8	75	40000	2600	0.03	0.06
	0.30	3.0	75	40000	2000	0.03	0.06
	0.30	4.8	75	40000	1400	0.03	0.06
	0.35	2.1	80	36000	2800	0.04	0.07
	0.35	3.5	80	36000	2200	0.04	0.07
	0.35	5.6	80	36000	1500	0.04	0.07
	0.40	2.4	80	32000	2800	0.04	0.08
	0.40	4.0	80	32000	2500	0.04	0.08
	0.40	6.4	80	32000	1700	0.04	0.08
	0.50	3.0	80	25000	2800	0.05	0.1
	0.50	5.0	80	25000	2400	0.05	0.1
	0.50	8.0	80	25000	2000	0.05	0.1
	0.50	10.0	60	19000	1500	0.05	0.1
	0.50	12.0	60	19000	1500	0.03	0.1
	0.75	10.0	80	17000	1700	0.08	0.1
	0.75	12.0	60	13000	1200	0.08	0.1
	1.00	10.0	80	13000	1500	0.2	0.5
	1.00	12.0	80	13000	1500	0.2	0.5
	1.50	12.0	80	8500	1300	0.3	0.8
	1.50	14.0	80	8500	1300	0.3	0.8
	1.50	16.0	80	8500	1300	0.3	0.8

2/3

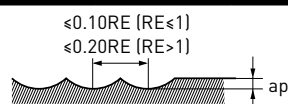


1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work.
When measuring the tool length, please use a mechanical contact type or a laser tool setter.
2. When machining titanium alloys, the use of water-soluble cutting fluid is effective.
3. If the depth of cut is smaller, the revolution and the feed rate can be increased.

VQ2XLB

Material	RE	LU	Vc	n	Vf	ap	ae
S Pure titanium	0.20	1.2	50	40000	960	0.03	0.04
	0.20	2.0	50	40000	760	0.03	0.04
	0.20	3.2	50	40000	530	0.03	0.04
	0.25	1.5	63	40000	1600	0.05	0.05
	0.25	2.5	63	40000	1200	0.05	0.05
	0.25	4.0	63	40000	800	0.05	0.05
	0.30	1.8	75	40000	2000	0.05	0.06
	0.30	3.0	75	40000	1600	0.05	0.06
	0.30	4.8	75	40000	1100	0.05	0.06
	0.35	2.1	80	36000	2200	0.06	0.07
	0.35	3.5	80	36000	1800	0.06	0.07
	0.35	5.6	80	36000	1200	0.06	0.07
	0.40	2.4	80	32000	2600	0.06	0.08
	0.40	4.0	80	32000	2000	0.06	0.08
	0.40	6.4	80	32000	1400	0.06	0.08
	0.50	3.0	80	27000	2500	0.08	0.1
	0.50	5.0	80	27000	2000	0.08	0.1
	0.50	8.0	80	27000	1600	0.08	0.1
	0.50	10.0	60	19000	1200	0.08	0.1
	0.50	12.0	60	19000	1200	0.04	0.1
	0.75	10.0	120	25000	2000	0.13	0.2
	0.75	12.0	100	21000	1600	0.13	0.2
	1.00	10.0	200	32000	2500	0.32	0.8
	1.00	12.0	180	29000	1700	0.32	0.8
	1.50	12.0	200	21000	1600	0.48	1.2
	1.50	14.0	200	21000	1600	0.48	1.2
	1.50	16.0	200	21000	1600	0.48	1.2

3/3



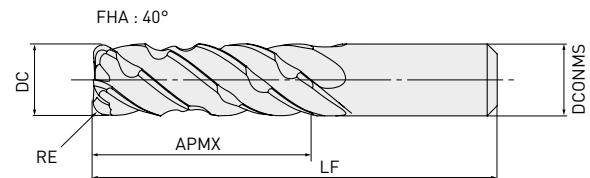
1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work.
When measuring the tool length, please use a mechanical contact type or a laser tool setter.
2. When machining titanium alloys, the use of water-soluble cutting fluid is effective.
3. If the depth of cut is smaller, the revolution and the feed rate can be increased.

VQJCSRB



CORNER RADIUS, SEMI LONG CUT LENGTH, 5 FLUTE,
IRREGULAR PITCH FLUTES, CHIPBREAKER

P M N S



RE ≤ 0.3 RE ≥ 0.5

±0.015 ±0.020



DC ≤ 12 DC > 12

0 0
- 0.030 - 0.040



DCONMS = 6 DCONMS = 8, 10 DCONMS = 12 DCONMS = 16 DCONMS = 20

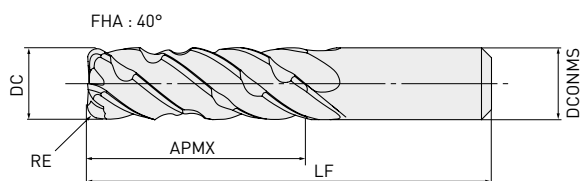
0 0 0 0 0
- 0.005 - 0.006 - 0.008 - 0.011 - 0.013

- Chipbreaker type end mill for efficient chip breaking capabilities that also provides good surface finishes.
- A high rigidity SMART MIRACLE vibration damping end mill for high efficiency trochoidal milling.

Order number	Stock	DC	RE	APMX	LF	DCONMS	ZEFP
VQJCSRBD0600R010	★	6	0.1	18	70	6	5
VQJCSRBD0600R020	★	6	0.2	18	70	6	5
VQJCSRBD0600R030	●	6	0.3	18	70	6	5
VQJCSRBD0600R050	●	6	0.5	18	70	6	5
VQJCSRBD0600R100	●	6	1.0	18	70	6	5
VQJCSRBD0800R020	★	8	0.2	24	80	8	5
VQJCSRBD0800R030	●	8	0.3	24	80	8	5
VQJCSRBD0800R050	●	8	0.5	24	80	8	5
VQJCSRBD0800R100	●	8	1.0	24	80	8	5
VQJCSRBD0800R150	●	8	1.5	24	80	8	5
VQJCSRBD0800R200	★	8	2.0	24	80	8	5
VQJCSRBD1000R020	★	10	0.2	30	90	10	5
VQJCSRBD1000R030	★	10	0.3	30	90	10	5
VQJCSRBD1000R050	●	10	0.5	30	90	10	5
VQJCSRBD1000R100	●	10	1.0	30	90	10	5
VQJCSRBD1000R150	●	10	1.5	30	90	10	5
VQJCSRBD1000R200	●	10	2.0	30	90	10	5

1/2

1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work.
When measuring the tool length, please use a mechanical contact type or a laser tool setter.

VQJCSRB – CORNER RADIUS, SEMI LONG CUT LENGTH, 5 FLUTE, IRREGULAR PITCH FLUTES, CHIPBREAKER

Order number	Stock	DC	RE	APMX	LF	DCONMS	ZEFP
VQJCSRBD1000R250	★	10	2.5	30	90	10	5
VQJCSRBD1200R050	●	12	0.5	36	100	12	5
VQJCSRBD1200R100	●	12	1.0	36	100	12	5
VQJCSRBD1200R150	●	12	1.5	36	100	12	5
VQJCSRBD1200R200	●	12	2.0	36	100	12	5
VQJCSRBD1200R250	★	12	2.5	36	100	12	5
VQJCSRBD1200R300	●	12	3.0	36	100	12	5
VQJCSRBD1600R050	★	16	0.5	48	110	16	5
VQJCSRBD1600R100	●	16	1.0	48	110	16	5
VQJCSRBD1600R200	●	16	2.0	48	110	16	5
VQJCSRBD1600R250	★	16	2.5	48	110	16	5
VQJCSRBD1600R300	●	16	3.0	48	110	16	5
VQJCSRBD1600R400	★	16	4.0	48	110	16	5
VQJCSRBD1600R500	●	16	5.0	48	110	16	5
VQJCSRBD1600R600	★	16	6.0	48	110	16	5
VQJCSRBD2000R050	★	20	0.5	60	125	20	5
VQJCSRBD2000R100	●	20	1.0	60	125	20	5
VQJCSRBD2000R200	●	20	2.0	60	125	20	5
VQJCSRBD2000R250	★	20	2.5	60	125	20	5
VQJCSRBD2000R300	●	20	3.0	60	125	20	5
VQJCSRBD2000R400	★	20	4.0	60	125	20	5
VQJCSRBD2000R500	●	20	5.0	60	125	20	5
VQJCSRBD2000R600	★	20	6.0	60	125	20	5

2/2

1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work.
When measuring the tool length, please use a mechanical contact type or a laser tool setter.

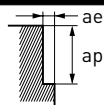
VQJCSRB

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

Material	DC	Vc	n	Vf	ap	ae	hm	h max
P Carbon steel, Alloy steel, Mild steel	6	200	10600	1800	18	0.9	0.010	0.019
	8	200	8000	1800	24	1.2	0.013	0.025
	10	200	6400	1700	30	1.5	0.016	0.029
	12	200	5300	1700	36	1.8	0.019	0.035
	16	200	4000	1400	48	2.4	0.020	0.039
	20	200	3200	1200	60	3.0	0.023	0.043
	6	180	9500	1500	18	0.9	0.009	0.017
	8	180	7200	1500	24	1.2	0.012	0.023
	10	180	5700	1400	30	1.5	0.015	0.028
	12	180	4800	1400	36	1.8	0.017	0.032
M Pre-hardened steel, Alloy tool steel	16	180	3600	1200	48	2.4	0.018	0.035
	20	180	2900	1000	60	3.0	0.021	0.039
	6	120	6400	1000	18	0.5	0.006	0.012
	8	120	4800	1000	24	0.6	0.008	0.016
	10	120	3800	900	30	0.8	0.010	0.019
	12	120	3200	800	36	0.9	0.011	0.021
	16	120	2400	700	48	1.2	0.012	0.023
	20	120	1900	600	60	1.5	0.013	0.026
	6	100	5300	800	18	0.5	0.006	0.012
	8	100	4000	800	24	0.6	0.008	0.016
M Hardened stainless steel, Cobalt chromium alloy	10	100	3200	800	30	0.8	0.010	0.019
	12	100	2700	700	36	0.9	0.011	0.021
	16	100	2000	600	48	1.2	0.012	0.023
	20	100	1600	500	60	1.5	0.013	0.026
	6	220	11700	2100	18	0.9	0.010	0.019
	8	220	8800	2100	24	1.2	0.014	0.026
N Copper, Copper alloy	10	220	7000	1800	30	1.5	0.015	0.028
	12	220	5800	1800	36	1.8	0.018	0.034
	16	220	4400	1500	48	2.4	0.020	0.038
	20	220	3500	1400	60	3.0	0.022	0.042
	6	40	2100	200	18	0.18	0.002	0.004
	8	40	1600	200	24	0.24	0.003	0.006
S Heat resistant alloy	10	40	1300	200	30	0.30	0.003	0.007
	12	40	1100	100	36	0.36	0.003	0.007
	16	40	800	100	48	0.48	0.004	0.007
	20	40	600	100	60	0.60	0.004	0.007

1/1



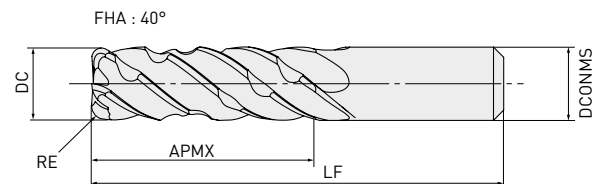
1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work.
When measuring the tool length, please use a mechanical contact type or a laser tool setter.
2. The irregular pitch flute end mill has a larger effect on controlling vibration when compared to standard end mills.
However, if the rigidity of the machine or the workpiece material installation is poor, vibration or abnormal sounds can occur.
In that case, please adjust the revolution, feed rate and depth of cut.
3. The revolution and feed rate can be increased with a smaller depth of cut.
4. For machining stainless steel, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

VQLCSRB



CORNER RADIUS, LONG CUT LENGTH, 5 FLUTE,
IRREGULAR PITCH FLUTES, CHIPBREAKER

P M N S



RE ≤ 0.3 RE ≥ 0.5

±0.015 ±0.020



DC ≤ 12 DC > 12

0 0
- 0.030 - 0.040



DCONMS = 6 DCONMS = 8, 10 DCONMS = 12 DCONMS = 16 DCONMS = 20

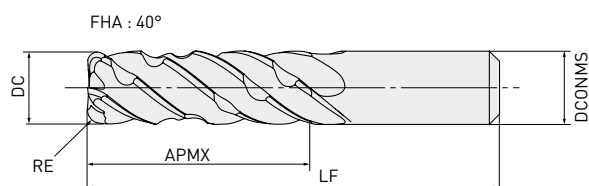
0 0 0 0 0
- 0.005 - 0.006 - 0.008 - 0.011 - 0.013

- Chipbreaker type end mill for efficient chip breaking capabilities that also provides good surface finishes.
- A high rigidity SMART MIRACLE vibration damping end mill for high efficiency trochoidal milling.

Order number	Stock	DC	RE	APMX	LF	DCONMS	ZEFP
VQLCSRBD0600R010	★	6	0.1	24	70	6	5
VQLCSRBD0600R020	★	6	0.2	24	70	6	5
VQLCSRBD0600R030	●	6	0.3	24	70	6	5
VQLCSRBD0600R050	●	6	0.5	24	70	6	5
VQLCSRBD0600R100	●	6	1.0	24	70	6	5
VQLCSRBD0800R020	★	8	0.2	32	90	8	5
VQLCSRBD0800R030	●	8	0.3	32	90	8	5
VQLCSRBD0800R050	●	8	0.5	32	90	8	5
VQLCSRBD0800R100	●	8	1.0	32	90	8	5
VQLCSRBD0800R150	●	8	1.5	32	90	8	5
VQLCSRBD0800R200	★	8	2.0	32	90	8	5
VQLCSRBD1000R020	★	10	0.2	40	100	10	5
VQLCSRBD1000R030	★	10	0.3	40	100	10	5
VQLCSRBD1000R050	●	10	0.5	40	100	10	5
VQLCSRBD1000R100	●	10	1.0	40	100	10	5
VQLCSRBD1000R150	●	10	1.5	40	100	10	5
VQLCSRBD1000R200	●	10	2.0	40	100	10	5

1/2

1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work.
When measuring the tool length, please use a mechanical contact type or a laser tool setter.

VQLCSRB – CORNER RADIUS, LONG CUT LENGTH, 5 FLUTE, IRREGULAR PITCH FLUTES, CHIPBREAKER

Order number	Stock	DC	RE	APMX	LF	DCONMS	ZEFP
VQLCSRBD1000R250	★	10	2.5	40	100	10	5
VQLCSRBD1200R050	●	12	0.5	48	110	12	5
VQLCSRBD1200R100	●	12	1.0	48	110	12	5
VQLCSRBD1200R150	●	12	1.5	48	110	12	5
VQLCSRBD1200R200	●	12	2.0	48	110	12	5
VQLCSRBD1200R250	★	12	2.5	48	110	12	5
VQLCSRBD1200R300	●	12	3.0	48	110	12	5
VQLCSRBD1600R050	★	16	0.5	64	130	16	5
VQLCSRBD1600R100	●	16	1.0	64	130	16	5
VQLCSRBD1600R200	●	16	2.0	64	130	16	5
VQLCSRBD1600R250	●	16	2.5	64	130	16	5
VQLCSRBD1600R300	●	16	3.0	64	130	16	5
VQLCSRBD1600R400	★	16	4.0	64	130	16	5
VQLCSRBD1600R500	●	16	5.0	64	130	16	5
VQLCSRBD1600R600	★	16	6.0	64	130	16	5
VQLCSRBD2000R050	★	20	0.5	80	150	20	5
VQLCSRBD2000R100	●	20	1.0	80	150	20	5
VQLCSRBD2000R200	●	20	2.0	80	150	20	5
VQLCSRBD2000R250	★	20	2.5	80	150	20	5
VQLCSRBD2000R300	●	20	3.0	80	150	20	5
VQLCSRBD2000R400	★	20	4.0	80	150	20	5
VQLCSRBD2000R500	●	20	5.0	80	150	20	5
VQLCSRBD2000R600	★	20	6.0	80	150	20	5

2/2

1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work.
When measuring the tool length, please use a mechanical contact type or a laser tool setter.

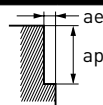
VQLCSRB

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

Material	DC	Vc	n	Vf	ap	ae	hm	h max
P Carbon steel, Alloy steel, Mild steel	6	180	9500	1600	24	0.6	0.008	0.015
	8	180	7200	1600	32	0.8	0.010	0.020
	10	180	5700	1500	40	1.0	0.012	0.023
	12	180	4800	1500	48	1.2	0.015	0.028
	16	180	3600	1300	64	1.6	0.017	0.033
	20	180	2900	1100	80	2.0	0.018	0.035
	6	160	8500	1200	24	0.6	0.007	0.013
	8	160	6400	1300	32	0.8	0.009	0.018
	10	160	5100	1200	40	1.0	0.011	0.022
	12	160	4200	1200	48	1.2	0.013	0.025
M Pre-hardened steel, Alloy tool steel	16	160	3200	1000	64	1.6	0.015	0.028
	20	160	2500	800	80	2.0	0.015	0.029
S Austenitic, Ferritic and martensitic stainless steel, Titanium alloy	6	100	5300	800	24	0.3	0.005	0.010
	8	100	4000	800	32	0.4	0.006	0.013
	10	100	3200	700	40	0.5	0.008	0.015
	12	100	2700	700	48	0.6	0.008	0.017
	16	100	2100	600	64	0.8	0.010	0.019
	20	100	1600	500	80	1.0	0.011	0.021
M Hardened stainless steel, Cobalt chromium alloy	6	90	4800	700	24	0.3	0.005	0.010
	8	90	3600	700	32	0.4	0.006	0.013
	10	90	2900	700	40	0.5	0.008	0.015
	12	90	2400	600	48	0.6	0.008	0.016
	16	90	1800	500	64	0.8	0.009	0.019
	20	90	1400	400	80	1.0	0.010	0.019
N Copper, Copper alloy	6	200	10600	1800	24	0.6	0.008	0.015
	8	200	8000	1800	32	0.8	0.011	0.020
	10	200	6400	1600	40	1.0	0.012	0.022
	12	200	5300	1600	48	1.2	0.014	0.027
	16	200	4000	1400	64	1.6	0.017	0.032
	20	200	3200	1300	80	2.0	0.019	0.037
S Heat resistant alloy	6	30	1600	100	24	0.12	0.002	0.003
	8	30	1200	100	32	0.16	0.002	0.004
	10	30	1000	100	40	0.20	0.003	0.005
	12	30	800	100	48	0.24	0.003	0.005
	16	30	600	80	64	0.32	0.003	0.006
	20	30	500	80	80	0.40	0.003	0.007

1/1



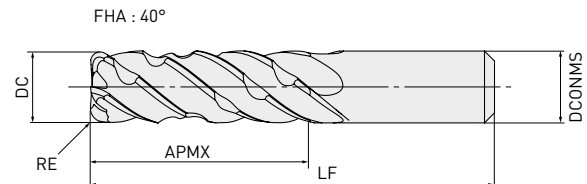
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In that case, please adjust the revolution, feed rate and depth of cut.
3. The revolution and feed rate can be increased with a smaller depth of cut.
4. For machining stainless steel, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

VQELCSRB



CORNER RADIUS, EXTRA LONG CUT LENGTH, 5 FLUTE, IRREGULAR PITCH FLUTES, CHIPBREAKER

P M N S



RE ≤ 0.3 RE ≥ 0.5

±0.015 ±0.020



DC ≤ 12 DC > 12

0 0
- 0.030 - 0.040



DCONMS = 6 DCONMS = 8, 10 DCONMS = 12 DCONMS = 16 DCONMS = 20

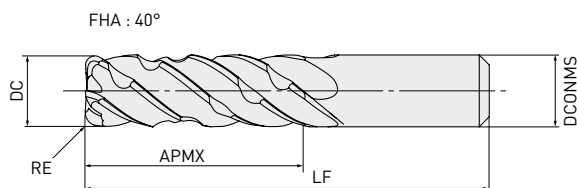
0 0 0 0 0
- 0.005 - 0.006 - 0.008 - 0.011 - 0.013

- Chipbreaker type end mill for efficient chip breaking capabilities that also provides good surface finishes.
- A high rigidity SMART MIRACLE vibration damping end mill for high efficiency trochoidal milling.

Order number	Stock	DC	RE	APMX	LF	DCONMS	ZEFP
VQELCSRBD0600R010	★	6	0.1	30	80	6	5
VQELCSRBD0600R020	★	6	0.2	30	80	6	5
VQELCSRBD0600R030	●	6	0.3	30	80	6	5
VQELCSRBD0600R050	●	6	0.5	30	80	6	5
VQELCSRBD0600R100	●	6	1.0	30	80	6	5
VQELCSRBD0800R020	★	8	0.2	40	100	8	5
VQELCSRBD0800R030	●	8	0.3	40	100	8	5
VQELCSRBD0800R050	●	8	0.5	40	100	8	5
VQELCSRBD0800R100	●	8	1.0	40	100	8	5
VQELCSRBD0800R150	●	8	1.5	40	100	8	5
VQELCSRBD0800R200	★	8	2.0	40	100	8	5
VQELCSRBD1000R020	★	10	0.2	50	110	10	5
VQELCSRBD1000R030	★	10	0.3	50	110	10	5
VQELCSRBD1000R050	●	10	0.5	50	110	10	5
VQELCSRBD1000R100	●	10	1.0	50	110	10	5
VQELCSRBD1000R150	●	10	1.5	50	110	10	5
VQELCSRBD1000R200	●	10	2.0	50	110	10	5

1/2

1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work.
When measuring the tool length, please use a mechanical contact type or a laser tool setter.

VQELCSRB – CORNER RADIUS, EXTRA LONG CUT LENGTH, 5 FLUTE, IRREGULAR PITCH FLUTES, CHIPBREAKER


Order number	Stock	DC	RE	APMX	LF	DCONMS	ZEFP
VQELCSRBD1000R250	★	10	2.5	50	110	10	5
VQELCSRBD1200R050	●	12	0.5	60	125	12	5
VQELCSRBD1200R100	●	12	1.0	60	125	12	5
VQELCSRBD1200R150	●	12	1.5	60	125	12	5
VQELCSRBD1200R200	●	12	2.0	60	125	12	5
VQELCSRBD1200R250	★	12	2.5	60	125	12	5
VQELCSRBD1200R300	●	12	3.0	60	125	12	5
VQELCSRBD1600R050	★	16	0.5	80	150	16	5
VQELCSRBD1600R100	●	16	1.0	80	150	16	5
VQELCSRBD1600R200	●	16	2.0	80	150	16	5
VQELCSRBD1600R250	★	16	2.5	80	150	16	5
VQELCSRBD1600R300	●	16	3.0	80	150	16	5
VQELCSRBD1600R400	★	16	4.0	80	150	16	5
VQELCSRBD1600R500	●	16	5.0	80	150	16	5
VQELCSRBD1600R600	★	16	6.0	80	150	16	5
VQELCSRBD2000R050	★	20	0.5	100	170	20	5
VQELCSRBD2000R100	●	20	1.0	100	170	20	5
VQELCSRBD2000R200	●	20	2.0	100	170	20	5
VQELCSRBD2000R250	★	20	2.5	100	170	20	5
VQELCSRBD2000R300	●	20	3.0	100	170	20	5
VQELCSRBD2000R400	★	20	4.0	100	170	20	5
VQELCSRBD2000R500	●	20	5.0	100	170	20	5
VQELCSRBD2000R600	★	20	6.0	100	170	20	5

2/2

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When measuring the tool length, please use a mechanical contact type or a laser tool setter.

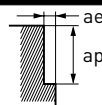
VQELCSRB

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

Material	DC	Vc	n	Vf	ap	ae	hm	h max
P Carbon steel, Alloy steel, Mild steel	6	160	8500	1400	30	0.5	0.007	0.013
	8	160	6400	1400	40	0.6	0.009	0.018
	10	160	5100	1300	50	0.8	0.011	0.021
	12	160	4200	1300	60	0.9	0.013	0.025
	16	160	3200	1100	80	1.2	0.014	0.028
	20	160	2500	950	100	1.5	0.016	0.031
	6	150	8000	1100	30	0.5	0.006	0.011
	8	150	6000	1200	40	0.6	0.008	0.016
	10	150	4800	1100	50	0.8	0.009	0.018
	12	150	4000	1100	60	0.9	0.011	0.022
M Pre-hardened steel, Alloy tool steel	16	150	3000	950	80	1.2	0.013	0.026
	20	150	2400	700	100	1.5	0.012	0.024
S Austenitic, Ferritic and martensitic stainless steel, Titanium alloy	6	90	4800	700	30	0.2	0.004	0.009
	8	90	3600	700	40	0.3	0.006	0.012
	10	90	2900	600	50	0.4	0.006	0.012
	12	90	2400	600	60	0.5	0.008	0.015
	16	90	1800	500	80	0.6	0.008	0.017
	20	90	1400	400	100	0.8	0.009	0.017
M Hardened stainless steel, Cobalt chromium alloy	6	80	4200	600	30	0.2	0.004	0.009
	8	80	3200	600	40	0.3	0.006	0.011
	10	80	2500	600	50	0.4	0.007	0.014
	12	80	2100	500	60	0.5	0.007	0.014
	16	80	1600	400	80	0.6	0.008	0.015
	20	80	1300	350	100	0.8	0.008	0.016
N Copper, Copper alloy	6	180	9500	1600	30	0.5	0.007	0.014
	8	180	7200	1600	40	0.6	0.009	0.018
	10	180	5700	1500	50	0.8	0.011	0.021
	12	180	4800	1500	60	0.9	0.013	0.025
	16	180	3600	1300	80	1.2	0.015	0.029
	20	180	2900	1200	100	1.5	0.017	0.033
S Heat resistant alloy	6	25	1300	90	30	0.10	0.001	0.003
	8	25	1000	90	40	0.12	0.002	0.003
	10	25	800	90	50	0.16	0.002	0.004
	12	25	700	80	60	0.18	0.002	0.004
	16	25	500	70	80	0.24	0.003	0.005
	20	25	400	70	100	0.30	0.003	0.007

1/1

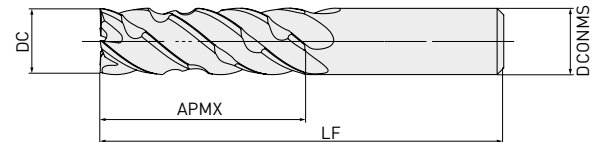


1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work.
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2. The irregular pitch flute end mill has a larger effect on controlling vibration when compared to standard end mills.
However, if the rigidity of the machine or the workpiece material installation is poor, vibration or abnormal sounds can occur.
In that case, please adjust the revolution, feed rate and depth of cut.
3. The revolution and feed rate can be increased with a smaller depth of cut.
4. For machining stainless steel, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

VQLCS



END MILL, LONG CUT LENGTH (4 x DC), 5 FLUTE, IRREGULAR PITCH FLUTES, CHIPBREAKER



DC ≤ 12	DC > 12
0	0
-0.030	-0.040



DCONMS=6	DCONMS=8, 10	DCONMS=12	DCONMS=16	DCONMS=20
0	0	0	0	0
-0.005	-0.006	-0.008	-0.011	-0.013

- Chipbreaker type end mill for efficient chip breaking capabilities that also provides good surface finishes.
- A high rigidity SMART MIRACLE vibration damping end mill for high efficiency trochoidal milling.

Order number	Stock	DC	APMX	LF	DCONMS	ZEFP
VQLCSD0600	●	6	24	70	6	5
VQLCSD0800	●	8	32	90	8	
VQLCSD1000	●	10	40	100	10	
VQLCSD1200	●	12	48	110	12	
NEW VQLCSD1600	●	16	64	130	16	
NEW VQLCSD2000	●	20	80	150	20	

1/1

1. If a flat is required on the tool for side clamping, please contact our technical department.

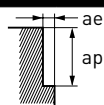
VQLCS

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

Material	DC	Vc	n	Vf	ap	ae	hm	h max
P Carbon steel, Alloy steel, Mild steel	6	180	9500	1600	24	0.6	0.008	0.015
	8	180	7200	1600	32	0.8	0.010	0.020
	10	180	5700	1500	40	1.0	0.012	0.023
	12	180	4800	1500	48	1.2	0.015	0.028
	16	180	3600	1300	64	1.6	0.017	0.033
	20	180	2900	1100	80	2.0	0.018	0.035
	6	160	8500	1200	24	0.6	0.007	0.013
	8	160	6400	1300	32	0.8	0.009	0.018
	10	160	5100	1200	40	1.0	0.011	0.022
	12	160	4200	1200	48	1.2	0.013	0.025
M Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel	16	160	3200	1000	64	1.6	0.015	0.028
	20	160	2500	800	80	2.0	0.015	0.029
S Austenitic, Ferritic and martensitic stainless steel, Titanium alloy	6	100	5300	800	24	0.3	0.005	0.010
	8	100	4000	800	32	0.4	0.006	0.013
	10	100	3200	700	40	0.5	0.008	0.015
	12	100	2700	700	48	0.6	0.008	0.017
	16	100	2100	600	64	0.8	0.010	0.019
M Hardened stainless steel, Cobalt chromium alloy	20	100	1600	500	80	1.0	0.011	0.021
	6	90	4800	700	24	0.3	0.005	0.010
	8	90	3600	700	32	0.4	0.006	0.013
	10	90	2900	700	40	0.5	0.008	0.015
	12	90	2400	600	48	0.6	0.008	0.016
N Copper, Copper alloy	16	90	1800	500	64	0.8	0.009	0.019
	20	90	1400	400	80	1.0	0.010	0.019
	6	200	10600	1800	24	0.6	0.008	0.015
	8	200	8000	1800	32	0.8	0.011	0.020
	10	200	6400	1600	40	1.0	0.012	0.022
S Heat resistant alloy	12	200	5300	1600	48	1.2	0.014	0.027
	16	200	4000	1400	64	1.6	0.017	0.032
	20	200	3200	1300	80	2.0	0.019	0.037
	6	30	1600	100	24	0.12	0.002	0.003
	8	30	1200	100	32	0.16	0.002	0.004
	10	30	1000	100	40	0.20	0.003	0.005
	12	30	800	100	48	0.24	0.003	0.005
	16	30	600	80	64	0.32	0.003	0.006
	20	30	500	80	80	0.40	0.003	0.007

1/1



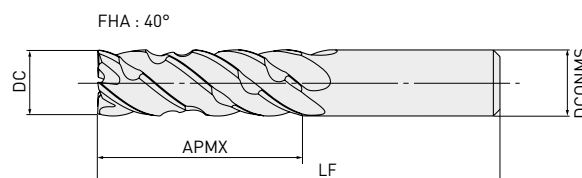
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VQELCS



END MILL, EXTRA LONG CUT LENGTH, 5 FLUTE, IRREGULAR PITCH FLUTES, CHIPBREAKER

P M N S



DC ≤ 12	DC > 12
0	0
-0.030	-0.040



DCONMS=6	DCONMS=8, 10	DCONMS=12	DCONMS=16	DCONMS=20
0	0	0	0	0
-0.005	-0.006	-0.008	-0.011	-0.013

- Chipbreaker type end mill for efficient chip breaking capabilities that also provides good surface finishes.
- A high rigidity SMART MIRACLE vibration damping end mill for high efficiency trochoidal milling.

Order number	Stock	DC	APMX	LF	DCONMS	ZEFP
VQELCSD0600	●	6	30	80	6	5
VQELCSD0800	●	8	40	100	8	
VQELCSD1000	●	10	50	110	10	
VQELCSD1200	●	12	60	125	12	
VQELCSD1600	●	16	80	150	16	
VQELCSD2000	●	20	100	170	20	

1/1

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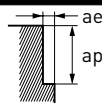
VQELCS

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

Material	DC	Vc	n	Vf	ap	ae	hm	h max
P Carbon steel, Alloy steel, Mild steel	6	160	8500	1400	30	0.5	0.007	0.013
	8	160	6400	1400	40	0.6	0.009	0.018
	10	160	5100	1300	50	0.8	0.011	0.021
	12	160	4200	1300	60	0.9	0.013	0.025
	16	160	3200	1100	80	1.2	0.014	0.028
	20	160	2500	950	100	1.5	0.016	0.031
	6	150	8000	1100	30	0.5	0.006	0.011
	8	150	6000	1200	40	0.6	0.008	0.016
	10	150	4800	1100	50	0.8	0.009	0.018
	12	150	4000	1100	60	0.9	0.011	0.022
M Pre-hardened steel, Alloy tool steel	16	150	3000	950	80	1.2	0.013	0.026
	20	150	2400	700	100	1.5	0.012	0.024
S Austenitic, Ferritic and martensitic stainless steel, Titanium alloy	6	90	4800	700	30	0.2	0.004	0.009
	8	90	3600	700	40	0.3	0.006	0.012
	10	90	2900	600	50	0.4	0.006	0.012
	12	90	2400	600	60	0.5	0.008	0.015
	16	90	1800	500	80	0.6	0.008	0.017
	20	90	1400	400	100	0.8	0.009	0.017
M Hardened stainless steel, Cobalt chromium alloy	6	80	4200	600	30	0.2	0.004	0.009
	8	80	3200	600	40	0.3	0.006	0.011
	10	80	2500	600	50	0.4	0.007	0.014
	12	80	2100	500	60	0.5	0.007	0.014
	16	80	1600	400	80	0.6	0.008	0.015
	20	80	1300	350	100	0.8	0.008	0.016
N Copper, Copper alloy	6	180	9500	1600	30	0.5	0.007	0.014
	8	180	7200	1600	40	0.6	0.009	0.018
	10	180	5700	1500	50	0.8	0.011	0.021
	12	180	4800	1500	60	0.9	0.013	0.025
	16	180	3600	1300	80	1.2	0.015	0.029
	20	180	2900	1200	100	1.5	0.017	0.033
S Heat resistant alloy	6	25	1300	90	30	0.10	0.001	0.003
	8	25	1000	90	40	0.12	0.002	0.003
	10	25	800	90	50	0.16	0.002	0.004
	12	25	700	80	60	0.18	0.002	0.004
	16	25	500	70	80	0.24	0.003	0.005
	20	25	400	70	100	0.30	0.003	0.007

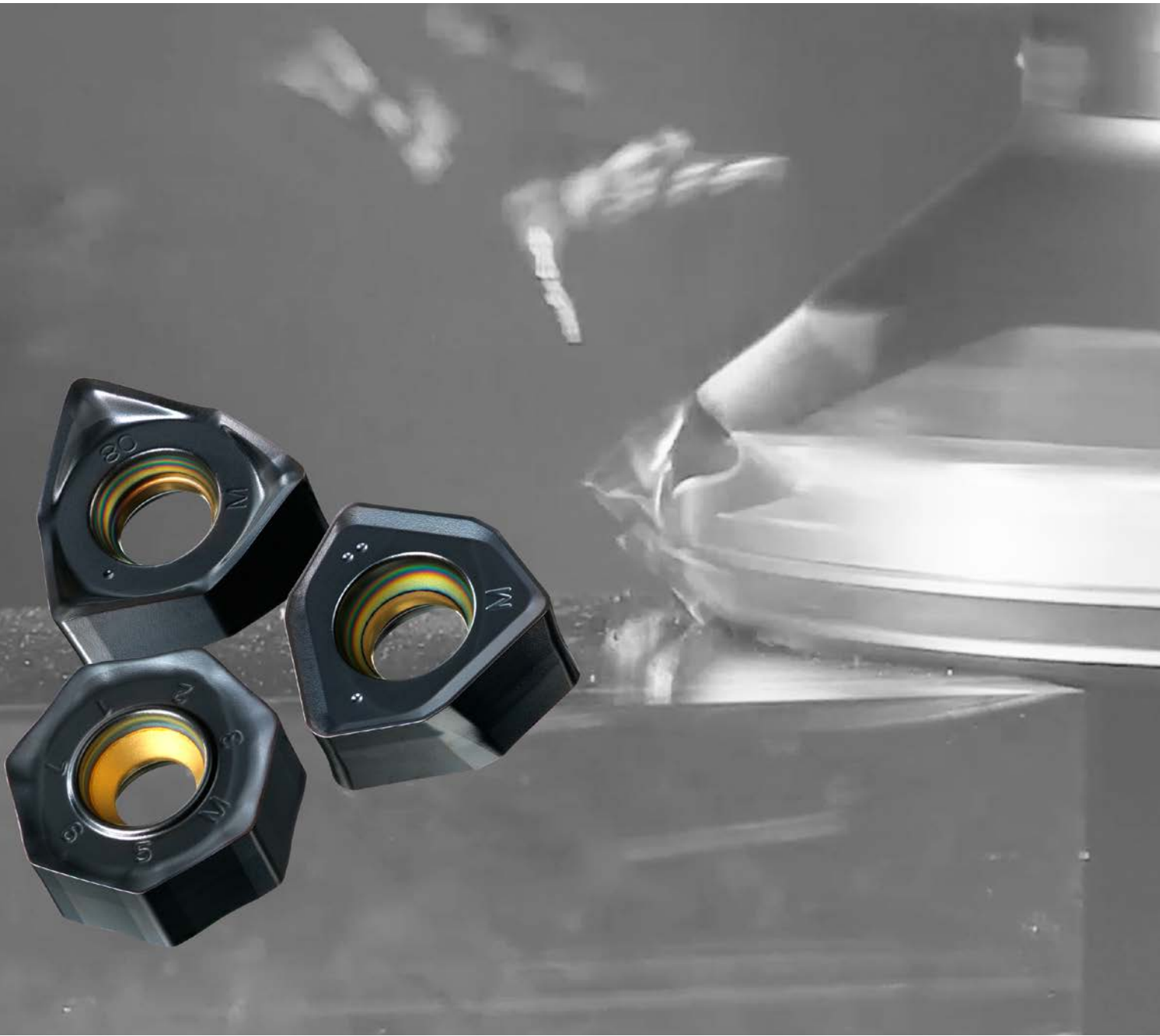
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MV1000 SERIES

SETTING A NEW STANDARD FOR TOOL LIFE



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MV1000 SERIES

COATED CARBIDE GRADE FOR MILLING

ADVANCED WEAR RESISTANCE

By adopting the newly developed Al-Rich coating technology, the (Al,Ti)N with a high Al content ratio displays very high hardness. This greatly improves oxidation and wear resistance.

ADVANCED THERMAL SHOCK RESISTANCE

The extreme heat resistance of this new series achieves amazing stability, not only during dry cutting, but also when wet cutting where inserts are usually prone to thermal cracking.



EXCELLENT WELDING RESISTANCE

Smooth surface.

OUTSTANDING WEAR RESISTANCE

Newly developed Al-Rich coating.

EXCELLENT CHIPPING RESISTANCE FOR STABLE MACHINING

Newly developed bonding layer.

FRACTURE RESISTANCE FOR THE ULTIMATE STABILITY

Exclusive cemented carbide substrate.

Graphical representation

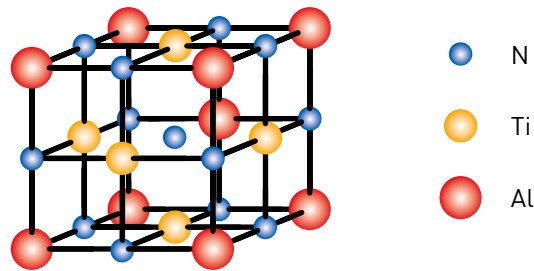


MV1000 SERIES

COMPLETE COATING TECHNOLOGY THAT REWRITES CURRENT TOOL LIFE STANDARDS

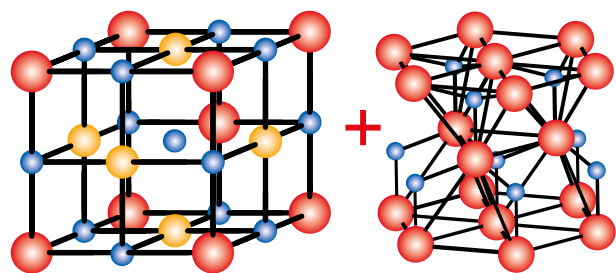
DUE TO THE NEWLY DEVELOPED AL-RICH COATING

Aluminium titanium nitride (Al,Ti)N is a compound of aluminium and titanium that is widely used as a coating for cutting tools due to its extremely hard and heat-resistant properties.



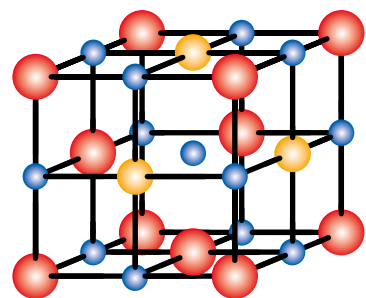
The combination of atoms with different sizes creates an exceptionally hard crystal structure.

The hardness of (Al,Ti)N increases as the Al content ratio increases, but with conventional technology, when the Al content ratio exceeds 60 %, the crystal structure changes and the hardness of (Al,Ti)N decreases.

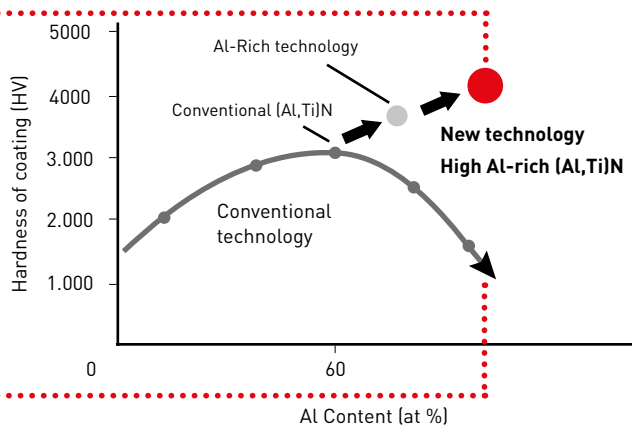
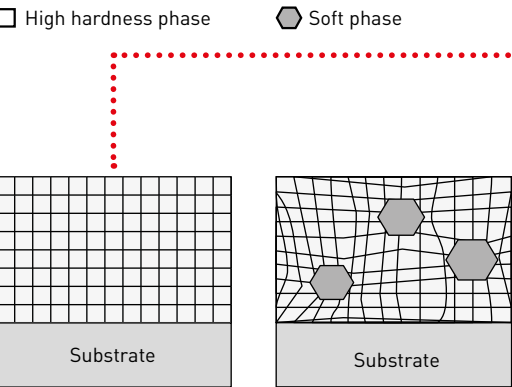


When the Al ratio is over 60 %, a softer crystal phase is formed.

Using a new coating process based on Mitsubishi Materials' own original technology. This a way in which the Al-Rich coating does not change its crystal structure even when the Al content is increased. This enables a higher Al content and a provides a higher hardness (Al,Ti)N.



Crystal image of **MV1000** series



MV1020 / MV1030

COATED CARBIDE GRADE FOR MILLING

MV1020

This grade has advanced wear and thermal shock resistance and also achieves stable cutting at unprecedented cutting speeds, especially when machining steel and ductile cast iron, thus greatly reducing work time.

MV1030

The new Al-Rich coating also provides excellent wear resistance. An unprecedented performance against sudden breakage was also realised especially during problematic wet cutting and when machining stainless steels.

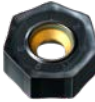
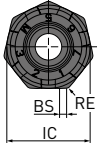
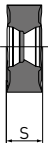
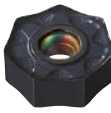
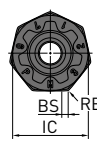
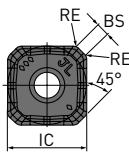
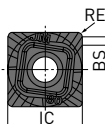
Material	ISO	CVD	Material	ISO	CVD	Material	ISO	CVD
P Steel	P10	MV1020	M Stainless steel	M10	MV1030	K Cast iron	K10	MV1020
	P20	MV1030		M20	MV1030		K20	MV1020
	P30	MV1030		M30			K30	MV1030
	P40			M40			K40	

1. Dry cutting is recommended for machining stainless steel with MV1030.

MV1000 SERIES

INSERTS

P	Steel	◆	◆	Please note that the cutting conditions differ depending on multiple factors, for more details refer to the recommended cutting conditions. Honing: E: Round S: Chamfer + round
M	Stainless steel		◆	
K	Cast iron	◆	◆	

Order number	Application	Class	Honing	MV1020	MV1030	IC	S	S1	BS	RE	Geometry
NNMU130508ZER-L	Low cutting resistance	M	E	●	●	13.4	5.09	—	1.0	0.8	AHX440/475   
NNMU130508ZEN-M	General purpose cutting	M	E	●	●	13.4	5.09	—	1.0	0.8	
NNMU130532ZEN-M	General purpose cutting	M	E	●	●	13.4	5.09	—	—	3.2	
NNMU130532ZEN-R	Cutting edge strength	M	E	●	●	13.4	5.09	—	—	3.2	
NEW NNMU200708ZEN-M	General purpose cutting	M	E	●	●	20.0	7.28	—	1.0	0.8	AHX640   
NEW NNMU200712ZER-L	Low cutting resistance	M	E	●	●	20.0	7.24	—	1.0	0.8	
NEW NNMU200608ZEN-MK	General purpose cutting	M	E	●	●	20.0	6.1	—	1.0	0.8	
NEW NNMU200608ZEN-HK	Strong purpose cutting	M	E	●	●	20.0	6.1	—	1.0	0.8	
SEET13T3AGEN-JL	Finish-light cutting	E	E	●	●	13.4	3.97	—	1.9	1.5	ASX445   
SEMT13T3AGSN-JM	Light-rough cutting	M	S	●	●	13.4	3.97	—	1.9	1.5	
SEMT13T3AGSN-JH	Medium-heavy cutting	M	S	●	●	13.4	3.97	—	1.9	1.5	
SEMT13T3AGSN-FT	Cast iron milling	M	S	●	●	13.4	3.97	—	1.9	1.5	
SOET12T308PEER-JL	Finish-light cutting	E	E	●	●	12.7	3.97	—	1.4	0.8	ASX400   
SOMT12T308PEER-JM	Light-rough cutting	M	E	●	●	12.7	3.97	—	1.4	0.8	
SOMT12T308PEER-JH	Medium-heavy cutting	M	E	●	●	12.7	3.97	—	1.4	0.8	
SOMT12T320PEER-FT	Heavy interrupted cutting	M	E	●	●	12.7	3.97	—	0.5	2.0	

1/3

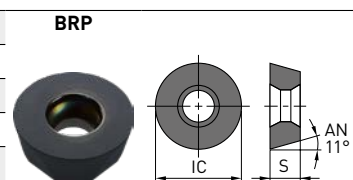
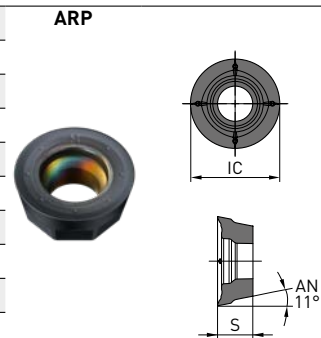
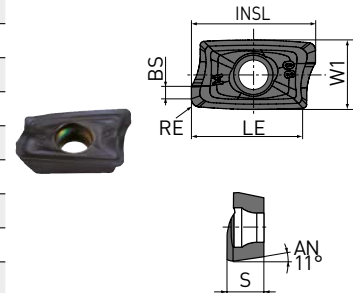
[10 inserts in one case]

247-249 

MV1000 SERIES – INSERTS

P	Steel	◆	◆	Please note that the cutting conditions differ depending on multiple factors, for more details refer to the recommended cutting conditions. Honing: E: Round S: Chamfer + round
M	Stainless steel	◆	◆	
K	Cast iron	◆	◆	

Order number	Application	Class	MV1020	MV1030	IC	S	BS	W1	RE	INSL	LE	Geometry
AOMT123602PEER-M	General purpose cutting	M	●	●	3.6	1.8	6.6	0.2	12	10		APX3000/4000
AOMT123604PEER-M	General purpose cutting	M	●	●	3.6	1.6	6.6	0.4	12	10		
AOMT123608PEER-M	General purpose cutting	M	●	●	3.6	1.2	6.6	0.6	12	10		
AOMT123610PEER-M	General purpose cutting	M	●	●	3.6	1.0	6.6	1	12	10		
AOMT123612PEER-M	General purpose cutting	M	●	●	3.6	0.8	6.6	1.2	12	10		
AOMT123616PEER-M	General purpose cutting	M	●	●	3.6	0.4	6.6	1.6	12	10		
AOMT123620PEER-M	General purpose cutting	M	●	●	3.6	0.4	6.6	2	12	10		
AOMT123624PEER-M	General purpose cutting	M	●	●	3.6	0.4	6.6	2.4	12	10		
AOMT123630PEER-M	General purpose cutting	M	●	●	3.6	0.4	6.6	3	12	10		
AOMT123632PEER-M	General purpose cutting	M	●	●	3.6	0.4	6.6	3.2	12	10		
AOMT123604PEER-H	Strong purpose cutting	M	●	●	3.6	1.6	6.6	0.4	12	10		
AOMT123608PEER-H	Strong purpose cutting	M	●	●	3.6	1.6	6.6	0.8	12	10		
AOMT123616PEER-H	Strong purpose cutting	M	●	●	3.6	0.4	6.6	1.6	12	10		
AOMT184804PEER-M	General purpose cutting	M	●	●	4.8	1.8	9.0	0.4	18	15		
AOMT184808PEER-M	General purpose cutting	M	●	●	4.8	1.4	9.0	0.8	18	15		
AOMT184810PEER-M	General purpose cutting	M	●	●	4.8	1.0	9.0	1	18	15		
AOMT184812PEER-M	General purpose cutting	M	●	●	4.8	0.8	9.0	1.2	18	15		
AOMT184816PEER-M	General purpose cutting	M	●	●	4.8	0.4	9.0	1.6	18	15		
AOMT184820PEER-M	General purpose cutting	M	●	●	4.8	0.4	9.0	2	18	15		
AOMT184804PEER-H	Strong purpose cutting	M	●	●	4.8	1.8	9.0	0.4	18	15		
AOMT184808PEER-H	Strong purpose cutting	M	●	●	4.8	1.4	9.0	0.8	18	15		
AOMT184816PEER-H	Strong purpose cutting	M	●	●	4.8	0.4	9.0	1.6	18	15		
RPMT1040M0E8-L1	Low cutting resistance	M	●	●	10	3.97						ARP
RPMT1040M0E4-L2	Low cutting resistance	M	●	●	10	3.97						
RPMT1040M0E8-M1	General purpose cutting	M	●	●	10	3.97						
RPMT1040M0E4-M2	General purpose cutting	M	●	●	10	3.97						
RPMT1040M0E8-R1	Strong purpose cutting	M	●	●	10	3.97						
RPMT1040M0E4-R2	Strong purpose cutting	M	●	●	10	3.97						
RPMT1248M0E8-L1	Low cutting resistance	M	●	●	12	4.76						
RPMT1248M0E4-L2	Low cutting resistance	M	●	●	12	4.76						
RPMT1248M0E8-M1	General purpose cutting	M	●	●	12	4.76						BRP
RPMT1248M0E4-M2	General purpose cutting	M	●	●	12	4.76						
RPMT1248M0E8-R1	Strong purpose cutting	M	●	●	12	4.76						
RPMT1248M0E4-R2	Strong purpose cutting	M	●	●	12	4.76						
RPMW10T3M0E	General purpose cutting	M	●	●	10	3.97						
RPMW1204M0E	General purpose cutting	M	●	●	12	4.76						
RPMW1606M0E	General purpose cutting	M	●	●	16	6.35						
RPMT08T2M0E-JS	Low cutting resistance	M	●	●	8	2.78						
RPMT10T3M0E-JS	Low cutting resistance	M	●	●	10	3.97						
RPMT1204M0E-JS	Low cutting resistance	M	●	●	12	4.76						
RPMT1606M0E-JS	Low cutting resistance	M	●	●	16	6.35						



2/3

(10 inserts in one case)

250–252

MV1000 SERIES – INSERTS

P	Steel	◆	◆	Please note that the cutting conditions differ depending on multiple factors, for more details refer to the recommended cutting conditions. Honing: E: Round S: Chamfer + round
M	Stainless steel	◆	◆	
K	Cast iron	◆	◆	

Order number	Application	Class	MV1020	MV1030	AN	IC	S	BS	RE	Geometry
JOMW06T215ZZSR-FT	Strong purpose cutting	M	●	●	13°	6.35	2.78	1.2	1.5	AJX
JOMW080320ZZSR-FT	Strong purpose cutting	M	●	●	13°	8	3.18	1.4	2	
JDMW09T320ZDSR-FT	Strong purpose cutting	M	●	●	15°	9.525	3.97	1.8	2	
JDMW120420ZDSR-FT	Strong purpose cutting	M	●	●	15°	12	4.76	2.5	2	
JDMW140520ZDSR-FT	Strong purpose cutting	M	●	●	15°	14	5.56	2.8	2	
JDMT120420ZDSR-ST	Strong purpose cutting	M	●	●	15°	12	4.76	2.5	2	
JDMT140520ZDSR-ST	Strong purpose cutting	M	●	●	15°	14	5.56	2.8	2	
JOMT06T216ZZER-JL	Low cutting resistance	M	●	●	13°	6.35	2.78	1.2	1.6	
JOMT080322ZZER-JL	Low cutting resistance	M	●	●	13°	8	3.18	1.4	2.2	
JDMT09T323ZDER-JL	Low cutting resistance	M	●	●	15°	9.525	3.97	1.2	1.5	
JDMT120423ZDER-JL	Low cutting resistance	M	●	●	15°	12	4.76	1.4	2	
JDMT140523ZDER-JL	Low cutting resistance	M	●	●	15°	14	5.56	1.8	2	
JOMT06T215ZZSR-JM	General purpose cutting	M	●	●	13°	6.35	2.78	1.2	1.5	
JOMT080320ZZSR-JM	General purpose cutting	M	●	●	13°	8	3.18	1.4	2	
JDMT09T320ZDSR-JM	General purpose cutting	M	●	●	15°	9.525	3.97	1.8	2	
JDMT120420ZDSR-JM	General purpose cutting	M	●	●	15°	12	4.76	2.5	2	
JDMT140520ZDSR-JM	General purpose cutting	M	●	●	15°	14	5.56	2.8	2	

3/3

(10 inserts in one case)

253

AHX440S

RECOMMENDED CUTTING CONDITIONS

DRY CUTTING

Material		Properties	Vc		fz	ap	ae
			MV1020	MV1030			
P	Mild steel	≤180HB	300 (200 – 400)	245 (190 – 300)	0.3 (0.2 – 0.4)	≤3	≤0.8 DC
	Carbon steel	180 – 280HB	260 (170 – 350)	210 (150 – 270)	0.3 (0.2 – 0.4)	≤3	≤0.8 DC
	Alloy steel	280 – 350HB	180 (100 – 250)	135 (90 – 180)	0.3 (0.2 – 0.4)	≤3	≤0.8 DC
M	Stainless steel	≤200HB	—	185 (120 – 250)	0.2 (0.1 – 0.3)	≤3	≤0.8 DC
		>200HB	—	140 (80 – 200)	0.2 (0.1 – 0.3)	≤3	≤0.8 DC
K	Ductile cast iron	Tensile strength ≤450MPa	240 (130 – 350)	185 (120 – 250)	0.2 (0.1 – 0.3)	≤3	≤0.8 DC
		Tensile strength ≤800MPa	220 (80 – 350)	150 (100 – 200)	0.2 (0.1 – 0.3)	≤3	≤0.8 DC
1/1							

1/1

1. Refer to the above table and set up cutting conditions according to cutting applications.
2. When placing emphasis on surface finish quality, wet cutting is recommended. (tool life is lowered as compared to dry cutting)
3. The recommended depth of cut differs according to insert geometry.
4. When clamp rigidity is low and tool overhang is long, we recommended to reduce the cutting speed and the feed rate by 30 %.
5. Recommended wet cutting for good surface finishing of stainless steel. (Tool life is short compared to wet cutting.)

AHX475S

RECOMMENDED CUTTING CONDITIONS

DRY CUTTING

Material	Properties		Vc		fz	ap	ae
			MV1020	MV1030			
P	Mild steel	≤180HB	R 220 (170–270)	140 (80–200)	0.6	≤1.6	≤0.5 DC
			R 220 (170–270)	140 (80–200)	0.8	≤1.6	0.5 DC < ae ≤ 0.8 DC
			M 220 (170–270)	140 (80–200)	1.0	≤1.6	0.8 DC < ae ≤ DC
	Carbon steel Alloy steel	180–280HB	R 200 (150–250)	120 (60–180)	0.6	≤1.6	≤0.5 DC
			R 200 (150–250)	120 (60–180)	0.8	≤1.6	0.5 DC < ae ≤ 0.8 DC
			M 200 (150–250)	120 (60–180)	1.0	≤1.6	0.8 DC < ae ≤ DC
		280–350HB	R 150 (100–200)	90 (30–150)	0.5	≤1.6	≤0.5 DC
			R 150 (100–200)	90 (30–150)	0.6	≤1.6	0.5 DC < ae ≤ 0.8 DC
			R 150 (100–200)	90 (30–150)	0.7	≤1.6	0.8 DC < ae ≤ DC
K	Ductile cast iron	Tensile strength ≤450MPa	R 200 (150–250)	140 (80–200)	0.6	≤1.6	≤0.5 DC
			R 200 (150–250)	140 (80–200)	0.8	≤1.6	0.5 DC < ae ≤ 0.8 DC
			M 200 (150–250)	140 (80–200)	1.0	≤1.6	0.8 DC < ae ≤ DC
		Tensile strength ≤800MPa	R 180 (130–230)	140 (80–200)	0.5	≤1.6	≤0.5 DC
			R 180 (130–230)	140 (80–200)	0.6	≤1.6	0.5 DC < ae ≤ 0.8 DC
			R 180 (130–230)	140 (80–200)	0.7	≤1.6	0.8 DC < ae ≤ DC

1/1

1. When clamp rigidity is low and tool overhang is long, we recommended to reduce the cutting speed and the feed rate by 30 %.

AHX640S

RECOMMENDED CUTTING CONDITIONS

DRY CUTTING

	Material	Properties		Vc		fz	ap	ae
				MV1020	MV1030			
P	Mild steel	≤180HB	M, L	300 (200–400)	245 (190–300)	0.3 (0.2–0.4)	≤5	≤0.8 DC
	Carbon steel	180–280HB	M, L	260 (170–350)	210 (150–270)	0.3 (0.2–0.4)	≤5	≤0.8 DC
	Alloy steel	280–350HB	M, L	180 (100–250)	135 (90–180)	0.3 (0.2–0.4)	≤5	≤0.8 DC
M	Stainless steel	≤200HB	L	—	185 (120–250)	0.2 (0.1–0.3)	≤5	≤0.8 DC
		>200HB	L	—	140 (80–200)	0.2 (0.1–0.3)	≤5	≤0.8 DC
	PH stainless steel	<450HB	L	—	130 (100–160)	0.2 (0.1–0.3)	≤5	≤0.8 DC
K	Gray cast iron	Tensile strength ≤450MPa	M, MK, HK	240 (130–350)	185 (120–250)	0.2 (0.1–0.3)	≤5	≤0.8 DC
		Tensile strength ≤800MPa	M, MK, HK	220 (80–350)	150 (100–200)	0.2 (0.1–0.3)	≤5	≤0.8 DC

1/1

ASX445

RECOMMENDED CUTTING CONDITIONS

DRY AND WET CUTTING

Material	Properties	Vc		fz		fz		fz	
		MV1020	MV1030						
P	Mild steel	≤180HB	300 (200–400)	275 (200–350)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	0.3 (0.2–0.4)
	Carbon steel	180–350HB	260 (170–350)	235 (170–300)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	0.3 (0.2–0.4)
	Alloy steel	280–350HB	180 (100–250)	165 (100–230)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	0.3 (0.2–0.4)
M	Stainless steel	—	—	220 (170–270)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	0.3 (0.2–0.4)
K	Ductile cast iron	Tensile strength ≤450MPa	240 (130–350)	190 (130–250)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	0.3 (0.2–0.4)
		Tensile strength >450MPa	220 (80–350)	110 (80–150)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	0.3 (0.2–0.4)

1/1

ASX400

RECOMMENDED CUTTING CONDITIONS

DRY AND WET CUTTING

Material	Properties	Vc		fz		fz		fz	
		MV1020	MV1030						
P	Mild steel	≤180HB	300 (200–400)	275 (200–350)	0.18 (0.08–0.28)	JL	0.20 (0.10–0.30)	JM	0.25 (0.10–0.35)
	Carbon steel	180–350HB	260 (170–350)	235 (170–300)	0.15 (0.07–0.23)	JL	0.18 (0.10–0.28)	JM	0.20 (0.10–0.30)
	Alloy steel	280–350HB	180 (100–250)	165 (100–230)	0.13 (0.06–0.20)	JL	0.15 (0.10–0.25)	JM	0.18 (0.10–0.28)
M	Stainless steel	—	—	220 (170–270)	0.15 (0.07–0.23)	JL	0.18 (0.10–0.28)	JM	0.20 (0.10–0.30)
K	Ductile cast iron	Tensile strength ≤450MPa	240 (130–350)	190 (130–250)	0.18 (0.10–0.28)	JL	0.20 (0.10–0.30)	JM	0.25 (0.10–0.35)
		Tensile strength >450MPa	220 (80–350)	110 (80–150)	0.18 (0.10–0.28)	JL	0.20 (0.10–0.30)	JM	0.25 (0.10–0.35)

1/1

APX3000 / 4000

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED (DRY CUTTING)

Material	Properties	Conditions	Recommendation 1st 2nd	ae							
				≤0.25 DC		0.25 – 0.5 DC		0.5 – 0.75 DC		DC (Slot)	
				MV1020	MV1030	MV1020	MV1030	MV1020	MV1030	MV1020	MV1030
P	Mild steel	≤180HB	● ●	L	M	280 (220–330)	230 (180–270)	270 (210–320)	220 (170–260)	220 (170–260)	180 (140–210)
	Carbon steel	180–280HB	● ●	L	M	220 (170–260)	180 (140–210)	210 (160–240)	170 (130–200)	170 (130–200)	170 (130–200)
	Alloy steel	280–350HB	● ●	L	M	180 (140–210)	180 (140–210)	170 (130–200)	170 (130–200)	140 (110–160)	140 (110–160)
M	Austenitic stainless steel	≤200HB	● ●	L	M	—	180 (140–210)	—	170 (130–200)	—	140 (110–160)
		>200HB	● ●	L	M	—	150 (110–180)	—	140 (100–160)	—	110 (80–130)
	PH stainless steel	<450HB	● ●	L	M	—	140 (110–170)	—	140 (110–170)	—	140 (110–170)
K	Gray cast iron	≤450HB	● ●	M	L	200 (150–280)	150 (100–200)	190 (140–270)	140 (90–190)	170 (130–240)	125 (80–170)
	Ductile cast iron	≤800MPa	● ●	M	L	180 (140–250)	150 (100–200)	170 (130–240)	140 (90–190)	150 (120–210)	125 (80–170)

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ARP5/6

RECOMMENDED CUTTING CONDITIONS

DRY CUTTING

Material	Properties	MV1020	MV1030
		Vc	Vc
M	Austenitic stainless steel		
	≤200HB	250 (200 – 300)	220 (170 – 270)
	>200HB	220 (170 – 270)	190 (140 – 240)
	Duplex steel		
	≤280HB	250 (200 – 300)	220 (170 – 270)
	Ferritic and martensitic stainless steel		
	≤200HB	270 (220 – 320)	240 (190 – 290)
	>200HB	270 (220 – 320)	240 (190 – 290)
	PH stainless steel		
	<450HB	190 (140 – 240)	170 (120 – 220)

1/1

WET CUTTING

Material	Properties	MV1020	MV1030
		Vc	Vc
M	Austenitic stainless steel		
	≤200HB	180 (130 – 230)	150 (100 – 200)
	>200HB	150 (100 – 200)	130 (80 – 180)
	Duplex steel		
	≤280HB	180 (130 – 230)	150 (100 – 200)
	Ferritic and martensitic stainless steel		
	≤200HB	190 (140 – 240)	170 (120 – 220)
	>200HB	190 (140 – 240)	170 (120 – 220)
	PH stainless steel		
	<450HB	130 (80 – 180)	120 (70 – 170)

1/1

BRP

RECOMMENDED CUTTING CONDITIONS

DRY CUTTING

	Material	Properties	MV1020	MV1030
			Vc	Vc
P	Mild steel	≤180HB	300 (200 – 400)	250 (200 – 300)
	Carbon steel	180 – 280HB	260 (170 – 350)	220 (170 – 270)
	Alloy steel	280 – 350HB	180 (100 – 250)	135 (90 – 180)
M	Austenitic stainless steel	≤200HB	250 (200 – 300)	220 (170 – 270)
		>200HB	220 (170 – 270)	190 (140 – 240)
	PH stainless steel	<450HB	190 (140 – 240)	170 (120 – 220)
K	Gray cast iron	≤450MPa	240 (130 – 350)	190 (130 – 250)
	Ductile cast iron	≤800MPa	220 (80 – 350)	110 (80 – 150)

1/1

FEED PER TOOTH (mm/t.)

Type	Depth of cut (mm)							
	1	2	3	4	5	6	7	8
BRP4	0.40	0.30	0.20	0.10	—	—	—	—
BRP5	0.40	0.35	0.30	0.20	0.10	—	—	—
BRP6	0.50	0.40	0.30	0.25	0.23	0.20	—	—
BRP8	0.60	0.50	0.45	0.40	0.33	0.30	0.25	0.20

AJX

RECOMMENDED CUTTING CONDITIONS

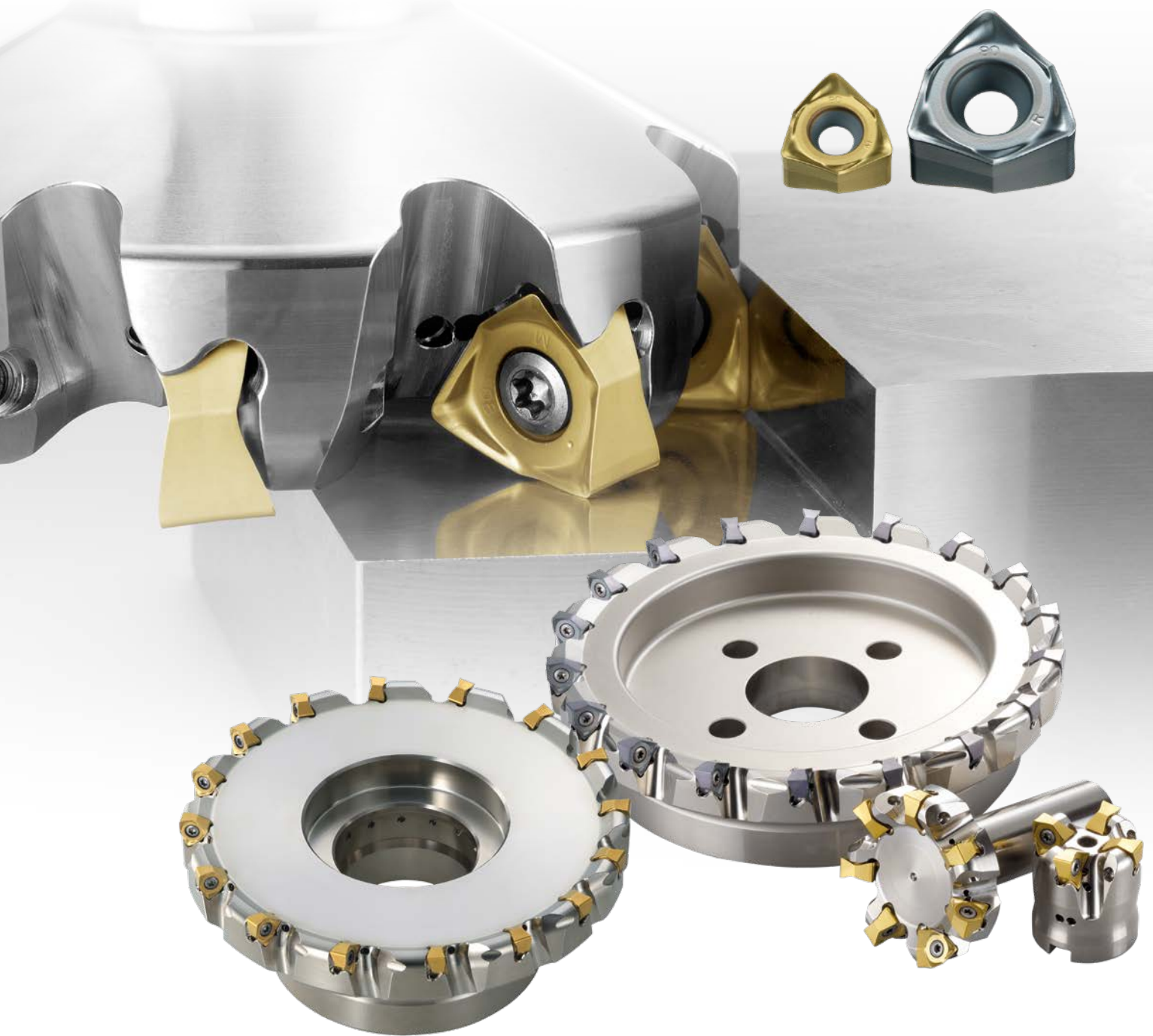
CUTTING SPEED (DRY CUTTING)

	Material	Properties	MV1020	MV1030
			Vc	Vc
P	Mild steel	≤180HB	230 (180 – 280)	160 (100 – 220)
	Carbon steel	180 – 350HB	220 (170 – 270)	150 (80 – 220)
	Alloy steel	280 – 350HBB	180 (100 – 250)	140 (70 – 210)
	Alloy tool steel	≤350HB	180 (100 – 250)	140 (70 – 210)
M	Austenitic stainless steel	≤200HB	—	160 (130 – 200)
		>200HB	—	140 (80 – 200)
	PH stainless steel	<450HB	—	140 (80 – 200)
K	Gray cast iron	≤450MPa	210 (160 – 260)	160 (120 – 210)
	Ductile cast iron	≤800MPa	190 (140 – 240)	130 (90 – 170)

1/1

WWX SERIES

A NEW LEVEL OF VERSATILITY



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WWX SERIES

STABLE AND RELIABLE

High performance 90° face milling cutter with double-sided trigon inserts for shoulder, face and copy milling.

The indexable inserts with 6 usable cutting edges offer lower cost per cutting edge and excellent process reliability thanks to a special negative geometry but with a positive, sharp cutting action.

Precise locating of the inserts ensures a true 90° corner milling operation, eliminating the need for secondary operations, thereby saving valuable production time and costs.

PRODUCT RANGE WWX200

- Arbor type: DC Ø 40 – 160 mm
- Shank type: DC Ø 25 – 50 mm
- Inserts with radii: 0.4 – 0.8
- Depth of cut: APMX 5 mm

APPLICATION

- General machining
- Face milling
- Shoulder milling



PRODUCT RANGE WWX400

- Arbor type: DC Ø 50 – 250 mm
- Shank type: DC Ø 50 – 80 mm
- Inserts with radii: 0.4 / 0.8 / 1.6 / 2.0
- Depth of cut: APMX 8 mm

FEATURES

- Low cutting force
- Good chip evacuation
- Large variety of grades and breakers available
- Double-sided trigon inserts with 6 cutting edges
- Superior surface finishing

WWX SERIES

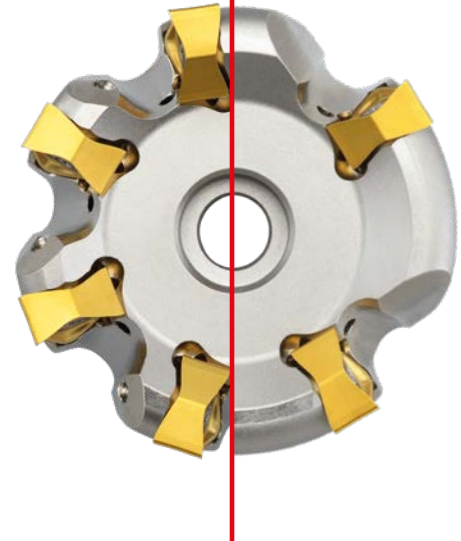
UNIQUE PROPERTIES

CHOICE AND AVAILABILITY

Diameters 25 – 160 mm (WWX200) / 50 – 250 mm (WWX400) are all available in coarse, fine and extra-fine pitch geometries. Providing a wide choice of sizes means the ideal milling body can be selected for a huge range of applications.

Additionally, each cutter body has an internal through coolant supply directed at each insert.

Extra fine pitch Coarse pitch



PERFECT 90° WALL MACHINING AND INSERTS WITH MAXIMUM DEPTH OF CUT UP TO 5 MM (WWX200) / 8 MM (WWX400)

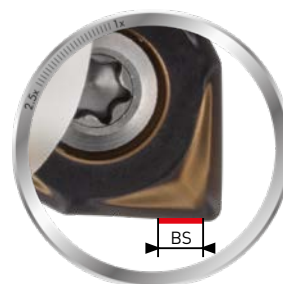
Clever positioning of the insert generates extremely low cutting resistance and helps to generate accurate 90° walls under all machining conditions.

LOW CUTTING FORCE

Innovative geometry generates low cutting forces. The increased insert thickness provides excellent resistance to breakage.

LARGE RADIUS OF MINOR CUTTING EDGE

To meet the modern expectations regarding surface finish quality, a specially defined radius ($R = 100 \mu\text{m}$) with a cutting width BS of 0.5 – 1.7 mm, is used as a wiper geometry across all L, M and R chipbreakers.



WWX SERIES

INSERTS

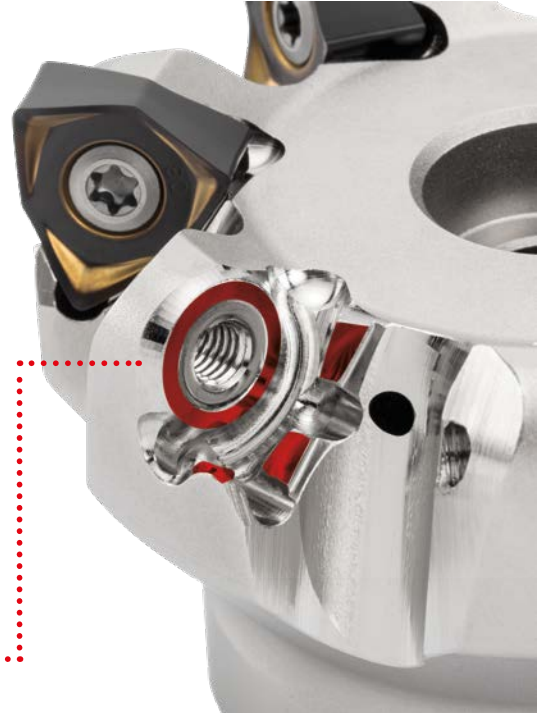
PRECISE INSERT POSITIONING IN COMBINATION WITH STRONG INSERT CLAMPING

Four contact surfaces inside the insert pocket, plus use of a large clamping screw provides precise, but stable and secure clamping of the inserts.

Therefore, WWX200 / WWX400 can be recommended for both semi-roughing and finish machining.



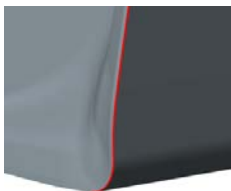
Strong **X** geometry



SHOULDER AND WALL MACHINING WITHOUT CHIP INTERFERENCE

Use of a convex main cutting edge allows for precise 90° shoulder machining and reduces contact between ejected chips and the workpiece.

WWX200 / WWX400



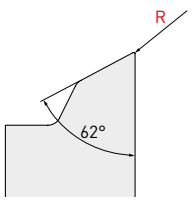
Conventional



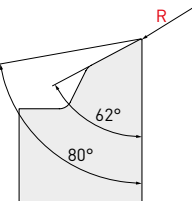
WWX SERIES

GRADES AND CHIPBREAKERS

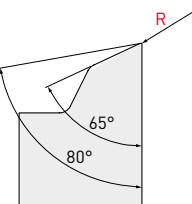
An extensive choice of grades and chipbreakers ensures the optimal choice is available for stable and efficient machining over a wide range of applications.



L-BREAKER
Recommended for machining that requires reduced cutting loads, or for machining HRSA materials.



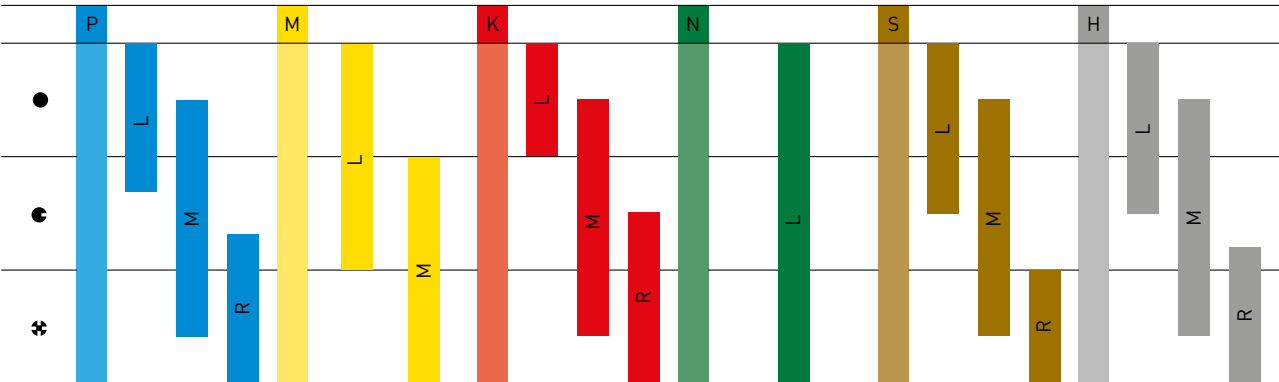
M-BREAKER
Outstanding balance of cutting edge sharpness and stability. First choice all-rounder, suitable for a variety of materials and applications.



R-BREAKER
First recommendation for interrupted cutting conditions.

APPLICATION OF CHIPBREAKERS

Cutting conditions: ●: Stable cutting ●: General cutting ✖: Unstable cutting



WWX SERIES

GRADES FOR MACHINING A WIDE RANGE OF MATERIALS

P	CVD	PVD	M	CVD	PVD	K	CVD	PVD	S	PVD	H	PVD
P10	MV1020	MP6120	VP15TF	M10		K10	MC5020		S10	MP9120	H10	
P20	MV1030	MP6130	M20	MV1030	MP7130	K20	MV1020	XC5010	S20	MP9130	H20	VP15TF
P30			M30		MP7140	K30			S30		H30	
P40			M40		MP7030	K40		VP20RT	S40		H40	

MV1020

This grade has advanced wear and thermal shock resistance and also achieves stable cutting at unprecedented cutting speeds, especially when machining steel and ductile cast iron, thus greatly reducing work time.

MV1030

The new Al-Rich coating also provides excellent wear resistance. An unprecedented performance against sudden breakage was also realised especially during problematic wet cutting and when machining stainless steels.

MP6120

For general milling of steel.

MP6130

For interrupted milling of steel.

MP7130

For general milling of stainless steel.

MC5020

For general milling of cast iron.

MP9120

For general milling of HRSA and titanium alloy.

MP9130

For interrupted and general milling of HRSA and Titanium alloy.

TF15

For general milling of aluminium.

VP15TF

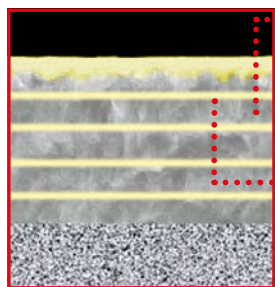
For stable machining when the coating is combined with a high wear and fracture resistant carbide substrate.

MP6100/MP7100/MP9100 SERIES

TOUGH-Σ TECHNOLOGY

A fusion of the separate coating technologies; PVD and multi-layering provides extra toughness.

Al-Ti-Cr-N BASED PVD COATING



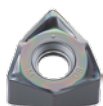
Graphical representation

BASE LAYER HIGH Al-(Al, Ti)N

The new technology Al-(Al, Ti)N coating provides stabilisation of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance.

BEST LAYER FOR EACH MATERIAL

P	(Al,Cr)N	M	TiN	S	CrN
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Thermal Cracks



Notching



Welding by Chipping

MV1000 SERIES

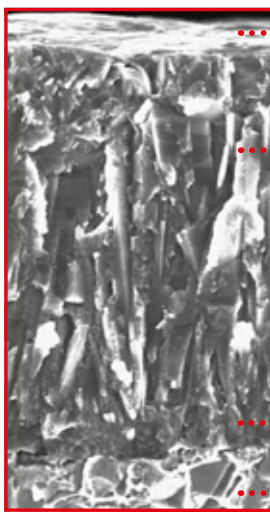
COATED CARBIDE GRADE FOR MILLING

ADVANCED WEAR RESISTANCE

By adopting the newly developed Al-Rich coating technology, the (Al,Ti)N with a high Al content ratio displays very high hardness. This greatly improves oxidation and wear resistance.

ADVANCED THERMAL SHOCK RESISTANCE

The extreme heat resistance of this new series achieves amazing stability, not only during dry cutting, but also when wet cutting where inserts are usually prone to thermal cracking.



Graphical representation

EXCELLENT WELDING RESISTANCE

Smooth surface.

OUTSTANDING WEAR RESISTANCE

Newly developed Al-Rich coating.

EXCELLENT CHIPPING RESISTANCE FOR STABLE MACHINING

Newly developed bonding layer.

FRACTURE RESISTANCE FOR THE ULTIMATE STABILITY

Exclusive cemented carbide substrate.



NEW LEVEL OF VERSATILITY



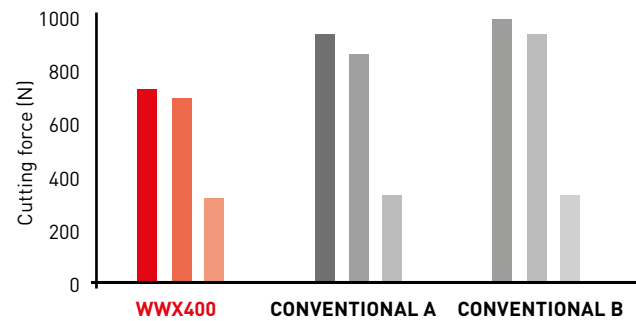
BENEFITS

- Inserts with the capability to machine up to APMX = 5 mm (WWX200)/8 mm (WWX400)
- Unique negative insert design with six cutting edges for high productivity machining enables lower costs per component
- Multi-edge, self-locating inserts enable robust and reliable machining
- Use over several different machining processes without changing tools provides flexibility

WWX400

CUTTING FORCE

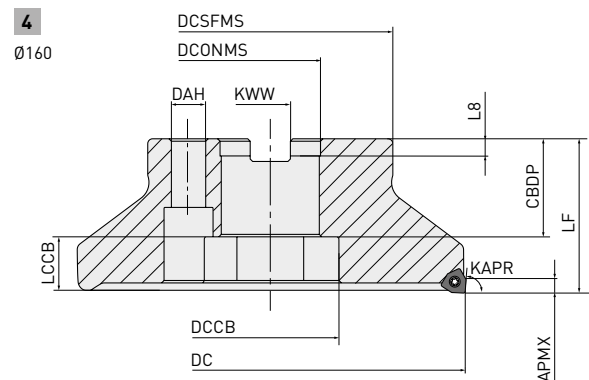
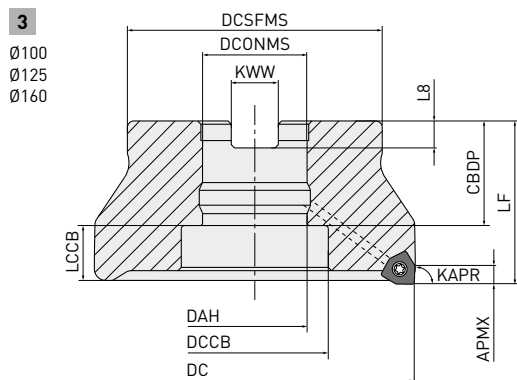
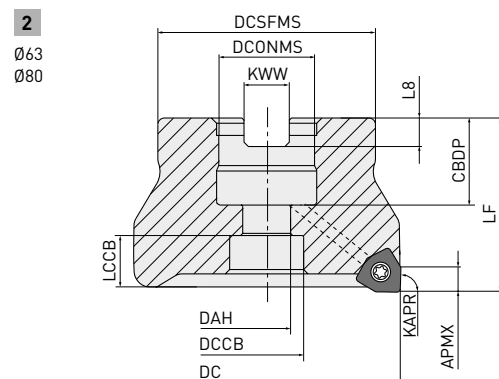
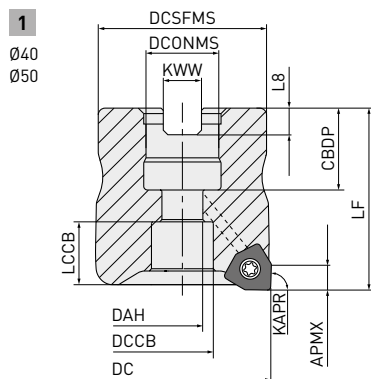
Material	1.7225 / 42CrM04
Tool	WWX400 Ø 80
Vc (m/min)	160
fz (mm/t.)	0.2
ap (mm)	2.0
ae (mm)	64
Cutting mode	Single insert



WWX200



90° FACE MILLING CUTTER



Right hand tool holder only.

ARBOR TYPE

Order number	Stock	APMX	DC	DCONMS	LF	RPMX	WT	ZEFP		Type
WWX200-040A03AR	●	5	40	16	40	21600	0.2	3	○	1
WWX200-040A04AR	●	5	40	16	40	21600	0.2	4	○	1
WWX200-050A04AR	●	5	50	22	40	18600	0.4	4	○	1
WWX200-050A05AR	●	5	50	22	40	18600	0.4	5	○	1
WWX200-050A06AR	●	5	50	22	40	18600	0.3	6	○	1
WWX200-063A05AR	●	5	63	22	40	16000	0.5	5	○	2
WWX200-063A06AR	●	5	63	22	40	16000	0.5	6	○	2
WWX200-063A07AR	●	5	63	22	40	16000	0.5	7	○	2
WWX200-080A05AR	●	5	80	27	50	13600	1.1	5	○	2
WWX200-080A07AR	●	5	80	27	50	13600	1.0	7	○	2

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WWX200 – 90° FACE MILLING CUTTER – ARBOR TYPE

Order number	Stock	APMX	DC	DCONMS	LF	RPMX	WT	ZEFP		Type
WWX200-080A09AR	●	5	80	27	50	13600	1.0	9	○	2
WWX200-100B06AR	●	5	100	32	50	11700	1.7	6	○	3
WWX200-100B08AR	●	5	100	32	50	11700	1.7	8	○	3
WWX200-100B11AR	●	5	100	32	50	11700	1.7	11	○	3
WWX200-125B07AR	●	5	125	40	63	10100	3.1	7	○	3
WWX200-125B11AR	●	5	125	40	63	10100	3.0	11	○	3
WWX200-125B14AR	●	5	125	40	63	10100	3.0	14	○	3
WWX200-160C09NR	●	5	160	40	63	8600	4.6	9	—	4
WWX200-160C12NR	●	5	160	40	63	8600	4.6	12	—	4
WWX200-160C16NR	●	5	160	40	63	8600	4.6	16	—	4

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1. The maximum spindle speeds RPMX are set to ensure tool and insert stability.
2. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
3. ○ = With through coolant holes
4. A set bolt to the arbor is not supplied with the body. Please refer to page 266, when ordering.
5. Please use a set bolt of the FMC type on the cutter body from 40 to 100 in diameter [DC].
6. Please use a set bolt of the FMA type on the cutter body from 125 to 160 in diameter [DC].

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MOUNTING DIMENSIONS

Order number	CBDP	DAH	DCCB	DCONMS	DCSFMS	KWW	LCCB	L8	Type
WWX200-040A03AR	18	9	13.6	16	37	8.4	13.8	5.6	1
WWX200-040A04AR	18	9	13.6	16	37	8.4	13.8	5.6	1
WWX200-050A04AR	20	11	17	22	47	10.4	11.8	6.3	1
WWX200-050A05AR	20	11	17	22	47	10.4	11.8	6.3	1
WWX200-050A06AR	20	11	17	22	47	10.4	11.8	6.3	1
WWX200-063A05AR	20	11	17	22	50	10.4	11.8	6.3	2
WWX200-063A06AR	20	11	17	22	50	10.4	11.8	6.3	2
WWX200-063A07AR	20	11	17	22	50	10.4	11.8	6.3	2
WWX200-080A05AR	23	13	20	27	56	12.4	11.8	7	2
WWX200-080A07AR	23	13	20	27	56	12.4	11.8	7	2
WWX200-080A09AR	23	13	20	27	56	12.4	11.8	7	2
WWX200-100B06AR	26	32	45	32	78	14.4	16.8	8	3
WWX200-100B08AR	26	32	45	32	78	14.4	16.8	8	3
WWX200-100B11AR	26	32	45	32	78	14.4	16.8	8	3
WWX200-125B07AR	35	42	56	40	89	16.4	21.8	9	3
WWX200-125B11AR	35	42	56	40	89	16.4	21.8	9	3
WWX200-125B14AR	35	42	56	40	89	16.4	21.8	9	3
WWX200-160C09NR	40	—	56	40	100	16.4	21.8	9	4
WWX200-160C12NR	40	—	56	40	100	16.4	21.8	9	4
WWX200-160C16NR	40	—	56	40	100	16.4	21.8	9	4

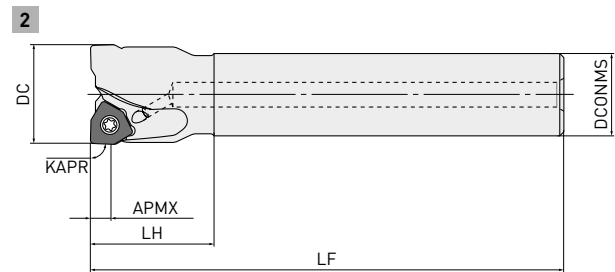
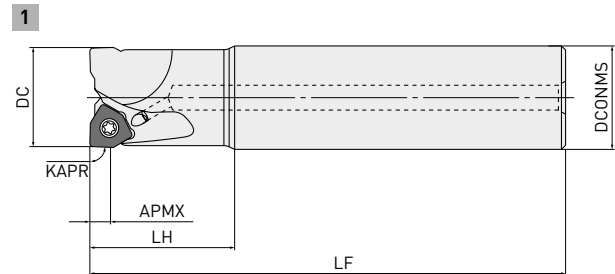
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WWX200



90° FACE MILLING CUTTER

P M K N S H



Right hand tool holder only.

SHANK TYPE

Order number	Stock	APMX	DC	DCONMS	LF	RPMX	WT	LH	ZEFP		Type
WWX200R2502SA20S	●	5	25	20	115	29600	0.3	30	2	○	2
WWX200R2502SA25S	●	5	25	25	115	29600	0.4	35	2	○	1
WWX200R2502SA25L	●	5	25	25	170	29600	0.6	70	2	○	1
WWX200R2502WA25S	●	5	25	25	91	29600	0.3	35	2	○	1
WWX200R2802SA25S	●	5	28	25	115	27400	0.4	35	2	○	2
WWX200R2802SA25L	●	5	28	25	170	27400	0.6	35	2	○	2
WWX200R3002SA25S	●	5	30	25	125	26200	0.5	35	2	○	2
WWX200R3202SA32S	●	5	32	32	125	26200	0.7	45	2	○	1
WWX200R3202WA32S	●	5	32	32	105	26200	0.6	45	2	○	1
WWX200R3203SA32S	●	5	32	32	125	26200	0.7	45	3	○	1
WWX200R3203SA32L	●	5	32	32	190	26200	1.0	90	3	○	1
WWX200R3203WA32S	●	5	32	32	105	26200	0.6	45	3	○	1
WWX200R3503SA32L	●	5	35	32	190	25100	1.1	45	3	○	2
WWX200R4003SA32S	★	5	40	32	125	21600	0.8	45	3	○	2
WWX200R4004SA32S	★	5	40	32	125	21600	0.8	45	4	○	2
WWX200R5004SA32S	★	5	50	32	125	18600	0.9	45	4	○	2
WWX200R5005SA32S	★	5	50	32	125	18600	0.9	45	5	○	2
WWX200R5006SA32S	★	5	50	32	125	18600	0.9	45	6	○	2

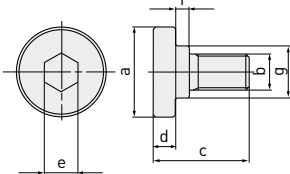
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1. The maximum spindle speeds RPMX are set to ensure tool and insert stability.
2. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
3. ○ = With through coolant holes

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WWX200

PARTS SOLD SEPARATELY – SET BOLT

Tool holder type	Set bolt		Type	Reference dimensions								Geometry
	With coolant hole	Without coolant hole		a	b	c	d	e	f	g		
	Order number											
WWX200-040A [○] AR	HSC08025H	—	1 13	M8x1.25	33	8	5	—	—			
WWX200-050A [○] AR	HSC10030H	HSC10035	1 16	M10x1.5	40 [45]	10	6	—	—			
WWX200-063A [○] AR	HSC10030H	HSC10035	1 16	M10x1.5	40 [45]	10	6	—	—			
WWX200-080A [○] AR	HSC12035H	HSC12035	1 18	M12x1.75	47	12	10	—	—			
WWX200-100B [○] AR	MBA16033H	—	2 40	M16x2	43	10	14	6	23			
WWX200-125B [○] AR	MBA20040H	—	2 50	M20x2.5	54	14	17	6	27			
WWX200-160C [○] NR	—	—	2 50	M20x2.5	54	14	17	6	27			

1. Internal coolant is necessary with the set bolt.

SPARE PARTS

Tool holder type	*		
WWX200 Arbor type	Clamp screw	Wrench (Insert)	Anti-seize lubricant
WWX200 Shank type	TPS3R	TIP10D	MK1KS

* Clamp torque (N • m): TPS3R = 2.0

INSERTS

	P	M	K	N	S	H
Steel	●	●				
Stainless steel		●				
Cast iron			●			
Non-ferrous material				●		
Heat resistant alloy, Titanium alloy					●	
Hardened steel						●

Cutting conditions :

●: Stable cutting ●: General cutting

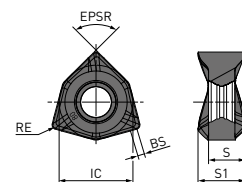
✱: Unstable cutting

Honing:

E: Round F: Sharp edge S: Chamfer + round

T: Chamfer Z: Stable

Order number	Class	Honing	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	TF15	MC5020	MV1020	NEW MV1030	IC	S	S1	BS	RE	Geometry
NEW 6NGU0906040PNER-L	G	E	●	●	●	●	●	●		●	●	●	9.0	5.3	6.1	1.6	0.4	
NEW 6NGU0906080PNER-L	G	E	●	●	●	●	●	●		●	●	●	9.0	5.3	6.1	1.2	0.8	
6NGU0906040PNFR-L	G	F							●				9.0	5.3	6.1	1.3	0.4	
6NGU0906080PNFR-L	G	F							●				9.0	5.3	6.1	1.3	0.8	
6NMU0906040PNER-M	M	E	●	●	●	●	●	●		●	●	●	9.0	5.3	6.1	1.6	0.4	
6NMU0906080PNER-M	M	E	●	●	●	●	●	●		●	●	●	9.0	5.3	6.1	1.2	0.8	
6NMU0906080PNER-R	M	E	●	●		●	●	●		●	●	●	9.0	5.3	6.1	1.2	0.8	



[10 inserts in one case]

WWX400

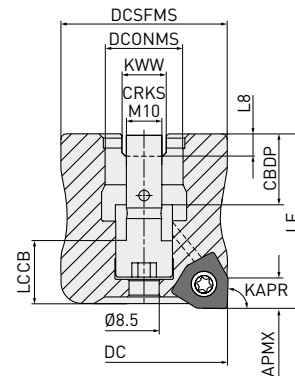


90° FACE MILLING CUTTER

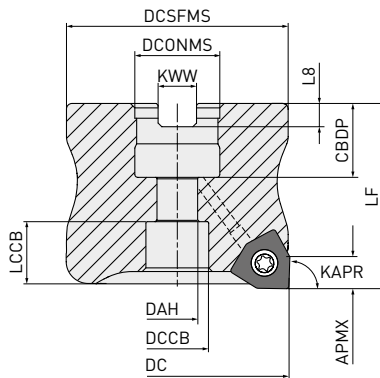
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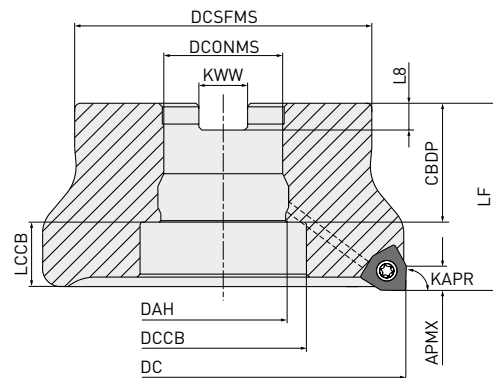
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Ø50



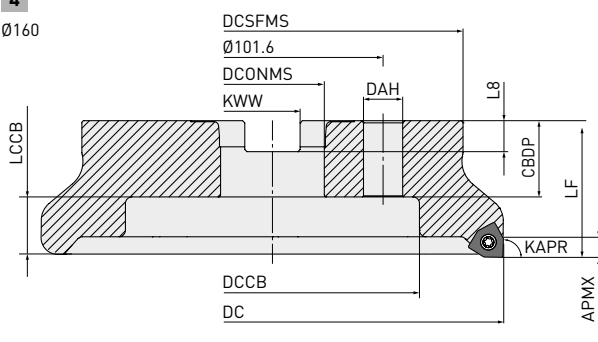
2
Ø63
Ø80



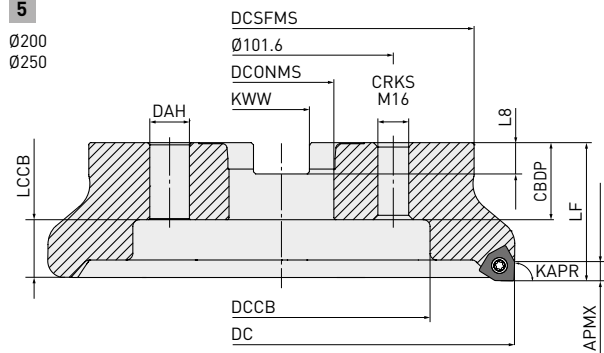
3
Ø100
Ø125



4
Ø160



5
Ø200
Ø250



Right hand tool holder only.

DC	Set bolt	Geometry	
Ø 50, Ø 63	HSC10030H	1	
Ø 80	HSC12035H		
Ø 100	MBA16033H		
Ø 125	MBA20040H		
Ø 160, Ø200, Ø250	—		
		2	

WWX400 – 90° FACE MILLING CUTTER – ARBOR TYPE

Order number	Stock	APMX	DC	DCONMS	GAMF	LF	RMPX	RPMX	WT	ZEFP		Type
WWX400-050A03AR	★	8	50	22	-12.8°	55	0.4°	5000	0.5	3	○	1
WWX400-050A04AR	●	8	50	22	-12.8°	55	0.4°	5000	0.5	4	○	1
WWX400-063A03AR	★	8	63	22	-11°	40	0.26°	14100	0.5	3	○	2
WWX400-063A04AR	●	8	63	22	-11°	40	0.26°	14100	0.5	4	○	2
WWX400-063A05AR	●	8	63	22	-11°	40	0.26°	14100	0.5	5	○	2
WWX400-080A04AR	★	8	80	27	-9.2°	50	0.16°	12200	1	4	○	2
WWX400-080A05AR	●	8	80	27	-9.2°	50	0.16°	12200	1	5	○	2
WWX400-080A07AR	●	8	80	27	-9.2°	50	0.16°	12200	0.9	7	○	2
WWX400-100B05AR	★	8	100	32	-8.5°	50	—	10700	1.6	5	○	3
WWX400-100B07AR	●	8	100	32	-8.5°	50	—	10700	1.5	7	○	3
WWX400-100B09AR	●	8	100	32	-8.5°	50	—	10700	1.5	9	○	3
WWX400-125B06AR	★	8	125	40	-7.8°	63	—	9500	3	6	○	3
WWX400-125B08AR	●	8	125	40	-7.8°	63	—	9500	3	8	○	3
WWX400-125B12AR	★	8	125	40	-7.8°	63	—	9500	2.9	12	○	3
WWX400-160C08NR	★	8	160	40	-7.3°	63	—	8300	4.5	8	—	4
WWX400-160C10NR	★	8	160	40	-7.3°	63	—	8300	4.4	10	—	4
WWX400-160C14NR	★	8	160	40	-10°	63	—	8300	4.4	14	—	4
WWX400-200C10NR	★	8	200	60	-7.2°	63	—	7300	6.7	10	—	5
WWX400-200C12NR	★	8	200	60	-7.2°	63	—	7300	6.7	12	—	5
WWX400-200C16NR	★	8	200	60	-8.5°	63	—	7300	6.6	16	—	5
WWX400-250C12NR	★	8	250	60	-7.2°	63	—	6400	11.5	12	—	5
WWX400-250C14NR	★	8	250	60	-7.2°	63	—	6400	11.5	14	—	5
WWX400-250C18NR	★	8	250	60	-7.2°	63	—	6400	11.4	18	—	5

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1. The maximum spindle speeds RPMX are set to ensure tool and insert stability.
2. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
3. ○ = With through coolant holes
4. A set bolt to the arbor is not supplied with the body. Please refer to page 269, when ordering.
5. Please use a set bolt of the FMC type on the cutter body from 63 to 100 in diameter [DC].
6. Please use a set bolt of the FMA type on the cutter body from 125 to 250 in diameter [DC].

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MOUNTING DIMENSIONS

Order number	CBDP	DAH	DCCB	DCONMS	DCSFMS	KWW	LCCB	L8	Type
WWX400-050A03AR	20	—	—	22	47	10.4	12.2	6.3	1
WWX400-050A04AR	20	—	—	22	47	10.4	12.2	6.3	1
WWX400-063A03AR	20	11	17	22	50	10.4	11.2	6.3	2
WWX400-063A04AR	20	11	17	22	50	10.4	11.2	6.3	2
WWX400-063A05AR	20	11	17	22	50	10.4	11.2	6.3	2
WWX400-080A04AR	23	13	20	27	56	12.4	14.2	7.0	2
WWX400-080A05AR	23	13	20	27	56	12.4	14.2	7.0	2
WWX400-080A07AR	23	13	20	27	56	12.4	14.2	7.0	2
WWX400-100B05AR	32	32	45	32	78	14.4	16.2	8.0	3
WWX400-100B07AR	32	32	45	32	78	14.4	16.2	8.0	3
WWX400-100B09AR	32	32	45	32	78	14.4	16.2	8.0	3
WWX400-125B06AR	40	40	56	40	89	16.4	21.2	9.0	3
WWX400-125B08AR	40	40	56	40	89	16.4	21.2	9.0	3
WWX400-125B12AR	40	40	56	40	89	16.4	21.2	9.0	3
WWX400-160C08NR	40	14	56	40	100	16.4	21.2	9.0	4
WWX400-160C10NR	40	14	56	40	100	16.4	21.2	9.0	4
WWX400-160C14NR	40	14	56	40	100	16.4	21.2	9.0	4
WWX400-200C10NR	32	18	135	60	160	25.7	29.2	14.22	5
WWX400-200C12NR	32	18	135	60	160	25.7	29.2	14.22	5
WWX400-200C16NR	32	18	135	60	160	25.7	29.2	14.22	5
WWX400-250C12NR	32	18	180	60	210	25.7	29.2	14.22	5
WWX400-250C14NR	32	18	180	60	210	25.7	29.2	14.22	5
WWX400-250C18NR	32	18	180	60	210	25.7	29.2	14.22	5

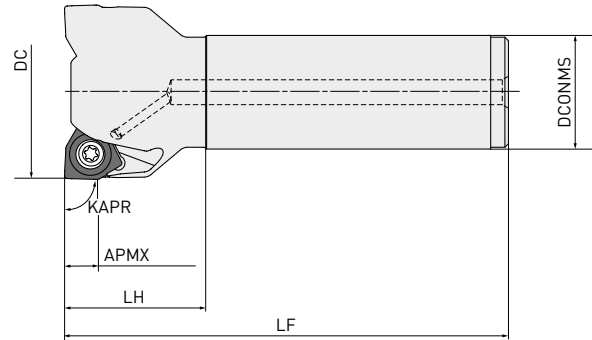
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WWX400



90° FACE MILLING CUTTER

P M K N S H



Right hand tool holder only.

SHANK TYPE

Order number	Stock	APMX	DC	DCONMS	GAMF	LF	RMPX	RPMX	WT	LH	ZEFP	
WWX400R5003SA32M	★	8	50	32	-12.8°	125	0.45°	16000	0.83	40	3	○
WWX400R5004SA32M	★	8	50	32	-12.8°	125	0.45°	16000	0.81	40	4	○
WWX400R6303SA32M	★	8	63	32	-11.0°	125	0.31°	14100	1.00	40	3	○
WWX400R6304SA32M	★	8	63	32	-11.0°	125	0.31°	14100	0.97	40	4	○
WWX400R6305SA32M	★	8	63	32	-11.0°	125	0.31°	14100	0.95	40	5	○
WWX400R8004SA32M	★	8	80	32	-9.2°	125	0.21°	12200	1.27	40	4	○
WWX400R8005SA32M	★	8	80	32	-9.2°	125	0.21°	12200	1.24	40	5	○
WWX400R8007SA32M	★	8	80	32	-9.2°	125	0.21°	12200	1.19	40	7	○

1/1

1. The maximum spindle speeds RPMX are set to ensure tool and insert stability.
2. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
3. ○ = With through coolant holes

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SPARE PARTS

Tool holder type			
	Clamp screw	Wrench (Insert)	Anti-seize lubricant
WWX400 Arbor type			
WWX400 Shank type	TS5R	TKY20T	MK1KS

* Clamp torque (N • m): TS5R = 5.0

● : Inventory maintained. ★ : Inventory maintained in Japan.

WWX400

INSERTS

P	Steel	●	●			✱		●	●
M	Stainless steel		●			●		●	●
K	Cast iron					✱	●	●	●
N	Non-ferrous material						●		
S	Heat resistant alloy, Titanium alloy			●	●				
H	Hardened steel	●				●			

Cutting conditions :

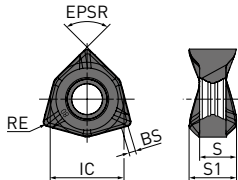
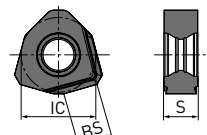
●: Stable cutting ●: General cutting

✱: Unstable cutting

Honing:

E: Round F: Sharp edge S: Chamfer + round

T: Chamfer Z: Stable

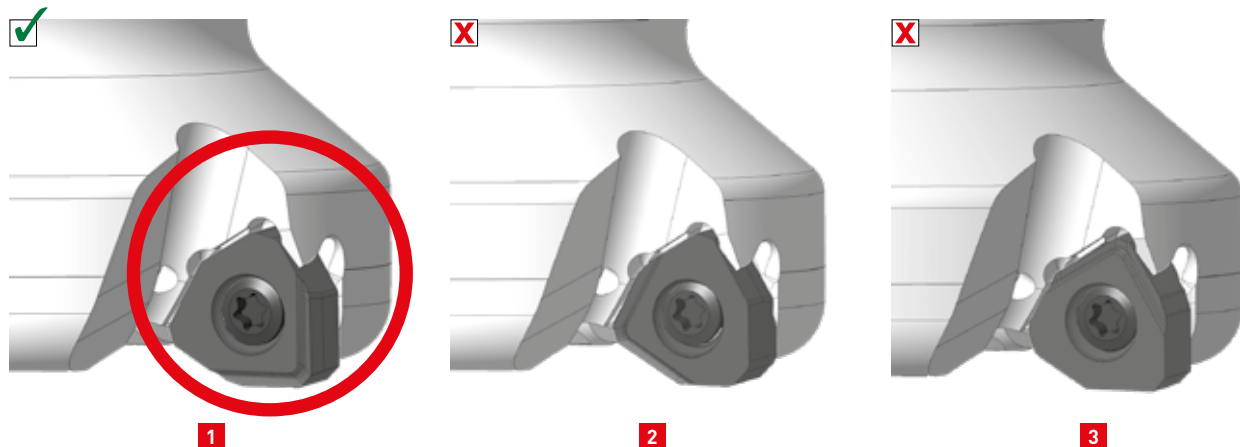
Order number	Class	Honing	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	TF15	MC5020	MV1020	NEW MV1030	IC	S	S1	BS	RE	Geometry Right hand insert only.
6NGU1409040PNER-L	G	E	●	●	●	●	●	●		●	●	●	14	7	9	1.7	0.4	
6NGU1409080PNER-L	G	E	●	●	●	●	●	●		●	●	●	14	7	9	1.3	0.8	
6NGU1409040PNFR-L	G	F							●				14	7	9	1.7	0.4	
6NGU1409080PNFR-L	G	F							●				14	7	9	1.3	0.8	
6NGU1409040PNER-M	G	E	●	●	●	●	●	●		●	●	●	14	7	9	1.7	0.4	
6NGU1409080PNER-M	G	E	●	●	●	●	●	●		●	●	●	14	7	9	1.3	0.8	
6NMU1409040PNER-M	M	E	●	●	●	●	●	●		●	●	●	14	7	9	1.7	0.4	
6NMU1409080PNER-M	M	E	●	●	●	●	●	●		●	●	●	14	7	9	1.3	0.8	
6NMU1409160PNER-M	M	E	●	●	●	●	●	●		●	●	●	14	7	9	0.5	1.6	
6NMU1409200PNER-M	M	E	●	●	●	●	●	●		●	●	●	14	7	9	0.5	2.0	
6NMU1409080PNER-R	M	E	●	●		●	●	●		●	●	●	14	7	9	1.3	0.8	
6NMU1409160PNER-R	M	E	●	●		●	●	●		●	●	●	14	7	9	0.5	1.6	
6NMU1409200PNER-R	M	E	●	●		●	●	●		●	●	●	14	7	9	0.5	2.0	
2NGU1406ZNER6C-M	G	E	●					●		●			14	6.3	—	6.5	—	

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[10 inserts in one case]

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INSTRUCTIONS FOR USE OF WIPER INSERTS



Wiper inserts for WWX400 are two-cornered. Please set as shown in picture 1.

Excellent surface finishes can be achieved with one wiper.

Set more than 2 wiper inserts, equally spaced, when the feed per revolution is larger than 6.5 mm/rev.

When choosing a wiper insert select a general grade that is similar to the ideal cutting conditions.

WWX200/400

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED / DRY CUTTING

Material	Properties	Cutting conditions	Grade	Vc		
				ae ≤ 0.5 DC	ae ≤ 0.8 DC	ae = DC
P	Mild steel	≤180HB	● MV1020	300 (250 – 350)	280 (230 – 330)	250 (200 – 300)
			● MP6120	240 (200 – 280)	220 (180 – 260)	200 (160 – 240)
			● MV1030	230 (190 – 270)	210 (170 – 250)	190 (150 – 230)
			● MV1020	290 (240 – 340)	260 (210 – 320)	240 (190 – 290)
			● MV1030	230 (190 – 270)	210 (170 – 250)	190 (150 – 230)
			● MP6130	230 (190 – 270)	210 (170 – 250)	190 (150 – 230)
			✱ MP6130	210 (170 – 250)	190 (150 – 230)	170 (130 – 210)
			✱ VP15TF	210 (170 – 250)	190 (150 – 230)	170 (130 – 210)
	Carbon steel Alloy steel	180 – 280HB	● MV1020	260 (210 – 310)	240 (190 – 280)	210 (160 – 260)
			● MP6120	210 (170 – 250)	190 (150 – 230)	170 (130 – 210)
			● MV1030	200 (160 – 240)	180 (140 – 220)	160 (120 – 200)
			● MV1020	250 (200 – 300)	230 (180 – 270)	200 (150 – 250)
			● MV1030	200 (160 – 240)	180 (140 – 220)	160 (120 – 200)
			● MP6130	200 (160 – 240)	180 (140 – 220)	160 (120 – 200)
			✱ MP6130	180 (140 – 220)	160 (120 – 200)	140 (100 – 180)
			✱ VP15TF	180 (140 – 220)	160 (120 – 200)	140 (100 – 180)
	Carbon steel Alloy steel Alloy tool steel	280 – 350HB ≤350HB	● MV1020	260 (210 – 310)	240 (190 – 280)	210 (160 – 260)
			● MP6120	200 (160 – 240)	180 (140 – 220)	160 (120 – 200)
			● MV1030	200 (160 – 240)	180 (140 – 220)	160 (120 – 200)
			● MV1020	250 (200 – 300)	230 (180 – 270)	200 (150 – 250)
			● MV1030	190 (150 – 230)	170 (130 – 210)	150 (110 – 190)
			● MP6130	190 (150 – 230)	170 (130 – 210)	150 (110 – 190)
			✱ MP6130	170 (130 – 210)	150 (110 – 190)	130 (90 – 170)
			✱ VP15TF	170 (130 – 210)	150 (110 – 190)	130 (90 – 170)
	Pre-hardened steel	35 – 45HRC	● MP6120	140 (120 – 160)	—	—
			● MP6130	120 (100 – 140)	—	—
			✱ MP6130	110 (90 – 130)	—	—
			✱ VP15TF	110 (90 – 130)	—	—
M	Austenitic stainless steel	≤200HB	● MV1030	180 (160 – 200)	160 (140 – 180)	—
			● MP7130	180 (160 – 200)	160 (140 – 180)	—
			● MV1030	170 (150 – 190)	150 (130 – 170)	—
			● MP7130	170 (150 – 190)	150 (130 – 170)	—
			● VP15TF	170 (150 – 190)	150 (130 – 170)	—
			✱ MP7130	150 (130 – 170)	130 (110 – 150)	—
			✱ VP15TF	150 (130 – 170)	130 (110 – 150)	—
			● MV1030	170 (150 – 190)	150 (130 – 170)	—
			● MP7130	170 (150 – 190)	150 (130 – 170)	—
		>200HB	● MV1030	160 (140 – 180)	140 (120 – 160)	—
			● MP7130	160 (140 – 180)	140 (120 – 160)	—
			● VP15TF	160 (140 – 180)	140 (120 – 160)	—
			✱ MP7130	140 (120 – 160)	120 (100 – 140)	—
			✱ VP15TF	140 (120 – 160)	120 (100 – 140)	—

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WWX200/400 – CUTTING SPEED / DRY CUTTING

Material	Properties	Cutting conditions	Grade	Vc		
				ae ≤ 0.5 DC	ae ≤ 0.8 DC	ae = DC
M	Ferritic and martensitic Stainless steel	●	MV1030	180 (160 – 200)	160 (140 – 180)	—
		●	MP7130	180 (160 – 200)	160 (140 – 180)	—
		●	MV1030	170 (150 – 190)	150 (130 – 170)	—
		●	MP7130	170 (150 – 190)	150 (130 – 170)	—
		●	VP15TF	170 (150 – 190)	150 (130 – 170)	—
		✱	MP7130	150 (130 – 170)	130 (110 – 150)	—
		✱	VP15TF	150 (130 – 170)	130 (110 – 150)	—
	Duplex stainless steel	●	MP7130	160 (140 – 180)	140 (120 – 160)	—
		●	MP7130	150 (130 – 170)	130 (110 – 150)	—
		●	VP15TF	150 (130 – 170)	130 (110 – 150)	—
		✱	MP7130	130 (110 – 150)	110 (90 – 130)	—
		✱	VP15TF	130 (110 – 150)	110 (90 – 130)	—
	Precipitation hardening Stainless steel	●	MP7130	140 (120 – 160)	—	—
		●	MP7130	130 (110 – 150)	—	—
		●	VP15TF	130 (110 – 150)	—	—
		✱	MP7130	110 (90 – 130)	—	—
		✱	VP15TF	110 (90 – 130)	—	—
K	Gray cast iron	●	MC5020	250 (210 – 290)	230 (190 – 270)	210 (170 – 250)
		●	MC5020	240 (200 – 280)	220 (180 – 260)	200 (160 – 240)
		●	VP15TF	240 (200 – 280)	220 (180 – 260)	—
		✱	MC5020	220 (180 – 260)	200 (160 – 240)	180 (140 – 220)
		✱	VP15TF	220 (180 – 260)	200 (160 – 240)	180 (140 – 220)
	Ductile cast iron	●	MV1020	240 (200 – 310)	220 (170 – 280)	200 (150 – 260)
		●	MV1030	210 (170 – 250)	190 (150 – 230)	170 (130 – 210)
		●	MC5020	220 (180 – 260)	200 (160 – 240)	180 (140 – 220)
		●	MV1020	230 (190 – 300)	210 (160 – 270)	190 (140 – 250)
		●	MV1030	210 (170 – 250)	190 (150 – 230)	170 (130 – 210)
		●	MC5020	210 (170 – 250)	190 (150 – 230)	170 (130 – 210)
		●	VP15TF	210 (170 – 250)	190 (150 – 230)	—
		✱	MC5020	190 (150 – 230)	170 (130 – 210)	150 (110 – 190)
		✱	VP15TF	190 (150 – 230)	170 (130 – 210)	150 (110 – 190)
		●	MV1020	210 (160 – 280)	190 (140 – 250)	160 (120 – 210)
	Ductile cast iron	●	MC5020	180 (140 – 220)	160 (120 – 200)	140 (100 – 180)
		●	MV1030	170 (130 – 210)	150 (110 – 190)	130 (90 – 170)
		●	MV1020	200 (150 – 270)	180 (130 – 240)	150 (110 – 200)
		●	MV1030	170 (130 – 210)	150 (110 – 190)	130 (90 – 170)
		●	MC5020	170 (130 – 210)	150 (110 – 190)	130 (90 – 170)
		●	VP15TF	170 (130 – 210)	150 (110 – 190)	—
		✱	MC5020	150 (110 – 190)	130 (90 – 170)	110 (70 – 150)
		✱	VP15TF	150 (110 – 190)	130 (90 – 170)	110 (70 – 150)
	Hardened steel	● ●	VP15TF	50 (30 – 70)	—	—
		●	MP6120	40 (30 – 70)	—	—

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WWX200/400

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED/WET CUTTING

Material	Properties	Cutting conditions	Grade	Vc		
				ae ≤ 0.5 DC	ae ≤ 0.8 DC	ae = DC
P	Mild steel	≤180HB	● MV1020	220 (210 – 230)	190 (180 – 210)	180 (160 – 190)
			● MP6120	150 (140 – 160)	130 (120 – 140)	120 (110 – 130)
			● MV1030	140 (130 – 150)	120 (110 – 130)	110 (100 – 120)
			● MV1020	210 (200 – 220)	180 (170 – 200)	170 (150 – 180)
			● MV1030	140 (130 – 150)	120 (110 – 130)	110 (100 – 120)
			● MP6130	140 (130 – 150)	120 (110 – 130)	110 (100 – 120)
			✱ MP6130	120 (110 – 130)	100 (90 – 110)	90 (80 – 100)
			✱ VP15TF	120 (110 – 130)	100 (90 – 110)	90 (80 – 100)
	Carbon steel Alloy steel	180 – 280HB	● MV1020	200 (190 – 210)	170 (160 – 190)	160 (150 – 170)
			● MP6120	150 (140 – 160)	130 (120 – 140)	120 (110 – 130)
			● MV1030	140 (130 – 150)	120 (110 – 130)	110 (100 – 120)
			● MV1020	190 (180 – 200)	160 (150 – 180)	150 (140 – 160)
			● MV1030	140 (130 – 150)	120 (110 – 130)	110 (100 – 120)
			● MP6130	140 (130 – 150)	120 (110 – 130)	110 (100 – 120)
			✱ MP6130	120 (110 – 130)	100 (90 – 110)	90 (80 – 100)
			✱ VP15TF	120 (110 – 130)	100 (90 – 110)	90 (80 – 100)
	Carbon steel Alloy steel Alloy tool steel	280 – 350HB ≤350HB	● MV1020	200 (190 – 210)	170 (160 – 190)	160 (150 – 170)
			● MP6120	140 (130 – 150)	120 (110 – 130)	110 (100 – 120)
			● MV1030	140 (130 – 150)	120 (110 – 130)	110 (100 – 120)
			● MV1020	190 (180 – 200)	160 (150 – 180)	150 (140 – 160)
			● MV1030	140 (130 – 150)	120 (110 – 130)	110 (100 – 120)
			● MP6130	130 (120 – 140)	110 (100 – 120)	100 (90 – 110)
			✱ MP6130	110 (100 – 120)	90 (80 – 100)	80 (70 – 90)
			✱ VP15TF	110 (100 – 120)	90 (80 – 100)	80 (70 – 90)
	Pre-hardened steel	35 – 45HRC	● MP6120	110 (100 – 120)	—	—
			● MP6130	100 (90 – 110)	—	—
			✱ MP6130	80 (70 – 90)	—	—
			✱ VP15TF	80 (70 – 90)	—	—
M	Austenitic stainless steel	≤200HB	● MP7130	130 (120 – 140)	110 (100 – 120)	—
			● MP7130	120 (110 – 130)	100 (90 – 110)	—
			● VP15TF	120 (110 – 130)	100 (90 – 110)	—
			✱ MP7130	100 (90 – 110)	80 (70 – 90)	—
			✱ VP15TF	100 (90 – 110)	80 (70 – 90)	—
		>200HB	● MP7130	130 (120 – 140)	110 (100 – 120)	—
			● MP7130	120 (110 – 130)	100 (90 – 110)	—
			● VP15TF	120 (110 – 130)	100 (90 – 110)	—
			✱ MP7130	100 (90 – 110)	80 (70 – 90)	—
			✱ VP15TF	100 (90 – 110)	80 (70 – 90)	—
	Ferritic and martensitic Stainless steel	≤200HB	● MP7130	130 (120 – 140)	110 (100 – 120)	—
			● MP7130	120 (110 – 130)	100 (90 – 110)	—
			● VP15TF	120 (110 – 130)	100 (90 – 110)	—
			✱ MP7130	100 (90 – 110)	80 (70 – 90)	—
			✱ VP15TF	100 (90 – 110)	80 (70 – 90)	—

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WWX200/400 – CUTTING SPEED / WET CUTTING

Material	Properties	Cutting conditions	Grade	Vc		
				ae ≤ 0.5 DC	ae ≤ 0.8 DC	ae = DC
K	Duplex stainless steel	≤280HB	● MP7130	120 (110 – 130)	100 (90 – 110)	—
			● MP7130	110 (100 – 120)	90 (80 – 100)	—
			● VP15TF	110 (100 – 120)	90 (80 – 100)	—
			✱ MP7130	90 (80 – 100)	70 (60 – 80)	—
			✱ VP15TF	90 (80 – 100)	70 (60 – 80)	—
	Precipitation hardening Stainless steel	<450HB	● MP7130	120 (110 – 130)	—	—
			● MP7130	110 (100 – 120)	—	—
			● VP15TF	110 (100 – 120)	—	—
			✱ MP7130	90 (80 – 100)	—	—
			✱ VP15TF	90 (80 – 100)	—	—
K	Gray cast iron		● MC5020	170 (150 – 190)	150 (130 – 170)	130 (110 – 150)
			● MC5020	160 (140 – 180)	140 (120 – 160)	120 (100 – 140)
			● VP15TF	160 (140 – 180)	140 (120 – 160)	—
			✱ MC5020	140 (120 – 160)	120 (100 – 140)	100 (80 – 120)
			✱ VP15TF	140 (120 – 160)	120 (100 – 140)	100 (80 – 120)
	Ductile cast iron	≤450MPa	● MV1020	200 (180 – 240)	180 (150 – 220)	150 (130 – 200)
			● MC5020	170 (150 – 190)	150 (130 – 170)	130 (110 – 150)
			● MV1030	160 (140 – 180)	140 (120 – 160)	120 (100 – 140)
			● MV1020	190 (170 – 230)	170 (140 – 210)	140 (120 – 190)
			● MV1030	160 (140 – 180)	140 (120 – 160)	120 (100 – 140)
			● MC5020	160 (140 – 180)	140 (120 – 160)	120 (100 – 140)
			● VP15TF	160 (140 – 180)	140 (120 – 160)	—
			✱ MC5020	140 (120 – 160)	120 (100 – 140)	100 (80 – 120)
			✱ VP15TF	140 (120 – 160)	120 (100 – 140)	100 (80 – 120)
	Ductile cast iron	≤800MPa	● MV1020	180 (170 – 210)	160 (150 – 190)	140 (120 – 160)
			● MC5020	160 (150 – 170)	140 (130 – 150)	120 (110 – 130)
			● MV1030	150 (140 – 160)	130 (120 – 140)	110 (100 – 120)
			● MV1020	170 (160 – 200)	150 (140 – 180)	120 (110 – 150)
			● MV1030	150 (140 – 160)	130 (120 – 140)	110 (100 – 120)
			● MC5020	150 (140 – 160)	130 (120 – 140)	110 (100 – 120)
			● VP15TF	150 (140 – 160)	130 (120 – 140)	—
			✱ MC5020	130 (120 – 140)	110 (100 – 120)	90 (80 – 100)
N	Aluminium alloy	Si<5%	● TF15	500 (300 – 900)	500 (300 – 900)	500 (300 – 900)
			● TF15	500 (300 – 900)	500 (300 – 900)	500 (300 – 900)
			✱ TF15	400 (200 – 800)	400 (200 – 800)	400 (200 – 800)
S	Titanium alloy	—	● MP9120	80 (60 – 100)	—	—
			● MP9120	70 (50 – 90)	—	—
			✱ MP9130	60 (40 – 80)	—	—
	Heat resistant alloy	—	● MP9120	60 (50 – 70)	—	—
			✱ MP9120	50 (30 – 60)	—	—
H	Hardened steel	40 – 55HRC	● VP15TF	50 (30 – 70)	—	—
			● MP6120	40 (30 – 70)	—	—

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1. To discharge chips effectively, use an air blow when machining. When the air blow is less effective at discharging chips, we recommend wet cutting.
2. When large vibration occurs, reduce the cutting conditions.
3. For interrupted cutting, reduce the cutting speed and feed rate by 20 %.

WWX200

RECOMMENDED CUTTING CONDITIONS

DEPTH OF CUT / FEED PER TOOTH

Material	Properties	Cutting conditions	Coolant	Grade	ae ≤ 0.5 DC		ae ≤ 0.8 DC		ae = DC	
					 ap	 fz	 ap	 fz	 ap	 fz
Mild steel	≤180HB	●	✗	MV1020	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 2.0 0.13 [0.10–0.15]
		●	✗	MV1030	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 2.0 0.13 [0.10–0.15]
		●	✗	MP6120	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 2.0 0.13 [0.10–0.15]
		●	✗	MV1020	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 2.0 0.13 [0.10–0.15]
		●	✗	MV1030	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 2.0 0.13 [0.10–0.15]
		●	✗	MP6130	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 2.0 0.13 [0.10–0.15]
		●	✗	MV1020	M, R	≤ 3.0 0.16 [0.10–0.20]	M, R	≤ 3.0 0.16 [0.10–0.20]	—	—
		●	✗	MV1030	M, R	≤ 3.0 0.16 [0.10–0.20]	M, R	≤ 3.0 0.16 [0.10–0.20]	—	—
		●	✗	MP6130	M, R	≤ 3.0 0.16 [0.10–0.20]	M, R	≤ 3.0 0.16 [0.10–0.20]	—	—
		✱	✗	MP6130	M, R	≤ 3.0 0.13 [0.10–0.15]	M, R	≤ 3.0 0.13 [0.10–0.15]	M	≤ 2.0 0.13 [0.10–0.15]
Carbon steel Alloy steel Alloy tool steel	180 – 280HB	●	✗	MV1020	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 2.0 0.13 [0.10–0.15]
		●	✗	MV1030	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 2.0 0.13 [0.10–0.15]
		●	✗	MP6120	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 2.0 0.13 [0.10–0.15]
		●	✗	MV1020	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 2.0 0.13 [0.10–0.15]
		●	✗	MV1030	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 2.0 0.13 [0.10–0.15]
		●	✗	MP6130	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 2.0 0.13 [0.10–0.15]
		●	✗	MV1020	M, R	≤ 3.0 0.16 [0.10–0.20]	M, R	≤ 3.0 0.16 [0.10–0.20]	—	—
		●	✗	MV1030	M, R	≤ 3.0 0.16 [0.10–0.20]	M, R	≤ 3.0 0.16 [0.10–0.20]	—	—
		●	✗	MP6130	M, R	≤ 3.0 0.16 [0.10–0.20]	M, R	≤ 3.0 0.16 [0.10–0.20]	—	—
		✱	✗	MP6130	M, R	≤ 3.0 0.13 [0.10–0.15]	M, R	≤ 3.0 0.13 [0.10–0.15]	M, R	≤ 2.0 0.13 [0.10–0.15]
Carbon steel Alloy steel Alloy tool steel	280 – 350HB ≤350HB	●	✗	MV1020	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 2.0 0.13 [0.10–0.15]
		●	✗	MV1030	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 2.0 0.13 [0.10–0.15]
		●	✗	MP6120	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 2.0 0.13 [0.10–0.15]
		●	✗	MV1020	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 2.0 0.13 [0.10–0.15]
		●	✗	MV1030	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 2.0 0.13 [0.10–0.15]
		●	✗	MP6130	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 3.0 0.13 [0.10–0.15]	L, M	≤ 2.0 0.13 [0.10–0.15]
		●	✗	MV1020	M, R	≤ 3.0 0.16 [0.10–0.20]	M, R	≤ 3.0 0.16 [0.10–0.20]	—	—
		●	✗	MV1030	M, R	≤ 3.0 0.16 [0.10–0.20]	M, R	≤ 3.0 0.16 [0.10–0.20]	—	—
		●	✗	MP6130	M, R	≤ 3.0 0.16 [0.10–0.20]	M, R	≤ 3.0 0.16 [0.10–0.20]	—	—
		✱	✗	MP6130	M, R	≤ 3.0 0.13 [0.10–0.15]	M, R	≤ 3.0 0.13 [0.10–0.15]	M	≤ 2.0 0.13 [0.10–0.15]
Pre-hardened steel	35 – 45HRC	●	✗	MP6120	M	≤ 2.0 0.13 [0.10–0.15]	—	—	—	—
		●	✗	MP6130	M	≤ 2.0 0.13 [0.10–0.15]	—	—	—	—
		●	✗	MP6130	R	≤ 2.0 0.16 [0.10–0.20]	—	—	—	—
		✱	✗	MP6130	R	≤ 2.0 0.13 [0.10–0.15]	—	—	—	—
		✱	✗	VP15TF	R	≤ 2.0 0.13 [0.10–0.15]	—	—	—	—

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WWX200 – DEPTH OF CUT/FEED PER TOOTH

Material	Properties	Cutting conditions	Coolant	Grade	ae ≤ 0.5 DC			ae ≤ 0.8 DC			ae = DC		
						ap	fz		ap	fz		ap	fz
M	Austenitic stainless steel	≤200HB		MP7130	L, M	≤ 3.0	0.13 [0.10–0.15]	L, M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
				MV1030	L, M	≤ 2.0	0.13 [0.10–0.15]	L, M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
				VP15TF	M	≤ 3.0	0.16 [0.10–0.20]	M	≤ 3.0	0.16 [0.10–0.20]	—	—	—
				MP7130	M	≤ 3.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
				VP15TF	M	≤ 3.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
		>200HB		MP7130	L, M	≤ 2.0	0.13 [0.10–0.15]	L, M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
				MP7130	L, M	≤ 3.0	0.13 [0.10–0.15]	L, M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
				MV1030	L, M	≤ 2.0	0.13 [0.10–0.15]	L, M	≤ 2.0	0.13 [0.10–0.15]	—	—	—
				VP15TF	M	≤ 2.0	0.16 [0.10–0.20]	M	≤ 3.0	0.16 [0.10–0.20]	—	—	—
				MP7130	M	≤ 2.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
	Ferritic and martensitic Stainless steel	≤200HB		MP7130	L, M	≤ 3.0	0.13 [0.10–0.15]	L, M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
				MV1030	L, M	≤ 2.0	0.13 [0.10–0.15]	L, M	≤ 2.0	0.13 [0.10–0.15]	—	—	—
				VP15TF	M	≤ 3.0	0.16 [0.10–0.20]	M	≤ 3.0	0.16 [0.10–0.20]	—	—	—
				MP7130	M	≤ 3.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
				VP15TF	M	≤ 3.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
		>200HB		MP7130	M	≤ 3.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
				VP15TF	M	≤ 2.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
				VP15TF	M	≤ 2.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
				VP15TF	M	≤ 3.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
				VP15TF	M	≤ 3.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
K	Duplex stainless steel	≤280HB		MP7130	L, M	≤ 2.0	0.13 [0.10–0.15]	L, M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
				MP7130	L, M	≤ 3.0	0.13 [0.10–0.15]	L, M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
				VP15TF	M	≤ 2.0	0.16 [0.10–0.20]	M	≤ 3.0	0.16 [0.10–0.20]	—	—	—
				VP15TF	M	≤ 3.0	0.16 [0.10–0.20]	M	≤ 3.0	0.16 [0.10–0.20]	—	—	—
				MP7130	M	≤ 2.0	0.13 [0.10–0.15]	M	≤ 3.0	0.16 [0.10–0.20]	—	—	—
				MP7130	M	≤ 3.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
				VP15TF	M	≤ 2.0	0.13 [0.10–0.15]	M	≤ 3.0	0.16 [0.10–0.20]	—	—	—
				VP15TF	M	≤ 3.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
				VP15TF	M	≤ 3.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
				VP15TF	M	≤ 3.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
	Precipitation Hardening stainless steel	<450HB		MP7130	L, M	≤ 2.0	0.13 [0.10–0.15]	—	—	—	—	—	—
				VP15TF	M	≤ 2.0	0.16 [0.10–0.20]	—	—	—	—	—	—
				MP7130	M	≤ 2.0	0.13 [0.10–0.15]	—	—	—	—	—	—
				VP15TF	M	≤ 2.0	0.13 [0.10–0.15]	—	—	—	—	—	—
				VP15TF	M	≤ 2.0	0.13 [0.10–0.15]	—	—	—	—	—	—
				VP15TF	M	≤ 2.0	0.13 [0.10–0.15]	—	—	—	—	—	—
				VP15TF	M	≤ 2.0	0.13 [0.10–0.15]	—	—	—	—	—	—
				VP15TF	M	≤ 2.0	0.13 [0.10–0.15]	—	—	—	—	—	—
				VP15TF	M	≤ 2.0	0.13 [0.10–0.15]	—	—	—	—	—	—
				VP15TF	M	≤ 2.0	0.13 [0.10–0.15]	—	—	—	—	—	—
				VP15TF	M	≤ 2.0	0.13 [0.10–0.15]	—	—	—	—	—	—
N	Gray cast iron	≤350MPa		MC5020	L, M	≤ 3.0	0.13 [0.10–0.15]	L, M	≤ 3.0	0.13 [0.10–0.15]	L, M	≤ 2.0	0.13 [0.10–0.15]
				VP15TF	M, R	≤ 3.0	0.16 [0.10–0.20]	M, R	≤ 3.0	0.16 [0.10–0.20]	—	—	—
				MC5020	M, R	≤ 3.0	0.13 [0.10–0.15]	M, R	≤ 3.0	0.13 [0.10–0.15]	M, R	≤ 2.0	0.13 [0.10–0.15]
				VP15TF	M, R	≤ 3.0	0.13 [0.10–0.15]	M, R	≤ 3.0	0.13 [0.10–0.15]	M, R	≤ 2.0	0.13 [0.10–0.15]
				VP15TF	M, R	≤ 3.0	0.13 [0.10–0.15]	M, R	≤ 3.0	0.13 [0.10–0.15]	M, R	≤ 2.0	0.13 [0.10–0.15]
	Ductile cast iron	≤800MPa		MV1020	L, M	≤ 3.0	0.13 [0.10–0.15]	L, M	≤ 3.0	0.13 [0.10–0.15]	L, M	≤ 2.0	0.13 [0.10–0.15]
				MV1030	L, M	≤ 3.0	0.13 [0.10–0.15]	L, M	≤ 3.0	0.13 [0.10–0.15]	L, M	≤ 2.0	0.13 [0.10–0.15]
				MC5020	L, M	≤ 3.0	0.13 [0.10–0.15]	L, M	≤ 3.0	0.13 [0.10–0.15]	L, M	≤ 2.0	0.13 [0.10–0.15]
				MV1020	M, R	≤ 3.0	0.16 [0.10–0.20]	M, R	≤ 3.0	0.16 [0.10–0.20]	—	—	—
				MV1030	M, R	≤ 3.0	0.16 [0.10–0.20]	M, R	≤ 3.0	0.16 [0.10–0.20]	—	—	—
S	Heat resistant alloy	—		VP15TF	M, R	≤ 3.0	0.16 [0.10–0.20]	M, R	≤ 3.0	0.16 [0.10–0.20]	—	—	—
				MC5020	M, R	≤ 3.0	0.13 [0.10–0.15]	M, R	≤ 3.0	0.13 [0.10–0.15]	M, R	≤ 2.0	0.13 [0.10–0.15]
				VP15TF	M, R	≤ 3.0	0.13 [0.10–0.15]	M, R	≤ 3.0	0.13 [0.10–0.15]	M, R	≤ 2.0	0.13 [0.10–0.15]
				VP15TF	M, R	≤ 3.0	0.13 [0.10–0.15]	M, R	≤ 3.0	0.13 [0.10–0.15]	M, R	≤ 2.0	0.13 [0.10–0.15]
				VP15TF	M, R	≤ 3.0	0.13 [0.10–0.15]	M, R	≤ 3.0	0.13 [0.10–0.15]	M, R	≤ 2.0	0.13 [0.10–0.15]
	Aluminium alloy	—		TF15	L	≤ 3.0	0.13 [0.10–0.15]	L	≤ 3.0	0.13 [0.10–0.15]	L	≤ 2.0	0.13 [0.10–0.15]
				MP9120	L, M	≤ 2.0	0.10 [0.05–0.13]	—	—	—	—	—	—
				MP9130	L, M	≤ 2.0	0.10 [0.05–0.13]	—	—	—	—	—	—
				MP9120	L, M	≤ 2.0	0.10 [0.05–0.13]	—	—	—	—	—	—
				MP9130	L, M	≤ 2.0	0.10 [0.05–0.13]	—	—	—	—	—	—
H	Hardened steel	40 – 55HRC		VP15TF	M	≤ 2.0	0.05 [0.05–0.10]	—	—	—	—	—	—
				VP15TF	M, R	≤ 2.0	0.05 [0.05–0.10]	—	—	—	—	—	—
				MP6120	M, R	≤ 2.0	0.05 [0.05–0.10]	—	—	—	—	—	—

WWX400

RECOMMENDED CUTTING CONDITIONS

DEPTH OF CUT / FEED PER TOOTH

Material	Properties	Cutting conditions	Coolant	Grade	ae ≤ 0.5 DC			ae ≤ 0.8 DC			ae = DC		
						ap	fz		ap	fz		ap	fz
Mild steel	≤180HB	●	✗	MV1020	L,M	≤ 4.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]
		●	✗	MV1030	L,M	≤ 4.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]
		●	✗	MP6120	L,M	≤ 4.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]
		●	✗	MV1020	L,M	≤ 4.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]
		●	✗	MV1030	L,M	≤ 4.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]
		●	✗	MP6130	L,M	≤ 4.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]
		●	✗	MV1020	M,R	≤ 4.0	0.16 [0.10–0.20]	M,R	≤ 3.0	0.16 [0.10–0.20]	—	—	—
		●	✗	MV1030	M,R	≤ 4.0	0.16 [0.10–0.20]	M,R	≤ 3.0	0.16 [0.10–0.20]	—	—	—
		●	✗	MP6130	M,R	≤ 4.0	0.16 [0.10–0.20]	M,R	≤ 3.0	0.16 [0.10–0.20]	—	—	—
		✱	✗	MP6130	M,R	≤ 4.0	0.13 [0.10–0.15]	M,R	≤ 3.0	0.13 [0.10–0.15]	M	≤ 2.0	0.13 [0.10–0.15]
Carbon steel Alloy steel Alloy tool steel	180 – 280HB	●	✗	MV1020	L,M	≤ 4.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]
		●	✗	MV1030	L,M	≤ 4.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]
		●	✗	MP6120	L,M	≤ 4.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]
		●	✗	MV1020	L,M	≤ 4.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]
		●	✗	MV1030	L,M	≤ 4.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]
		●	✗	MP6130	L,M	≤ 4.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]
		●	✗	MV1020	M,R	≤ 4.0	0.16 [0.10–0.20]	M,R	≤ 3.0	0.16 [0.10–0.20]	—	—	—
		●	✗	MV1030	M,R	≤ 4.0	0.16 [0.10–0.20]	M,R	≤ 3.0	0.16 [0.10–0.20]	—	—	—
		●	✗	MP6130	M,R	≤ 4.0	0.16 [0.10–0.20]	M,R	≤ 3.0	0.16 [0.10–0.20]	—	—	—
		✱	✗	MP6130	M,R	≤ 4.0	0.13 [0.10–0.15]	M,R	≤ 3.0	0.13 [0.10–0.15]	M	≤ 2.0	0.13 [0.10–0.15]
Carbon steel Alloy steel Alloy tool steel	280 – 350HB ≤350HB	●	✗	MV1020	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]
		●	✗	MV1030	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]
		●	✗	MP6120	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]
		●	✗	MV1020	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]
		●	✗	MV1030	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]
		●	✗	MP6130	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]
		●	✗	MV1020	M,R	≤ 3.0	0.16 [0.10–0.20]	M,R	≤ 3.0	0.16 [0.10–0.20]	—	—	—
		●	✗	MV1030	M,R	≤ 3.0	0.16 [0.10–0.20]	M,R	≤ 3.0	0.16 [0.10–0.20]	—	—	—
		●	✗	MP6130	M,R	≤ 3.0	0.16 [0.10–0.20]	M,R	≤ 3.0	0.16 [0.10–0.20]	—	—	—
		✱	✗	MP6130	M,R	≤ 3.0	0.13 [0.10–0.15]	M,R	≤ 3.0	0.13 [0.10–0.15]	M	≤ 2.0	0.13 [0.10–0.15]
Pre-hardened steel	35 – 45HRC	●	✗	MP6120	L,M	≤ 2.0	0.13 [0.10–0.15]	—	—	—	—	—	—
		●	✗	MP6130	L,M	≤ 2.0	0.13 [0.10–0.15]	—	—	—	—	—	—
		●	✗	MP6130	M,R	≤ 2.0	0.16 [0.10–0.20]	—	—	—	—	—	—
		✱	✗	MP6130	M,R	≤ 2.0	0.13 [0.10–0.15]	—	—	—	—	—	—
		✱	✗	VP15TF	M,R	≤ 2.0	0.13 [0.10–0.15]	—	—	—	—	—	—

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1. To discharge chips effectively, use an air blow when machining. When the air blow is less effective at discharging chips, we recommend wet cutting.
2. When large vibration occurs, reduce the cutting conditions.
3. For interrupted cutting, reduce the cutting speed and feed rate by 20 %.

WWX400 – DEPTH OF CUT/FEED PER TOOTH

Material	Properties	Cutting conditions	Coolant	Grade	ae ≤ 0.5 DC			ae ≤ 0.8 DC			ae = DC		
						ap	fz		ap	fz		ap	fz
M	Austenitic stainless steel	≤200HB	  	MV1030	L,M	≤ 2.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]	—	—	—
			  	MP7130	L,M	≤ 4.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
			  	VP15TF	M	≤ 4.0	0.16 [0.10–0.20]	M	≤ 3.0	0.16 [0.10–0.20]	—	—	—
			  	MP7130	M	≤ 4.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
			  	VP15TF	M	≤ 4.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
			  	MP7130	M	≤ 4.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
		>200HB	  	MV1030	L,M	≤ 2.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]	—	—	—
			  	MP7130	L,M	≤ 4.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
			  	MV1030	L,M	≤ 2.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]	—	—	—
			  	MP7130	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
			  	VP15TF	M	≤ 3.0	0.16 [0.10–0.20]	M	≤ 3.0	0.16 [0.10–0.20]	—	—	—
			  	MP7130	M	≤ 3.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
	Ferritic and martensitic Stainless steel	≤200HB	  	MV1030	L,M	≤ 2.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]	—	—	—
			  	MP7130	L,M	≤ 4.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
			  	VP15TF	M	≤ 4.0	0.16 [0.10–0.20]	M	≤ 3.0	0.16 [0.10–0.20]	—	—	—
			  	MP7130	M	≤ 3.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
		>200HB	  	VP15TF	M	≤ 3.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
			  	MP7130	M	≤ 3.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
			  	VP15TF	M	≤ 3.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
			  	MP7130	M	≤ 3.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
	Duplex stainless steel	≤280HB	  	MP7130	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
			  	MP7130	L,M	≤ 4.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
			  	VP15TF	M	≤ 3.0	0.16 [0.10–0.20]	M	≤ 3.0	0.16 [0.10–0.20]	—	—	—
			  	VP15TF	M	≤ 4.0	0.16 [0.10–0.20]	M	≤ 3.0	0.16 [0.10–0.20]	—	—	—
			  	MP7130	M	≤ 3.0	0.13 [0.10–0.15]	M	≤ 3.0	0.16 [0.10–0.20]	—	—	—
			  	MP7130	M	≤ 4.0	0.13 [0.10–0.15]	M	≤ 3.0	0.16 [0.10–0.20]	—	—	—
			  	VP15TF	M	≤ 3.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
			  	VP15TF	M	≤ 4.0	0.13 [0.10–0.15]	M	≤ 3.0	0.13 [0.10–0.15]	—	—	—
	Precipitation Hardening stainless steel	<450HB	  	MP7130	L,M	≤ 2.0	0.13 [0.10–0.15]	—	—	—	—	—	—
			  	MP7130	L,M	≤ 2.0	0.13 [0.10–0.15]	—	—	—	—	—	—
			  	VP15TF	M	≤ 2.0	0.16 [0.10–0.20]	—	—	—	—	—	—
			  	MP7130	M	≤ 2.0	0.13 [0.10–0.15]	—	—	—	—	—	—
			  	VP15TF	M	≤ 2.0	0.13 [0.10–0.15]	—	—	—	—	—	—
K	Gray cast iron	≤350MPa	  	MC5020	L,M	≤ 4.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]
			  	VP15TF	M,R	≤ 4.0	0.16 [0.10–0.20]	M,R	≤ 3.0	0.16 [0.10–0.20]	—	—	—
			  	MC5020	M,R	≤ 4.0	0.13 [0.10–0.15]	M,R	≤ 3.0	0.13 [0.10–0.15]	M,R	≤ 2.0	0.13 [0.10–0.15]
			  	VP15TF	M,R	≤ 4.0	0.13 [0.10–0.15]	M,R	≤ 3.0	0.13 [0.10–0.15]	M,R	≤ 2.0	0.13 [0.10–0.15]
			  	VP15TF	M,R	≤ 4.0	0.13 [0.10–0.15]	M,R	≤ 3.0	0.13 [0.10–0.15]	M,R	≤ 2.0	0.13 [0.10–0.15]
	Ductile cast iron	≤800MPa	  	MV1020	L,M	≤ 4.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]
			  	MV1030	L,M	≤ 4.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]
			  	MC5020	L,M	≤ 4.0	0.13 [0.10–0.15]	L,M	≤ 3.0	0.13 [0.10–0.15]	L,M	≤ 2.0	0.13 [0.10–0.15]
			  	MV1020	M,R	≤ 4.0	0.16 [0.10–0.20]	M,R	≤ 3.0	0.16 [0.10–0.20]	—	—	—
			  	MV1030	M,R	≤ 4.0	0.16 [0.10–0.20]	M,R	≤ 3.0	0.16 [0.10–0.20]	—	—	—
			  	VP15TF	M,R	≤ 4.0	0.16 [0.10–0.20]	M,R	≤ 3.0	0.16 [0.10–0.20]	—	—	—
			  	MC5020	M,R	≤ 4.0	0.13 [0.10–0.15]	M,R	≤ 3.0	0.13 [0.10–0.15]	M,R	≤ 2.0	0.13 [0.10–0.15]
			  	VP15TF	M,R	≤ 4.0	0.13 [0.10–0.15]	M,R	≤ 3.0	0.13 [0.10–0.15]	M,R	≤ 2.0	0.13 [0.10–0.15]
			  	VP15TF	M,R	≤ 4.0	0.13 [0.10–0.15]	M,R	≤ 3.0	0.13 [0.10–0.15]	M,R	≤ 2.0	0.13 [0.10–0.15]
N	Aluminium alloy	Si<5%	  	TF15	L	≤ 4.0	0.13 [0.10–0.15]	L	≤ 3.0	0.13 [0.10–0.15]	L	≤ 2.0	0.13 [0.10–0.15]
S	Titanium alloy	—	  	MP9120	L,M	≤ 2.0	0.10 [0.05–0.13]	—	—	—	—	—	—
			  	MP9130	L,M	≤ 2.0	0.10 [0.05–0.13]	—	—	—	—	—	—
	Heat resistant alloy	—	  	MP9120	L,M	≤ 2.0	0.10 [0.05–0.13]	—	—	—	—	—	—
			  	MP9130	L,M	≤ 2.0	0.10 [0.05–0.13]	—	—	—	—	—	—
H	Hardened steel	40 – 55HRC	  	VP15TF	M	≤ 2.0	0.05 [0.05–0.10]	—	—	—	—	—	—
			  	VP15TF	M,R	≤ 2.0	0.05 [0.05–0.10]	—	—	—	—	—	—

2/2

1. To discharge chips effectively, use an air blow when machining. When the air blow is less effective at discharging chips, we recommend wet cutting.
2. When large vibration occurs, reduce the cutting conditions.
3. For interrupted cutting, reduce the cutting speed and feed rate by 20 %.

MX3030

NEW CERMET GRADE FOR A WIDER RANGE OF APPLICATIONS



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 **MITSUBISHI MATERIALS**

MX3030

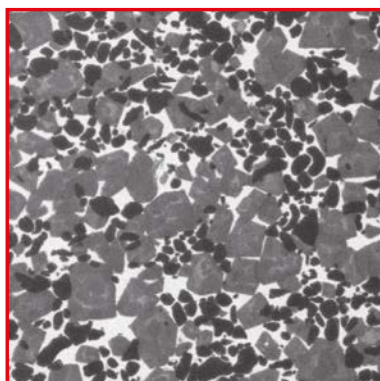
NEW CERMET GRADE FOR A WIDER RANGE OF APPLICATIONS

Enables excellent surface finishes even at high efficiency machining conditions.

IMPROVED MACHINING EFFICIENCY BY MAINTAINING EXCELLENT SURFACE FINISHES EVEN AT LARGE DEPTHS OF CUT

Cermet has a low affinity with iron, excellent thermal stability and oxidation resistance, and is therefore a suitable grade for finishing. However, it does not have the same bonding strength as cemented carbide thereby creating the challenge to compensate for fracture resistance.

MX3030 solves the challenge with higher thermal conductivity than conventional products and has excellent thermal cracking resistance. Therefore, it is possible to suppress wear and maintain high quality surface finishes. Also, since MX3030 has excellent toughness, improved machining efficiency even at large depths of cut can be realised.



MX3030

A special alloy is used for the binder material



Fracture resistance properties increased

High hardness Ti compound particles are used in the substrate



High wear resistance properties

MILD STEEL DIN ST37-2 SURFACE FINISH COMPARISON

Material	DIN ST37-2
DC (mm)	125
Vc (m/min)	200
fz (mm/t)	0.1
ap (mm)	2.0
ae (mm)	100
Cutting mode	Dry cutting, 8 Inserts, Centre cut, After 8 m cutting work



MX3030



Conventional

MX3030

INSERTS

P	Steel	◆
M	Stainless steel	◆
K	Cast iron	◆

Please note that the cutting conditions differ depending on multiple factors, for more details refer to the recommended cutting conditions.

Edge preparation: E: Round S: Chamfer + Round T: Chamfer

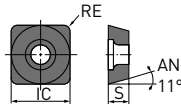
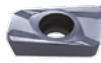
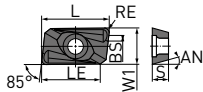
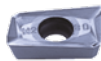
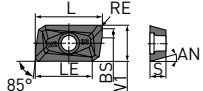
Order number	Hand	Class	Edge preparation	MX3030	IC	L	LE	W1	S	BS	RE	Geometry
SNGU140812ANER-L	R	G	E	●	14.0	—	—	—	8.4	1.5	1.2	WSX445
SNGU140812ANER-M	R	G	E	●								
SNMU140812ANER-M	R	M	E	●								
SNGU140812ANEL-L	L	G	E	★								
SNGU140812ANEL-M	L	G	E	★								
SNMU140812ANEL-M	L	M	E	★								
NEW AOMT123604PEER-M	R	M	E	●	—	12.0	10	6.6	3.6	1.6	0.4	APX3000
NEW AOMT123608PEER-M	R	M	E	●	—	12.0	10	6.6	3.6	1.2	0.8	
SEET13T3AGEN-JL	—	E	E	●	13.4	—	—	—	3.97	1.9	1.5	ASX445
SEMT13T3AGSN-JM	—	M	S	●	13.4	—	—	—	3.97	1.9	1.5	
SOET12T308PEER-JL	R	E	E	●	12.7	—	—	—	3.97	1.4	0.8	ASX400
SOMT12T308PEER-JM	R	M	E	●	12.7	—	—	—	3.97	1.4	0.8	
OEMX12T3ETR1	R	M	T	★	12.7	—	—	—	3.97	1.0	—	OCTACUT
OEMX1705ETR1	R	M	T	★	17.0	—	—	—	5.0	1.4	—	
RPMW10T3M0E	—	M	E	★	10.0	—	—	—	3.97	—	—	BRP
RPMW1204M0E	—	M	E	★	12.0	—	—	—	4.76	—	—	

1/2

[10 inserts in one case]

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MX3030 – INSERTS

P	Steel	◆	Please note that the cutting conditions differ depending on multiple factors, for more details refer to the recommended cutting conditions. Edge preparation: E: Round S: Chamfer + Round T: Chamfer									
M	Stainless steel	◆										
K	Cast iron	◆										
Order number	Hand	Class	Edge preparation	MX3030	IC	L	LE	W1	S	BS	RE	Geometry
SPMW090304	—	M	T	★	9.525	—	—	—	3.18	—	0.4	CESP, SFSP, CGSP  
SPMW090308	—	M	T	★	9.525	—	—	—	3.18	—	0.8	
SPMW120304	—	M	T	★	12.7	—	—	—	3.18	—	0.4	
SPMW120308	—	M	T	●	12.7	—	—	—	3.18	—	0.8	
APMT1135PDER-H1	R	M	E	★	—	11.25	9	6.35	3.5	1.5	0.4	BAP300  
APMT1135PDER-H2	R	M	E	★	—	11.25	9	6.35	3.5	1.2	0.8	
APMT1135PDER-M2	R	M	E	★	—	11.18	9	6.35	3.5	1.2	0.8	
APMT1604PDER-H2	R	M	E	★	—	17.11	14	9.525	4.76	1.4	0.8	BAP400, SRM2  
APMT1604PDER-M2	R	M	E	★	—	17.10	14	9.525	4.76	1.4	0.8	

2/2

[10 inserts in one case]

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CUTTING PERFORMANCE

SURFACE FINISH COMPARISON WHEN MACHINING DIN 42CrMo4 ALLOY STEEL

The MX3030 grades produced an excellent finished surface with uniform machining marks with only a slight cloudiness.

Material	DIN 42CrMo4
Tool	ASX400-JL
Vc (m/min)	250
fz (mm/t)	0.05
ap (mm)	0.5
ae (mm)	100
Cutting mode	Dry cutting

Ra 0.5105 µm Rz 3.1582 µm



MX3030

Ra 0.5320 µm Rz 3.8950 µm



Conventional

MX3030

RECOMMENDED CUTTING CONDITIONS

Material	Properties	Cutter type	Inserts	Vc	ft	
						
P Mild steel	≤180 HB	WSX445	L, M	180 [130 – 230]	0.15	
		APX3000	M	160 [120 – 200]	0.15	
		ASX445	JL	180 [130 – 250]	0.15	
		ASX445	JM	180 [130 – 250]	0.2	
		ASX400	JL	180 [130 – 250]	0.15	
		ASX400	JM	180 [130 – 250]	0.18	
		OCTACUT	—	180 [100 – 250]	0.2	
		BAP	H	160 [120 – 200]	0.1	
		BRP	—	180 [130 – 250]	0.30*	
P Carbon steel Alloy steel	180 – 280 HB	WSX445	L, M	150 [120 – 180]	0.15	
		APX3000	M	140 [100 – 180]	0.15	
		ASX445	JL	150 [120 – 180]	0.15	
		ASX445	JM	150 [120 – 180]	0.2	
		ASX400	JL	150 [120 – 180]	0.13	
		ASX400	JM	150 [120 – 180]	0.15	
		OCTACUT	—	120 [80 – 160]	0.2	
		BAP	H	120 [100 – 160]	0.08	
		BRP	—	150 [120 – 180]	0.30*	
	280 – 350 HB	CESP, CFSP, CGSP	—	130 [100 – 160]	0.2	0.4
		WSX445	L, M	150 [120 – 180]	0.15	
		APX3000	M	100 [80 – 160]	0.15	
		ASX445	JL	100 [80 – 160]	0.15	
		ASX445	JM	100 [80 – 160]	0.2	
		ASX400	JL	100 [80 – 160]	0.1	
		ASX400	JM	100 [80 – 160]	0.13	
		OCTACUT	—	100 [80 – 160]	0.2	
		BAP	—	100 [80 – 160]	0.08	
M Stainless steel	≤270 HB	BRP	—	100 [80 – 160]	0.30*	
		WSX445	L, M	130 [100 – 180]	0.15	
		APX3000	M	120 [80 – 140]	0.15	
		ASX445	JL	150 [120 – 180]	0.15	
		ASX445	JM	150 [120 – 180]	0.2	
		ASX400	JL	150 [120 – 180]	0.15	
		ASX400	JM	150 [120 – 180]	0.18	
		OCTACUT	—	150 [100 – 200]	0.15	
		BAP	M	120 [80 – 140]	0.1	
K Cast iron Ductile cast iron	≤500 MPa	BRP	—	150 [120 – 180]	0.30*	
		WSX445	L, M	150 [120 – 180]	0.15	
		APX3000	M	120 [80 – 140]	0.15	
		ASX445	JL	130 [100 – 160]	0.15	
		ASX445	JM	130 [100 – 160]	0.2	
		ASX400	JL	150 [120 – 180]	0.15	
		ASX400	JM	150 [120 – 180]	0.18	
		BAP	H	100 [80 – 120]	0.1	
		BRP	—	150 [120 – 180]	0.30*	

1/1

* BRP is the feed amount at a depth of cut of 3 mm.

1. For APX3000, the feed rate is for cutter diameter DC of 12 – 16 mm, cutting depth $a_e \leq DC \times 0.25$, and $a_p \leq 4$ mm.

NEW

DXAS

TRISTAR DRILL SERIES

EXCHANGEABLE HEAD CARBIDE DRILL



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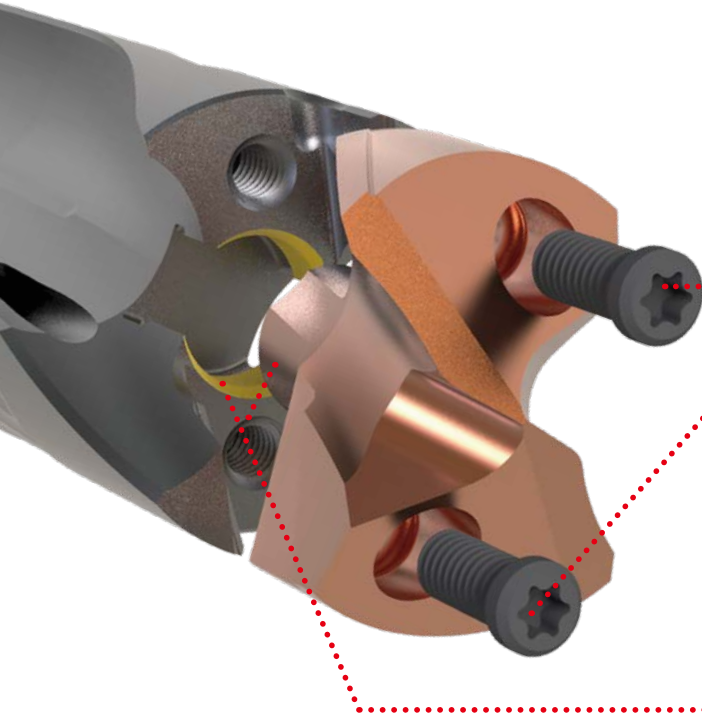
 **MITSUBISHI MATERIALS**

DXAS

EXCHANGEABLE HEAD CARBIDE DRILL

REVOLUTIONISING THE HEAD REPLACEMENT SYSTEM

Dramatically reduces running costs and achieves machining accuracy and efficiency comparable to solid drills.



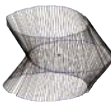
STRONG AND INTUITIVE TWO-SCREW SYSTEM

The two-screw fastening suppresses deformation of the holder and enables high-strength fastening, so it is less likely to loosen and securely fixes the head, even in high-stress machining environments.

PERFECT CENTERING

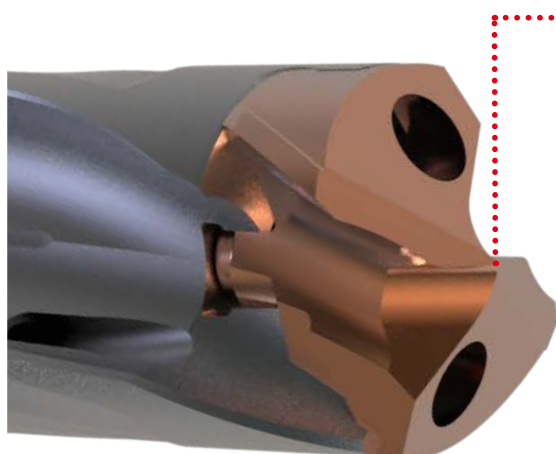
"Perfect Centering" minimises the misalignment of the central axes of the head and holder that occurs when fastened, achieving hole precision comparable to that of a solid drill.



	DXAS	Conventional	Conventional
	Head exchangeable type		Solid drills
Cylindricity (mm)	0.05	0.22	0.06
			

DXAS

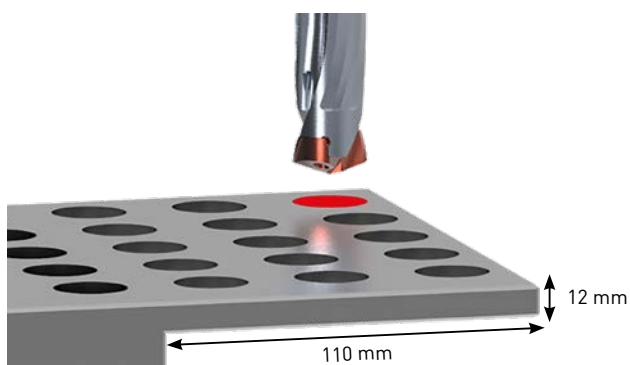
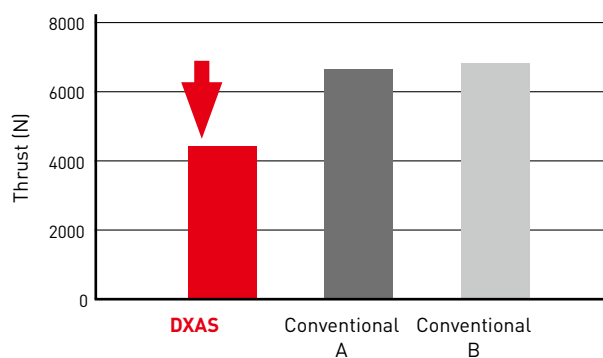
STABLE MACHINING EVEN FOR LOW RIGIDITY WORKPIECES



XR POINT THINNING

By smoothly curling the chips, low resistance and excellent chip separation are achieved. The low resistance design achieves highly efficient machining and reduces power consumption during machining.

REDUCED TO 60 %



DIN CK50: COMPARISON WITH ONE-SIDED HOLDING WHEN DRILLING THIN PLATE

The high-strength fastening mechanism and low-resistance blade geometry have dramatically improved the processing stability of low-rigidity workpieces. High-precision drilling can be achieved even in thin plates, improving quality.

Material	Carbon steel (DIN CK50)
Tool	Ø 30.0 mm, L/D = 5l
Vc (m/min)	70
fr (mm/rev)	0.35
Hole depth	12 mm (Through hole)
Cutting mode	Wet cutting Internal coolant Water-soluble coolant, 1MPa

BURR CONDITION ON THE EXIT SIDE



DXAS



Conventional

DXAS

Conventional

Hole oversize (mm)	0.076	0.125
Machine Load value (%)	88	124

DXAS

STABLE MACHINING EVEN FOR DEEP HOLES

NEW COOLANT SYSTEM

The new design ejects coolant from the flute directly onto the cutting edge, achieving excellent cooling.



DXAS



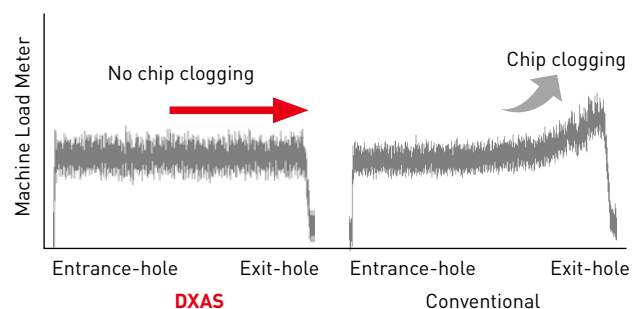
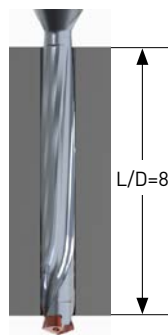
Conventional

FLUTE DESIGN WITH EXCELLENT CHIP EVACUATION

The strong point geometry at the tip directs chips into the wide end section of the flute, and the variable flute design achieves high chip removal performance.

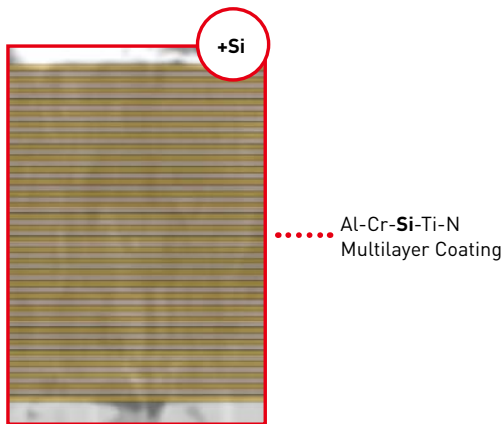
DIN CK50: COMPARISON OF CHIP REMOVAL WHEN DRILLING LARGE DIAMETER DEEP HOLES

Material	Carbon steel (DIN CK50)
Tool	Ø 30.0 mm, L/D = 8
Vc (m/min)	70
fr (mm/rev)	0.25
Hole depth	240 mm (Through hole)
Cutting mode	Wet cutting Internal coolant Water-soluble coolant, 1MPa



DXAS

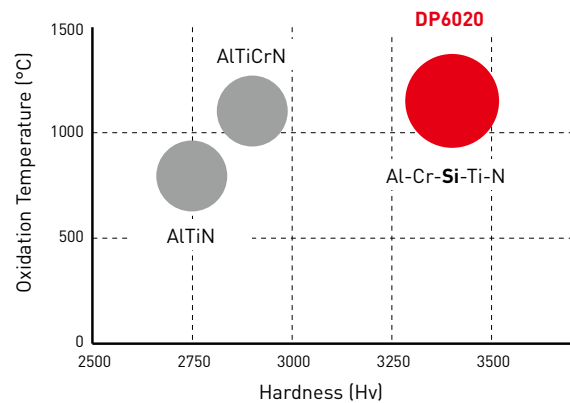
P CLASS DRILLING HEAD



*By Image

DP6020 WITH EXCELLENT HEAT RESISTANCE AND HARDNESS

By adding Si, the coating hardness and the temperature at which oxidation started to occur were significantly raised. This multi-layer structure also improves wear and crack resistance during cutting and provided excellent wear resistance even during high-speed, high feed machining.



HIGH STRENGTH NEGATIVE CUTTING EDGE

The negative rake blade improves wear resistance. It also breaks up chips when penetrating the workpiece, preventing them from wrapping around the holder.

CUTTING EDGE WEAR PHOTO



DXAS

Can continue after 115 m



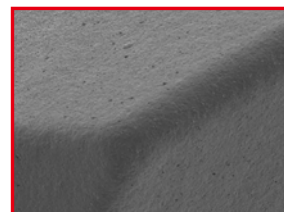
Conventional

Breakage at 45 m

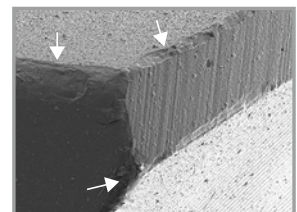
HIGH-QUALITY CUTTING EDGE

The cutting edge is less susceptible to stress concentration and has excellent adhesion to the coating, providing both wear resistance and prevention of sudden breakage.

ENLARGED PHOTO OF CUTTING EDGE



DXAS



Conventional

TRISTAR DRILL SERIES

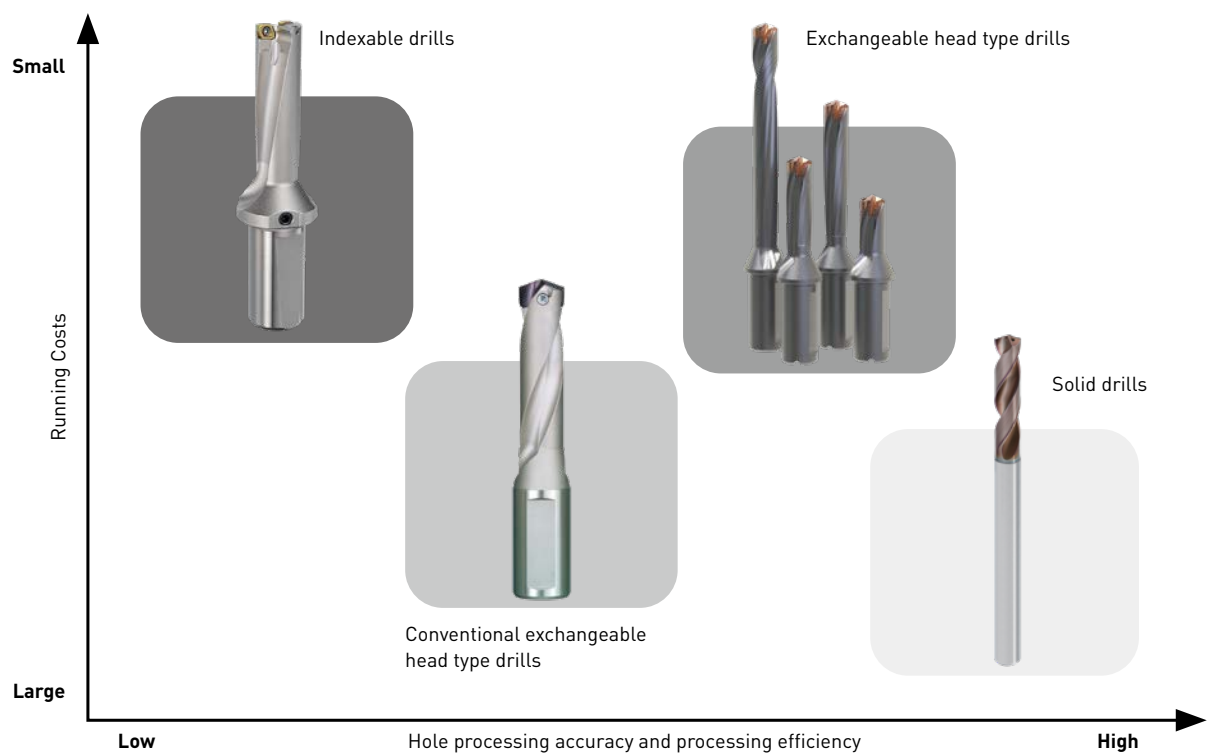
REDUCED RUNNING COSTS – HIGH PRECISION – HIGH EFFICIENCY

TRISTAR, A NEW GENERATION DRILL SERIES FROM MITSUBISHI MATERIALS PROVIDES 3 STRONG ADVANTAGES

- Reduced running costs
- High precision
- High efficiency

Exceptionally long life and reduces running costs compared to conventional replaceable head drills. In addition, it achieves machining accuracy and efficiency comparable to that of solid drills.

SOLID CARBIDE TRISTAR DRILL SERIES

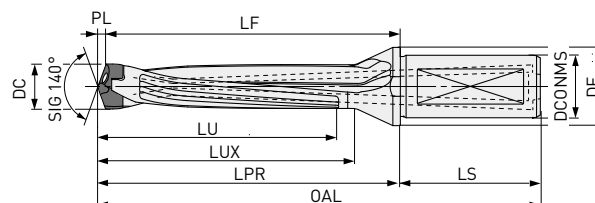


DXAS



TRISTAR DRILL SERIES

P **K**



DC < 18	18 < DC < 30	30 < DC
0.019	0.023	0.027
0.001	0.002	0.002
DCONMS = 25 DCONMS = 32		
0	0	
-0.013	-0.016	



Order number	Stock	Hole depth (L/D)	No. of teeth	DC	LU	LUX	LPR	LS	OAL	LF	PL	DCONMS	DF	Applicable Heads
DXAS1800X1F25	●	1.5	2	18	32.0	40.0	58	56	114	55.0	3.0	25	31.3	DXAS1800P
DXAS1800X3F25	●	3	2	18	59.0	67.0	85	56	141	82.0	3.0	25	31.3	
DXAS1800X5F25	●	5	2	18	95.0	103.0	121	56	177	118.0	3.0	25	31.3	
DXAS1800X8F25	●	8	2	18	149.0	157.0	175	56	231	172.0	3.0	25	31.3	
DXAS1900X1F25	●	1.5	2	19	33.5	41.5	59.5	56	115.5	56.3	3.2	25	31.3	DXAS1900P
DXAS1900X3F25	●	3	2	19	62.0	70.0	88	56	144	84.8	3.2	25	31.3	
DXAS1900X5F25	●	5	2	19	100.0	108.0	126	56	182	122.8	3.2	25	31.3	
DXAS1900X8F25	●	8	2	19	157.0	165.0	183	56	239	179.8	3.2	25	31.3	
DXAS2000X1F25	●	1.5	2	20	35.0	43.0	61	56	117	57.6	3.4	25	31.3	DXAS2000P
DXAS2000X3F25	●	3	2	20	65.0	73.0	91	56	147	87.6	3.4	25	31.3	
DXAS2000X5F25	●	5	2	20	105.0	113.0	131	56	187	127.6	3.4	25	31.3	
DXAS2000X8F25	●	8	2	20	165.0	173.0	191	56	247	187.6	3.4	25	31.3	
DXAS2100X1F25	●	1.5	2	21	36.5	44.5	62.5	56	118.5	58.9	3.6	25	31.3	DXAS2100P
DXAS2100X3F25	●	3	2	21	68.0	76.0	94	56	150	90.4	3.6	25	31.3	
DXAS2100X5F25	●	5	2	21	110.0	118.0	136	56	192	132.4	3.6	25	31.3	
DXAS2100X8F25	●	8	2	21	173.0	181.0	199	56	255	195.4	3.6	25	31.3	
DXAS2200X1F25	●	1.5	2	22	38.0	46.0	64	56	120	60.3	3.7	25	31.3	DXAS2200P
DXAS2200X3F25	●	3	2	22	71.0	79.0	97	56	153	93.3	3.7	25	31.3	
DXAS2200X5F25	●	5	2	22	115.0	123.0	141	56	197	137.3	3.7	25	31.3	
DXAS2200X8F25	●	8	2	22	181.0	189.0	207	56	263	203.3	3.7	25	31.3	
DXAS2300X1F25	●	1.5	2	23	39.5	47.5	65.5	56	121.5	61.6	3.9	25	31.3	DXAS2300P
DXAS2300X3F25	●	3	2	23	74.0	82.0	100	56	156	96.1	3.9	25	31.3	
DXAS2300X5F25	●	5	2	23	120.0	128.0	146	56	202	142.1	3.9	25	31.3	
DXAS2300X8F25	●	8	2	23	189.0	197.0	215	56	271	211.1	3.9	25	31.3	
DXAS2400X1F25	●	1.5	2	24	41.0	49.0	67	56	123	62.9	4.1	25	31.3	DXAS2400P
DXAS2400X3F25	●	3	2	24	77.0	85.0	103	56	159	98.9	4.1	25	31.3	
DXAS2400X5F25	●	5	2	24	125.0	133.0	151	56	207	146.9	4.1	25	31.3	
DXAS2400X8F25	●	8	2	24	197.0	205.0	223	56	279	218.9	4.1	25	31.3	

1/2

DXAS – TRISTAR DRILL SERIES

Order number	Stock	Hole depth (L/D)	No. of teeth	DC	LU	LUX	LPR	LS	OAL	LF	PL	DCONMS	DF	Applicable Heads
DXAS2500X1F25	●	1.5	2	25	42.5	50.5	68.5	56	124.5	64.3	4.2	25	31.3	DXAS2500P* DXAS2550P
DXAS2500X3F25	●	3	2	25	80.0	88.0	106	56	162	101.8	4.2	25	31.3	
DXAS2500X5F25	●	5	2	25	130.0	138.0	156	56	212	151.8	4.2	25	31.3	
DXAS2500X8F25	●	8	2	25	205.0	213.0	231	56	287	226.8	4.2	25	31.3	
DXAS2600X1F32	●	1.5	2	26	44.0	52.0	77	60	137	72.6	4.4	32	41.3	DXAS2600P* DXAS2650P DXAS2670P
DXAS2600X3F32	●	3	2	26	83.0	91.0	116	60	176	111.6	4.4	32	41.3	
DXAS2600X5F32	●	5	2	26	135.0	143.0	168	60	228	163.6	4.4	32	41.3	
DXAS2600X8F32	●	8	2	26	213.0	221.0	246	60	306	241.6	4.4	32	41.3	
DXAS2700X1F32	●	1.5	2	27	45.5	53.5	78.5	60	138.5	73.9	4.6	32	41.3	DXAS2700P* DXAS2750P
DXAS2700X3F32	●	3	2	27	86.0	94.0	119	60	179	114.4	4.6	32	41.3	
DXAS2700X5F32	●	5	2	27	140.0	148.0	173	60	233	168.4	4.6	32	41.3	
DXAS2700X8F32	●	8	2	27	221.0	229.0	254	60	314	249.4	4.6	32	41.3	
DXAS2800X1F32	●	1.5	2	28	47.0	55.0	80	60	140	75.3	4.7	32	41.3	DXAS2800P* DXAS2850P
DXAS2800X3F32	●	3	2	28	89.0	97.0	122	60	182	117.3	4.7	32	41.3	
DXAS2800X5F32	●	5	2	28	145.0	153.0	178	60	238	173.3	4.7	32	41.3	
DXAS2800X8F32	●	8	2	28	229.0	237.0	262	60	322	257.3	4.7	32	41.3	
DXAS2900X1F32	●	1.5	2	29	48.5	56.5	81.5	60	141.5	76.6	4.9	32	41.3	DXAS2900P* DXAS2950P
DXAS2900X3F32	●	3	2	29	92.0	100.0	125	60	185	120.1	4.9	32	41.3	
DXAS2900X5F32	●	5	2	29	150.0	158.0	183	60	243	178.1	4.9	32	41.3	
DXAS2900X8F32	●	8	2	29	237.0	245.0	270	60	330	265.1	4.9	32	41.3	
DXAS3000X1F32	●	1.5	2	30	50.0	58.0	83	60	143	77.9	5.1	32	41.3	DXAS3000P*
DXAS3000X3F32	●	3	2	30	95.0	103.0	128	60	188	122.9	5.1	32	41.3	
DXAS3000X5F32	●	5	2	30	155.0	163.0	188	60	248	182.9	5.1	32	41.3	
DXAS3000X8F32	●	8	2	30	245.0	253.0	278	60	338	272.9	5.1	32	41.3	

2/2

1. The above dimensions (*) are for when installing the inserts.

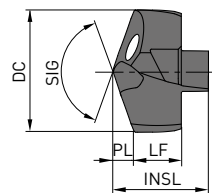
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SPARE PARTS

Drill diameter (DC)	 Clamp Screw	Clamp Torque (N x m)	 Wrench	Drive Size
18 – 19	TPS25-1	1.0	TIP07F	7IP
20 – 22	TPS3-1	2.0	TIP10F	10IP
23 – 25	TPS351-1	2.5	TIP10W	10IP
26 – 30	TPS43	4.0	TIP15W	15IP

DXAS

INSERTS



DC < 18	18 < DC < 30	30 < DC
0.019	0.023	0.027
0.001	0.002	0.002

Order number	DP6020	DC	LF	LPR	PL	SIG	Applicable holder
DXAS1800P	●	18.0	7.0	10.0	3.0	140°	DXAS1800
DXAS1810P	●	18.1	6.9	10.0	3.1	140°	
DXAS1820P	●	18.2	6.9	10.0	3.1	140°	
DXAS1830P	●	18.3	6.9	10.0	3.1	140°	
DXAS1840P	●	18.4	6.9	10.0	3.1	140°	
DXAS1850P	●	18.5	6.9	10.0	3.1	140°	
DXAS1860P	●	18.6	6.9	10.0	3.1	140°	
DXAS1870P	●	18.7	6.8	10.0	3.2	140°	
DXAS1880P	●	18.8	6.8	10.0	3.2	140°	
DXAS1890P	●	18.9	6.8	10.0	3.2	140°	
DXAS1900P	●	19.0	6.8	10.0	3.2	140°	DXAS1900
DXAS1910P	●	19.1	6.8	10.0	3.2	140°	
DXAS1920P	●	19.2	6.7	10.0	3.3	140°	
DXAS1930P	●	19.3	6.7	10.0	3.3	140°	
DXAS1940P	●	19.4	6.7	10.0	3.3	140°	
DXAS1950P	●	19.5	6.7	10.0	3.3	140°	
DXAS1960P	●	19.6	6.7	10.0	3.3	140°	
DXAS1970P	●	19.7	6.7	10.0	3.3	140°	
DXAS1980P	●	19.8	6.6	10.0	3.4	140°	
DXAS1990P	●	19.9	6.6	10.0	3.4	140°	
DXAS2000P	●	20.0	8.1	11.5	3.4	140°	DXAS2000
DXAS2050P	●	20.5	8.0	11.5	3.5	140°	DXAS2100
DXAS2100P	●	21.0	7.9	11.5	3.6	140°	
DXAS2150P	●	21.5	7.9	11.5	3.6	140°	DXAS2200
DXAS2200P	●	22.0	7.8	11.5	3.7	140°	
DXAS2250P	●	22.5	7.7	11.5	3.8	140°	DXAS2300
DXAS2300P	●	23.0	9.1	13.0	3.9	140°	
DXAS2350P	●	23.5	9.0	13.0	4.0	140°	DXAS2400
DXAS2400P	●	24.0	8.9	13.0	4.1	140°	
DXAS2450P	●	24.5	8.9	13.0	4.1	140°	
DXAS2470P	●	24.7	8.8	13.0	4.2	140°	DXAS2500
DXAS2500P	●	25.0	8.8	13.0	4.2	140°	
DXAS2550P	●	25.5	8.7	13.0	4.3	140°	DXAS2600
DXAS2600P	●	26.0	10.1	14.5	4.4	140°	
DXAS2650P	●	26.5	10.0	14.5	4.5	140°	
DXAS2670P	●	26.7	10.0	14.5	4.5	140°	DXAS2700
DXAS2700P	●	27.0	9.9	14.5	4.6	140°	
DXAS2750P	●	27.5	9.8	14.5	4.7	140°	DXAS2800
DXAS2800P	●	28.0	9.8	14.5	4.7	140°	
DXAS2850P	●	28.5	9.7	14.5	4.8	140°	DXAS2900
DXAS2900P	●	29.0	10.6	15.5	4.9	140°	
DXAS2950P	●	29.5	10.5	15.5	5.0	140°	DXAS3000
DXAS3000P	●	30.0	10.4	15.5	5.1	140°	

DXAS – RECOMMENDED CUTTING CONDITIONS

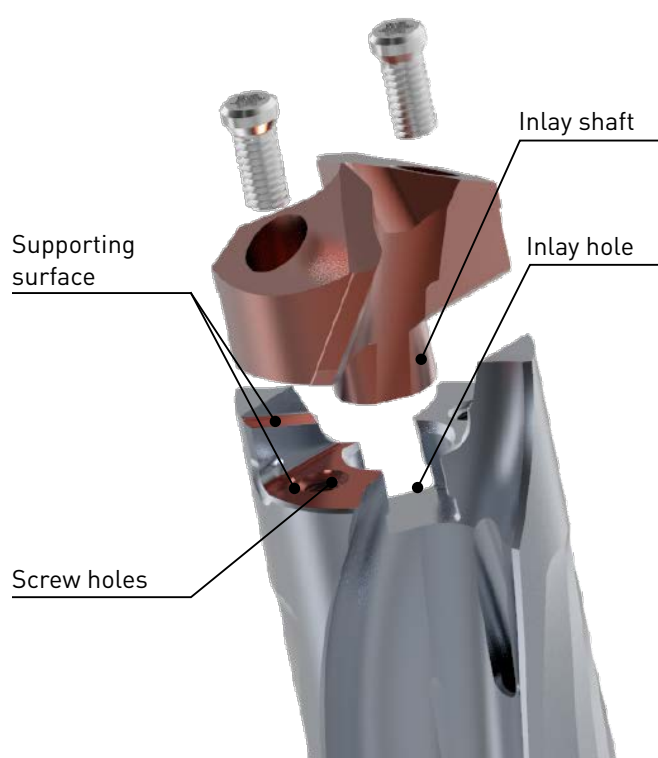
Material	DC	Hole depth (L/D)	Vc	n	Vf
P Mild steel DIN St37-2 etc.	18.0	1.5–8	110 (80 – 170)	1900	0.30 (0.20 – 0.45)
	19.0	1.5–8	110 (80 – 170)	1800	0.30 (0.20 – 0.45)
	20.0	1.5–8	110 (80 – 170)	1800	0.30 (0.20 – 0.45)
	21.0	1.5–8	110 (80 – 170)	1700	0.30 (0.20 – 0.45)
	22.0	1.5–8	110 (80 – 170)	1600	0.30 (0.20 – 0.45)
	23.0	1.5–8	110 (80 – 170)	1500	0.30 (0.20 – 0.45)
	24.0	1.5–8	110 (80 – 170)	1500	0.30 (0.20 – 0.45)
	25.0	1.5–8	110 (80 – 170)	1400	0.35 (0.25 – 0.45)
	26.0	1.5–8	110 (80 – 170)	1300	0.35 (0.25 – 0.45)
	27.0	1.5–8	110 (80 – 170)	1300	0.35 (0.25 – 0.45)
	28.0	1.5–8	110 (80 – 170)	1300	0.35 (0.25 – 0.45)
	29.0	1.5–8	110 (80 – 170)	1200	0.35 (0.25 – 0.45)
	30.0	1.5–8	110 (80 – 170)	1200	0.35 (0.25 – 0.45)
P Carbon steel DIN CK50 etc.	18.0	1.5–8	100 (70 – 170)	1800	0.30 (0.20 – 0.45)
	19.0	1.5–8	100 (70 – 170)	1700	0.30 (0.20 – 0.45)
	20.0	1.5–8	100 (70 – 170)	1600	0.30 (0.20 – 0.45)
	21.0	1.5–8	100 (70 – 170)	1500	0.30 (0.20 – 0.45)
	22.0	1.5–8	100 (70 – 170)	1400	0.30 (0.20 – 0.45)
	23.0	1.5–8	100 (70 – 170)	1400	0.30 (0.20 – 0.45)
	24.0	1.5–8	100 (70 – 170)	1300	0.30 (0.20 – 0.45)
	25.0	1.5–8	100 (70 – 170)	1300	0.35 (0.25 – 0.45)
	26.0	1.5–8	100 (70 – 170)	1200	0.35 (0.25 – 0.45)
	27.0	1.5–8	100 (70 – 170)	1200	0.35 (0.25 – 0.45)
	28.0	1.5–8	100 (70 – 170)	1100	0.35 (0.25 – 0.45)
	29.0	1.5–8	100 (70 – 170)	1100	0.35 (0.25 – 0.45)
	30.0	1.5–8	100 (70 – 170)	1100	0.35 (0.25 – 0.45)
K Alloy steel DIN 41CrMo4, DIN 20Cr4 etc.	18.0	1.5–8	100 (70 – 140)	1800	0.30 (0.20 – 0.45)
	19.0	1.5–8	100 (70 – 140)	1700	0.30 (0.20 – 0.45)
	20.0	1.5–8	100 (70 – 140)	1600	0.30 (0.20 – 0.45)
	21.0	1.5–8	100 (70 – 140)	1500	0.30 (0.20 – 0.45)
	22.0	1.5–8	100 (70 – 140)	1400	0.30 (0.20 – 0.45)
	23.0	1.5–8	100 (70 – 140)	1400	0.30 (0.20 – 0.45)
	24.0	1.5–8	100 (70 – 140)	1300	0.30 (0.20 – 0.45)
	25.0	1.5–8	100 (70 – 140)	1300	0.35 (0.25 – 0.45)
	26.0	1.5–8	100 (70 – 140)	1200	0.35 (0.25 – 0.45)
	27.0	1.5–8	100 (70 – 140)	1200	0.35 (0.25 – 0.45)
	28.0	1.5–8	100 (70 – 140)	1100	0.35 (0.25 – 0.45)
	29.0	1.5–8	100 (70 – 140)	1100	0.35 (0.25 – 0.45)
	30.0	1.5–8	100 (70 – 140)	1100	0.35 (0.25 – 0.45)
K Cast iron DIN GG30, DIN GGG45 etc.	18.0	1.5–8	100 (70 – 170)	1800	0.30 (0.20 – 0.45)
	19.0	1.5–8	100 (70 – 170)	1700	0.30 (0.20 – 0.45)
	20.0	1.5–8	100 (70 – 170)	1600	0.30 (0.20 – 0.45)
	21.0	1.5–8	100 (70 – 170)	1500	0.30 (0.20 – 0.45)
	22.0	1.5–8	100 (70 – 170)	1400	0.30 (0.20 – 0.45)
	23.0	1.5–8	100 (70 – 170)	1400	0.30 (0.20 – 0.45)
	24.0	1.5–8	100 (70 – 170)	1300	0.30 (0.20 – 0.45)
	25.0	1.5–8	100 (70 – 170)	1300	0.35 (0.25 – 0.45)
	26.0	1.5–8	100 (70 – 170)	1200	0.35 (0.25 – 0.45)
	27.0	1.5–8	100 (70 – 170)	1200	0.35 (0.25 – 0.45)
	28.0	1.5–8	100 (70 – 170)	1100	0.35 (0.25 – 0.45)
	29.0	1.5–8	100 (70 – 170)	1100	0.35 (0.25 – 0.45)
	30.0	1.5–8	100 (70 – 170)	1100	0.35 (0.25 – 0.45)

1/1

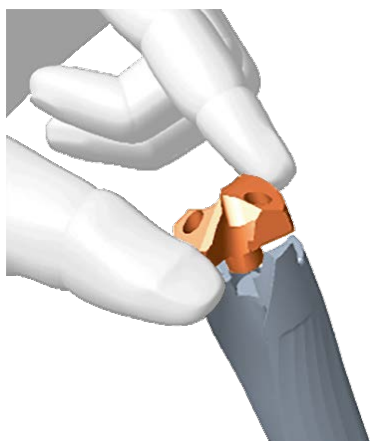
1. Refer to the table above for more details on how to set the cutting conditions according to the usage.
2. When using non-water-soluble cutting fluid, reduce the cutting speed to 80 % to 90 %.
3. When using L/D=8, the maximum feed rate should be 0.4 mm/rev.

HOW TO INSTALL THE HEAD

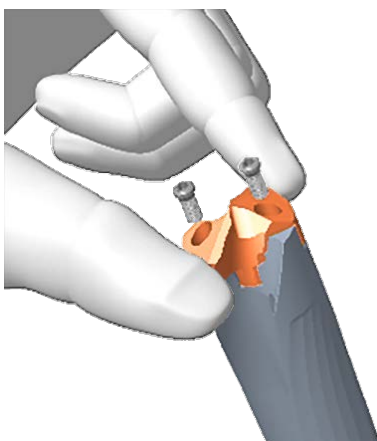
1. Thoroughly clean the head mounting area of the holder using an air blower, etc., and check that there are no foreign objects or dirt on the screw holes or the head support surface.
2. Insert the head's inlay shaft into the holder's inlay hole.
3. Insert the two clamp screws from the head and temporarily tighten each one.
4. While lightly pressing the head against the support surface of the holder, tighten the two clamp screws to the recommended torque.



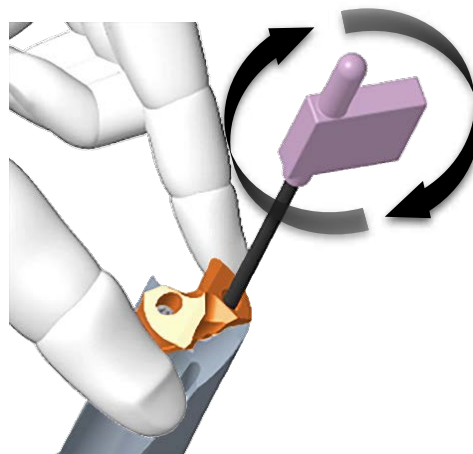
2.



3.



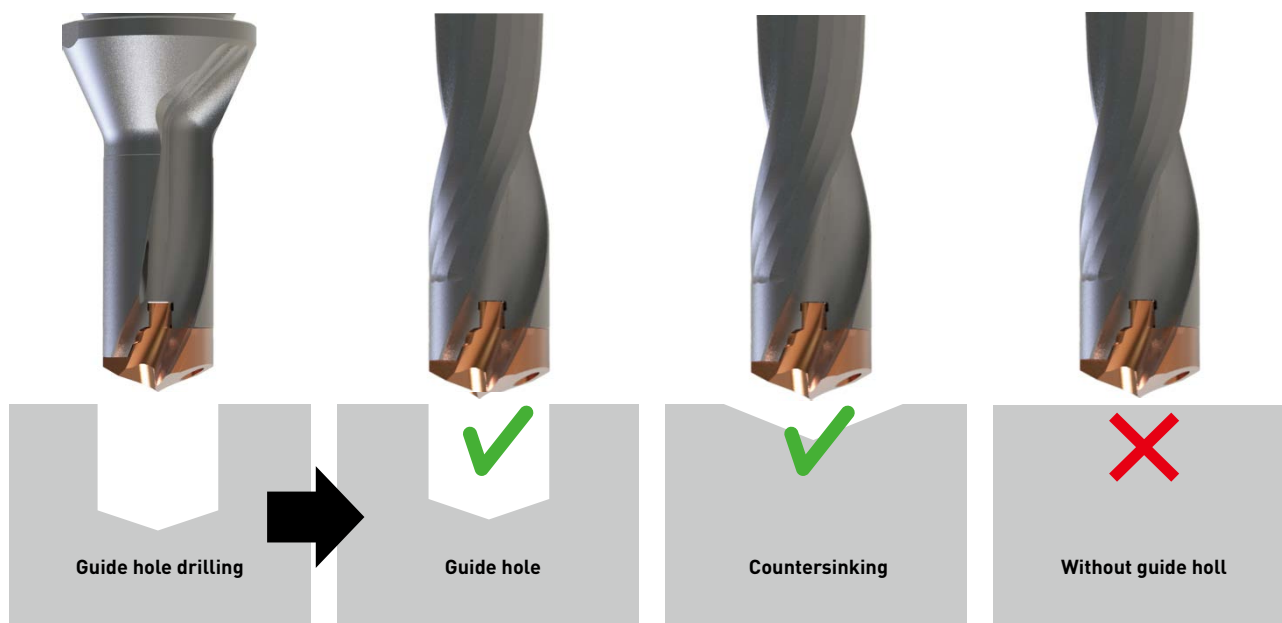
4.



OPERATIONAL GUIDANCE

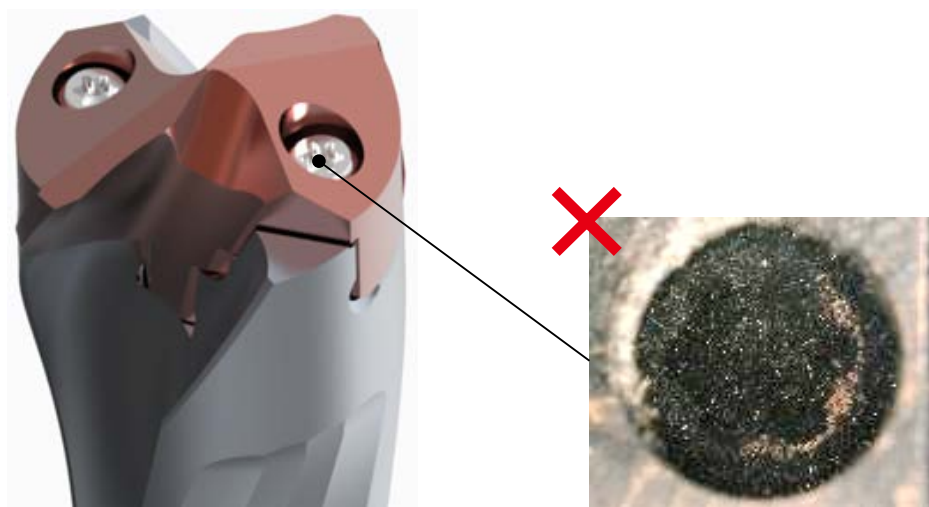
1. WHEN TO USE $L/D = 8$ AND HOW TO IMPROVE HOLE ACCURACY

Machining without guide holes increases the possibility of problems such as rifling occurring.



2. M.Q.L. AND DRY MACHINING ARE NOT RECOMMENDED

M.Q.L. and dry machining are not recommended because sludge will accumulate on the clamping screws.



OPERATIONAL GUIDANCE

3. HOW TO PREVENT CHIP WRAPPING

We do not recommend lowering the feed rate when penetrating the workpiece, as this can cause chips to wrap around the drill and workpiece.

WHEN CUTTING CONDITIONS CAN BE INCREASED

We recommend improving the cutting speed and feed rate.



$V_c = 80 \text{ m/min}$
 $fr = 0.30 \text{ mm/rev}$



$V_c = 100 \text{ m/min}$
 $fr = 0.35 \text{ mm/rev}$



WHEN CUTTING CONDITIONS CANNOT BE INCREASED

It is recommended to introduce a peck and stop the feed when half the drill point protrudes when drilling through holes.



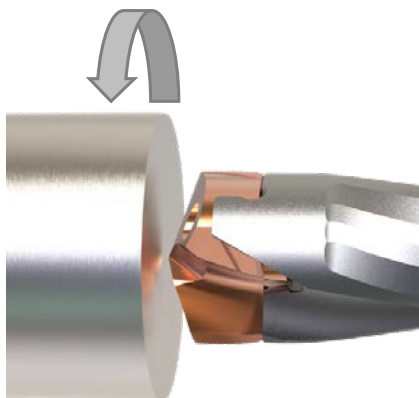
Long chips produced when no peck feed is used.



Chips are successfully broken when a peck feed is used.

4. HOW TO SUPPRESS CHATTER AND VIBRATION IN MACHINING OPERATIONS WHERE THE WORKPIECE IS ROTATING

To reduce chatter and vibration when machining workpieces with rotating shafts, try machining at a lower peripheral speed and higher feed rate.



When cutting speed is high



$V_c = 101 \text{ m/min}$
 $fr = 0.34 \text{ mm/rev}$
 $F = 391 \text{ mm/min}$

Low cutting speed and high feed rate



$V_c = 70 \text{ m/min}$
 $fr = 0.45 \text{ mm/rev}$
 $F = 358 \text{ mm/min}$



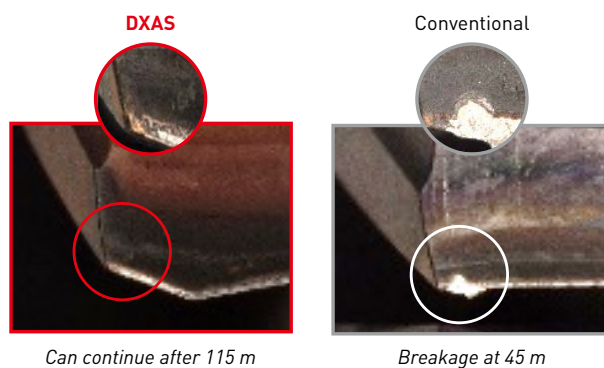
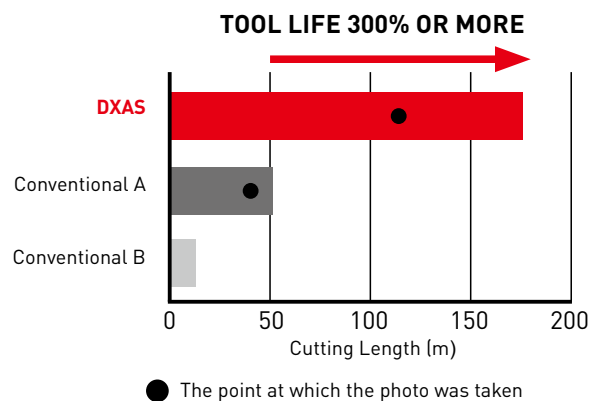
DXAS

APPLICATION EXAMPLES

DIN CK50: TOOL LIFE COMPARISON UNDER GENERAL CUTTING CONDITIONS ($F = 531 \text{ mm/min}$)

It has an overwhelming tool life that is more than three times longer than conventional products. In addition to significantly reducing running costs, it also reduces the frequency of head replacement.

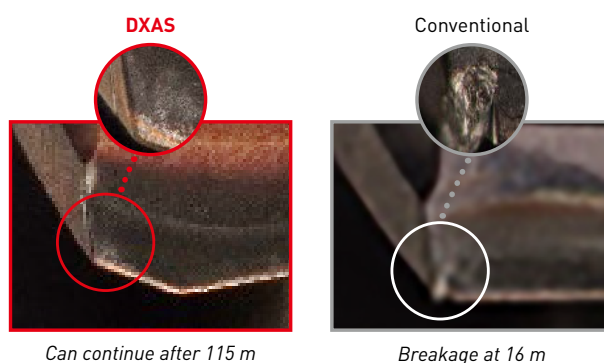
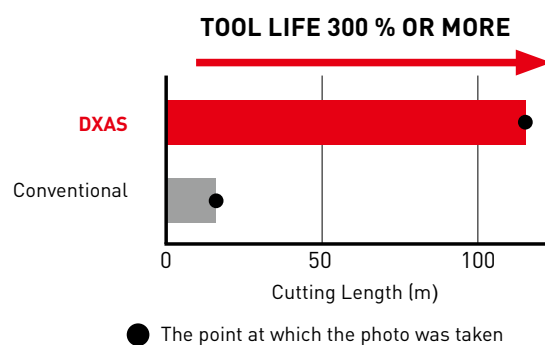
Material	Carbon steel (DIN CK50)
Tool	$\varnothing 18.0 \text{ mm}$, $L/D = 5$
V_c (m/min)	100
f_r (mm/rev)	0.3
Hole depth	90 mm (Through hole)
Cutting mode	Wet cutting Internal coolant Water-soluble coolant, 1MPa



DIN CK50: TOOL LIFE COMPARISON AT HIGHLY EFFICIENT CUTTING CONDITIONS ($F = 955 \text{ mm/min}$)

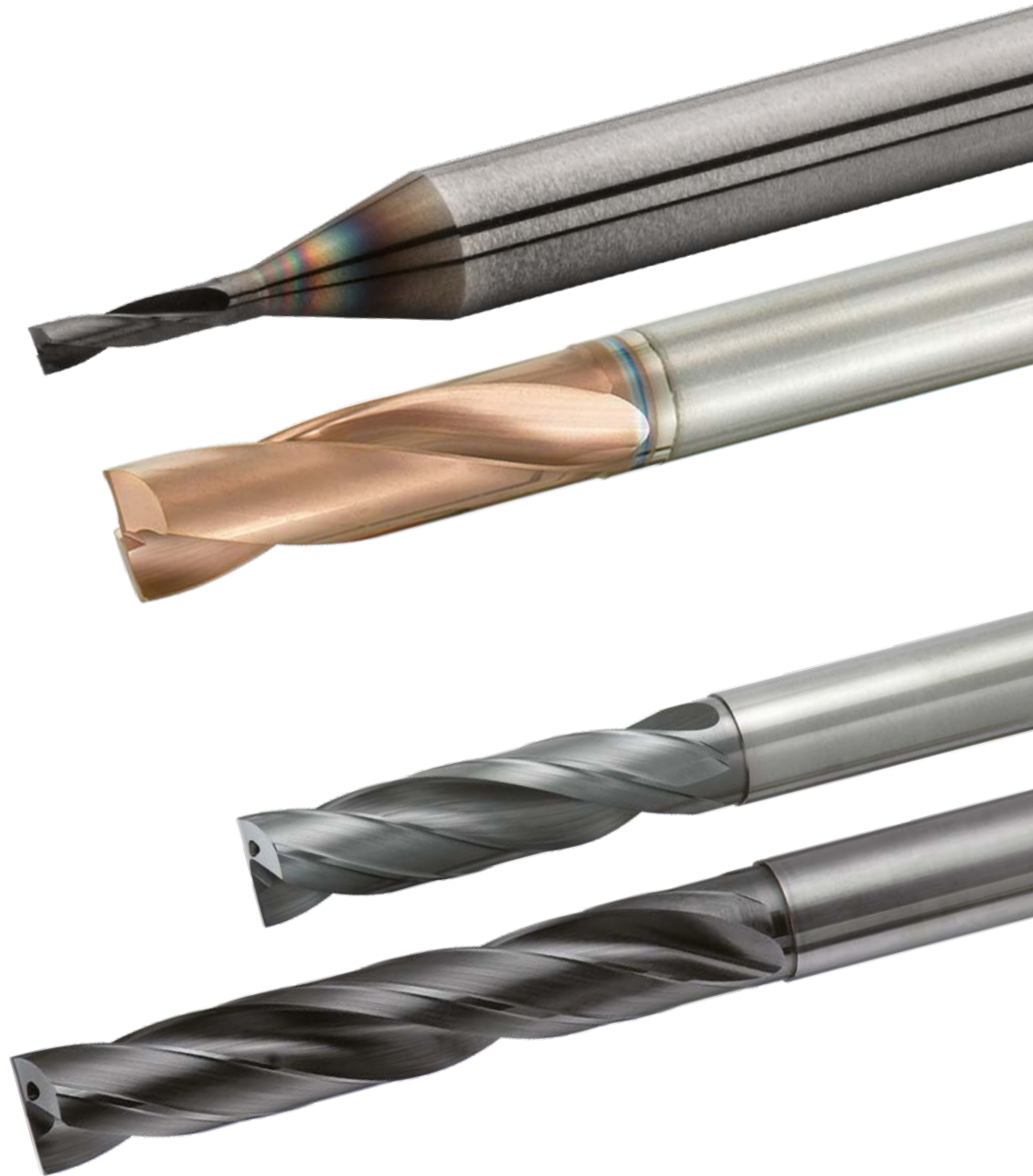
DXAS has excellent wear resistance even under high-efficiency conditions, achieving more than three times the normal tool life. The low resistance design enables stable machining.

Material	Carbon steel (DIN CK50)
Tool	$\varnothing 18.0 \text{ mm}$, $L/D = 5$
V_c (m/min)	120
f_r (mm/rev)	0.45
Hole depth	90 mm (Through hole)
Cutting mode	Wet cutting Internal coolant Water-soluble coolant, 1MPa



DFAS / MFE

SOLID CARBIDE FLAT BOTTOM DRILLS FOR
HIGH EFFICIENCY DRILLING OF VARIOUS APPLICATIONS



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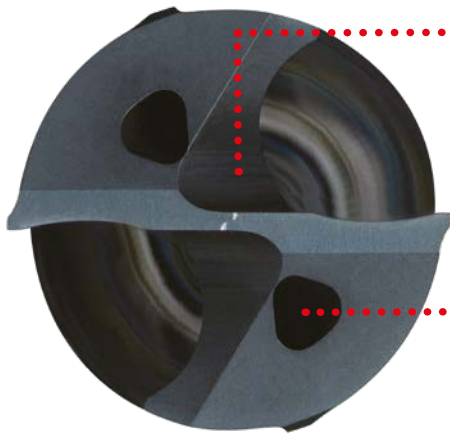
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DFAS / DFAS-E

SOLID CARBIDE FLAT BOTTOM DRILLS WITH INTERNAL COOLANT DC 3.0 – 14



OPTIMISED CHIP CONTROL AND LOAD REDUCTION

The thinned centre cutting edge generates low cutting resistance and thereby creates an optimum chip geometry for a smoother chip flow.

TRI-COOLING TECHNOLOGY FOR ALL DIAMETERS

Coolant flow is increased without reducing the rigidity of the drill. The extra coolant flow dramatically improves chip evacuation and dissipates cutting heat. This enables stable machining of stainless steel and titanium alloys.

ORIGINAL SHARP CUTTING EDGE SHAPE

Strength is ensured by providing a flat land (gash) at the corner and by adopting a sharp main cutting edge, burrs are suppressed.

COMPARISON OF BURRS WHEN MACHINING TITANIUM ALLOY



DFAS
0.08 mm



Conventional
0.12 mm

COATED GRADE DP102A

DP102A coated grade provides excellent lubricity and long-term durability, achieving excellent wear resistance at low to medium cutting speeds.



MINI-MFE

SMALL DIAMETER SOLID CARBIDE FLAT BOTTOM DRILLS DC 0.75 – 2.95

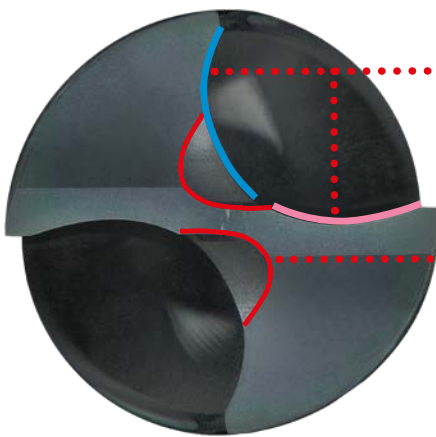


UNIQUE SHARP CUTTING EDGES

The flat lands on the corners provide greater strength and sharpness for substantial reduction of burrs.

EXCELLENT CHIP CONTROL

End geometry that combines different radii forms a strong cutting edge and provides excellent chip control.



POINT THINNING FOR LOWER THRUST FORCE

The multi radius point geometry in combination with the thinned point forms ideal chip shapes, thereby dramatically reducing cutting resistance.



MFE



Conventional

COATED GRADE DP102A

DP102A is a PVD coated cemented carbide grade specialised for drills. The coating has high adhesion and stability even on a sharp cutting edge. This greatly improves wear resistance and is ideal for drilling small diameter holes at low speed and feed conditions.

SHARP CUTTING EDGES WITH LONG TOOL LIFE

Material	X5CrNi189
Tool/ Drill	MFE0100X02S030
L/D (mm)	2
Vc (m/min)	25
fr (mm/rev.)	0.007
Machine	Vertical MC (BT40)

100 HOLES



MFE

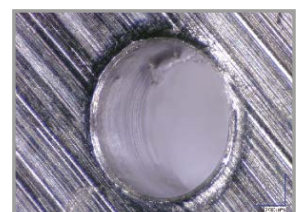


Conventional

500 HOLES



MFE



Conventional

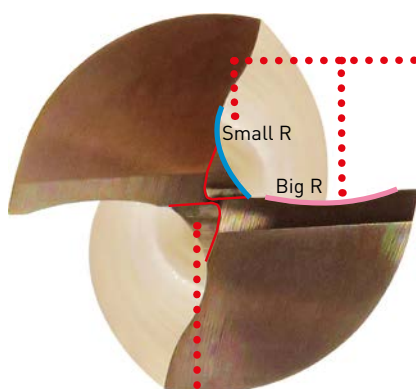


Al-Cr-N Based PVD Coating

MFE

SOLID CARBIDE FLAT BOTTOM DRILLS

DC 3.0 – 20.0

**EXCELLENT CHIP CONTROL**

The combination of different radius geometries provides a strong cutting edge and excellent chip control.



Material	DIN CK 50
Vc (m/min)	50
fr (mm/rev.)	0.07

NEW "Z" POINT THINNING WITH LOWER THRUST FORCE

New point thinning provides excellent chip evacuation.

GASH LAND FOR A STRONGER CORNER

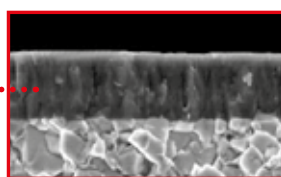
Gash land (0 degree rake) provides excellent chipping resistance.

ZERO-μ SURFACE

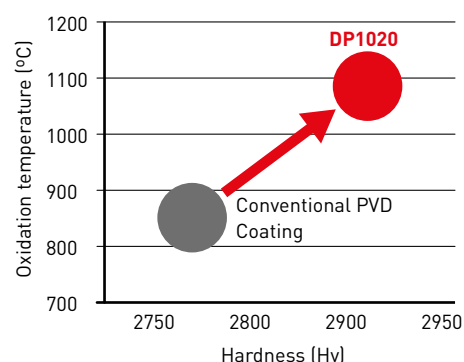
Smooth surface provides reduced deflection and excellent positional accuracy.

COATED GRADE DP1020

DP1020 grade offers excellent wear resistance and reduced friction for longer tool life and covers a wide range of applications.



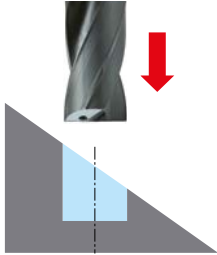
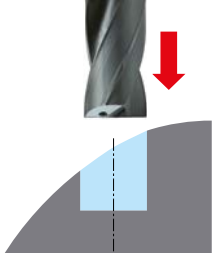
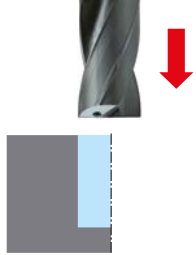
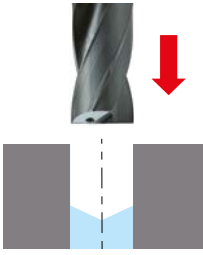
With accumulated AlTiCrN based PVD coating



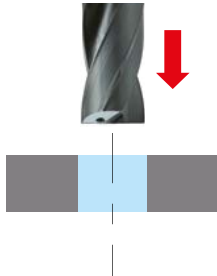
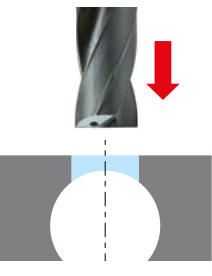
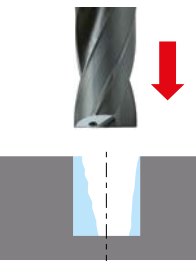
DFAS / MFE

HIGH EFFICIENCY OVER A WIDE APPLICATION RANGE

HIGH EFFICIENCY COUNTER BORING IN VARIOUS TYPES OF MACHINING WITH EXCELLENT CHIPPING RESISTANCE

Spot Facing and Pilot Drilling				
	Angled surface	Offset circular surface	Shoulder	Deep hole
				
NEW MFE	◎	◎	◎	
DFAS 3D	◎	◎	◎	
NEW DFAS 5D				◎

LOW CUTTING FORCES REDUCES BURRS DUE TO ITS UNIQUE SHAPE, IT IS POSSIBLE TO CORRECT ECCENTRIC HOLES AND CAST HOLES WITH HIGH ACCURACY

	Drilling		Reform	
	Thin plate	Intersecting hole	Eccentric and cast holes	
				
NEW MFE	◎	◎	◎	
DFAS 3D	◎	◎	◎	
NEW DFAS 5D				

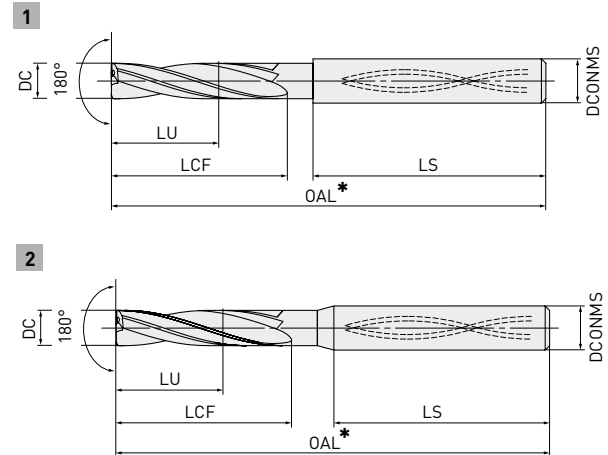
DFAS-E



SOLID CARBIDE FLAT BOTTOM DRILLS

m7 TOLERANCE

P M K N S



$3 \leq DC \leq 6$	$6 < DC \leq 10$	$10 < DC \leq 14$
+ 0.016	+ 0.021	+ 0.025
+ 0.004	+ 0.006	+ 0.007



$4 \leq DCONMS \leq 6$	$6 < DCONMS \leq 10$	$10 < DCONMS \leq 14$
0	0	0
- 0.008	- 0.009	- 0.011

Order number	DP102A	DC	L/D	LU	LCF	LS	OAL*	DCONMS	Type
DFAS0300X03S060E	●	3	3	9	14	40.4	62	6	2
DFAS0310X03S060E	●	3.1	3	9.3	16	38.6	62	6	2
DFAS0320X03S060E	●	3.2	3	9.6	16	38.8	62	6	2
DFAS0330X03S060E	●	3.3	3	9.9	16	39.0	62	6	2
DFAS0340X03S060E	●	3.4	3	10.2	16	39.1	62	6	2
DFAS0350X03S060E	●	3.5	3	10.5	16	39.3	62	6	2
DFAS0360X03S060E	●	3.6	3	10.8	17	38.5	62	6	2
DFAS0370X03S060E	●	3.7	3	11.1	17	38.7	62	6	2
DFAS0380X03S060E	●	3.8	3	11.4	18	41.9	66	6	2
DFAS0390X03S060E	●	3.9	3	11.7	18	42.1	66	6	2
DFAS0400X03S060E	●	4	3	12	18	42.3	66	6	2
DFAS0410X03S060E	●	4.1	3	12.3	20	40.5	66	6	2
DFAS0420X03S060E	●	4.2	3	12.6	20	40.6	66	6	2
DFAS0430X03S060E	●	4.3	3	12.9	20	40.8	66	6	2
DFAS0440X03S060E	●	4.4	3	13.2	20	41.0	66	6	2
DFAS0450X03S060E	●	4.5	3	13.5	20	41.2	66	6	2
DFAS0460X03S060E	●	4.6	3	13.8	21	42.3	66	6	2
DFAS0470X03S060E	●	4.7	3	14.1	21	42.4	66	6	2
DFAS0480X03S060E	●	4.8	3	14.4	22	41.4	66	6	2
DFAS0490X03S060E	●	4.9	3	14.7	22	41.5	66	6	2
DFAS0500X03S060E	●	5	3	15	23	40.5	66	6	2

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* DIN6537-K

DFAS-E - SOLID CARBIDE FLAT BOTTOM DRILLS, m7 TOLERANCE

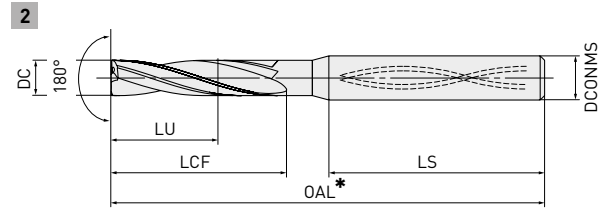
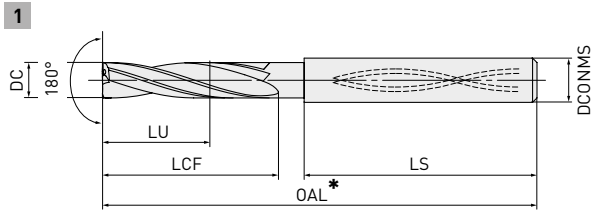
Order number	DP102A	DC	L/D	LU	LCF	LS	OAL*	DCONMS	Type
DFAS0510X03S060E	●	5.1	3	15.3	25	38.6	66	6	2
DFAS0520X03S060E	●	5.2	3	15.6	25	38.6	66	6	2
DFAS0530X03S060E	●	5.3	3	15.9	25	38.7	66	6	2
DFAS0540X03S060E	●	5.4	3	16.2	25	38.7	66	6	2
DFAS0550X03S060E	●	5.5	3	16.5	25	38.8	66	6	2
DFAS0560X03S060E	●	5.6	3	16.8	26	37.8	66	6	2
DFAS0570X03S060E	●	5.7	3	17.1	26	37.9	66	6	2
DFAS0580X03S060E	●	5.8	3	17.4	27	36.9	66	6	2
DFAS0590X03S060E	●	5.9	3	17.7	27	37.0	66	6	2
DFAS0600X03S060E	●	6	3	18	27	37.0	66	6	1
DFAS0610X03S080E	●	6.1	3	18.3	29	47.1	79	8	2
DFAS0620X03S080E	●	6.2	3	18.6	29	47.1	79	8	2
DFAS0630X03S080E	●	6.3	3	18.9	29	47.2	79	8	2
DFAS0640X03S080E	●	6.4	3	19.2	29	47.2	79	8	2
DFAS0650X03S080E	●	6.5	3	19.5	29	47.3	79	8	2
DFAS0660X03S080E	●	6.6	3	19.8	30	46.3	79	8	2
DFAS0670X03S080E	●	6.7	3	20.1	30	46.4	79	8	2
DFAS0680X03S080E	●	6.8	3	20.4	32	44.4	79	8	2
DFAS0690X03S080E	●	6.9	3	20.7	32	44.5	79	8	2
DFAS0700X03S080E	●	7	3	21	32	44.5	79	8	2
DFAS0710X03S080E	●	7.1	3	21.3	34	42.6	79	8	2
DFAS0720X03S080E	●	7.2	3	21.6	34	42.6	79	8	2
DFAS0730X03S080E	●	7.3	3	21.9	34	42.7	79	8	2
DFAS0740X03S080E	●	7.4	3	22.2	34	42.7	79	8	2
DFAS0750X03S080E	●	7.5	3	22.5	34	42.8	79	8	2
DFAS0760X03S080E	●	7.6	3	22.8	36	40.8	79	8	2
DFAS0770X03S080E	●	7.7	3	23.1	36	40.9	79	8	2
DFAS0780X03S080E	●	7.8	3	23.4	36	40.9	79	8	2
DFAS0790X03S080E	●	7.9	3	23.7	36	41.0	79	8	2
DFAS0800X03S080E	●	8	3	24	36	41.0	79	8	1
DFAS0810X03S100E	●	8.1	3	24.3	39	47.1	89	10	2
DFAS0820X03S100E	●	8.2	3	24.6	39	47.1	89	10	2
DFAS0830X03S100E	●	8.3	3	24.9	39	47.2	89	10	2
DFAS0840X03S100E	●	8.4	3	25.2	39	47.2	89	10	2
DFAS0850X03S100E	●	8.5	3	25.5	39	47.3	89	10	2
DFAS0860X03S100E	●	8.6	3	25.8	40	46.3	89	10	2
DFAS0870X03S100E	●	8.7	3	26.1	40	46.4	89	10	2
DFAS0880X03S100E	●	8.8	3	26.4	40	46.4	89	10	2
DFAS0890X03S100E	●	8.9	3	26.7	40	46.5	89	10	2
DFAS0900X03S100E	●	9	3	27	40	46.5	89	10	2
DFAS0910X03S100E	●	9.1	3	27.3	43	43.6	89	10	2
DFAS0920X03S100E	●	9.2	3	27.6	43	43.6	89	10	2
DFAS0930X03S100E	●	9.3	3	27.9	43	43.7	89	10	2
DFAS0940X03S100E	●	9.4	3	28.2	43	43.7	89	10	2
DFAS0950X03S100E	●	9.5	3	28.5	43	43.8	89	10	2
DFAS0960X03S100E	●	9.6	3	28.8	45	41.8	89	10	2
DFAS0970X03S100E	●	9.7	3	29.1	45	41.9	89	10	2
DFAS0980X03S100E	●	9.8	3	29.4	45	41.9	89	10	2

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* DIN6537-K

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DFAS-E - SOLID CARBIDE FLAT BOTTOM DRILLS, m7 TOLERANCE



Order number	DP102A	DC	L/D	LU	LCF	LS	OAL*	DCONMS	Type
DFAS0990X03S100E	●	9.9	3	29.7	45	42.0	89	10	2
DFAS1000X03S100E	●	10	3	30	45	42.0	89	10	1
DFAS1010X03S120E	●	10.1	3	30.3	47	53.0	102	12	1
DFAS1020X03S120E	●	10.2	3	30.6	47	53.0	102	12	1
DFAS1030X03S120E	●	10.3	3	30.9	47	53.0	102	12	1
DFAS1040X03S120E	●	10.4	3	31.2	47	53.0	102	12	1
DFAS1050X03S120E	●	10.5	3	31.5	47	53.0	102	12	1
DFAS1060X03S120E	●	10.6	3	31.8	49	51.0	102	12	1
DFAS1070X03S120E	●	10.7	3	32.1	49	51.0	102	12	1
DFAS1080X03S120E	●	10.8	3	32.4	49	51.0	102	12	1
DFAS1090X03S120E	●	10.9	3	32.7	49	51.0	102	12	1
DFAS1100X03S120E	●	11	3	33	49	51.0	102	12	1
DFAS1110X03S120E	●	11.1	3	33.3	52	48.0	102	12	1
DFAS1120X03S120E	●	11.2	3	33.6	52	48.0	102	12	1
DFAS1130X03S120E	●	11.3	3	33.9	52	48.0	102	12	1
DFAS1140X03S120E	●	11.4	3	34.2	52	48.0	102	12	1
DFAS1150X03S120E	●	11.5	3	34.5	52	48.0	102	12	1
DFAS1160X03S120E	●	11.6	3	34.8	54	46.0	102	12	1
DFAS1170X03S120E	●	11.7	3	35.1	54	46.0	102	12	1
DFAS1180X03S120E	●	11.8	3	35.4	54	46.0	102	12	1
DFAS1190X03S120E	●	11.9	3	35.7	54	46.0	102	12	1
DFAS1200X03S120E	●	12	3	36	54	46.0	102	12	1
DFAS1250X03S140E	●	12.5	3	37.5	56	49.0	107	14	1
DFAS1300X03S140E	●	13	3	39	58	47.0	107	14	1
DFAS1350X03S140E	●	13.5	3	40.5	60	45.0	107	14	1
DFAS1400X03S140E	●	14	3	42	60	45.0	107	14	1

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* DIN6537-K

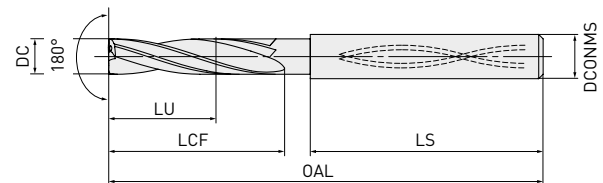
DFAS



SOLID CARBIDE FLAT BOTTOM DRILLS

h8 TOLERANCE

P M K N S



DC=3	3<DC≤6	6<DC≤10	10<DC≤14
0	0	0	0
-0.014	-0.018	-0.022	-0.027



4≤DCONMS≤6	6<DCONMS≤10	10<DCONMS≤14
0	0	0
-0.008	-0.009	-0.011

Order number	DP102A	DC	L/D	LU	LCF	LS	OAL	DCONMS
DFAS0300X03S040	●	3.0	3	9.0	14	39.0	55	4
NEW DFAS0300X05S040	★	3.0	5	15.0	20	65.0	87	4
DFAS0310X03S040	★	3.1	3	9.3	16	37.0	55	4
NEW DFAS0310X05S040	★	3.1	5	15.5	23	62.0	87	4
DFAS0320X03S040	★	3.2	3	9.6	16	37.0	55	4
NEW DFAS0320X05S040	★	3.2	5	16.0	23	62.0	87	4
DFAS0330X03S040	●	3.3	3	9.9	16	37.0	55	4
NEW DFAS0330X05S040	★	3.3	5	16.5	23	62.0	87	4
DFAS0340X03S040	★	3.4	3	10.2	16	37.0	55	4
NEW DFAS0340X05S040	★	3.4	5	17.0	23	62.0	87	4
DFAS0350X03S040	●	3.5	3	10.5	16	37.0	55	4
NEW DFAS0350X05S040	★	3.5	5	17.5	23	62.0	87	4
DFAS0360X03S040	★	3.6	3	10.8	18	35.0	55	4
NEW DFAS0360X05S040	★	3.6	5	18.0	26	64.0	92	4
DFAS0370X03S040	★	3.7	3	11.1	18	35.0	55	4
NEW DFAS0370X05S040	★	3.7	5	18.5	26	64.0	92	4
DFAS0380X03S040	★	3.8	3	11.4	18	35.0	55	4
NEW DFAS0380X05S040	★	3.8	5	19.0	26	64.0	92	4
DFAS0390X03S040	★	3.9	3	11.7	18	35.0	55	4
NEW DFAS0390X05S040	★	3.9	5	19.5	26	64.0	92	4
DFAS0400X03S040	●	4.0	3	12.0	18	35.0	55	4
NEW DFAS0400X05S040	★	4.0	5	20.0	26	64.0	92	4
DFAS0410X03S050	★	4.1	3	12.3	20	40.0	62	5
NEW DFAS0410X05S050	★	4.1	5	20.5	29	69.0	100	5

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DFAS – SOLID CARBIDE FLAT BOTTOM DRILLS, h8 TOLERANCE

	Order number	DP102A	DC	L/D	LU	LCF	LS	OAL	DCONMS
	DFAS0420X03S050	●	4.2	3	12.6	20	40.0	62	5
NEW	DFAS0420X05S050	★	4.2	5	21.0	29	69.0	100	5
	DFAS0430X03S050	★	4.3	3	12.9	20	40.0	62	5
NEW	DFAS0430X05S050	★	4.3	5	21.5	29	69.0	100	5
	DFAS0440X03S050	★	4.4	3	13.2	20	40.0	62	5
NEW	DFAS0440X05S050	★	4.4	5	22.0	29	69.0	100	5
	DFAS0450X03S050	●	4.5	3	13.5	20	40.0	62	5
NEW	DFAS0450X05S050	★	4.5	5	22.5	29	69.0	100	5
	DFAS0460X03S050	★	4.6	3	13.8	23	37.0	62	5
NEW	DFAS0460X05S050	★	4.6	5	23.0	33	70.0	105	5
	DFAS0470X03S050	★	4.7	3	14.1	23	37.0	62	5
NEW	DFAS0470X05S050	★	4.7	5	23.5	33	70.0	105	5
	DFAS0480X03S050	★	4.8	3	14.4	23	37.0	62	5
NEW	DFAS0480X05S050	★	4.8	5	24.0	33	70.0	105	5
	DFAS0490X03S050	★	4.9	3	14.7	23	37.0	62	5
NEW	DFAS0490X05S050	★	4.9	5	24.5	33	70.0	105	5
	DFAS0500X03S050	●	5.0	3	15.0	23	37.0	62	5
NEW	DFAS0500X05S050	★	5.0	5	25.0	33	70.0	105	5
	DFAS0510X03S060	★	5.1	3	15.3	25	39.0	66	6
NEW	DFAS0510X05S060	★	5.1	5	25.5	36	62.0	100	6
	DFAS0520X03S060	★	5.2	3	15.6	25	39.0	66	6
NEW	DFAS0520X05S060	★	5.2	5	26.0	36	62.0	100	6
	DFAS0530X03S060	●	5.3	3	15.9	25	39.0	66	6
NEW	DFAS0530X05S060	★	5.3	5	26.5	36	62.0	100	6
	DFAS0540X03S060	★	5.4	3	16.2	25	39.0	66	6
NEW	DFAS0540X05S060	★	5.4	5	27.0	36	62.0	100	6
	DFAS0550X03S060	●	5.5	3	16.5	25	39.0	66	6
NEW	DFAS0550X05S060	★	5.5	5	27.5	36	62.0	100	6
	DFAS0560X03S060	★	5.6	3	16.8	27	37.0	66	6
NEW	DFAS0560X05S060	★	5.6	5	28.0	39	59.0	100	6
	DFAS0570X03S060	★	5.7	3	17.1	27	37.0	66	6
NEW	DFAS0570X05S060	★	5.7	5	28.5	39	59.0	100	6
	DFAS0580X03S060	★	5.8	3	17.4	27	37.0	66	6
NEW	DFAS0580X05S060	★	5.8	5	29.0	39	59.0	100	6
	DFAS0590X03S060	★	5.9	3	17.7	27	37.0	66	6
NEW	DFAS0590X05S060	★	5.9	5	29.5	39	59.0	100	6
	DFAS0600X03S060	●	6.0	3	18.0	27	37.0	66	6
NEW	DFAS0600X05S060	★	6.0	5	30.0	39	59.0	100	6
	DFAS0610X03S070	★	6.1	3	18.3	29	44.0	75	7
NEW	DFAS0610X05S070	★	6.1	5	30.5	42	65.0	109	7
	DFAS0620X03S070	★	6.2	3	18.6	29	44.0	75	7
NEW	DFAS0620X05S070	★	6.2	5	31.0	42	65.0	109	7
	DFAS0630X03S070	★	6.3	3	18.9	29	44.0	75	7
NEW	DFAS0630X05S070	★	6.3	5	31.5	42	65.0	109	7
	DFAS0640X03S070	★	6.4	3	19.2	29	44.0	75	7
NEW	DFAS0640X05S070	★	6.4	5	32.0	42	65.0	109	7
	DFAS0650X03S070	●	6.5	3	19.5	29	44.0	75	7
NEW	DFAS0650X05S070	★	6.5	5	32.5	42	65.0	109	7

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DFAS – SOLID CARBIDE FLAT BOTTOM DRILLS, h8 TOLERANCE

	Order number	DP102A	DC	L/D	LU	LCF	LS	OAL	DCONMS
	DFAS0660X03S070	★	6.6	3	19.8	32	41.0	75	7
NEW	DFAS0660X05S070	★	6.6	5	33.0	46	61.0	109	7
	DFAS0670X03S070	★	6.7	3	20.1	32	41.0	75	7
NEW	DFAS0670X05S070	★	6.7	5	33.5	46	61.0	109	7
	DFAS0680X03S070	●	6.8	3	20.4	32	41.0	75	7
NEW	DFAS0680X05S070	★	6.8	5	34.0	46	61.0	109	7
	DFAS0690X03S070	★	6.9	3	20.7	32	41.0	75	7
NEW	DFAS0690X05S070	★	6.9	5	34.5	46	61.0	109	7
	DFAS0700X03S070	●	7.0	3	21.0	32	41.0	75	7
NEW	DFAS0700X05S070	★	7.0	5	35.0	46	61.0	109	7
	DFAS0710X03S080	★	7.1	3	21.3	34	44.0	80	8
NEW	DFAS0710X05S080	★	7.1	5	35.5	49	67.0	118	8
	DFAS0720X03S080	★	7.2	3	21.6	34	44.0	80	8
NEW	DFAS0720X05S080	★	7.2	5	36.0	49	67.0	118	8
	DFAS0730X03S080	★	7.3	3	21.9	34	44.0	80	8
NEW	DFAS0730X05S080	★	7.3	5	36.5	49	67.0	118	8
	DFAS0740X03S080	★	7.4	3	22.2	34	44.0	80	8
NEW	DFAS0740X05S080	★	7.4	5	37.0	49	67.0	118	8
	DFAS0750X03S080	●	7.5	3	22.5	34	44.0	80	8
NEW	DFAS0750X05S080	★	7.5	5	37.5	49	67.0	118	8
	DFAS0760X03S080	★	7.6	3	22.8	36	42.0	80	8
NEW	DFAS0760X05S080	★	7.6	5	38.0	52	64.0	118	8
	DFAS0770X03S080	★	7.7	3	23.1	36	42.0	80	8
NEW	DFAS0770X05S080	★	7.7	5	38.5	52	64.0	118	8
	DFAS0780X03S080	★	7.8	3	23.4	36	42.0	80	8
NEW	DFAS0780X05S080	★	7.8	5	39.0	52	64.0	118	8
	DFAS0790X03S080	★	7.9	3	23.7	36	42.0	80	8
NEW	DFAS0790X05S080	★	7.9	5	39.5	52	64.0	118	8
	DFAS0800X03S080	●	8.0	3	24.0	36	42.0	80	8
NEW	DFAS0800X05S080	★	8.0	5	40.0	52	64.0	118	8
	DFAS0810X03S090	★	8.1	3	24.3	38	45.0	85	9
NEW	DFAS0810X05S090	★	8.1	5	40.5	55	70.0	127	9
	DFAS0820X03S090	●	8.2	3	24.6	38	45.0	85	9
NEW	DFAS0820X05S090	★	8.2	5	41.0	55	70.0	127	9
	DFAS0830X03S090	★	8.3	3	24.9	38	45.0	85	9
NEW	DFAS0830X05S090	★	8.3	5	41.5	55	70.0	127	9
	DFAS0840X03S090	★	8.4	3	25.2	38	45.0	85	9
NEW	DFAS0840X05S090	★	8.4	5	42.0	55	70.0	127	9
	DFAS0850X03S090	●	8.5	3	25.5	38	45.0	85	9
NEW	DFAS0850X05S090	★	8.5	5	42.5	55	70.0	127	9
	DFAS0860X03S090	★	8.6	3	25.8	41	42.0	85	9
NEW	DFAS0860X05S090	★	8.6	5	43.0	59	66.0	127	9
	DFAS0870X03S090	★	8.7	3	26.1	41	42.0	85	9
NEW	DFAS0870X05S090	★	8.7	5	43.5	59	66.0	127	9
	DFAS0880X03S090	●	8.8	3	26.4	41	42.0	85	9
NEW	DFAS0880X05S090	★	8.8	5	44.0	59	66.0	127	9
	DFAS0890X03S090	★	8.9	3	26.7	41	42.0	85	9
NEW	DFAS0890X05S090	★	8.9	5	44.5	59	66.0	127	9

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DFAS – SOLID CARBIDE FLAT BOTTOM DRILLS, h8 TOLERANCE

	Order number	DP102A	DC	L/D	LU	LCF	LS	OAL	DCONMS
	DFAS0900X03S090	●	9.0	3	27.0	41	42.0	85	9
NEW	DFAS0900X05S090	★	9.0	5	45.0	59	66.0	127	9
	DFAS0910X03S100	★	9.1	3	27.3	43	45.0	90	10
NEW	DFAS0910X05S100	★	9.1	5	45.5	62	72.0	136	10
	DFAS0920X03S100	★	9.2	3	27.6	43	45.0	90	10
NEW	DFAS0920X05S100	★	9.2	5	46.0	62	72.0	136	10
	DFAS0930X03S100	★	9.3	3	27.9	43	45.0	90	10
NEW	DFAS0930X05S100	★	9.3	5	46.5	62	72.0	136	10
	DFAS0940X03S100	★	9.4	3	28.2	43	45.0	90	10
NEW	DFAS0940X05S100	★	9.4	5	47.0	62	72.0	136	10
	DFAS0950X03S100	●	9.5	3	28.5	43	45.0	90	10
NEW	DFAS0950X05S100	★	9.5	5	47.5	62	72.0	136	10
	DFAS0960X03S100	★	9.6	3	28.8	45	43.0	90	10
NEW	DFAS0960X05S100	★	9.6	5	48.0	65	69.0	136	10
	DFAS0970X03S100	●	9.7	3	29.1	45	43.0	90	10
NEW	DFAS0970X05S100	★	9.7	5	48.5	65	69.0	136	10
	DFAS0980X03S100	★	9.8	3	29.4	45	43.0	90	10
NEW	DFAS0980X05S100	★	9.8	5	49.0	65	69.0	136	10
	DFAS0990X03S100	★	9.9	3	29.7	45	43.0	90	10
NEW	DFAS0990X05S100	★	9.9	5	49.5	65	69.0	136	10
	DFAS1000X03S100	●	10.0	3	30.0	45	43.0	90	10
NEW	DFAS1000X05S100	★	10.0	5	50.0	65	69.0	136	10
	DFAS1010X03S110	★	10.1	3	30.3	47	52.0	101	11
NEW	DFAS1010X05S110	★	10.1	5	50.5	68	79.0	149	11
	DFAS1020X03S110	●	10.2	3	30.6	47	52.0	101	11
NEW	DFAS1020X05S110	★	10.2	5	51.0	68	79.0	149	11
	DFAS1030X03S110	★	10.3	3	30.9	47	52.0	101	11
NEW	DFAS1030X05S110	★	10.3	5	51.5	68	79.0	149	11
	DFAS1040X03S110	★	10.4	3	31.2	47	52.0	101	11
NEW	DFAS1040X05S110	★	10.4	5	52.0	68	79.0	149	11
	DFAS1050X03S110	●	10.5	3	31.5	47	52.0	101	11
NEW	DFAS1050X05S110	★	10.5	5	52.5	68	79.0	149	11
	DFAS1060X03S110	★	10.6	3	31.8	50	49.0	101	11
NEW	DFAS1060X05S110	★	10.6	5	53.0	72	75.0	149	11
	DFAS1070X03S110	★	10.7	3	32.1	50	49.0	101	11
NEW	DFAS1070X05S110	★	10.7	5	53.5	72	75.0	149	11
	DFAS1080X03S110	★	10.8	3	32.4	50	49.0	101	11
NEW	DFAS1080X05S110	★	10.8	5	54.0	72	75.0	149	11
	DFAS1090X03S110	★	10.9	3	32.7	50	49.0	101	11
NEW	DFAS1090X05S110	★	10.9	5	54.5	72	75.0	149	11
	DFAS1100X03S110	●	11.0	3	33.0	50	49.0	101	11
NEW	DFAS1100X05S110	★	11.0	5	55.0	72	75.0	149	11
	DFAS1110X03S120	★	11.1	3	33.3	52	51.0	105	12
NEW	DFAS1110X05S120	★	11.1	5	55.5	75	81.0	158	12
	DFAS1120X03S120	★	11.2	3	33.6	52	51.0	105	12
NEW	DFAS1120X05S120	★	11.2	5	56.0	75	81.0	158	12
	DFAS1130X03S120	★	11.3	3	33.9	52	51.0	105	12

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DFAS – SOLID CARBIDE FLAT BOTTOM DRILLS, h8 TOLERANCE

	Order number	DP102A	DC	L/D	LU	LCF	LS	OAL	DCONMS
NEW	DFAS1130X05S120	★	11.3	5	56.5	75	81.0	158	12
	DFAS1140X03S120	★	11.4	3	34.2	52	51.0	105	12
NEW	DFAS1140X05S120	★	11.4	5	57.0	75	81.0	158	12
	DFAS1150X03S120	●	11.5	3	34.5	52	51.0	105	12
NEW	DFAS1150X05S120	★	11.5	5	57.5	75	81.0	158	12
	DFAS1160X03S120	★	11.6	3	34.8	54	49.0	105	12
NEW	DFAS1160X05S120	★	11.6	5	58.0	78	78.0	158	12
	DFAS1170X03S120	★	11.7	3	35.1	54	49.0	105	12
NEW	DFAS1170X05S120	★	11.7	5	58.5	78	78.0	158	12
	DFAS1180X03S120	★	11.8	3	35.4	54	49.0	105	12
NEW	DFAS1180X05S120	★	11.8	5	59.0	78	78.0	158	12
	DFAS1190X03S120	★	11.9	3	35.7	54	49.0	105	12
NEW	DFAS1190X05S120	★	11.9	5	59.5	78	78.0	158	12
	DFAS1200X03S120	●	12.0	3	36.0	54	49.0	105	12
NEW	DFAS1200X05S120	★	12.0	5	60.0	78	78.0	158	12
	DFAS1250X03S130	★	12.5	3	37.5	56	52.0	110	13
NEW	DFAS1250X05S130	★	12.5	5	62.5	81	84.0	167	13
	DFAS1300X03S130	●	13.0	3	39.0	59	49.0	110	13
NEW	DFAS1300X05S130	★	13.0	5	65.0	85	80.0	167	13
	DFAS1350X03S140	★	13.5	3	40.5	61	51.0	114	14
NEW	DFAS1350X05S140	★	13.5	5	67.5	88	86.0	176	14
	DFAS1400X03S140	●	14.0	3	42.0	63	49.0	114	14
NEW	DFAS1400X05S140	★	14.0	5	70.0	91	83.0	176	14
									5/5



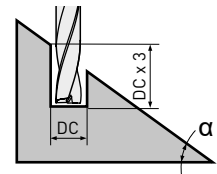
DFAS / DFAS-E

RECOMMENDED CUTTING CONDITIONS

Material	DC	L/D	n	$\alpha = 0^\circ$ fr
P Mild steel, Carbon steel, Alloy steel	3.0	≤5	10610	0.07 [0.04 – 0.10]
	4.0	≤5	7960	0.08 [0.04 – 0.11]
	5.0	≤5	6370	0.10 [0.05 – 0.14]
	6.0	≤5	5310	0.12 [0.06 – 0.17]
	7.0	≤5	4550	0.13 [0.07 – 0.20]
	8.0	≤5	3980	0.16 [0.08 – 0.23]
	9.0	≤5	3540	0.17 [0.09 – 0.26]
	10.0	≤5	3180	0.20 [0.10 – 0.29]
	11.0	≤5	2890	0.22 [0.11 – 0.32]
	12.0	≤5	2650	0.24 [0.12 – 0.35]
	13.0	≤5	2450	0.26 [0.13 – 0.39]
	14.0	≤5	2270	0.28 [0.14 – 0.42]
M Stainless Steel	3.0	≤5	3180	0.04 [0.01 – 0.08]
	4.0	≤5	2390	0.06 [0.01 – 0.11]
	5.0	≤5	1910	0.08 [0.02 – 0.13]
	6.0	≤5	1590	0.08 [0.02 – 0.15]
	7.0	≤5	1360	0.09 [0.02 – 0.16]
	8.0	≤5	1190	0.10 [0.03 – 0.17]
	9.0	≤5	1060	0.11 [0.03 – 0.19]
	10.0	≤5	950	0.12 [0.03 – 0.20]
	11.0	≤5	870	0.13 [0.04 – 0.22]
	12.0	≤5	800	0.14 [0.04 – 0.24]
	13.0	≤5	730	0.15 [0.04 – 0.26]
	14.0	≤5	680	0.16 [0.05 – 0.28]
K Gray cast iron, Ductile cast iron	3.0	≤5	10610	0.04 [0.02 – 0.07]
	4.0	≤5	7960	0.05 [0.03 – 0.09]
	5.0	≤5	6370	0.07 [0.03 – 0.11]
	6.0	≤5	5310	0.08 [0.04 – 0.13]
	7.0	≤5	4550	0.09 [0.05 – 0.15]
	8.0	≤5	3980	0.11 [0.05 – 0.17]
	9.0	≤5	3540	0.12 [0.06 – 0.20]
	10.0	≤5	3180	0.13 [0.07 – 0.22]
	11.0	≤5	2890	0.15 [0.07 – 0.24]
	12.0	≤5	2650	0.16 [0.08 – 0.26]
	13.0	≤5	2450	0.17 [0.09 – 0.28]
	14.0	≤5	2270	0.19 [0.09 – 0.30]

1/2

1. This should be the depth from the uppermost surface of the workpiece material when machining on an angled surface. (Refer to diagram)
2. The cutting table above assumes drilling on a flat surface.
For hole drilling on an angled surface, adjust the feed rate in accordance with the inclination angle.
When the inclination angle α is 30° or less, reduce the feed rate by 30 % or more as a guideline.
When the inclination angle α is greater than 30° , reduce the feed rate by 50 % or more as a guideline.
3. This product is a tool intended for hole drilling. It cannot be used for cross-feed or helical machining.
4. If a drill with $L/D = 5$ is used, a pilot hole of the same diameter, or a centre drilled hole with a diameter larger than the finished drill is needed.

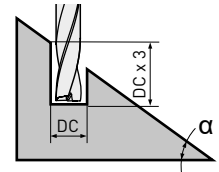


DFAS/DFAS-E

Material		DC	L/D	n	$\alpha = 0^\circ$ fr
N	Aluminium alloy	3.0	≤5	13790	0.04 [0.02 – 0.07]
		4.0	≤5	10350	0.05 [0.03 – 0.09]
		5.0	≤5	8280	0.07 [0.03 – 0.11]
		6.0	≤5	6900	0.08 [0.04 – 0.13]
		7.0	≤5	5910	0.09 [0.05 – 0.15]
		8.0	≤5	5170	0.11 [0.05 – 0.17]
		9.0	≤5	4600	0.12 [0.06 – 0.20]
		10.0	≤5	4140	0.13 [0.07 – 0.22]
		11.0	≤5	3760	0.15 [0.07 – 0.24]
		12.0	≤5	3450	0.16 [0.08 – 0.26]
		13.0	≤5	3180	0.17 [0.09 – 0.28]
		14.0	≤5	2960	0.19 [0.09 – 0.30]
S	Titanium alloy	3.0	≤5	3710	0.03 [0.01 – 0.05]
		4.0	≤5	2790	0.04 [0.01 – 0.07]
		5.0	≤5	2230	0.05 [0.02 – 0.08]
		6.0	≤5	1860	0.06 [0.02 – 0.10]
		7.0	≤5	1590	0.07 [0.02 – 0.12]
		8.0	≤5	1390	0.08 [0.03 – 0.13]
		9.0	≤5	1240	0.09 [0.03 – 0.15]
		10.0	≤5	1110	0.10 [0.03 – 0.17]
		11.0	≤5	1010	0.11 [0.04 – 0.18]
		12.0	≤5	930	0.12 [0.04 – 0.20]
		13.0	≤5	860	0.13 [0.04 – 0.22]
		14.0	≤5	800	0.14 [0.05 – 0.23]

2/2

1. This should be the depth from the uppermost surface of the workpiece material when machining on an angled surface. (Refer to diagram)
2. The cutting table above assumes drilling on a flat surface.
For hole drilling on an angled surface, adjust the feed rate in accordance with the inclination angle.
When the inclination angle α is 30° or less, reduce the feed rate by 30 % or more as a guideline.
When the inclination angle α is greater than 30° , reduce the feed rate by 50 % or more as a guideline.
3. This product is a tool intended for hole drilling. It cannot be used for cross-feed or helical machining.
4. If a drill with $L/D = 5$ is used, a pilot hole of the same diameter, or a centre drilled hole with a diameter larger than the finished drill is needed.



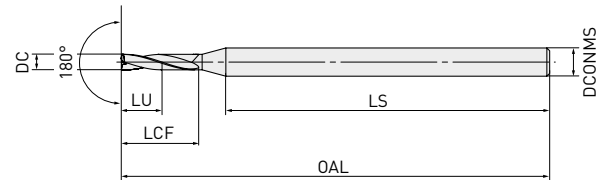
MINI-MFE



FOR SMALL DIAMETER HOLES

DC 0.75 – 2.95

P M K N



0.75 ≤ DC ≤ 2.95

0

- 0.014



DCONMS = 3 DCONMS = 4

0

- 0.006

0

- 0.008

Order number	DP102A	DC	L/D	LU	LCF	LS	OAL	DCONMS
MFE0075X02S030	★	0.75	2	1.5	3.0	37.3	45	3
MFE0080X02S030	★	0.80	2	1.6	3.2	37.2	45	3
MFE0085X02S030	★	0.85	2	1.7	3.4	37.1	45	3
MFE0090X02S030	★	0.90	2	1.8	3.6	37.0	45	3
MFE0095X02S030	★	0.95	2	1.9	3.8	36.9	45	3
MFE0100X02S030	★	1.00	2	2.0	4.0	36.8	45	3
MFE0105X02S030	★	1.05	2	2.1	4.2	36.7	45	3
MFE0110X02S030	★	1.10	2	2.2	4.4	36.6	45	3
MFE0115X02S030	★	1.15	2	2.3	4.6	36.4	45	3
MFE0120X02S030	★	1.20	2	2.4	4.8	36.3	45	3
MFE0125X02S030	★	1.25	2	2.5	5.0	36.2	45	3
MFE0130X02S030	★	1.30	2	2.6	5.2	36.1	45	3
MFE0135X02S030	★	1.35	2	2.7	5.4	36.0	45	3
MFE0140X02S030	★	1.40	2	2.8	5.6	35.9	45	3
MFE0145X02S030	★	1.45	2	2.9	5.8	35.8	45	3
MFE0150X02S030	★	1.50	2	3.0	6.0	35.7	45	3
MFE0155X02S030	★	1.55	2	3.1	6.2	35.6	45	3
MFE0160X02S030	★	1.60	2	3.2	6.4	35.5	45	3
MFE0165X02S030	★	1.65	2	3.3	6.6	35.4	45	3
MFE0170X02S030	★	1.70	2	3.4	6.8	35.3	45	3
MFE0175X02S030	★	1.75	2	3.5	7.0	35.2	45	3

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MINI-MFE – FOR SMALL DIAMETER HOLES, DC 0.75 – 2.95

Order number	DP102A	DC	L/D	LU	LCF	LS	OAL	DCONMS
MFE0180X02S030	★	1.80	2	3.6	7.2	35.1	45	3
MFE0185X02S030	★	1.85	2	3.7	7.4	35.0	45	3
MFE0190X02S030	★	1.90	2	3.8	7.6	34.8	45	3
MFE0195X02S030	★	1.95	2	3.9	7.8	34.7	45	3
MFE0200X02S040	★	2.00	2	4.0	8.0	37.8	50	4
MFE0205X02S040	★	2.05	2	4.1	8.2	37.7	50	4
MFE0210X02S040	★	2.10	2	4.2	8.4	37.6	50	4
MFE0215X02S040	★	2.15	2	4.3	8.6	37.4	50	4
MFE0220X02S040	★	2.20	2	4.4	8.8	37.3	50	4
MFE0225X02S040	★	2.25	2	4.5	9.0	37.2	50	4
MFE0230X02S040	★	2.30	2	4.6	9.2	37.1	50	4
MFE0235X02S040	★	2.35	2	4.7	9.4	37.0	50	4
MFE0240X02S040	★	2.40	2	4.8	9.6	36.9	50	4
MFE0245X02S040	★	2.45	2	4.9	9.8	36.8	50	4
MFE0250X02S040	★	2.50	2	5.0	10.0	36.7	50	4
MFE0255X02S040	★	2.55	2	5.1	10.2	36.6	50	4
MFE0260X02S040	★	2.60	2	5.2	10.4	36.5	50	4
MFE0265X02S040	★	2.65	2	5.3	10.6	36.4	50	4
MFE0270X02S040	★	2.70	2	5.4	10.8	36.3	50	4
MFE0275X02S040	★	2.75	2	5.5	11.0	36.2	50	4
MFE0280X02S040	★	2.80	2	5.6	11.2	36.1	50	4
MFE0285X02S040	★	2.85	2	5.7	11.4	36.0	50	4
MFE0290X02S040	★	2.90	2	5.8	11.6	35.8	50	4
MFE0295X02S040	★	2.95	2	5.9	11.8	35.7	50	4

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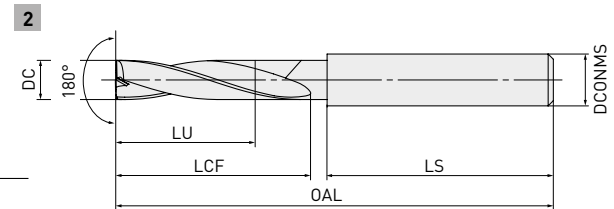
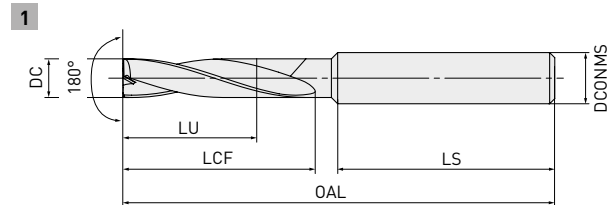
MFE



SOLID CARBIDE FLAT BOTTOM DRILLS

h7 TOLERANCE

P M K N



3<DC≤6	6<DC≤10	10<DC≤18	18<DC≤20
0	0	0	0
-0.012	-0.015	-0.018	-0.021



DCONMS = 6	6<DCONMS≤10	10<DCONMS≤18	DCONMS = 20
0	0	0	0
-0.008	-0.009	-0.011	-0.013

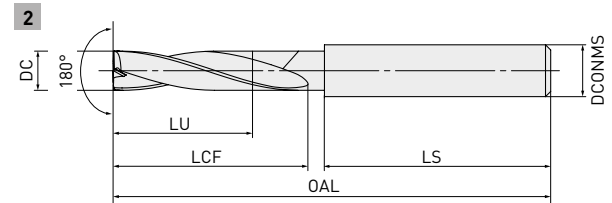
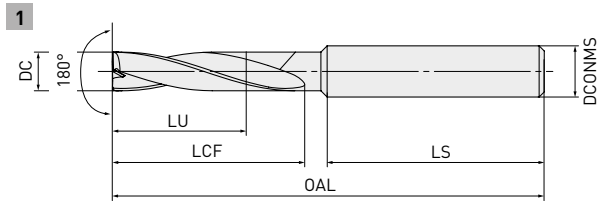
Order number	DP1020	DC	L/D	LU	LCF	LS	OAL	DCONMS	Type
MFE0300X02S060	★	3.0	2	6.0	12	35.4	55	6	1
MFE0310X02S060	★	3.1	2	6.2	14	33.6	55	6	1
MFE0320X02S060	★	3.2	2	6.4	14	33.8	55	6	1
MFE0330X02S060	★	3.3	2	6.6	14	34.0	55	6	1
MFE0340X02S060	★	3.4	2	6.8	14	34.1	55	6	1
MFE0350X02S060	★	3.5	2	7.0	14	34.3	55	6	1
MFE0360X02S060	★	3.6	2	7.2	16	32.5	55	6	1
MFE0370X02S060	★	3.7	2	7.4	16	32.7	55	6	1
MFE0380X02S060	★	3.8	2	7.6	16	32.9	55	6	1
MFE0390X02S060	★	3.9	2	7.8	16	33.1	55	6	1
MFE0400X02S060	★	4.0	2	8.0	16	33.3	55	6	1
MFE0410X02S060	★	4.1	2	8.2	18	38.5	62	6	1
MFE0420X02S060	★	4.2	2	8.4	18	38.6	62	6	1
MFE0430X02S060	★	4.3	2	8.6	18	38.8	62	6	1
MFE0440X02S060	★	4.4	2	8.8	18	39.0	62	6	1
MFE0450X02S060	★	4.5	2	9.0	18	39.2	62	6	1
MFE0460X02S060	★	4.6	2	9.2	20	38.3	62	6	1
MFE0470X02S060	★	4.7	2	9.4	20	38.3	62	6	1
MFE0480X02S060	★	4.8	2	9.6	20	38.4	62	6	1
MFE0490X02S060	★	4.9	2	9.8	20	38.4	62	6	1
MFE0500X02S060	★	5.0	2	10.0	20	38.5	62	6	1

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MFE – SOLID CARBIDE FLAT BOTTOM DRILLS, h7 TOLERANCE

Order number	DP1020	DC	L/D	LU	LCF	LS	OAL	DCONMS	Type
MFE0510X02S060	★	5.1	2	10.2	22	36.5	62	6	1
MFE0520X02S060	★	5.2	2	10.4	22	36.6	62	6	1
MFE0530X02S060	★	5.3	2	10.6	22	36.6	62	6	1
MFE0540X02S060	★	5.4	2	10.8	22	36.7	62	6	1
MFE0550X02S060	★	5.5	2	11.0	22	36.7	62	6	1
MFE0560X02S060	★	5.6	2	11.2	24	34.8	62	6	1
MFE0570X02S060	★	5.7	2	11.4	24	34.8	62	6	1
MFE0580X02S060	★	5.8	2	11.6	24	34.9	62	6	1
MFE0590X02S060	★	5.9	2	11.8	24	34.9	62	6	1
MFE0600X02S060	★	6.0	2	12.0	24	35.0	62	6	1
MFE0610X02S070	★	6.1	2	12.2	26	44.5	74	7	1
MFE0610X02S080	★	6.1	2	12.2	26	44.0	74	8	1
MFE0620X02S070	★	6.2	2	12.4	26	44.6	74	7	1
MFE0620X02S080	★	6.2	2	12.4	26	44.1	74	8	1
MFE0630X02S070	★	6.3	2	12.6	26	44.6	74	7	1
MFE0630X02S080	★	6.3	2	12.6	26	44.1	74	8	1
MFE0640X02S070	★	6.4	2	12.8	26	44.7	74	7	1
MFE0640X02S080	★	6.4	2	12.8	26	44.2	74	8	1
MFE0650X02S070	★	6.5	2	13.0	26	44.7	74	7	1
MFE0650X02S080	★	6.5	2	13.0	26	44.2	74	8	1
MFE0660X02S070	★	6.6	2	13.2	28	42.8	74	7	1
MFE0660X02S080	★	6.6	2	13.2	28	42.3	74	8	1
MFE0670X02S070	★	6.7	2	13.4	28	42.8	74	7	1
MFE0670X02S080	★	6.7	2	13.4	28	42.3	74	8	1
MFE0680X02S070	★	6.8	2	13.6	28	42.9	74	7	1
MFE0680X02S080	★	6.8	2	13.6	28	42.4	74	8	1
MFE0690X02S070	★	6.9	2	13.8	28	42.9	74	7	1
MFE0690X02S080	★	6.9	2	13.8	28	42.4	74	8	1
MFE0700X02S070	★	7.0	2	14.0	28	43.0	74	7	1
MFE0700X02S080	★	7.0	2	14.0	28	42.5	74	8	1
MFE0710X02S080	★	7.1	2	14.2	30	40.5	74	8	1
MFE0720X02S080	★	7.2	2	14.4	30	40.6	74	8	1
MFE0730X02S080	★	7.3	2	14.6	30	40.6	74	8	1
MFE0740X02S080	★	7.4	2	14.8	30	40.7	74	8	1
MFE0750X02S080	★	7.5	2	15.0	30	40.7	74	8	1
MFE0760X02S080	★	7.6	2	15.2	32	38.8	74	8	1
MFE0770X02S080	★	7.7	2	15.4	32	38.8	74	8	1
MFE0780X02S080	★	7.8	2	15.6	32	38.9	74	8	1
MFE0790X02S080	★	7.9	2	15.8	32	38.9	74	8	1
MFE0800X02S080	★	8.0	2	16.0	32	39.0	74	8	1
MFE0810X02S100	★	8.1	2	16.2	34	46.0	84	10	1
MFE0820X02S100	★	8.2	2	16.4	34	46.1	84	10	1
MFE0830X02S100	★	8.3	2	16.6	34	46.1	84	10	1
MFE0840X02S100	★	8.4	2	16.8	34	46.2	84	10	1
MFE0850X02S100	★	8.5	2	17.0	34	46.2	84	10	1
MFE0860X02S100	★	8.6	2	17.2	36	44.3	84	10	1
MFE0870X02S100	★	8.7	2	17.4	36	44.3	84	10	1
MFE0880X02S100	★	8.8	2	17.6	36	44.4	84	10	1
MFE0890X02S100	★	8.9	2	17.8	36	44.4	84	10	1
MFE0900X02S100	★	9.0	2	18.0	36	44.5	84	10	1
MFE0910X02S100	★	9.1	2	18.2	38	42.5	84	10	1
MFE0920X02S100	★	9.2	2	18.4	38	42.6	84	10	1

MFE – SOLID CARBIDE FLAT BOTTOM DRILLS, h7 TOLERANCE



Order number	DP1020	DC	L/D	LU	LCF	LS	OAL	DCONMS	Type
MFE0930X02S100	★	9.3	2	18.6	38	42.6	84	10	1
MFE0940X02S100	★	9.4	2	18.8	38	42.7	84	10	1
MFE0950X02S100	★	9.5	2	19.0	38	42.7	84	10	1
MFE0960X02S100	★	9.6	2	19.2	40	40.8	84	10	1
MFE0970X02S100	★	9.7	2	19.4	40	40.8	84	10	1
MFE0980X02S100	★	9.8	2	19.6	40	40.9	84	10	1
MFE0990X02S100	★	9.9	2	19.8	40	40.9	84	10	1
MFE1000X02S100	★	10.0	2	20.0	40	41.0	84	10	1
MFE1010X02S120	★	10.1	2	20.2	42	49.0	95	12	1
MFE1020X02S120	★	10.2	2	20.4	42	49.1	95	12	1
MFE1030X02S120	★	10.3	2	20.6	42	49.1	95	12	1
MFE1040X02S120	★	10.4	2	20.8	42	49.2	95	12	1
MFE1050X02S120	★	10.5	2	21.0	42	49.2	95	12	1
MFE1060X02S120	★	10.6	2	21.2	44	47.3	95	12	1
MFE1070X02S120	★	10.7	2	21.4	44	47.3	95	12	1
MFE1080X02S120	★	10.8	2	21.6	44	47.4	95	12	1
MFE1090X02S120	★	10.9	2	21.8	44	47.4	95	12	1
MFE1100X02S120	★	11.0	2	22.0	44	47.5	95	12	1
MFE1110X02S120	★	11.1	2	22.2	46	45.5	95	12	1
MFE1120X02S120	★	11.2	2	22.4	46	45.6	95	12	1
MFE1130X02S120	★	11.3	2	22.6	46	45.6	95	12	1
MFE1140X02S120	★	11.4	2	22.8	46	45.7	95	12	1
MFE1150X02S120	★	11.5	2	23.0	46	45.7	95	12	1
MFE1160X02S120	★	11.6	2	23.2	48	43.8	95	12	1
MFE1170X02S120	★	11.7	2	23.4	48	43.8	95	12	1
MFE1180X02S120	★	11.8	2	23.6	48	43.9	95	12	1
MFE1190X02S120	★	11.9	2	23.8	48	43.9	95	12	1
MFE1200X02S120	★	12.0	2	24.0	48	44.0	95	12	1
MFE1250X02S140	★	12.5	2	25.0	50	49.0	102	14	2
MFE1300X02S140	★	13.0	2	26.0	52	47.0	102	14	2
MFE1350X02S140	★	13.5	2	27.0	54	45.0	102	14	2
MFE1400X02S140	★	14.0	2	28.0	56	43.0	102	14	2
MFE1450X02S160	★	14.5	2	29.0	58	50.0	111	16	2
MFE1500X02S160	★	15.0	2	30.0	60	48.0	111	16	2
MFE1550X02S160	★	15.5	2	31.0	62	46.0	111	16	2
MFE1600X02S160	★	16.0	2	32.0	64	44.0	111	16	2
MFE1650X02S180	★	16.5	2	33.0	66	50.0	119	18	2
MFE1700X02S180	★	17.0	2	34.0	68	48.0	119	18	2
MFE1750X02S180	★	17.5	2	35.0	70	46.0	119	18	2
MFE1800X02S180	★	18.0	2	36.0	72	44.0	119	18	2
MFE1850X02S200	★	18.5	2	37.0	74	50.0	127	20	2
MFE1900X02S200	★	19.0	2	38.0	76	48.0	127	20	2
MFE1950X02S200	★	19.5	2	39.0	78	46.0	127	20	2
MFE2000X02S200	★	20.0	2	40.0	80	44.0	127	20	2

MINI-MFE / MFE

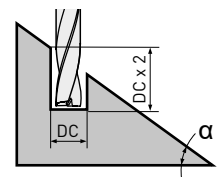
RECOMMENDED CUTTING CONDITIONS

Material		Properties	DC	L/D	n	$\alpha = 0^\circ$ fr
P	Mild steel	≤180HB	0.75	≤2	23300	0.030 [0.010 – 0.050]
			1.0	≤2	17500	0.030 [0.010 – 0.050]
			1.5	≤2	12200	0.035 [0.015 – 0.055]
			2.0	≤2	9500	0.040 [0.020 – 0.060]
			2.5	≤2	7900	0.050 [0.030 – 0.070]
			3.0	≤2	7900	0.060 [0.040 – 0.080]
			4.0	≤2	5900	0.080 [0.060 – 0.100]
			5.0	≤2	4700	0.100 [0.080 – 0.130]
			6.0	≤2	3900	0.130 [0.100 – 0.150]
			8.0	≤2	2900	0.150 [0.130 – 0.170]
			10.0	≤2	2300	0.170 [0.150 – 0.200]
			12.0	≤2	1900	0.200 [0.170 – 0.250]
			16.0	≤2	1400	0.250 [0.200 – 0.300]
			20.0	≤2	1100	0.300 [0.250 – 0.350]
	Carbon steel, Alloy steel	180 – 280HB	0.75	≤2	19000	0.030 [0.010 – 0.050]
			1.0	≤2	14300	0.030 [0.010 – 0.050]
			1.5	≤2	10000	0.035 [0.015 – 0.055]
			2.0	≤2	7900	0.040 [0.020 – 0.060]
			2.5	≤2	6600	0.050 [0.030 – 0.070]
			3.0	≤2	7900	0.060 [0.040 – 0.080]
			4.0	≤2	5900	0.080 [0.060 – 0.100]
			5.0	≤2	4700	0.100 [0.080 – 0.130]
			6.0	≤2	3900	0.130 [0.100 – 0.150]
			8.0	≤2	2900	0.150 [0.130 – 0.170]
			10.0	≤2	2300	0.170 [0.150 – 0.200]
			12.0	≤2	1900	0.200 [0.170 – 0.250]
			16.0	≤2	1400	0.250 [0.200 – 0.300]
			20.0	≤2	1100	0.300 [0.250 – 0.350]
	Carbon steel, Alloy steel	280 – 350HB	0.75	≤2	16900	0.030 [0.010 – 0.050]
			1.0	≤2	12700	0.030 [0.010 – 0.050]
			1.5	≤2	8400	0.035 [0.015 – 0.050]
			2.0	≤2	6700	0.040 [0.020 – 0.060]
			2.5	≤2	5700	0.050 [0.030 – 0.070]
			3.0	≤2	6800	0.060 [0.040 – 0.080]
			4.0	≤2	5100	0.080 [0.060 – 0.100]
			5.0	≤2	4100	0.100 [0.080 – 0.130]
6.0			≤2	3400	0.130 [0.100 – 0.150]	
8.0			≤2	2500	0.150 [0.130 – 0.170]	
10.0			≤2	2000	0.170 [0.150 – 0.200]	
12.0			≤2	1700	0.200 [0.170 – 0.250]	
16.0			≤2	1200	0.250 [0.200 – 0.300]	
20.0			≤2	1000	0.300 [0.250 – 0.350]	

1/2

1/2

1. The recommended hole depth is $DC \times 2$. This should be the depth from the uppermost surface of the workpiece when machining on an angled surface. (Refer to diagram)
2. The above cutting table assumes drilling on a flat surface.
For hole drilling on an angled surface, adjust the feed rate in accordance with the inclination angle.
When the inclination angle α is 30° or less, adjust the feed rate to 70 % or lower as a guideline.
When the inclination angle α is greater than 30° , adjust the feed rate to 50 % or lower as a guideline.
3. This product is a tool intended for hole drilling. It cannot be used for cross-feed or helical machining.

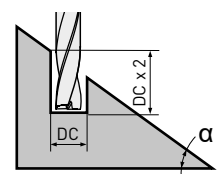


MINI-MFE/MFE

Material	Properties	DC	L/D	n	$\alpha = 0^\circ$ fr	
M	Stainless steel	≤200HB	0.75	≤2	10600	0.007 [0.003 – 0.011]
			1.0	≤2	7900	0.007 [0.003 – 0.011]
			1.5	≤2	5300	0.010 [0.005 – 0.015]
			2.0	≤2	4700	0.015 [0.010 – 0.020]
			2.5	≤2	3800	0.015 [0.010 – 0.020]
			3.0	≤2	3100	0.020 [0.010 – 0.030]
			4.0	≤2	2300	0.030 [0.020 – 0.040]
			5.0	≤2	1900	0.040 [0.030 – 0.050]
			6.0	≤2	1500	0.050 [0.040 – 0.060]
			8.0	≤2	1100	0.060 [0.050 – 0.080]
			10.0	≤2	950	0.080 [0.060 – 0.100]
			12.0	≤2	790	0.100 [0.080 – 0.120]
			16.0	≤2	590	0.120 [0.100 – 0.150]
			20.0	≤2	470	0.150 [0.120 – 0.200]
K	Gray cast iron	≤350MPa	0.75	≤2	23300	0.030 [0.010 – 0.050]
			1.0	≤2	17500	0.030 [0.010 – 0.050]
			1.5	≤2	12200	0.035 [0.015 – 0.055]
			2.0	≤2	9500	0.040 [0.020 – 0.060]
			2.5	≤2	7900	0.050 [0.030 – 0.070]
			3.0	≤2	7900	0.060 [0.040 – 0.080]
			4.0	≤2	5900	0.080 [0.060 – 0.100]
			5.0	≤2	4700	0.100 [0.080 – 0.120]
			6.0	≤2	3900	0.120 [0.100 – 0.140]
			8.0	≤2	2900	0.140 [0.120 – 0.160]
			10.0	≤2	2300	0.160 [0.140 – 0.180]
			12.0	≤2	1900	0.180 [0.160 – 0.200]
			16.0	≤2	1400	0.200 [0.180 – 0.240]
			20.0	≤2	1100	0.240 [0.200 – 0.280]
	Ductile cast iron	≤450MPa	0.75	≤2	16900	0.010 [0.005 – 0.015]
			1.0	≤2	12700	0.010 [0.005 – 0.015]
			1.5	≤2	10000	0.020 [0.010 – 0.030]
			2.0	≤2	8700	0.030 [0.015 – 0.045]
			2.5	≤2	7300	0.045 [0.025 – 0.065]
			3.0	≤2	6800	0.050 [0.040 – 0.060]
			4.0	≤2	5500	0.060 [0.050 – 0.080]
			5.0	≤2	4400	0.080 [0.060 – 0.100]
			6.0	≤2	3700	0.100 [0.080 – 0.120]
			8.0	≤2	2700	0.120 [0.100 – 0.150]
N	Aluminium alloys	Si<5 %	10.0	≤2	2200	0.150 [0.120 – 0.180]
			12.0	≤2	1800	0.180 [0.150 – 0.200]
			16.0	≤2	1300	0.200 [0.180 – 0.250]
			20.0	≤2	1100	0.250 [0.200 – 0.300]
			0.75	≤2	42400	0.020 [0.010 – 0.030]
			1.0	≤2	31800	0.020 [0.010 – 0.030]
			1.5	≤2	21200	0.020 [0.010 – 0.030]
			2.0	≤2	17500	0.050 [0.030 – 0.070]
			2.5	≤2	14000	0.060 [0.040 – 0.090]
			3.0	≤2	11600	0.060 [0.040 – 0.090]
			4.0	≤2	8700	0.080 [0.060 – 0.100]
			5.0	≤2	7000	0.100 [0.080 – 0.130]
			6.0	≤2	5800	0.130 [0.100 – 0.160]
			8.0	≤2	4300	0.160 [0.130 – 0.200]
10.0	≤2	3500	0.200 [0.160 – 0.240]			
12.0	≤2	2900	0.240 [0.200 – 0.280]			
16.0	≤2	2100	0.280 [0.240 – 0.320]			
20.0	≤2	1700	0.320 [0.280 – 0.360]			

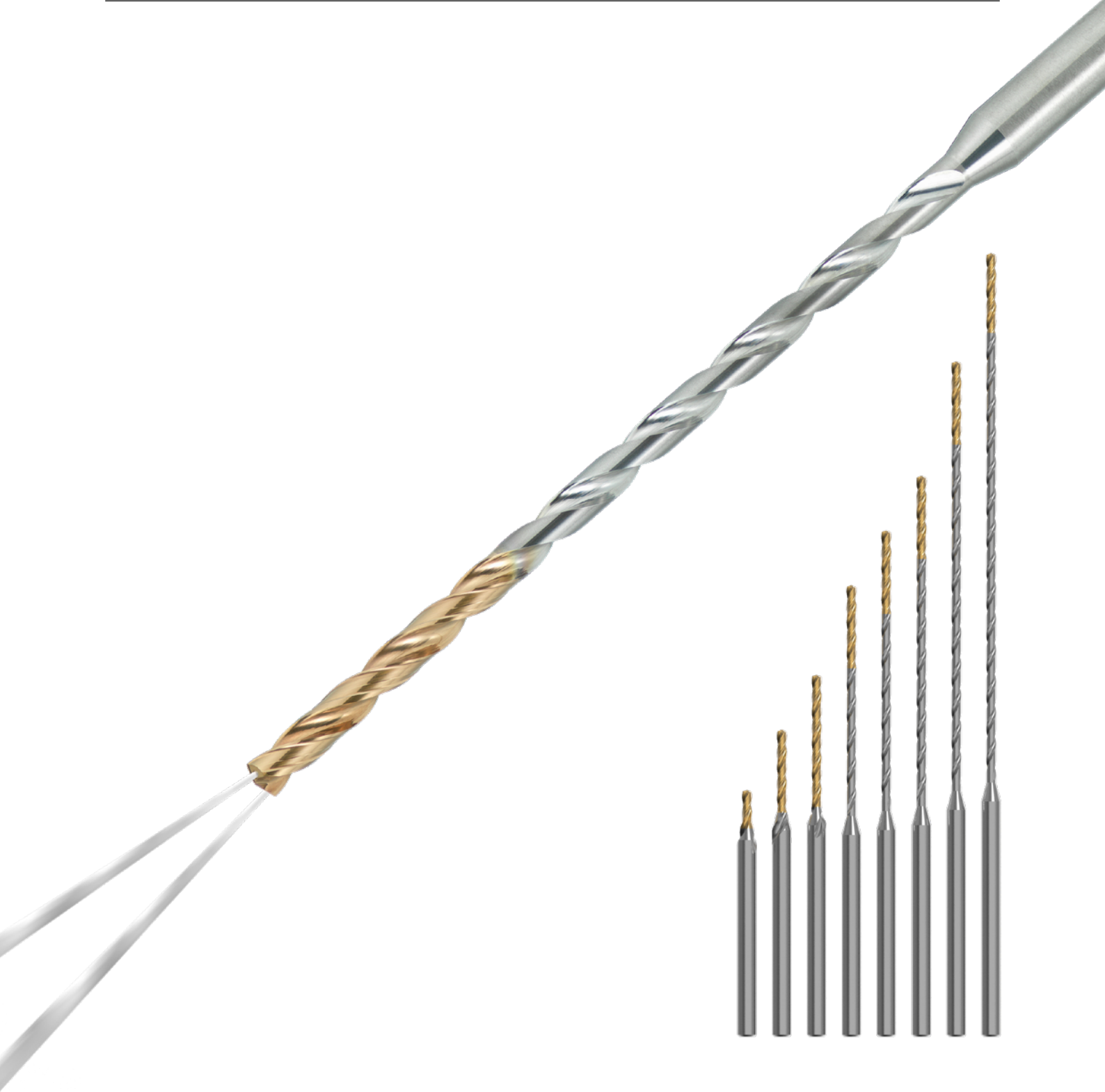
2/2

1. The recommended hole depth is DC x 2. This should be the depth from the uppermost surface of the workpiece when machining on an angled surface. (Refer to diagram)
2. The above cutting table assumes drilling on a flat surface.
For hole drilling on an angled surface, adjust the feed rate in accordance with the inclination angle.
When the inclination angle α is 30° or less, adjust the feed rate to 70 % or lower as a guideline.
When the inclination angle α is greater than 30° , adjust the feed rate to 50 % or lower as a guideline.
3. This product is a tool intended for hole drilling. It cannot be used for cross-feed or helical machining.



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SOLID CARBIDE TRISTAR DRILL SERIES
FAST, RELIABLE AND ACCURATE



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 **MITSUBISHI MATERIALS**

MINI DVAS

HIGH EFFICIENCY, LONG TOOL LIFE, HIGH PRECISION

TRISTAR, A NEW GENERATION DRILL SERIES PROVIDES 3 STRONG ADVANTAGES

TRISTAR: FAST

Conventional deep hole drilling is usually a slow process.

DVAS drills can perform at higher feeds and speeds meaning faster drilling cycles.

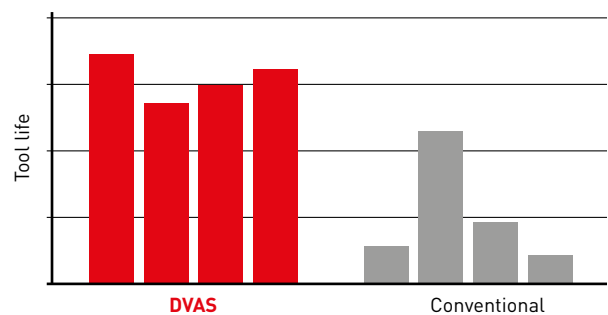


Cutting time 8 s/hole

TRISTAR: RELIABLE

Breakages, short tool life and lack of coolant can be common with standard tools.

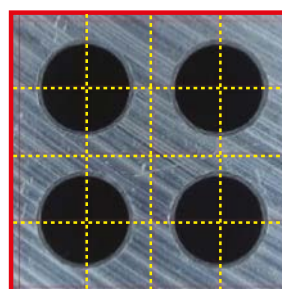
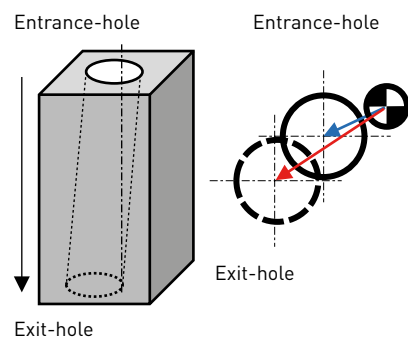
DVAS – Tool life exceeds all normal expectations.



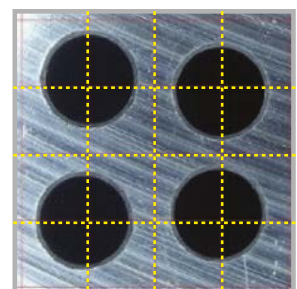
TRISTAR: ACCURATE

Conventionally drilled holes can wander considerably and have poor positioning.

Straighter holes and improved dimensional accuracy are enabled by using DVAS drills.



DVAS



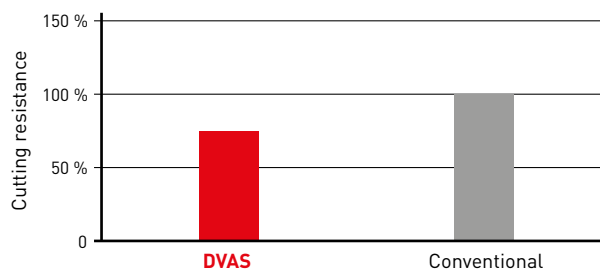
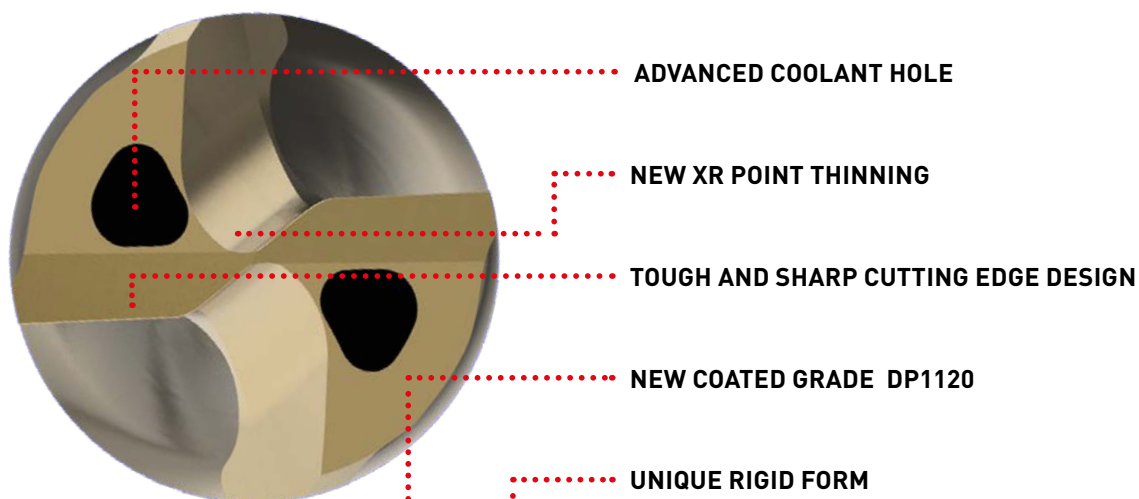
Conventional

MINI DVAS

FAST, RELIABLE AND ACCURATE NEW STANDARDS ENABLED BY FIVE TECHNOLOGIES

The first of the TRISTAR series is a small diameter drill with 5 technological features for fast, reliable and accurate drilling.

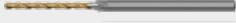
Ø 1.0 mm – Ø 2.9 mm L/D = 2 – 50



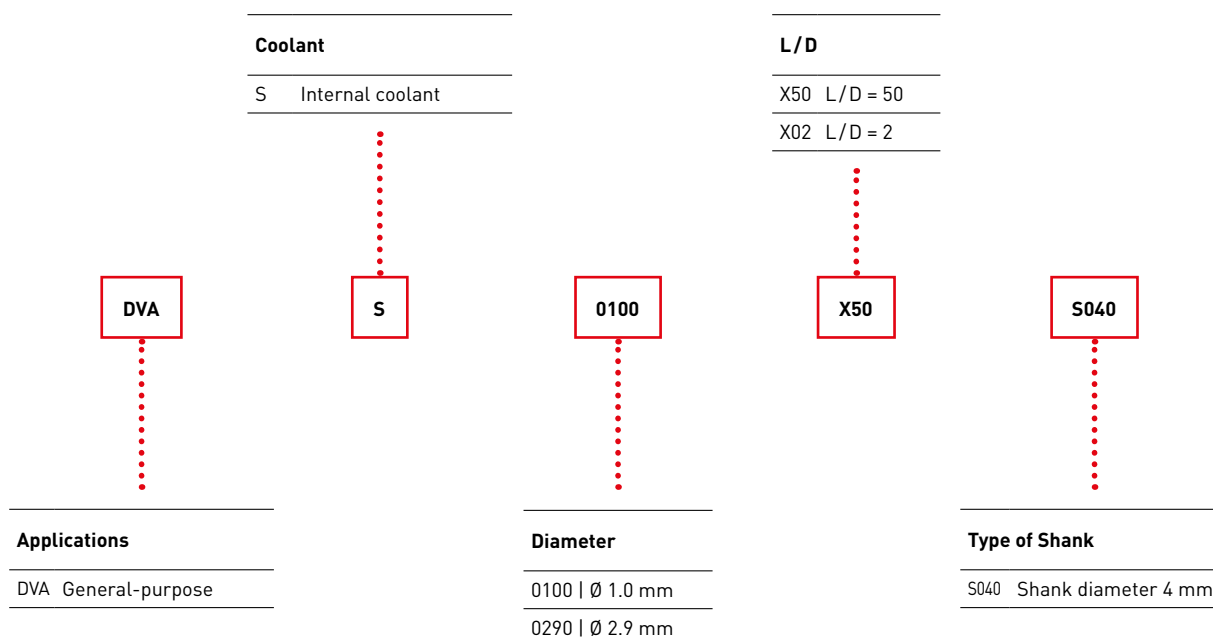
Material	42CrMo4
Tool	DC = Ø 1.0 mm, L/D = 20
Vc (m/min)	70
f (mm/rev)	0.04

DRILLS SELECTION

DVAS – SOLID CARBIDE TRISTAR DRILL SERIES

	Product code	DC	Size	Item	Hole depth	Material					Shape
						P	M	K	N	S	
Pilot drill	DVAS0000X02	Ø1.0 – Ø2.9	0.1	20	2	⊙	⊙	○	○	⊙	
	DVAS0000X07	Ø1.0 – Ø2.9	0.1	20	7	⊙	⊙	○	○	⊙	
	DVAS0000X12	Ø1.0 – Ø2.9	0.1	20	12	⊙	⊙	○	○	⊙	
Long drill	DVAS0000X20	Ø1.0 – Ø2.9	0.1	20	20	⊙	⊙	○	○	⊙	
	DVAS0000X25	Ø1.0 – Ø2.9	0.1	20	25	⊙	⊙	○	○	⊙	
	DVAS0000X30	Ø1.0 – Ø2.9	0.1	20	30	⊙	⊙	○	○	⊙	
	DVAS0000X40	Ø1.0 – Ø2.9	0.1	20	40	⊙	⊙	○	○	⊙	
	DVAS0000X50	Ø1.0 – Ø2.5	0.5	20	50	⊙	⊙	○	○	⊙	

IDENTIFICATION

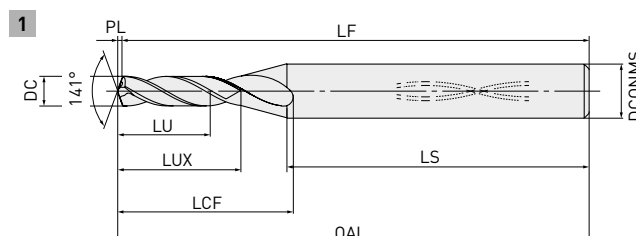


MINI DVAS



SOLID CARBIDE PILOT DRILLS - TRISTAR DRILLS

P M K N S



DC < 3
0.006
-0.004



DCONMS = 4
0
-0.008

Order number	DP1120	DC	DCONMS	L/D	LU	LUX	LCF	LS	OAL	LF	PL	Type
DVAS0100X02S040	●	1.0	4	2	2.2	3.2	8.6	41.2	50.0	49.8	0.2	1
DVAS0110X02S040	●	1.1	4	2	2.4	3.5	9.0	41.1	50.0	49.8	0.2	1
DVAS0120X02S040	●	1.2	4	2	2.6	3.9	9.4	41.0	50.0	49.8	0.2	1
DVAS0130X02S040	●	1.3	4	2	2.8	4.2	9.9	40.8	50.0	49.8	0.2	1
DVAS0140X02S040	●	1.4	4	2	3.0	4.5	10.3	40.7	50.0	49.8	0.2	1
DVAS0150X02S040	●	1.5	4	2	3.3	4.8	10.7	40.6	50.0	49.7	0.3	1
DVAS0160X02S040	●	1.6	4	2	3.5	5.1	11.1	40.4	50.0	49.7	0.3	1
DVAS0170X02S040	●	1.7	4	2	3.7	5.5	11.6	40.3	50.0	49.7	0.3	1
DVAS0180X02S040	●	1.8	4	2	3.9	5.8	12.0	40.2	50.0	49.7	0.3	1
DVAS0190X02S040	●	1.9	4	2	4.1	6.1	12.4	40.0	50.0	49.7	0.3	1
DVAS0200X02S040	●	2.0	4	2	4.4	6.4	12.9	39.9	50.0	49.6	0.4	1
DVAS0210X02S040	●	2.1	4	2	4.6	6.7	13.3	39.8	50.0	49.6	0.4	1
DVAS0220X02S040	●	2.2	4	2	4.8	7.0	13.7	39.7	50.0	49.6	0.4	1
DVAS0230X02S040	●	2.3	4	2	5.0	7.4	14.1	44.5	55.0	54.6	0.4	1
DVAS0240X02S040	●	2.4	4	2	5.2	7.7	14.6	44.4	55.0	54.6	0.4	1
DVAS0250X02S040	●	2.5	4	2	5.5	8.0	15.0	44.3	55.0	54.6	0.4	1
DVAS0260X02S040	●	2.6	4	2	5.7	8.3	15.4	44.1	55.0	54.5	0.5	1
DVAS0270X02S040	●	2.7	4	2	5.9	8.6	15.8	44.0	55.0	54.5	0.5	1
DVAS0280X02S040	●	2.8	4	2	6.1	8.9	16.3	43.9	55.0	54.5	0.5	1
DVAS0290X02S040	●	2.9	4	2	6.3	9.3	16.7	43.7	55.0	54.5	0.5	1

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MINI DVAS



SOLID CARBIDE TRISTAR DRILL

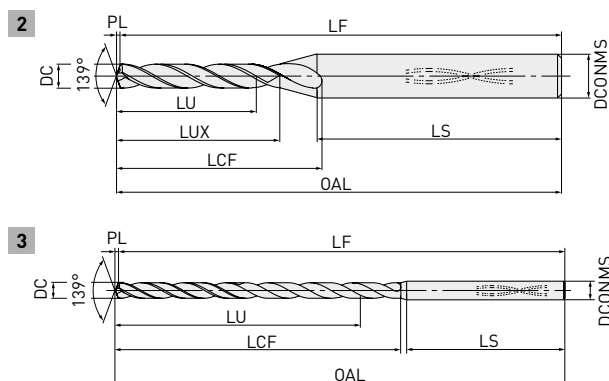
P M K S N



DC < 3
0
-0.010



DCONMS = 4
0
-0.008



Order number	DP1120	DC	DCONMS	L/D	LU	LUX	LCF	LS	OAL	LF	PL	Type
DVAS0100X07S040	●	1.0	4	7	7.2	8.2	13.6	41.2	55.0	54.8	0.2	2
DVAS0100X12S040	●	1.0	4	12	12.2	13.2	18.6	39.2	58.0	57.8	0.2	2
DVAS0100X20S040	●	1.0	4	20	20.2	—	23.2	38.2	67.0	66.8	0.2	3
DVAS0100X25S040	●	1.0	4	25	25.2	—	28.2	39.2	73.0	72.8	0.2	3
DVAS0100X30S040	●	1.0	4	30	30.2	—	33.2	40.2	79.0	78.8	0.2	3
DVAS0100X40S040	●	1.0	4	40	40.2	—	43.2	41.2	90.0	89.8	0.2	3
DVAS0100X50S040	●	1.0	4	50	50.2	—	53.2	43.2	102.0	101.8	0.2	3
DVAS0110X07S040	●	1.1	4	7	7.9	9.1	14.5	40.6	55.0	54.8	0.2	2
DVAS0110X12S040	●	1.1	4	12	13.4	14.6	20.0	38.1	58.0	57.8	0.2	2
DVAS0110X20S040	●	1.1	4	20	22.2	—	25.5	36.1	67.0	66.8	0.2	3
DVAS0110X25S040	●	1.1	4	25	27.7	—	31.0	36.6	73.0	72.8	0.2	3
DVAS0110X30S040	●	1.1	4	30	33.2	—	36.5	37.1	79.0	78.8	0.2	3
DVAS0110X40S040	●	1.1	4	40	44.2	—	47.5	37.1	90.0	89.8	0.2	3
NEW DVAS0110X50S040	●	1.1	4	50	55.2	—	58.5	38.1	102.0	101.8	0.2	3
DVAS0120X07S040	●	1.2	4	7	8.6	9.9	15.4	40.0	55.0	54.8	0.2	2
DVAS0120X12S040	●	1.2	4	12	14.6	15.9	21.4	39.0	60.0	59.8	0.2	2
DVAS0120X20S040	●	1.2	4	20	24.2	—	27.8	38.0	71.0	70.8	0.2	3
DVAS0120X25S040	●	1.2	4	25	30.2	—	33.8	38.0	77.0	76.8	0.2	3
DVAS0120X30S040	●	1.2	4	30	36.2	—	39.8	39.0	84.0	83.8	0.2	3
DVAS0120X40S040	●	1.2	4	40	48.2	—	51.8	40.0	97.0	96.8	0.2	3
NEW DVAS0120X50S040	●	1.2	4	50	60.2	—	63.8	41.0	110.0	109.8	0.2	3
DVAS0130X07S040	●	1.3	4	7	9.3	10.7	16.4	39.3	55.0	54.8	0.2	2
DVAS0130X12S040	●	1.3	4	12	15.8	17.2	22.9	37.8	60.0	59.8	0.2	2
DVAS0130X20S040	●	1.3	4	20	26.2	—	30.1	35.8	71.0	70.8	0.2	3
DVAS0130X25S040	●	1.3	4	25	32.7	—	36.6	35.3	77.0	76.8	0.2	3
DVAS0130X30S040	●	1.3	4	30	39.2	—	43.1	35.8	84.0	83.8	0.2	3
DVAS0130X40S040	●	1.3	4	40	52.2	—	56.1	35.8	97.0	96.8	0.2	3
NEW DVAS0130X50S040	●	1.3	4	50	65.2	—	69.1	35.8	110.0	109.8	0.2	3

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MINI DVAS – SOLID CARBIDE TRISTAR DRILL

	Order number	DP1120	DC	DCONMS	L/D	LU	LUX	LCF	LS	OAL	LF	PL	Type
	DVAS0140X07S040	●	1.4	4	7	10.1	11.5	17.3	38.7	55.0	54.7	0.3	2
	DVAS0140X12S040	●	1.4	4	12	17.1	18.5	24.3	39.7	63.0	62.7	0.3	2
	DVAS0140X20S040	●	1.4	4	20	28.3	—	32.5	37.7	75.0	74.7	0.3	3
	DVAS0140X25S040	●	1.4	4	25	35.3	—	39.5	37.7	82.0	81.7	0.3	3
	DVAS0140X30S040	●	1.4	4	30	42.3	—	46.5	38.7	90.0	89.7	0.3	3
	DVAS0140X40S040	●	1.4	4	40	56.3	—	60.5	39.7	105.0	104.7	0.3	3
NEW	DVAS0140X50S040	●	1.4	4	50	70.3	—	74.5	40.7	120.0	119.7	0.3	3
	DVAS0150X07S040	●	1.5	4	7	10.8	12.3	18.2	38.1	55.0	54.7	0.3	2
	DVAS0150X12S040	●	1.5	4	12	18.3	19.8	25.7	38.6	63.0	62.7	0.3	2
	DVAS0150X20S040	●	1.5	4	20	30.3	—	34.8	35.6	75.0	74.7	0.3	3
	DVAS0150X25S040	●	1.5	4	25	37.8	—	42.3	35.1	82.0	81.7	0.3	3
	DVAS0150X30S040	●	1.5	4	30	45.3	—	49.8	35.6	90.0	89.7	0.3	3
	DVAS0150X40S040	●	1.5	4	40	60.3	—	64.8	35.6	105.0	104.7	0.3	3
	DVAS0150X50S040	●	1.5	4	50	75.3	—	79.8	35.6	120.0	119.7	0.3	3
	DVAS0160X07S040	●	1.6	4	7	11.5	13.1	19.2	39.4	57.0	56.7	0.3	2
	DVAS0160X12S040	●	1.6	4	12	19.5	21.1	27.2	40.4	66.0	65.7	0.3	2
	DVAS0160X20S040	●	1.6	4	20	32.3	—	37.1	37.4	79.0	78.7	0.3	3
	DVAS0160X25S040	●	1.6	4	25	40.3	—	45.1	38.4	88.0	87.7	0.3	3
	DVAS0160X30S040	●	1.6	4	30	48.3	—	53.1	41.4	99.0	98.7	0.3	3
	DVAS0160X40S040	●	1.6	4	40	64.3	—	69.1	39.4	113.0	112.7	0.3	3
NEW	DVAS0160X50S040	●	1.6	4	50	80.3	—	85.1	40.4	130.0	129.7	0.3	3
	DVAS0170X07S040	●	1.7	4	7	12.2	14.0	20.1	38.8	57.0	56.7	0.3	2
	DVAS0170X12S040	●	1.7	4	12	20.7	22.5	28.6	39.3	66.0	65.7	0.3	2
	DVAS0170X20S040	●	1.7	4	20	34.3	—	39.4	35.3	79.0	78.7	0.3	3
	DVAS0170X25S040	●	1.7	4	25	42.8	—	47.9	35.8	88.0	87.7	0.3	3
	DVAS0170X30S040	●	1.7	4	30	51.3	—	56.4	38.3	99.0	98.7	0.3	3
	DVAS0170X40S040	●	1.7	4	40	68.3	—	73.4	35.3	113.0	112.7	0.3	3
NEW	DVAS0170X50S040	●	1.7	4	50	85.3	—	90.4	35.3	130.0	129.7	0.3	3
	DVAS0180X07S040	●	1.8	4	7	12.9	14.8	21.0	40.2	59.0	58.7	0.3	2
	DVAS0180X12S040	●	1.8	4	12	21.9	23.8	30.0	41.2	69.0	68.7	0.3	2
	DVAS0180X20S040	●	1.8	4	20	36.3	—	41.7	38.2	84.0	83.7	0.3	3
	DVAS0180X25S040	●	1.8	4	25	45.3	—	50.7	39.2	94.0	93.7	0.3	3
	DVAS0180X30S040	●	1.8	4	30	54.3	—	59.7	40.2	104.0	103.7	0.3	3
	DVAS0180X40S040	●	1.8	4	40	72.3	—	77.7	41.2	123.0	122.7	0.3	3
NEW	DVAS0180X50S040	●	1.8	4	50	90.3	—	95.7	43.2	143.0	142.7	0.3	3
	DVAS0190X07S040	●	1.9	4	7	13.7	15.6	21.9	39.5	59.0	58.6	0.4	2
	DVAS0190X12S040	●	1.9	4	12	23.2	25.1	31.4	40.0	69.0	68.6	0.4	2
	DVAS0190X20S040	●	1.9	4	20	38.4	—	44.1	36.0	84.0	83.6	0.4	3
	DVAS0190X25S040	●	1.9	4	25	47.9	—	53.6	36.5	94.0	93.6	0.4	3
	DVAS0190X30S040	●	1.9	4	30	57.4	—	63.1	37.0	104.0	103.6	0.4	3
	DVAS0190X40S040	●	1.9	4	40	76.4	—	82.1	37.0	123.0	122.6	0.4	3
NEW	DVAS0190X50S040	●	1.9	4	50	95.4	—	101.1	38.0	143.0	142.6	0.4	3
	DVAS0200X07S040	●	2.0	4	7	14.4	16.4	22.9	41.9	62.0	61.6	0.4	2
	DVAS0200X12S040	●	2.0	4	12	24.4	26.4	32.9	42.9	73.0	72.6	0.4	2
	DVAS0200X20S040	●	2.0	4	20	40.4	—	46.4	40.9	91.0	90.6	0.4	3
	DVAS0200X25S040	●	2.0	4	25	50.4	—	56.4	41.9	102.0	101.6	0.4	3
	DVAS0200X30S040	●	2.0	4	30	60.4	—	66.4	42.9	113.0	112.6	0.4	3
	DVAS0200X40S040	●	2.0	4	40	80.4	—	86.4	45.9	136.0	135.6	0.4	3
	DVAS0200X50S040	●	2.0	4	50	100.4	—	106.4	47.9	158.0	157.6	0.4	3

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MINI DVAS – SOLID CARBIDE TRISTAR DRILL

	Order number	DP1120	DC	DCONMS	L/D	LU	LUX	LCF	LS	OAL	LF	PL	Type
	DVAS0210X07S040	●	2.1	4	7	15.1	17.2	23.8	41.3	62.0	61.6	0.4	2
	DVAS0210X12S040	●	2.1	4	12	25.6	27.7	34.3	41.8	73.0	72.6	0.4	2
	DVAS0210X20S040	●	2.1	4	20	42.4	—	48.7	38.8	91.0	90.6	0.4	3
	DVAS0210X25S040	●	2.1	4	25	52.9	—	59.2	39.3	102.0	101.6	0.4	3
	DVAS0210X30S040	●	2.1	4	30	63.4	—	69.7	39.8	113.0	112.6	0.4	3
	DVAS0210X40S040	●	2.1	4	40	84.4	—	90.7	41.8	136.0	135.6	0.4	3
NEW	DVAS0210X50S040	●	2.1	4	50	105.4	—	111.7	42.8	158.0	157.6	0.4	3
	DVAS0220X07S040	●	2.2	4	7	15.8	18.1	24.7	40.6	62.0	61.6	0.4	2
	DVAS0220X12S040	●	2.2	4	12	26.8	29.1	35.7	40.6	73.0	72.6	0.4	2
	DVAS0220X20S040	●	2.2	4	20	44.4	—	51.0	36.6	91.0	90.6	0.4	3
	DVAS0220X25S040	●	2.2	4	25	55.4	—	62.0	36.6	102.0	101.6	0.4	3
	DVAS0220X30S040	●	2.2	4	30	66.4	—	73.0	36.6	113.0	112.6	0.4	3
	DVAS0220X40S040	●	2.2	4	40	88.4	—	95.0	37.6	136.0	135.6	0.4	3
NEW	DVAS0220X50S040	●	2.2	4	50	110.4	—	117.0	37.6	158.0	157.6	0.4	3
	DVAS0230X07S040	●	2.3	4	7	16.5	18.9	25.7	43.0	65.0	64.6	0.4	2
	DVAS0230X12S040	●	2.3	4	12	28.0	30.4	37.2	44.5	78.0	77.6	0.4	2
	DVAS0230X20S040	●	2.3	4	20	46.4	—	53.3	41.5	98.0	97.6	0.4	3
	DVAS0230X25S040	●	2.3	4	25	57.9	—	64.8	43.0	111.0	110.6	0.4	3
	DVAS0230X30S040	●	2.3	4	30	69.4	—	76.3	44.5	124.0	123.6	0.4	3
	DVAS0230X40S040	●	2.3	4	40	92.4	—	99.3	47.5	150.0	149.6	0.4	3
NEW	DVAS0230X50S040	●	2.3	4	50	115.4	—	122.3	50.5	176.0	175.6	0.4	3
	DVAS0240X07S040	●	2.4	4	7	17.2	19.7	26.6	42.4	65.0	64.6	0.4	2
	DVAS0240X12S040	●	2.4	4	12	29.2	31.7	38.6	43.4	78.0	77.6	0.4	2
	DVAS0240X20S040	●	2.4	4	20	48.4	—	55.6	39.4	98.0	97.6	0.4	3
	DVAS0240X25S040	●	2.4	4	25	60.4	—	67.6	40.4	111.0	110.6	0.4	3
	DVAS0240X30S040	●	2.4	4	30	72.4	—	79.6	41.4	124.0	123.6	0.4	3
	DVAS0240X40S040	●	2.4	4	40	96.4	—	103.6	43.4	150.0	149.6	0.4	3
NEW	DVAS0240X50S040	●	2.4	4	50	120.4	—	127.6	45.4	176.0	175.6	0.4	3
	DVAS0250X07S040	●	2.5	4	7	18.0	20.5	27.5	41.7	65.0	64.5	0.5	2
	DVAS0250X12S040	●	2.5	4	12	30.5	33.0	40.0	42.2	78.0	77.5	0.5	2
	DVAS0250X20S040	●	2.5	4	20	50.5	—	58.0	37.2	98.0	97.5	0.5	3
	DVAS0250X25S040	●	2.5	4	25	63.0	—	70.5	37.7	111.0	110.5	0.5	3
	DVAS0250X30S040	●	2.5	4	30	75.5	—	83.0	38.2	124.0	123.5	0.5	3
	DVAS0250X40S040	●	2.5	4	40	100.5	—	108.0	39.2	150.0	149.5	0.5	3
	DVAS0250X50S040	●	2.5	4	50	125.5	—	133.0	40.2	176.0	175.5	0.5	3
	DVAS0260X07S040	●	2.6	4	7	18.7	21.3	28.4	41.1	65.0	64.5	0.5	2
	DVAS0260X12S040	●	2.6	4	12	31.7	34.3	41.4	41.1	78.0	77.5	0.5	2
	DVAS0260X20S040	●	2.6	4	20	52.5	—	60.3	35.1	98.0	97.5	0.5	3
	DVAS0260X25S040	●	2.6	4	25	65.5	—	73.3	35.1	111.0	110.5	0.5	3
	DVAS0260X30S040	●	2.6	4	30	78.5	—	86.3	35.1	124.0	123.5	0.5	3
	DVAS0260X40S040	●	2.6	4	40	104.5	—	112.3	35.1	150.0	149.5	0.5	3
NEW	DVAS0260X50S040	●	2.6	4	50	130.5	—	138.3	35.1	176.0	175.5	0.5	3
	DVAS0270X07S040	●	2.7	4	7	19.4	22.2	29.4	43.5	68.0	67.5	0.5	2
	DVAS0270X12S040	●	2.7	4	12	32.9	35.7	42.9	45.0	83.0	82.5	0.5	2
	DVAS0270X20S040	●	2.7	4	20	54.5	—	62.6	42.0	107.0	106.5	0.5	3
	DVAS0270X25S040	●	2.7	4	25	68.0	—	76.1	43.5	122.0	121.5	0.5	3
	DVAS0270X30S040	●	2.7	4	30	81.5	—	89.6	45.0	137.0	136.5	0.5	3
	DVAS0270X40S040	●	2.7	4	40	108.5	—	116.6	48.0	167.0	166.5	0.5	3
NEW	DVAS0270X50S040	●	2.7	4	50	135.5	—	143.6	51.0	197.0	196.5	0.5	3

3/4

MINI DVAS – SOLID CARBIDE TRISTAR DRILL

Order number	DP1120	DC	DCONMS	L/D	LU	LUX	LCF	LS	OAL	LF	PL	Type
DVAS0280X07S040	●	2.8	4	7	20.1	23.0	30.3	42.8	68.0	67.5	0.5	2
DVAS0280X12S040	●	2.8	4	12	34.1	37.0	44.3	43.8	83.0	82.5	0.5	2
DVAS0280X20S040	●	2.8	4	20	56.5	—	64.9	39.8	107.0	106.5	0.5	3
DVAS0280X25S040	●	2.8	4	25	70.5	—	78.9	40.8	122.0	121.5	0.5	3
DVAS0280X30S040	●	2.8	4	30	84.5	—	92.9	41.8	137.0	136.5	0.5	3
DVAS0280X40S040	●	2.8	4	40	112.5	—	120.9	43.8	167.0	166.5	0.5	3
NEW DVAS0280X50S040	●	2.8	4	50	140.5	—	148.9	45.8	197.0	196.5	0.5	3
DVAS0290X07S040	●	2.9	4	7	20.8	23.8	31.2	42.2	68.0	67.5	0.5	2
DVAS0290X12S040	●	2.9	4	12	35.3	38.3	45.7	42.7	83.0	82.5	0.5	2
DVAS0290X20S040	●	2.9	4	20	58.5	—	67.2	37.7	107.0	106.5	0.5	3
DVAS0290X25S040	●	2.9	4	25	73.0	—	81.7	38.2	122.0	121.5	0.5	3
DVAS0290X30S040	●	2.9	4	30	87.5	—	96.2	38.7	137.0	136.5	0.5	3
DVAS0290X40S040	●	2.9	4	40	116.5	—	125.2	39.7	167.0	166.5	0.5	3
NEW DVAS0290X50S040	●	2.9	4	50	145.5	—	154.2	40.7	197.0	196.5	0.5	3
												4/4

MINI DVAS

RECOMMENDED CUTTING CONDITIONS

Material	DC	L/D	Vc	n	fr
P Mild steel Carbon steel, Alloy steel	1.0	2 – 30	65 [30 – 100]	20700	0.035 (0.020 – 0.050)
	1.0	40, 50	65 [30 – 100]	20700	0.030 (0.020 – 0.040)
	1.5	2 – 30	65 [30 – 100]	13800	0.053 (0.030 – 0.075)
	1.5	40, 50	65 [30 – 100]	13800	0.045 (0.030 – 0.060)
	2.0	2 – 30	70 [40 – 100]	11100	0.070 (0.040 – 0.100)
	2.0	40, 50	70 [40 – 100]	11100	0.060 (0.040 – 0.080)
	2.5	2 – 30	70 [40 – 100]	8900	0.088 (0.050 – 0.125)
	2.5	40, 50	70 [40 – 100]	8900	0.075 (0.050 – 0.100)
	2.9	2 – 30	70 [40 – 100]	7700	0.102 (0.058 – 0.145)
	2.9	40, 50	70 [40 – 100]	7700	0.087 (0.058 – 0.116)
M Austenitic stainless steel, Ferritic stainless steel Ferritic and martensitic stainless steel Precipitation hardening stainless steel	1.0	2 – 30	60 [20 – 100]	19100	0.025 (0.010 – 0.040)
	1.0	40, 50	60 [20 – 100]	19100	0.020 (0.010 – 0.030)
	1.5	2 – 30	60 [20 – 100]	12700	0.038 (0.015 – 0.060)
	1.5	40, 50	60 [20 – 100]	12700	0.030 (0.015 – 0.045)
	2.0	2 – 30	60 [20 – 100]	9500	0.050 (0.020 – 0.080)
	2.0	40, 50	60 [20 – 100]	9500	0.040 (0.020 – 0.060)
	2.5	2 – 30	60 [20 – 100]	7600	0.063 (0.025 – 0.100)
	2.5	40, 50	60 [20 – 100]	7600	0.050 (0.025 – 0.075)
	2.9	2 – 30	60 [20 – 100]	6600	0.073 (0.029 – 0.116)
	2.9	40, 50	60 [20 – 100]	6600	0.058 (0.029 – 0.087)
K Cast iron Ductile cast iron	1.0	2 – 30	70 [40 – 100]	22300	0.035 (0.020 – 0.050)
	1.0	40, 50	70 [40 – 100]	22300	0.030 (0.020 – 0.040)
	1.5	2 – 30	70 [40 – 100]	14900	0.053 (0.030 – 0.075)
	1.5	40, 50	70 [40 – 100]	14900	0.045 (0.030 – 0.060)
	2.0	2 – 30	70 [40 – 100]	11100	0.070 (0.040 – 0.100)
	2.0	40, 50	70 [40 – 100]	11100	0.060 (0.040 – 0.080)
	2.5	2 – 30	70 [40 – 100]	8900	0.088 (0.050 – 0.125)
	2.5	40, 50	70 [40 – 100]	8900	0.075 (0.050 – 0.100)
	2.9	2 – 30	70 [40 – 100]	7700	0.102 (0.058 – 0.145)
	2.9	40, 50	70 [40 – 100]	7700	0.087 (0.058 – 0.116)
N Aluminium alloy	1.0	2 – 30	140 [100 – 180]	31800	0.040 (0.020 – 0.060)
	1.0	40, 50	140 [100 – 180]	31800	0.035 (0.020 – 0.050)
	1.5	2 – 30	140 [100 – 180]	21200	0.060 (0.030 – 0.090)
	1.5	40, 50	140 [100 – 180]	21200	0.053 (0.030 – 0.075)
	2.0	2 – 30	140 [100 – 180]	15900	0.080 (0.040 – 0.120)
	2.0	40, 50	140 [100 – 180]	15900	0.070 (0.040 – 0.100)
	2.5	2 – 30	140 [100 – 180]	12700	0.100 (0.050 – 0.150)
	2.5	40, 50	140 [100 – 180]	12700	0.088 (0.050 – 0.125)
	2.9	2 – 30	140 [100 – 180]	11000	0.116 (0.058 – 0.174)
	2.9	40, 50	140 [100 – 180]	11000	0.102 (0.058 – 0.145)

1/2

1. This recommended condition is only when using internal coolant.
2. Check the condition of chips and perform step machining if necessary.
Reference of step length: 0.2 to 1.0 DC
3. Adjust the cutting conditions according to machine tool and workpiece clamp rigidity and machining geometry, etc.
4. Machining depths exceeding flute length (LU) are not recommend.
5. Clamp the drill so that the drill runout is within 0.003 mm.
6. Do not clamp the flute part of the drill.

MINI DVAS

Material	DC	L/D	Vc	n	fr
Heat resistant alloy	1.0	2 – 30	30 (10 – 50)	9500	0.015 (0.010 – 0.020)
	1.0	40, 50	30 (10 – 50)	9500	0.015 (0.010 – 0.020)
	1.5	2 – 30	30 (10 – 50)	6400	0.023 (0.015 – 0.030)
	1.5	40, 50	30 (10 – 50)	6400	0.023 (0.015 – 0.030)
	2.0	2 – 30	30 (10 – 50)	4800	0.030 (0.020 – 0.040)
	2.0	40, 50	30 (10 – 50)	4800	0.030 (0.020 – 0.040)
	2.5	2 – 30	30 (10 – 50)	3800	0.038 (0.025 – 0.050)
	2.5	40, 50	30 (10 – 50)	3800	0.038 (0.025 – 0.050)
	2.9	2 – 30	30 (10 – 50)	3300	0.044 (0.029 – 0.058)
	2.9	40, 50	30 (10 – 50)	3300	0.044 (0.029 – 0.058)
S Titanium alloy	1.0	2 – 30	30 (20 – 40)	9500	0.020 (0.010 – 0.030)
	1.0	40, 50	30 (20 – 40)	9500	0.020 (0.010 – 0.030)
	1.5	2 – 30	30 (20 – 40)	6400	0.030 (0.015 – 0.045)
	1.5	40, 50	30 (20 – 40)	6400	0.030 (0.015 – 0.045)
	2.0	2 – 30	30 (20 – 40)	4800	0.040 (0.020 – 0.060)
	2.0	40, 50	30 (20 – 40)	4800	0.040 (0.020 – 0.060)
	2.5	2 – 30	30 (20 – 40)	3800	0.050 (0.025 – 0.075)
	2.5	40, 50	30 (20 – 40)	3800	0.050 (0.025 – 0.075)
	2.9	2 – 30	30 (20 – 40)	3300	0.058 (0.029 – 0.087)
	2.9	40, 50	30 (20 – 40)	3300	0.058 (0.029 – 0.087)
Cobalt chrome alloy	1.0	2 – 30	60 (30 – 90)	19100	0.020 (0.010 – 0.030)
	1.0	40, 50	60 (30 – 90)	19100	0.020 (0.010 – 0.030)
	1.5	2 – 30	60 (30 – 90)	12700	0.030 (0.015 – 0.045)
	1.5	40, 50	60 (30 – 90)	12700	0.030 (0.015 – 0.045)
	2.0	2 – 30	60 (30 – 90)	9500	0.040 (0.020 – 0.060)
	2.0	40, 50	60 (30 – 90)	9500	0.040 (0.020 – 0.060)
	2.5	2 – 30	60 (30 – 90)	7600	0.050 (0.025 – 0.075)
	2.5	40, 50	60 (30 – 90)	7600	0.050 (0.025 – 0.075)
	2.9	2 – 30	60 (30 – 90)	6600	0.058 (0.029 – 0.087)
	2.9	40, 50	60 (30 – 90)	6600	0.058 (0.029 – 0.087)

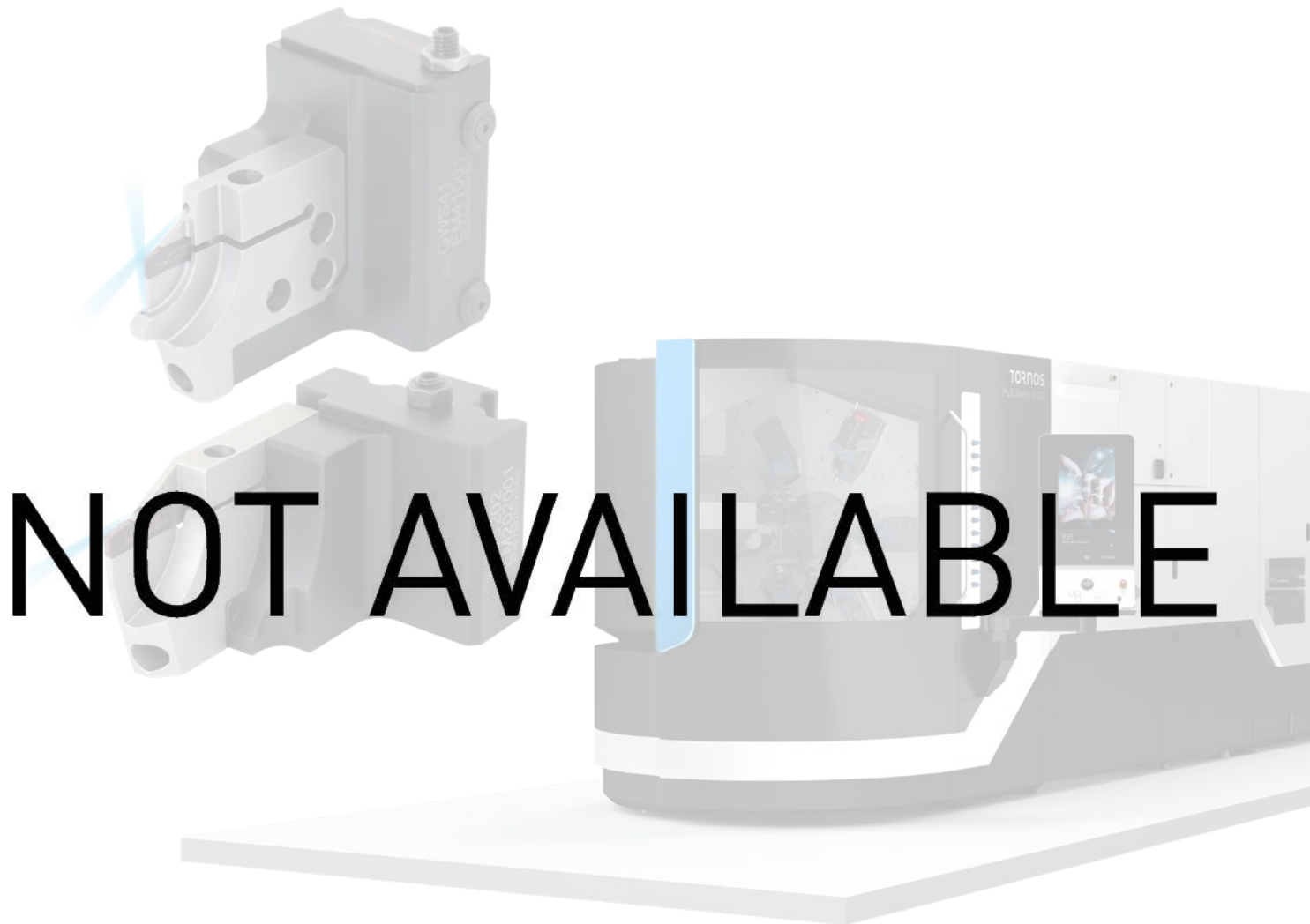
2/2

1. This recommended condition is only when using internal coolant.
2. Check the condition of chips and perform step machining if necessary.
Reference of step length: 0.2 to 1.0 DC
3. Adjust the cutting conditions according to machine tool and workpiece clamp rigidity and machining geometry, etc.
4. Machining depths exceeding flute length (LU) are not recommend.
5. Clamp the drill so that the drill runout is within 0.003 mm.
6. Do not clamp the flute part of the drill.

NEW

G80A (MPLUS)

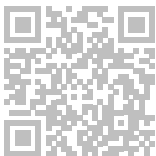
PARTING OFF SYSTEM FOR
TORNOS MULTI-SPINDLE MACHINES



In cooperation with



TORNOS



Interested in more...

MP112

www.mhg-mediastore.net

PARTING OFF IN SERIES

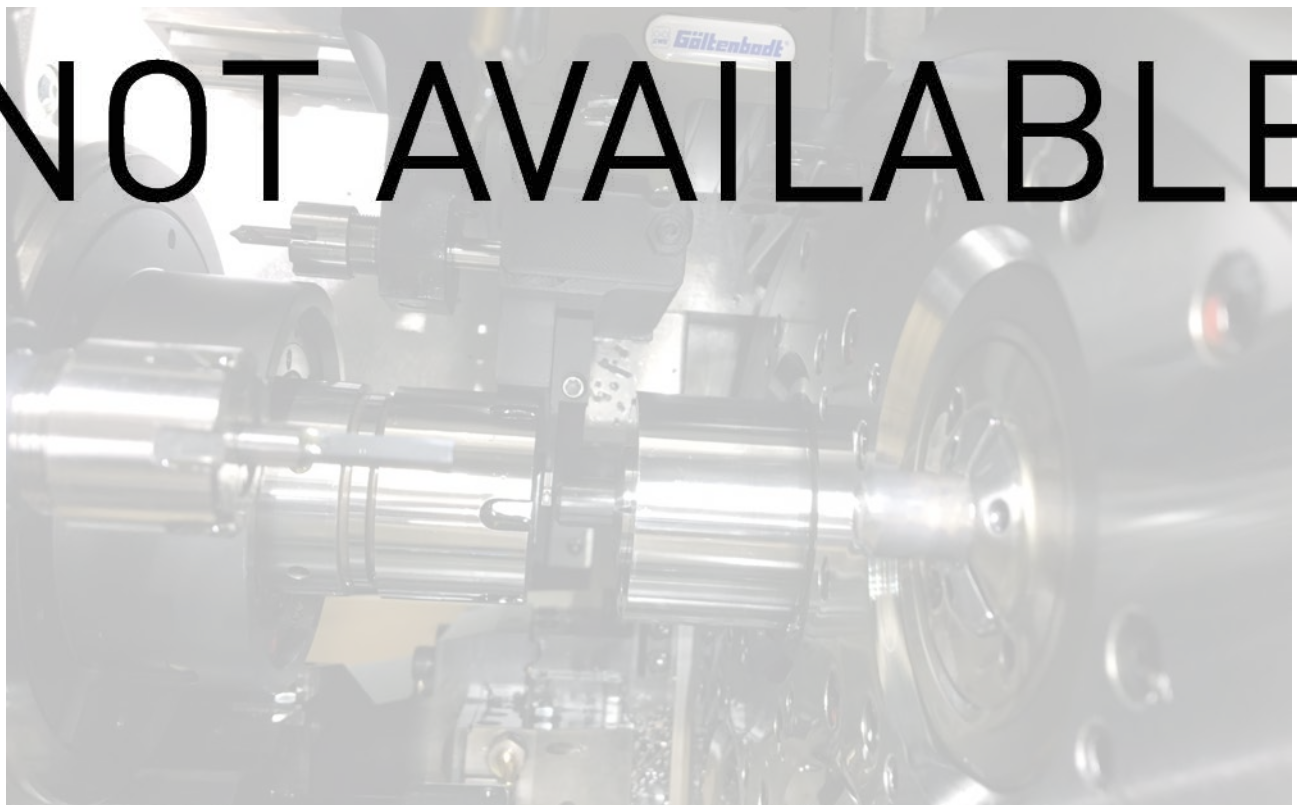
MODULAR – PERFORMANCE – UNCOMPROMISING

Regardless of the industry, it is the deep knowledge of the details that ultimately makes the difference and distinguishes the best from the rest. Whether it is in the medical or automotive industries, general mechanical engineering or the consumer goods industry, the components should be designed using the least space, weight or resources for the same function.



This means, small parts have to be produced in an efficient and precise way, as it has been done for many years on multi-spindle machines. Completely independent of any component details, one of the key elements in the whole machining process is reliable parting off.

NOT AVAILABLE



The new G80A parting-off system, also includes the details that offer added performance, reliability and efficiency. The targeted internal coolant supply makes the process even more reliable and enables longer tool life.

Easy handling both when changing inserts and when setting the centre height are added features. The grooving modules are specially designed for the conditions on the machine, which significantly increases stability.

PARTING OFF SYSTEM FOR TORNOS MULTI-SPINDLE MACHINES

FOR THE LIMITED SPACE IN MULTI-SPINDLE MACHINES

Reliable parting off with modular tools specially designed for Swiss multi-spindle machines in cooperation with Göltenbott. Efficient and reliable processing is realised due to the optimized internal through coolant supply for parting off widths from 1.5 mm.

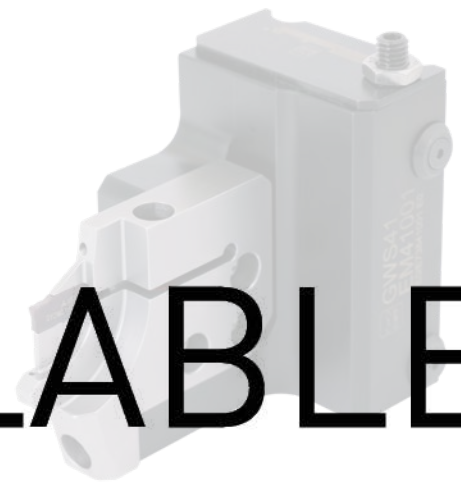
Product range

- Quick change adapter system GWS41
- Quick change adapter system GWS202
- Modules for GY indexable inserts
- GY indexable inserts

Characteristics

- Designed for the limited space between the main and counter spindle
- Secure and accurate clamping of the indexable insert
- Optimised through coolant supply

NOT AVAILABLE



SPECIALLY DESIGNED FEATURES FOR

EFFICIENCY AND EASE OF USE



BENEFITS

- High process reliability
- Internal coolant supply optimised for long tool life
- Small grooving width for maximum material utilisation



G80A

PARTING OFF SYSTEM FOR TORNOS MULTI-SPINDLE MACHINES

Internal coolant supply up to 8 Mpa for optimal coolant on the cutting edge.

Stability based on the proven Göltenbott GWS column guide system. Quick change, easy centre height setting and precision in one system.

Accessible and strong clamping of the indexable insert.

Optimal stability and function by individual alignment of the components and with regards to the limited space in these type of machines.

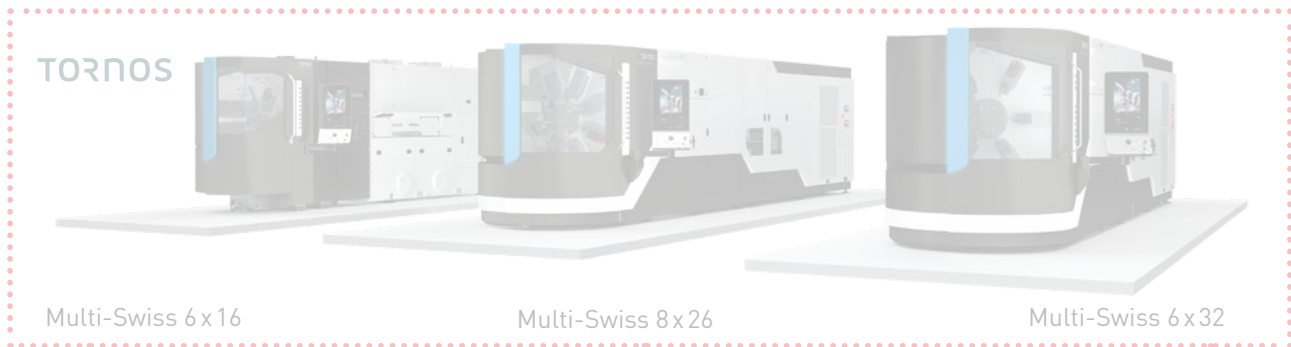
NOT AVAILABLE



G80A

PARTING OFF SYSTEM FOR TORNOS MULTI-SPINDLE MACHINES

Designed respectively for the current Tornos Multi-Swiss machines the following combinations are available.



NOT AVAILABLE



Göltensbott®
Innovation and Precision.



Göltensbott system GWS41 (page 336+337)

Göltensbott system GWS202 (page 338+339)



Mplus...



Modul G80A w = 1.5 – w = 2.0

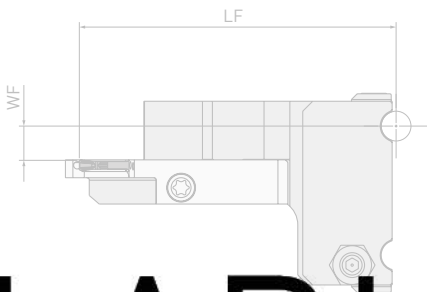
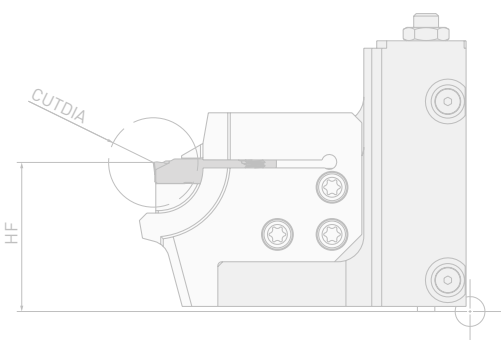
Modul G80A w = 2.0



Wide variety of GY-grooving inserts for applications in different materials

G80A

QUICK CHANGE TYPE ADAPTERS GWS41



NOT AVAILABLE

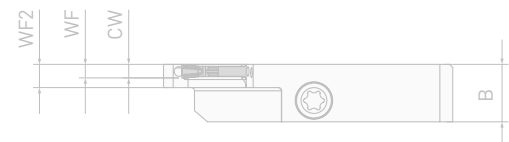
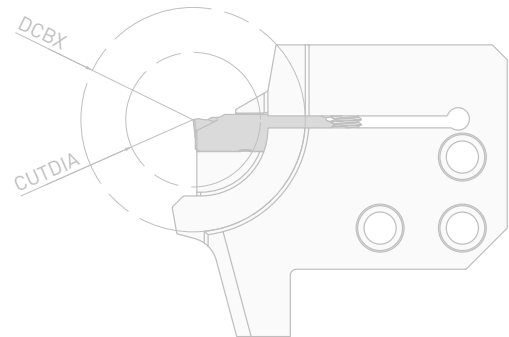
Order number	Stock	Hand	GWS system	Spindle for machine	CUTDIA	LF X-Axis	HF Y-Axis	W Z-Axis
EM41001	●	R	41	MS 6 x 16	16	63.8*	30	7.15 (cw = 1.5) / 6.9 (cw = 2.0)
								1/1

1. Module shown only for dimensional visualisation.
* Spindle nut diameter max. 30 mm.



G80A

MODULE FOR QUICK CHANGE ADAPTER GWS41



NOT AVAILABLE

Order number	Stock	Hand	G.S system	Suit. for machine	CUTDIA	DCBX	Tool size	CW	WF	WF2	B	IK
G80A-EM410RL16GYC2-E	●	R	41	MS 6 x 16	16	30	C	1.5	1.85	3.6	8.9	FF1 / SF2
G80A-EM410RL16GYD2-E	●	R	41	MS 6 x 16	16	30	D	2.0	2.1	3.6	8.9	FF1 / SF2
												1/1

1. For modules with flank cooling (FF), tool presetting must be carried out using the incident light method.

2. Rake face coolant requires no specific presetting method.
- Mplus...

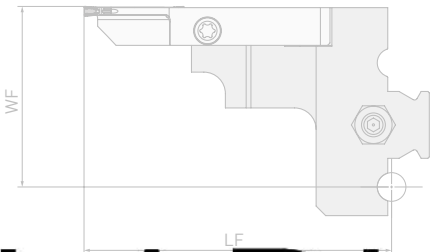
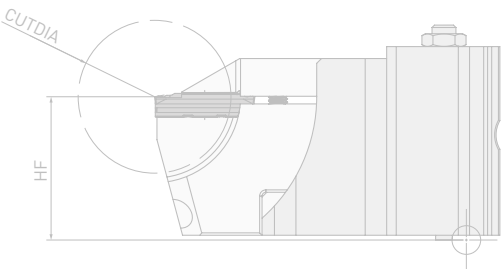
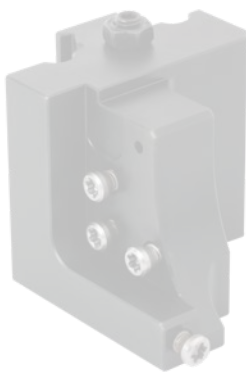
SPARE PARTS

Tool holder		
	Screw	Wrench
EM41001	TS43 [3.5 Nm]*	
G80A-EM410RL16GYC2-E		TKY15W-E
G80A-EM410RL16GYD2-E	TS406 [3.5 Nm]*	

* Recommended to use a torque screwdriver with a Torx 15 bit.

G80A

QUICK CHANGE ADAPTERS GWS202



NOT AVAILABLE

Order number Stock Hand GWS system Suitable for machine CUTDIA X-Axis Y-Axis Z-Axis

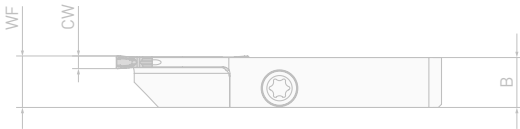
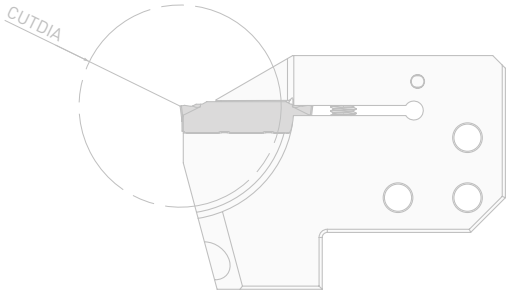
EM202001	●	L	202	MS 8 x 26 / MS 6 x 32	32*	64.4	30	37.8 (cw = 2.0)
								1/1

1. Module shown only for dimensional visuilation.
* Spindle nut diameter max. 66 mm.



G80A

MODULE FOR QUICK CHANGE ADAPTER GWS202



NOT AVAILABLE

Order number	Stock	Hand	GWS system	Suitable for machine	CUTDIA	Seat size	CW	WF	B	IK
G80A-EM202LL32GYD1-E	●	L	41	MS 8x26 / MS 6x32	32	D	2.0	8.15	7.9	SF1
										1/1

1. Rake face coolant requires no specific presetting method.



SPARE PARTS

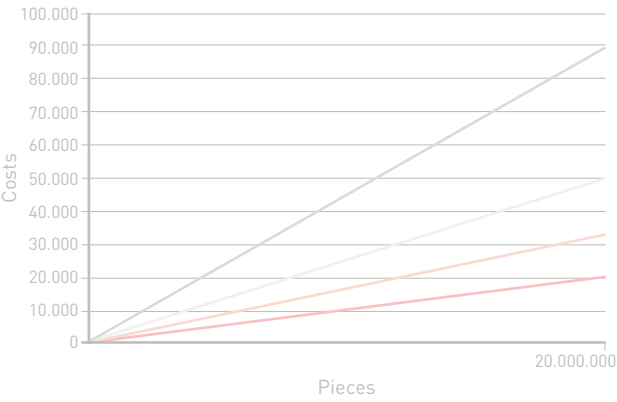
Tool holder		
	Screw	Wrench
EM202001	TS43 (3.5 Nm)*	TKY15W-E
G80A-EM202LL32GYD1-E	TS406 (3.5 Nm)*	

* Recommended to use a torque screwdriver with a Torx 15 bit.

G80A

PERFORMANCE COMPARISON 1

Material	NiCr23Fe
Tool	GWS41 – G80A
Vc (m/min)	47
f (mm/rev)	0.02
Lot size	20.000.000
Efficiency increase	Approx. 55.000 €/batch tooling cost reduction
Results	10.000 m less material consumption due to smaller grooving width.



PERFORMANCE COMPARISON 2

Material	100Cr6
Tool	GWS41 – G80A
Vc (m/min)	117
f (mm/rev)	0.03
Lot size	50.000
Efficiency increase	Approx. 30 €/Lot
Results	Positive environmental influence enabled by producing less scrap material.



NOT AVAILABLE

G80A

SPECIAL SOLUTIONS

Not all types of machines are mentioned in the overview on page 335. Technical support regarding fitment of the G80A type tool or a custom solution can be offered for other types of machines.



NOT AVAILABLE



Please contact the local Mitsubishi Materials supplier for special analysis of the situation. If a tailored solution is required, collision tests are carried out both using CAD and on site using an additively manufactured tool model before the final tool is produced. After successful testing, a final solution will be offered.

G80A

GY-GROOVING INSERTS

INSERT GRADES

P		M		K		S		N
NX2525	●							
MY5015	●			MY5015	●	MP9015	●	
VP10RT	●	VP10RT	●	VP10RT	●	MP9025	●	RT9020
VP20RT	✱	VP20RT	✱	VP20RT	✱		✱	

MP9000 SERIES



The high Al-rich (Al, Ti)N single layer coating provides stabilization of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance.

..... High Al-rich (Al, Ti)N Single Layer Coating

..... Special Cemented Carbide Substrate

VP20RT

(1st Recommendation)



PVD coated grade suitable for a wide range of applications. The combination of a special tough cemented carbide substrate with MIRACLE coating provides an excellent balance of wear and fracture resistance.

..... MIRACLE coating

..... Carbide substrate (HRA90.5)

VP10RT

(2nd Recommendation)



PVD coated grade with a cemented carbide substrate harder than VP20RT. For use on difficult-to-cut materials and for extending tool life.

..... MIRACLE coating

..... Carbide substrate (HRA92.0)

MY5015



CVD coated grade with excellent wear resistance even at high temperatures. Providing longer tool life when machining cast and ductile cast irons. Also suitable for high speed continuous cutting of steels.

..... CVD coating

..... Carbide substrate

RT9010

First recommended grade for titanium alloys.

NX2525

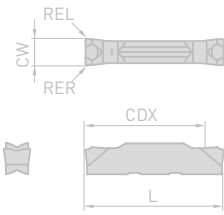
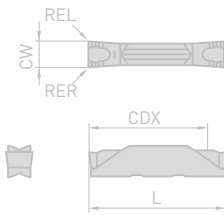
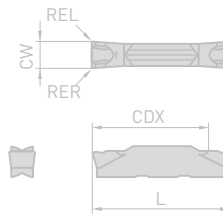
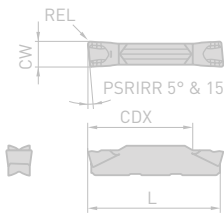
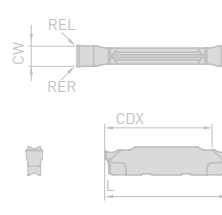
NX2525, a cermet grade for finish machining of steels and for good surface finishes at lower cutting speeds.

NOT AVAILABLE

G80A

A WIDE SELECTION OF INSERTS

PARTING OFF

GU Chipbreaker (For mild steel)	GS Chipbreaker (Low feeds)	GM Chipbreaker (Medium feeds)	R/L05-/R15-GS- GM Breaker (Medium feeds)	GL Breaker (For aluminium alloys)
				
				

Right hand tool holder shown.

NOT AVAILABLE

Order number	RT9010	VP1010	VP2010	MY5015	MP5015	MP5025	Seat size	CW	Tolerance	R R/L	CD	L
GY2M0200D020N-GU		●	●	●			D	2.00	±0.03	0.2	19.7	20.70
GY2M0150C010N-GS		●	●				C	1.50	±0.03	0.1	13.4	14.70
GY2G0150C003R15-GS		●	●				C	1.50	±0.02	0.03	13.17	15.20
GY2G0150C010R08-GS		●	●				C	1.50	±0.02	0.1	13.17	15.20
GY2G0150C010R15-GS		●	●				C	1.50	±0.02	0.1	13.17	15.20
GY2M0200D020N-GS		●	●	●			D	2.00	±0.03	0.2	18.7	20.70
GY2G0200D003R15-GS		●	●				D	2.00	±0.03	0.03	18.85	21.30
GY2G0200D010R15-GS		●	●				D	2.00	±0.03	0.1	18.85	21.30
GY2G0200D020R08-GS		●	●				D	2.00	±0.03	0.2	18.85	21.30
GY2M0150C020N-GM		●	●	●	●	●	C	1.50	±0.03	0.2	13.9	14.70
GY2M0200D020N-GM		●	●	●	●	●	D	2.00	±0.03	0.2	19.4	20.70
GY2M0200D020R05-GM		●	●				D	2.00	±0.03	0.2	19.5	20.80
GY2M0200D020L05-GM		●	●				D	2.00	±0.03	0.2	19.5	20.80
GY1M0200D020L05-GM		★	●				D	2.00	±0.03	0.2	—	20.80
GY1M0200D020N-GM		●	●	●	●	●	D	2.00	±0.03	0.2	—	20.70
GY1M0200D020R05-GM		●	●				D	2.00	±0.03	0.2	—	20.80
GY2G0200D005N-GL	●						D	2.00	±0.02	0.05	19.5	21.05

1/1

G80A

RECOMMENDED CUTTING CONDITIONS

Material	Hardness	Grade	Vc
P	Mild steel	VP20RT	160 (100 – 220)
		VP10RT	170 (110 – 230)
		MY5015	220 (140 – 300)
		NX2525	150 (90 – 210)
	Carbon steel Alloy steel	VP20RT	130 (80 – 180)
		VP10RT	140 (90 – 190)
		MY5015	180 (110 – 250)
		NX2525	120 (70 – 170)
		VP20RT	100 (60 – 140)
		VP10RT	110 (70 – 150)
		MY5015	150 (90 – 210)
		NX2525	95 (55 – 135)
M	Stainless steel	VP20RT	100 (60 – 140)
		VP10RT	110 (70 – 150)
K	Gray cast iron	VP20RT	130 (80 – 180)
		VP10RT	140 (90 – 190)
		MY5015	220 (140 – 300)
	Ductile cast iron	VP20RT	100 (60 – 140)
		VP10RT	110 (70 – 150)
		MY5015	150 (90 – 210)
		MP9015	70 (40 – 100)
		MP9025	60 (30 – 90)
		VP20RT	45 (30 – 60)
		VP10RT	55 (40 – 70)
S	Heat resistant alloy	—	—
	Titanium alloy	—	—

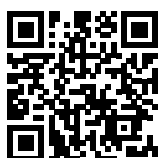
1. VP20RT is the first recommended grade for materials other than hardened steel.
2. For VP10RT, VP20RT, MP9015, MP9025 and MY5015, wet cutting is recommended.

RECOMMENDED FEED RATE (MM/REV)

CW	Breaker			
	GU	GS	GM	GL
1.5	—	0.025 – 0.130	0.05 – 0.15	—
2.0	0.03 – 0.08	0.025 – 0.130	0.05 – 0.15	0.02 – 0.08

415SD (MPLUS)

FIRST CHOICE FOR HIGH-FEED MACHINING OF
TITANIUM ALLOYS



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MP111

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415SD

FOR HIGH-FEED EFFICIENT MACHINING



HIGH-FEED MILLING CUTTER CONCEPT FOR STABILITY AND HIGH PERFORMANCE

- Unevenly spaced cutting edges reduce vibrations, especially in long overhang applications.
- Fine and extra fine pitch types enable a highly efficient cutting performance.
- Carefully selected steel for the tool body is capable of safely absorbing machining forces. In addition, the nickel coating increases wear and corrosion protection.
- The insert location in the holder combined with the ideal geometry and a precisely positioned coolant outlet achieves maximum stability and machining performance.

CUTTING PERFORMANCE

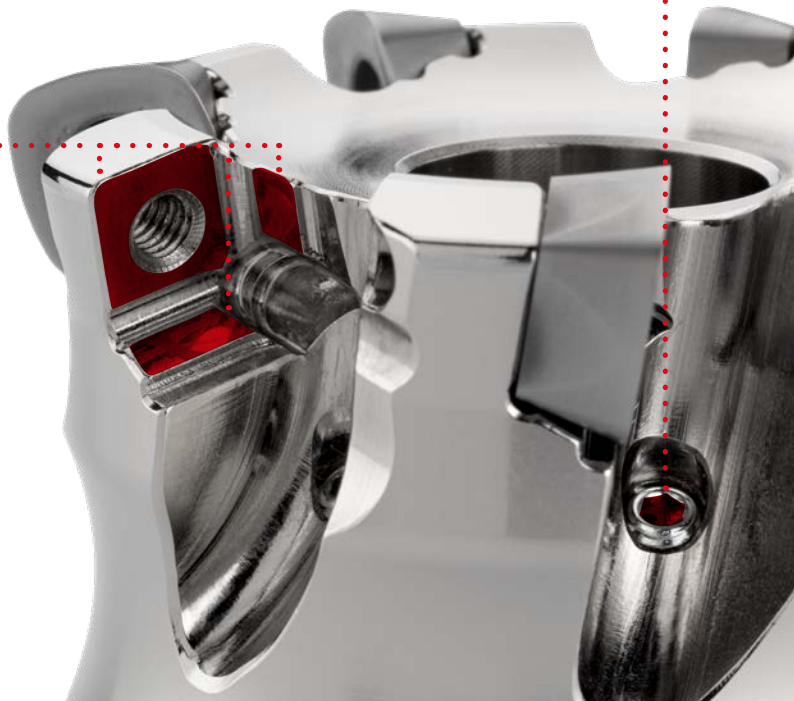
The approach angle of 15° achieves an APMX of 2 mm, which enables a high removal rate but with low radial forces.

TARGETED APPLICATIONS

The use of different diameters and the precise positioning of the coolant nozzles enables perfect chip removal as well as reducing and dissipating the high temperatures that occur at the cutting edge.

SAFE, PRECISE AND RELIABLE

Exact positioning, secure insert clamping with large contact surfaces offers the possibility of high-performance and efficient high-feed machining of stainless steels and heat resistant materials.



415SD

INSERTS FOR HIGH-FEED EFFICIENT MACHINING

THE PVD-COATED, HIGH-PERFORMANCE GRADE MP9130 FOCUSES ON TITANIUM MACHINING

- High-feed face milling including radial, plunge and ramping operations.
- Ideal for machining components that require a long overhang.
- Highly suitable for low power machines and low rigidity component clamping.



L-BREAKER

Ideal for applications that require low cutting resistance.



M-BREAKER

First recommendation - ideal combination of cutting edge stability and low cutting resistance.



R-BREAKER

High cutting edge stability, for heavy interrupted machining or difficult cutting conditions.



Highest productivity even when applications require low cutting resistance.

- Low power consumption.
- Designed to achieve low radial cutting forces.
- Process reliability and long tool life, especially when machining difficult-to-cut materials.
- Stable and robust 4-edge insert for efficient, high-feed milling.

415SD



HIGH-FEED CUTTER

P K S

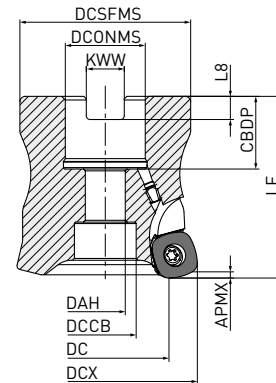


415SD

GAMP: 9°

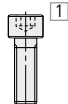
GAMF: 5° – 6°

1



Right hand tool holder only.

DCX	Set bolt	Geometry
Ø 50, Ø 52	HSC10035	1
Ø 63, Ø 66	HSC12035	



ARBOR TYPE

Order number	Stock	APMX	DC	DCONMS	DCX	LF	RMPX	WT	ZEFP	Type	
415SD-050A04AR-E	●	2	33.4	22	50	50	3°	0.4	4	1	SDMT12
415SD-050A05AR-E	●	2	33.4	22	50	50	3°	0.4	5	1	
415SD-052A04AR-E	●	2	35.4	22	52	50	3°	0.4	4	1	
415SD-052A06AR-E	●	2	35.4	22	52	50	3°	0.4	6	1	
415SD-063X05AR-E	●	2	46.5	27	63	50	2°	0.7	5	1	
415SD-063X07AR-E	●	2	46.5	27	63	50	2°	0.7	7	1	
415SD-066X05AR-E	●	2	49.4	27	66	50	1.9°	0.7	5	1	
415SD-066X07AR-E	●	2	49.4	27	66	50	1.9°	0.7	7	1	

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1. Please refer to page 351, for maximum depth of cut (APMX).

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415SD



HIGH-FEED CUTTER

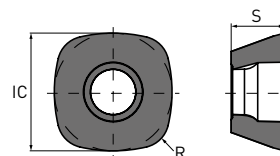
MOUNTING DIMENSIONS

Order number	CBDP	DAH	DCCB	DCONMS	DCSFMS	DCX	KWW	L8	Type
415SD-050A04AR-E	20	11	17	22	47	50	10.4	6.3	1
415SD-050A05AR-E	20	11	17	22	47	50	10.4	6.3	1
415SD-052A04AR-E	20	11	17	22	47	52	10.4	6.3	1
415SD-052A06AR-E	20	11	17	22	47	52	10.4	6.3	1
415SD-063X05AR-E	22	13	19	27	60	63	12.4	7.0	1
415SD-063X07AR-E	22	13	19	27	60	63	12.4	7.0	1
415SD-066X05AR-E	22	13	19	27	60	66	12.4	7.0	1
415SD-066X07AR-E	22	13	19	27	60	66	12.4	7.0	1

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INSERTS

Order number	Class	MP9130	NEW MV1020	NEW MV1030	IC	S	RE	Shape
SDMT125530ZEN-L	L	●	●	●	12.25	5.56	3.0	
SDMT125530ZEN-M	M	●	●	●	12.25	5.56	3.0	
SDMT125530ZSN-R	R	●	●	●	12.25	5.56	3.0	



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415SD

HIGH-FEED CUTTER



SPARE PARTS

Tool holder					
	Clamp screw	Flag wrench	Coolant nozzle	Standard L wrench	Anti-seize lubricant
415SD	TPS43	TIP15W-E	HSD04004H12	HKY20R	MK1KS

1. Clamp torque (N • m): TPS43 = 3.5

COOLANT NOZZLES ARE AVAILABLE WITH VARYING DIAMETERS FOR ADJUSTING COOLANT PRESSURE

← Standard →				
	≤ 1 Mpa (≤ 20 l/min.)	≥ 3 Mpa (≥ 25 l/min.)	≥ 5 Mpa (≥ 30 l/min.)	≥ 7 Mpa (≥ 50 l/min.)
Nozzle Dia.	Ø 0.6 mm	Ø 0.8 mm	Ø 1.2 mm	Ø 1.6 mm
Order number	HSD04004H06	HSD04004H08	HSD04004H12	HSD04004H16

415SD

RECOMMENDED CUTTING CONDITIONS

CORRECTION FACTOR BY OVERHANG LENGTH

	DCX	Overhang length	Adjustment value		
			Vc	ap	fz
Arbor type	50 – 66	<2.5xDCX	100%	100%	100%
		3.0xDCX	85%	100%	90%
		4.0xDCX	80%	80%	80%
		5.0xDCX	75%	75%	60%
		6.0xDCX	70%	70%	40%

CUTTING SPEED/WET CUTTING

Material	Properties	Cutting conditions	Grade	APMX	Vc		
					ae ≤ 0.5 DC	ae ≤ 0.75 DC	ae = DC
S Titanium alloy	—	● ● ✱	MP9130	≤ 1	55 (40 – 70)	50 (35 – 65)	45 (30 – 60)
			MP9130	≤ 2	55 (40 – 70)	50 (35 – 65)	45 (30 – 60)

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NEW

CUTTING SPEED/DRY CUTTING

Material		Properties	Cutting conditions	Grade	APMX	Vc		
						ae ≤ 0.5 DC	ae ≤ 0.75 DC	ae = DC
P	Mild steel	≤ 180 HB	● ● ✱	MV1020	≤ 2	220 (170 – 270)	220 (170 – 270)	220 (170 – 270)
				MV1030	≤ 2	140 (80 – 200)	140 (80 – 200)	140 (80 – 200)
	Carbon steel, Alloy steel	180 – 280 HB	● ● ✱	MV1020	≤ 2	200 (150 – 250)	200 (150 – 250)	200 (150 – 250)
				MV1030	≤ 2	120 (60 – 180)	120 (60 – 180)	120 (60 – 180)
				MV1020	≤ 2	150 (100 – 200)	150 (100 – 200)	150 (100 – 200)
				MV1030	≤ 2	90 (30 – 150)	90 (30 – 150)	90 (30 – 150)
	280 – 350 HB		MV1020	≤ 2	150 (100 – 200)	150 (100 – 200)	150 (100 – 200)	
			MV1030	≤ 2	90 (30 – 150)	90 (30 – 150)	90 (30 – 150)	
K	Ductile cast iron	Tensile strength ≤ 450 MPa	● ● ✱	MV1020	≤ 2	200 (150 – 250)	200 (150 – 250)	200 (150 – 250)
				MV1030	≤ 2	140 (80 – 200)	140 (80 – 200)	140 (80 – 200)
		Tensile strength ≤ 800 MPa		MV1020	≤ 2	180 (130 – 230)	180 (130 – 230)	180 (130 – 230)
				MV1030	≤ 2	140 (80 – 200)	140 (80 – 200)	140 (80 – 200)
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415SD

RECOMMENDED CUTTING CONDITIONS

DEPTH OF CUT/FEED PER TOOTH

Material	Properties	Cutting conditions	Coolant	Grade	ae ≤ 0.5 DC		ae ≤ 0.75 DC		ae = DC	
					 ap	fz	 ap	fz	 ap	fz
P Mild steel	≤ 180 HB	●	✗	MV1020	L	≤ 1 0.9 [0.4 – 1.2]	L	≤ 1 0.8 [0.4 – 1.1]	L	≤ 1 0.8 [0.4 – 1.0]
		●	✗	MV1030	L	≤ 1 0.9 [0.4 – 1.2]	L	≤ 1 0.8 [0.4 – 1.1]	L	≤ 1 0.8 [0.4 – 1.0]
		●	✗	MV1020	L	≤ 2 0.8 [0.4 – 1.2]	L	≤ 2 0.7 [0.4 – 1.1]	L	≤ 2 0.7 [0.4 – 1.0]
		●	✗	MV1030	L	≤ 2 0.8 [0.4 – 1.2]	L	≤ 2 0.7 [0.4 – 1.1]	L	≤ 2 0.7 [0.4 – 1.0]
		●	✗	MV1020	L	≤ 1 —	L	≤ 1 —	L	≤ 1 —
		●	✗	MV1030	L	≤ 1 —	L	≤ 1 —	L	≤ 1 —
		●	✗	MV1020	L	≤ 2 —	L	≤ 2 —	L	≤ 2 —
		●	✗	MV1030	L	≤ 2 —	L	≤ 2 —	L	≤ 2 —
		●	✗	MV1020	M	≤ 1 1.2 [0.4 – 1.8]	M	≤ 1 1.1 [0.4 – 1.6]	M	≤ 1 1.1 [0.4 – 1.6]
		●	✗	MV1030	M	≤ 1 1.2 [0.4 – 1.8]	M	≤ 1 1.1 [0.4 – 1.6]	M	≤ 1 1.1 [0.4 – 1.6]
		●	✗	MV1020	M	≤ 2 1.1 [0.4 – 1.8]	M	≤ 2 1.0 [0.4 – 1.6]	M	≤ 2 1.0 [0.4 – 1.6]
		●	✗	MV1030	M	≤ 2 1.1 [0.4 – 1.8]	M	≤ 2 1.0 [0.4 – 1.6]	M	≤ 2 1.0 [0.4 – 1.6]
		●	✗	MV1020	M	≤ 1 1.0 [0.4 – 1.7]	M	≤ 1 1.0 [0.4 – 1.5]	M	≤ 1 1.0 [0.4 – 1.5]
		●	✗	MV1030	M	≤ 1 1.0 [0.4 – 1.7]	M	≤ 1 1.0 [0.4 – 1.5]	M	≤ 1 1.0 [0.4 – 1.5]
		●	✗	MV1020	M	≤ 2 0.9 [0.4 – 1.7]	M	≤ 2 0.9 [0.4 – 1.5]	M	≤ 2 0.9 [0.4 – 1.5]
		●	✗	MV1030	M	≤ 2 0.9 [0.4 – 1.7]	M	≤ 2 0.9 [0.4 – 1.5]	M	≤ 2 0.9 [0.4 – 1.5]
		✱	✗	MV1020	M	≤ 1 1.0 [0.4 – 1.7]	M	≤ 1 1.0 [0.4 – 1.5]	M	≤ 1 1.0 [0.4 – 1.5]
		✱	✗	MV1030	M	≤ 1 1.0 [0.4 – 1.7]	M	≤ 1 1.0 [0.4 – 1.5]	M	≤ 1 1.0 [0.4 – 1.5]
		✱	✗	MV1020	M	≤ 2 0.9 [0.4 – 1.7]	M	≤ 2 0.9 [0.4 – 1.5]	M	≤ 2 0.9 [0.4 – 1.5]
		✱	✗	MV1030	M	≤ 2 0.9 [0.4 – 1.7]	M	≤ 2 0.9 [0.4 – 1.5]	M	≤ 2 0.9 [0.4 – 1.5]
		●	✗	MV1020	R	≤ 1 1.5 [0.4 – 2.1]	R	≤ 1 1.4 [0.4 – 1.9]	R	≤ 1 1.4 [0.4 – 1.9]
		●	✗	MV1030	R	≤ 1 1.5 [0.4 – 2.1]	R	≤ 1 1.4 [0.4 – 1.9]	R	≤ 1 1.4 [0.4 – 1.9]
		●	✗	MV1020	R	≤ 2 1.4 [0.4 – 2.1]	R	≤ 2 1.3 [0.4 – 1.9]	R	≤ 2 1.3 [0.4 – 1.9]
		●	✗	MV1030	R	≤ 2 1.4 [0.4 – 2.1]	R	≤ 2 1.3 [0.4 – 1.9]	R	≤ 2 1.3 [0.4 – 1.9]
		●	✗	MV1020	R	≤ 1 1.4 [0.4 – 2.0]	R	≤ 1 1.2 [0.4 – 1.8]	R	≤ 1 1.2 [0.4 – 1.7]
		●	✗	MV1030	R	≤ 1 1.4 [0.4 – 2.0]	R	≤ 1 1.2 [0.4 – 1.8]	R	≤ 1 1.2 [0.4 – 1.7]
		●	✗	MV1020	R	≤ 2 1.3 [0.4 – 2.0]	R	≤ 2 1.1 [0.4 – 1.8]	R	≤ 2 1.1 [0.4 – 1.7]
		●	✗	MV1030	R	≤ 2 1.3 [0.4 – 2.0]	R	≤ 2 1.1 [0.4 – 1.8]	R	≤ 2 1.1 [0.4 – 1.7]
		✱	✗	MV1020	R	≤ 1 1.4 [0.4 – 2.0]	R	≤ 1 1.2 [0.4 – 1.8]	R	≤ 1 1.2 [0.4 – 1.7]
		✱	✗	MV1030	R	≤ 1 1.4 [0.4 – 2.0]	R	≤ 1 1.2 [0.4 – 1.8]	R	≤ 1 1.2 [0.4 – 1.7]
		✱	✗	MV1020	R	≤ 2 1.3 [0.4 – 2.0]	R	≤ 2 1.1 [0.4 – 1.8]	R	≤ 2 1.1 [0.4 – 1.7]
		✱	✗	MV1030	R	≤ 2 1.3 [0.4 – 2.0]	R	≤ 2 1.1 [0.4 – 1.8]	R	≤ 2 1.1 [0.4 – 1.7]

415SD – DEPTH OF CUT / FEED PER TOOTH

Material	Properties	Cutting conditions	Coolant	Grade	ae ≤ 0.5 DC				ae ≤ 0.75 DC				ae = DC			
						ap	fz		ap	fz		ap	fz			
P	Carbon steel, Alloy steel	180 – 280 HB			MV1020	L	≤ 1	0.7 [0.4 – 1.1]	L	≤ 1	0.7 [0.4 – 1.0]	L	≤ 1	0.7 [0.4 – 1.0]		
					MV1030	L	≤ 1	0.7 [0.4 – 1.1]	L	≤ 1	0.7 [0.4 – 1.0]	L	≤ 1	0.7 [0.4 – 1.0]		
					MV1020	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—		
					MV1030	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—		
					MV1020	L	≤ 1	—	L	≤ 1	—	L	≤ 1	—		
					MV1030	L	≤ 1	—	L	≤ 1	—	L	≤ 1	—		
					MV1020	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—		
					MV1030	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—		
					MV1020	M	≤ 1	1.0 [0.4 – 1.7]	M	≤ 1	1.0 [0.4 – 1.5]	M	≤ 1	1.0 [0.4 – 1.5]		
					MV1030	M	≤ 1	1.0 [0.4 – 1.7]	M	≤ 1	1.0 [0.4 – 1.5]	M	≤ 1	1.0 [0.4 – 1.5]		
					MV1020	M	≤ 2	0.9 [0.4 – 1.7]	M	≤ 2	0.9 [0.4 – 1.5]	M	≤ 2	0.9 [0.4 – 1.5]		
					MV1030	M	≤ 2	0.9 [0.4 – 1.7]	M	≤ 2	0.9 [0.4 – 1.5]	M	≤ 2	0.9 [0.4 – 1.5]		
					MV1020	M	≤ 1	0.9 [0.4 – 1.5]	M	≤ 1	0.8 [0.4 – 1.4]	M	≤ 1	0.8 [0.4 – 1.3]		
					MV1030	M	≤ 1	0.9 [0.4 – 1.5]	M	≤ 1	0.8 [0.4 – 1.4]	M	≤ 1	0.8 [0.4 – 1.3]		
					MV1020	M	≤ 2	0.8 [0.4 – 1.5]	M	≤ 2	0.7 [0.4 – 1.4]	M	≤ 2	0.7 [0.4 – 1.3]		
					MV1030	M	≤ 2	0.8 [0.4 – 1.5]	M	≤ 2	0.7 [0.4 – 1.4]	M	≤ 2	0.7 [0.4 – 1.3]		
					MV1020	M	≤ 1	0.9 [0.4 – 1.5]	M	≤ 1	0.8 [0.4 – 1.4]	M	≤ 1	0.8 [0.4 – 1.3]		
					MV1030	M	≤ 1	0.9 [0.4 – 1.5]	M	≤ 1	0.8 [0.4 – 1.4]	M	≤ 1	0.8 [0.4 – 1.3]		
					MV1020	M	≤ 2	0.8 [0.4 – 1.5]	M	≤ 2	0.7 [0.4 – 1.4]	M	≤ 2	0.7 [0.4 – 1.3]		
					MV1030	M	≤ 2	0.8 [0.4 – 1.5]	M	≤ 2	0.7 [0.4 – 1.4]	M	≤ 2	0.7 [0.4 – 1.3]		
					MV1020	R	≤ 1	1.4 [0.4 – 2.0]	R	≤ 1	1.2 [1.0 – 1.8]	R	≤ 1	1.2 [0.4 – 1.7]		
					MV1030	R	≤ 1	1.4 [0.4 – 2.0]	R	≤ 1	1.2 [1.0 – 1.8]	R	≤ 1	1.2 [0.4 – 1.7]		
					MV1020	R	≤ 2	1.3 [0.4 – 2.0]	R	≤ 2	1.1 [1.0 – 1.8]	R	≤ 2	1.1 [0.4 – 1.7]		
					MV1030	R	≤ 2	1.3 [0.4 – 2.0]	R	≤ 2	1.1 [1.0 – 1.8]	R	≤ 2	1.1 [0.4 – 1.7]		
					MV1020	R	≤ 1	1.2 [0.4 – 1.8]	R	≤ 1	1.1 [0.8 – 1.6]	R	≤ 1	1.1 [0.4 – 1.6]		
					MV1030	R	≤ 1	1.2 [0.4 – 1.8]	R	≤ 1	1.1 [0.8 – 1.6]	R	≤ 1	1.1 [0.4 – 1.6]		
					MV1020	R	≤ 2	1.1 [0.4 – 1.8]	R	≤ 2	1.0 [0.8 – 1.6]	R	≤ 2	1.0 [0.4 – 1.6]		
					MV1030	R	≤ 2	1.1 [0.4 – 1.8]	R	≤ 2	1.0 [0.8 – 1.6]	R	≤ 2	1.0 [0.4 – 1.6]		
					MV1020	R	≤ 1	1.2 [0.4 – 1.8]	R	≤ 1	1.1 [0.8 – 1.6]	R	≤ 1	1.1 [0.4 – 1.6]		
					MV1030	R	≤ 1	1.2 [0.4 – 1.8]	R	≤ 1	1.1 [0.8 – 1.6]	R	≤ 1	1.1 [0.4 – 1.6]		
					MV1020	R	≤ 2	1.1 [0.4 – 1.8]	R	≤ 2	1.0 [0.8 – 1.6]	R	≤ 2	1.0 [0.4 – 1.6]		
					MV1030	R	≤ 2	1.1 [0.4 – 1.8]	R	≤ 2	1.0 [0.8 – 1.6]	R	≤ 2	1.0 [0.4 – 1.6]		

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415SD – DEPTH OF CUT / FEED PER TOOTH

Material	Properties	Cutting conditions	Coolant	Grade	ae ≤ 0.5 DC				ae ≤ 0.75 DC				ae = DC			
						ap	fz		ap	fz		ap	fz			
P	Carbon steel, Alloy steel	280 – 350 HB			MV1020	L	≤ 1	0.6 [0.4 – 0.9]	L	≤ 1	0.6 [0.4 – 0.8]	L	≤ 1	0.6 [0.4 – 0.8]		
					MV1030	L	≤ 1	0.6 [0.4 – 0.9]	L	≤ 1	0.6 [0.4 – 0.8]	L	≤ 1	0.6 [0.4 – 0.8]		
					MV1020	L	≤ 2	0.5 [0.4 – 0.9]	L	≤ 2	0.5 [0.4 – 0.8]	L	≤ 2	0.5 [0.4 – 0.8]		
					MV1030	L	≤ 2	0.5 [0.4 – 0.9]	L	≤ 2	0.5 [0.4 – 0.8]	L	≤ 2	0.5 [0.4 – 0.8]		
					MV1020	L	≤ 1	—	L	≤ 1	—	L	≤ 1	—		
					MV1030	L	≤ 1	—	L	≤ 1	—	L	≤ 1	—		
					MV1020	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—		
					MV1030	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—		
					MV1020	M	≤ 1	0.9 [0.4 – 1.5]	M	≤ 1	0.8 [0.4 – 1.4]	M	≤ 1	0.8 [0.4 – 1.3]		
					MV1030	M	≤ 1	0.9 [0.4 – 1.5]	M	≤ 1	0.8 [0.4 – 1.4]	M	≤ 1	0.8 [0.4 – 1.3]		
					MV1020	M	≤ 2	0.8 [0.4 – 1.5]	M	≤ 2	0.7 [0.4 – 1.4]	M	≤ 2	0.7 [0.4 – 1.3]		
					MV1030	M	≤ 2	0.8 [0.4 – 1.5]	M	≤ 2	0.7 [0.4 – 1.4]	M	≤ 2	0.7 [0.4 – 1.3]		
					MV1020	M	≤ 1	0.9 [0.4 – 1.5]	M	≤ 1	0.8 [0.4 – 1.4]	M	≤ 1	0.7 [0.4 – 1.2]		
					MV1030	M	≤ 1	0.9 [0.4 – 1.5]	M	≤ 1	0.8 [0.4 – 1.4]	M	≤ 1	0.7 [0.4 – 1.2]		
					MV1020	M	≤ 2	0.8 [0.4 – 1.5]	M	≤ 2	0.7 [0.4 – 1.4]	M	≤ 2	0.6 [0.4 – 1.2]		
					MV1030	M	≤ 2	0.8 [0.4 – 1.5]	M	≤ 2	0.7 [0.4 – 1.4]	M	≤ 2	0.6 [0.4 – 1.2]		
					MV1020	M	≤ 1	0.9 [0.4 – 1.5]	M	≤ 1	0.8 [0.4 – 1.4]	M	≤ 1	0.7 [0.4 – 1.2]		
					MV1030	M	≤ 1	0.9 [0.4 – 1.5]	M	≤ 1	0.8 [0.4 – 1.4]	M	≤ 1	0.7 [0.4 – 1.2]		
					MV1020	M	≤ 2	0.8 [0.4 – 1.5]	M	≤ 2	0.7 [0.4 – 1.4]	M	≤ 2	0.6 [0.4 – 1.2]		
					MV1030	M	≤ 2	0.8 [0.4 – 1.5]	M	≤ 2	0.7 [0.4 – 1.4]	M	≤ 2	0.6 [0.4 – 1.2]		
					MV1020	R	≤ 1	1.2 [0.4 – 1.8]	R	≤ 1	1.1 [0.4 – 1.6]	R	≤ 1	1.1 [0.8 – 1.6]		
					MV1030	R	≤ 1	1.2 [0.4 – 1.8]	R	≤ 1	1.1 [0.4 – 1.6]	R	≤ 1	1.1 [0.8 – 1.6]		
					MV1020	R	≤ 2	1.1 [0.4 – 1.8]	R	≤ 2	1.0 [0.4 – 1.6]	R	≤ 2	1.0 [0.8 – 1.6]		
					MV1030	R	≤ 2	1.1 [0.4 – 1.8]	R	≤ 2	1.0 [0.4 – 1.6]	R	≤ 2	1.0 [0.8 – 1.6]		
					MV1020	R	≤ 1	1.1 [0.4 – 1.8]	R	≤ 1	1.0 [0.4 – 1.6]	R	≤ 1	1.0 [0.4 – 1.5]		
					MV1030	R	≤ 1	1.1 [0.4 – 1.8]	R	≤ 1	1.0 [0.4 – 1.6]	R	≤ 1	1.0 [0.4 – 1.5]		
					MV1020	R	≤ 2	1.0 [0.4 – 1.8]	R	≤ 2	0.9 [0.4 – 1.6]	R	≤ 2	0.9 [0.4 – 1.5]		
					MV1030	R	≤ 2	1.0 [0.4 – 1.8]	R	≤ 2	0.9 [0.4 – 1.6]	R	≤ 2	0.9 [0.4 – 1.5]		
					MV1020	R	≤ 1	1.1 [0.4 – 1.8]	R	≤ 1	1.0 [0.4 – 1.6]	R	≤ 1	1.0 [0.4 – 1.5]		
					MV1030	R	≤ 1	1.1 [0.4 – 1.8]	R	≤ 1	1.0 [0.4 – 1.6]	R	≤ 1	1.0 [0.4 – 1.5]		
					MV1020	R	≤ 2	1.0 [0.4 – 1.8]	R	≤ 2	0.9 [0.4 – 1.6]	R	≤ 2	0.9 [0.4 – 1.5]		
					MV1030	R	≤ 2	1.0 [0.4 – 1.8]	R	≤ 2	0.9 [0.4 – 1.6]	R	≤ 2	0.9 [0.4 – 1.5]		

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415SD – DEPTH OF CUT / FEED PER TOOTH

Material	Properties	Cutting conditions	Coolant	Grade	ae ≤ 0.5 DC			ae ≤ 0.75 DC			ae = DC		
						ap	fz		ap	fz		ap	fz
K Ductile cast iron	Tensile strength ≤ 350 MPa			MV1020	L	≤ 1	0.9 [0.4 – 1.2]	L	≤ 1	0.8 [0.4 – 1.1]	L	≤ 1	0.8 [0.4 – 1.1]
				MV1030	L	≤ 1	0.9 [0.4 – 1.2]	L	≤ 1	0.8 [0.4 – 1.1]	L	≤ 1	0.8 [0.4 – 1.1]
				MV1020	L	≤ 2	0.8 [0.4 – 1.2]	L	≤ 2	0.7 [0.4 – 1.1]	L	≤ 2	0.7 [0.4 – 1.1]
				MV1030	L	≤ 2	0.8 [0.4 – 1.2]	L	≤ 2	0.7 [0.4 – 1.1]	L	≤ 2	0.7 [0.4 – 1.1]
				MV1020	L	≤ 1	—	L	≤ 1	—	L	≤ 1	—
				MV1030	L	≤ 1	—	L	≤ 1	—	L	≤ 1	—
				MV1020	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—
				MV1030	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—
				MV1020	M	≤ 1	1.2 [0.4 – 1.8]	M	≤ 1	1.1 [0.4 – 1.6]	M	≤ 1	1.1 [0.4 – 1.6]
				MV1030	M	≤ 1	1.2 [0.4 – 1.8]	M	≤ 1	1.1 [0.4 – 1.6]	M	≤ 1	1.1 [0.4 – 1.6]
				MV1020	M	≤ 2	1.1 [0.4 – 1.8]	M	≤ 2	1.0 [0.4 – 1.6]	M	≤ 2	1.0 [0.4 – 1.6]
				MV1030	M	≤ 2	1.1 [0.4 – 1.8]	M	≤ 2	1.0 [0.4 – 1.6]	M	≤ 2	1.0 [0.4 – 1.6]
				MV1020	M	≤ 1	1.1 [0.4 – 1.7]	M	≤ 1	1.0 [0.4 – 1.5]	M	≤ 1	0.9 [0.4 – 1.5]
				MV1030	M	≤ 1	1.1 [0.4 – 1.7]	M	≤ 1	1.0 [0.4 – 1.5]	M	≤ 1	0.9 [0.4 – 1.5]
				MV1020	M	≤ 2	1.0 [0.4 – 1.7]	M	≤ 2	0.9 [0.4 – 1.5]	M	≤ 2	0.8 [0.4 – 1.5]
				MV1030	M	≤ 2	1.0 [0.4 – 1.7]	M	≤ 2	0.9 [0.4 – 1.5]	M	≤ 2	0.8 [0.4 – 1.5]
				MV1020	M	≤ 1	1.1 [0.4 – 1.7]	M	≤ 1	1.0 [0.4 – 1.5]	M	≤ 1	0.9 [0.4 – 1.5]
				MV1030	M	≤ 1	1.1 [0.4 – 1.7]	M	≤ 1	1.0 [0.4 – 1.5]	M	≤ 1	0.9 [0.4 – 1.5]
				MV1020	M	≤ 2	1.0 [0.4 – 1.7]	M	≤ 2	0.9 [0.4 – 1.5]	M	≤ 2	0.8 [0.4 – 1.5]
				MV1030	M	≤ 2	1.0 [0.4 – 1.7]	M	≤ 2	0.9 [0.4 – 1.5]	M	≤ 2	0.8 [0.4 – 1.5]
				MV1020	R	≤ 1	1.5 [0.4 – 2.1]	R	≤ 1	1.4 [0.4 – 1.9]	R	≤ 1	1.3 [1.1 – 1.9]
				MV1030	R	≤ 1	1.5 [0.4 – 2.1]	R	≤ 1	1.4 [0.4 – 1.9]	R	≤ 1	1.3 [1.1 – 1.9]
				MV1020	R	≤ 2	1.4 [0.4 – 2.1]	R	≤ 2	1.3 [0.4 – 1.9]	R	≤ 2	1.2 [1.1 – 1.9]
				MV1030	R	≤ 2	1.4 [0.4 – 2.1]	R	≤ 2	1.3 [0.4 – 1.9]	R	≤ 2	1.2 [1.1 – 1.9]
				MV1020	R	≤ 1	1.4 [1.0 – 2.0]	R	≤ 1	1.2 [0.4 – 1.8]	R	≤ 1	1.2 [0.4 – 1.7]
				MV1030	R	≤ 1	1.4 [1.0 – 2.0]	R	≤ 1	1.2 [0.4 – 1.8]	R	≤ 1	1.2 [0.4 – 1.7]
				MV1020	R	≤ 2	1.3 [1.0 – 2.0]	R	≤ 2	1.1 [0.4 – 1.8]	R	≤ 2	1.1 [0.4 – 1.7]
				MV1030	R	≤ 2	1.3 [1.0 – 2.0]	R	≤ 2	1.1 [0.4 – 1.8]	R	≤ 2	1.1 [0.4 – 1.7]
				MV1020	R	≤ 1	1.4 [1.0 – 2.0]	R	≤ 1	1.2 [0.4 – 1.8]	R	≤ 1	1.2 [0.4 – 1.7]
				MV1030	R	≤ 1	1.4 [1.0 – 2.0]	R	≤ 1	1.2 [0.4 – 1.8]	R	≤ 1	1.2 [0.4 – 1.7]
				MV1020	R	≤ 2	1.3 [1.0 – 2.0]	R	≤ 2	1.1 [0.4 – 1.8]	R	≤ 2	1.1 [0.4 – 1.7]
				MV1030	R	≤ 2	1.3 [1.0 – 2.0]	R	≤ 2	1.1 [0.4 – 1.8]	R	≤ 2	1.1 [0.4 – 1.7]

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415SD – DEPTH OF CUT / FEED PER TOOTH

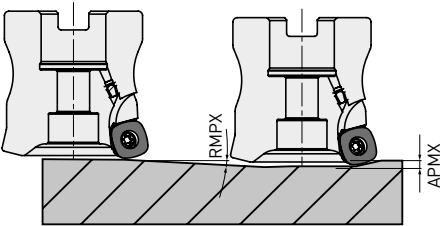
Material	Properties	Cutting conditions	Coolant	Grade	ae ≤ 0.5 DC				ae ≤ 0.75 DC				ae = DC			
						ap	fz		ap	fz		ap	fz			
K	Ductile cast iron	Tensile strength ≤ 800 MPa	 	MV1020	L	≤ 1	0.9 [0.4 – 1.2]	L	≤ 1	0.8 [0.4 – 1.1]	L	≤ 1	0.8 [0.4 – 1.1]			
			 	MV1030	L	≤ 1	0.9 [0.4 – 1.2]	L	≤ 1	0.8 [0.4 – 1.1]	L	≤ 1	0.8 [0.4 – 1.1]			
			 	MV1020	L	≤ 2	0.8 [0.4 – 1.2]	L	≤ 2	0.7 [0.4 – 1.1]	L	≤ 2	0.7 [0.4 – 1.1]			
			 	MV1030	L	≤ 2	0.8 [0.4 – 1.2]	L	≤ 2	0.7 [0.4 – 1.1]	L	≤ 2	0.7 [0.4 – 1.1]			
			 	MV1020	L	≤ 1	—	L	≤ 1	—	L	≤ 1	—			
			 	MV1030	L	≤ 1	—	L	≤ 1	—	L	≤ 1	—			
			 	MV1020	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—			
			 	MV1030	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—			
			 	MV1020	M	≤ 1	1.2 [0.4 – 1.8]	M	≤ 1	1.1 [0.4 – 1.6]	M	≤ 1	1.1 [0.4 – 1.6]			
			 	MV1030	M	≤ 1	1.2 [0.4 – 1.8]	M	≤ 1	1.1 [0.4 – 1.6]	M	≤ 1	1.1 [0.4 – 1.6]			
			 	MV1020	M	≤ 2	1.1 [0.4 – 1.8]	M	≤ 2	1.0 [0.4 – 1.6]	M	≤ 2	1.0 [0.4 – 1.6]			
			 	MV1030	M	≤ 2	1.1 [0.4 – 1.8]	M	≤ 2	1.0 [0.4 – 1.6]	M	≤ 2	1.0 [0.4 – 1.6]			
			 	MV1020	M	≤ 1	1.1 [0.4 – 1.7]	M	≤ 1	1.0 [0.4 – 1.5]	M	≤ 1	0.9 [0.4 – 1.5]			
			 	MV1030	M	≤ 1	1.1 [0.4 – 1.7]	M	≤ 1	1.0 [0.4 – 1.5]	M	≤ 1	0.9 [0.4 – 1.5]			
			 	MV1020	M	≤ 2	1.0 [0.4 – 1.7]	M	≤ 2	0.9 [0.4 – 1.5]	M	≤ 2	0.8 [0.4 – 1.5]			
			 	MV1030	M	≤ 2	1.0 [0.4 – 1.7]	M	≤ 2	0.9 [0.4 – 1.5]	M	≤ 2	0.8 [0.4 – 1.5]			
			 	MV1020	M	≤ 1	1.1 [0.4 – 1.7]	M	≤ 1	1.0 [0.4 – 1.5]	M	≤ 1	0.9 [0.4 – 1.5]			
			 	MV1030	M	≤ 1	1.1 [0.4 – 1.7]	M	≤ 1	1.0 [0.4 – 1.5]	M	≤ 1	0.9 [0.4 – 1.5]			
			 	MV1020	M	≤ 2	1.0 [0.4 – 1.7]	M	≤ 2	0.9 [0.4 – 1.5]	M	≤ 2	0.8 [0.4 – 1.5]			
			 	MV1030	M	≤ 2	1.0 [0.4 – 1.7]	M	≤ 2	0.9 [0.4 – 1.5]	M	≤ 2	0.8 [0.4 – 1.5]			
			 	MV1020	R	≤ 1	1.5 [0.4 – 2.1]	R	≤ 1	1.4 [0.4 – 1.9]	R	≤ 1	1.3 [1.1 – 1.9]			
			 	MV1030	R	≤ 1	1.5 [0.4 – 2.1]	R	≤ 1	1.4 [0.4 – 1.9]	R	≤ 1	1.3 [1.1 – 1.9]			
			 	MV1020	R	≤ 2	1.4 [0.4 – 2.1]	R	≤ 2	1.3 [0.4 – 1.9]	R	≤ 2	1.2 [1.1 – 1.9]			
			 	MV1030	R	≤ 2	1.4 [0.4 – 2.1]	R	≤ 2	1.3 [0.4 – 1.9]	R	≤ 2	1.2 [1.1 – 1.9]			
			 	MV1020	R	≤ 1	1.4 [1.0 – 2.0]	R	≤ 1	1.2 [0.4 – 1.8]	R	≤ 1	1.2 [0.4 – 1.7]			
			 	MV1030	R	≤ 1	1.4 [1.0 – 2.0]	R	≤ 1	1.2 [0.4 – 1.8]	R	≤ 1	1.2 [0.4 – 1.7]			
			 	MV1020	R	≤ 2	1.3 [1.0 – 2.0]	R	≤ 2	1.1 [0.4 – 1.8]	R	≤ 2	1.1 [0.4 – 1.7]			
			 	MV1030	R	≤ 2	1.3 [1.0 – 2.0]	R	≤ 2	1.1 [0.4 – 1.8]	R	≤ 2	1.1 [0.4 – 1.7]			
			 	MV1020	R	≤ 1	1.4 [1.0 – 2.0]	R	≤ 1	1.2 [0.4 – 1.8]	R	≤ 1	1.2 [0.4 – 1.7]			
			 	MV1030	R	≤ 1	1.4 [1.0 – 2.0]	R	≤ 1	1.2 [0.4 – 1.8]	R	≤ 1	1.2 [0.4 – 1.7]			
			 	MV1020	R	≤ 2	1.3 [1.0 – 2.0]	R	≤ 2	1.1 [0.4 – 1.8]	R	≤ 2	1.1 [0.4 – 1.7]			
			 	MV1030	R	≤ 2	1.3 [1.0 – 2.0]	R	≤ 2	1.1 [0.4 – 1.8]	R	≤ 2	1.1 [0.4 – 1.7]			
			S	Titanium alloy	—	 	MP9130	L	≤ 1	0.7 [0.5 – 0.9]	L	≤ 1	0.6 [0.4 – 0.7]	L	≤ 1	0.5 [0.3 – 0.6]
						 	MP9130	L	≤ 2	0.6 [0.4 – 0.8]	L	≤ 2	0.5 [0.3 – 0.6]	L	≤ 2	0.4 [0.2 – 0.5]
						 	MP9130	M	≤ 1	0.7 [0.5 – 0.9]	M	≤ 1	0.6 [0.4 – 0.7]	M	≤ 1	0.5 [0.3 – 0.6]
						 	MP9130	M	≤ 2	0.6 [0.4 – 0.8]	M	≤ 2	0.5 [0.3 – 0.6]	M	≤ 2	0.4 [0.2 – 0.5]
 	MP9130	R				≤ 1	0.8 [0.6 – 1.0]	R	≤ 1	0.7 [0.4 – 0.9]	R	≤ 1	0.6 [0.4 – 0.8]			
 	MP9130	R				≤ 2	0.7 [0.5 – 0.9]	R	≤ 2	0.6 [0.3 – 0.8]	R	≤ 2	0.5 [0.3 – 0.7]			
 	MP9130	R				≤ 1	0.7 [0.5 – 0.9]	R	≤ 1	0.6 [0.4 – 0.7]	R	≤ 1	0.5 [0.3 – 0.6]			
 	MP9130	R				≤ 2	0.6 [0.4 – 0.8]	R	≤ 2	0.5 [0.3 – 0.6]	R	≤ 2	0.4 [0.2 – 0.5]			

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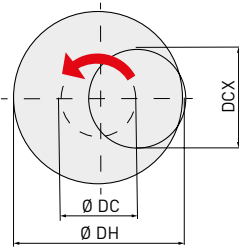
415SD

MAXIMUM CAPACITIES BY MODE

RAMPING



HELICAL DRILLING



- How to derive a locus of the centre of the tool.
$$\text{ØDC} = \text{ØDH} - \text{DCX}$$

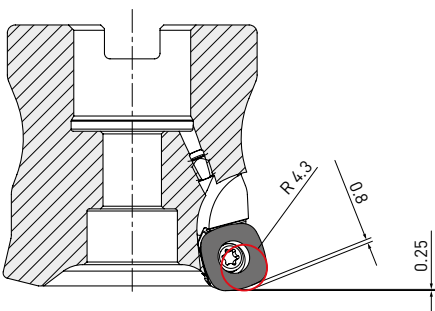
Locus of the centre of the tool Desired hole diameter Cutting Diameter Maximum
- For the depth of cut per pass, refer to the cutting conditions above for helical drilling.
- Set the machine spindle revolution so that the tool is rotating and cutting in a down cut direction.

- When ramping and helical cutting, please apply a lower feed (60 % of the calculated feed rate or less).
- The long chips generated can disperse, ensure that adequate safety precautions are taken.

Tool holder type	DCX	DC	APMX	Ramping	Helical drilling	
				RMPX	DH	
					Min.	Max.
ARBOR TYPE						
41SD-050A04AR-E	50	33.4	2	3	84	97
41SD-050A05AR-E	50	33.4	2	3	84	97
41SD-052A04AR-E	52	35.4	2	3	88	101
41SD-052A06AR-E	52	35.4	2	3	88	101
41SD-063A05AR-E	63	46.5	2	2	110	123
41SD-063A07AR-E	63	46.5	2	2	110	123
41SD-066A05AR-E	66	49.4	2	1.9	116	129
41SD-066A07AR-E	66	49.4	2	1.9	116	129

NOTE FOR PROGRAMMING

When using 415SD (Mplus), please programme as an RE = 4.3 radius cutter. The approximate uncut portions for the programme are as follows.



SYMBOLS

 Recommended cutting conditions	MACHINING TYPE
APPLICATION	 Roughing
 Face milling	 Medium cutting
 Chamfer milling	 Light cutting
 Shoulder milling with R	 Pre-finishing
 Face milling close to a wall	 Finishing
 Shoulder milling	 Fine-finishing
 Side milling	TOOL MATERIAL
 Slot milling	 Ultra micro grain carbide Ultra micro grain carbide substrate material.
 Ramping	 Cubic boron nitride Mitsubishi Materials' original CBN material.
 Pocket milling	 Ceramic For high speed efficient machining of super alloys due to the excellent high temperature strength property.
 Slot milling with R	 High hardness powder metallurgy HSS High hardness powder metallurgy HSS substrate material.
 Copy milling	 High grade high alloy HSS High grade high alloy HSS substrate material.
 T-Slot milling	 Cobalt high speed steel Cobalt high speed steel substrate material.
	 High speed steel High speed steel substrate material.

COATING	
	SMART MIRACLE coating New smooth and dense coating technology for high efficiency milling of difficult to cut materials.
	CRN coating Newly developed CrN coating for Copper Electrodes machining.
	Violet coating Increased tool life of 2-3 times more than TiN coated products.
	DP coating New generation coating suitable for a wide range of materials.
	MIRACLE coating The original Miracle (Al,Ti)N coating. Also suitable for dry cutting.
	[Al, Ti]N coating (Al,Ti)N highly versatile application range.
	[Al,Ti,Cr]N multi-layer coating For carbon, alloy and hardened steels.
	IMPACT MIRACLE coating Single phase nano crystal coating technology has higher film hardness and heat resistance.
	MIRACLE coating The original MIRACLE (Al,Ti)N coating. Also suitable for dry cutting.
	VFR coating The (AlCrSi)N/(AlTiSi)N PVD multilayer coating is ideal for machining of extremely hard materials up to 70 HRC.
	DLC coating Hardness similar to CVD diamond coating achieved with high adhesion strength.
	Diamond coating Suitable for CFRP and CFRP-aluminium materials.
	Diamond coating Suitable for graphite machining.
	Diamond coating The original CVD diamond coating.
	CVD Diamond coating Unique multi-layer micro-grain diamond crystal control technology drastically improves wear resistance and smoothness.

CUTTING EDGE PROPERTIES	
	Sharp corner edge Indicates the end mill has a sharp corner edge.
	Gash land Indicates the end mill cutting edge has a protective chamfer.
	Rake angle
	Helix angle Indicates the helix angle of the end mill.
	Point angle Indicates the drill point angle.
	Roughing flute geometry
	Variable helix
	Rounded gash
	Corner angle
WEB THINNING	
	X type point geometry X web thinning used at the drill point.
	XR type point geometry XR web thinning used at the drill point.
	S type point geometry Easy cutting geometry.
	N type point geometry Effective when the point web is thick.
	Chipbreaker

SYMBOLS

TOLERANCES



Tolerance of taper angle
Indicates the tolerance of the taper angle.



R tolerance
Indicates the radial tolerance of a ball nose end mill.



R tolerance
Indicates the radial tolerance of the corner radius.



R tolerance
Indicates the radial tolerance of a cutter with a corner radius.



Outside diameter tolerance
Indicates the diameter tolerance of the end mill.



Peak tolerance
Indicates the tolerance for the end diameter.



Shank diameter tolerance



Shank diameter tolerance



Drill tolerance / diameter

COOLANT HOLES



External coolant



Internal coolant



Internal coolant



Centered, internal coolant hole



Radial, internal coolant holes



Internal coolant holes



Internal coolant holes

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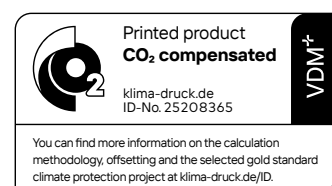
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