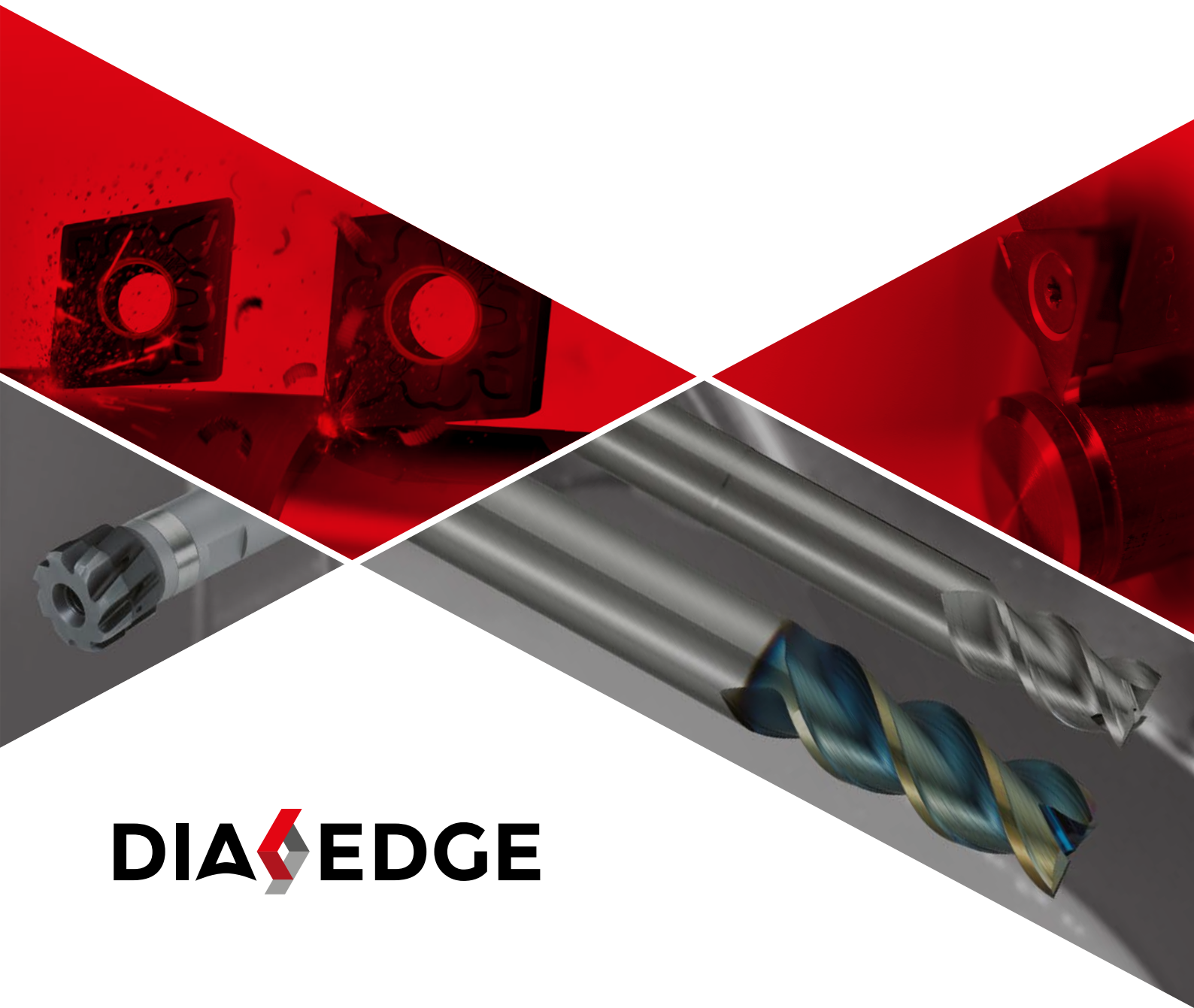
MITSUBISHI MATERIALS

PRODUCT NEWS 2024



DIA EDGE

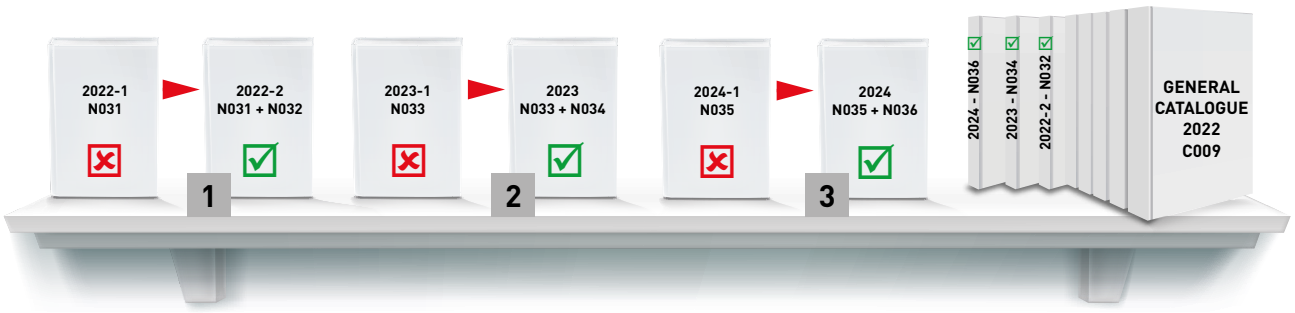
DIA EDGE

BETTER. TOGETHER.

MITSUBISHI MATERIALS

CATALOGUE SYSTEM

HOW TO REPLACE PRODUCT NEWS BOOKS



NOTES:

1 The Product News 2022-1 – N031 has been integrated into Product News 2022-2 – N032.

2 The Product News 2023-1 – N033 will be integrated into Product News 2023 – N034.

3 The Product News 2024-1 – N035 will be integrated into Product News 2024 – N036.

☑ **The yearly Product News catalogues (e.g. N032, N034 etc.) 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 (e.g. N032, N034 etc.) will merge into the new GENERAL CATALOGUE.**

NEW

PRODUCT NEWS 2024

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 of the tooling brand DIAEDGE for turning, milling and drilling applications.

CURRENT, INNOVATIVE, COMPETITIVE

NOTES: This Product News 2024 (N036) complements the General Catalogue C009, Product News 2022-2 (N032) and the Product News 2023 (N034).
It contains all new products and series expansions that have been launched after the release of the N032, N034 book and the C009 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

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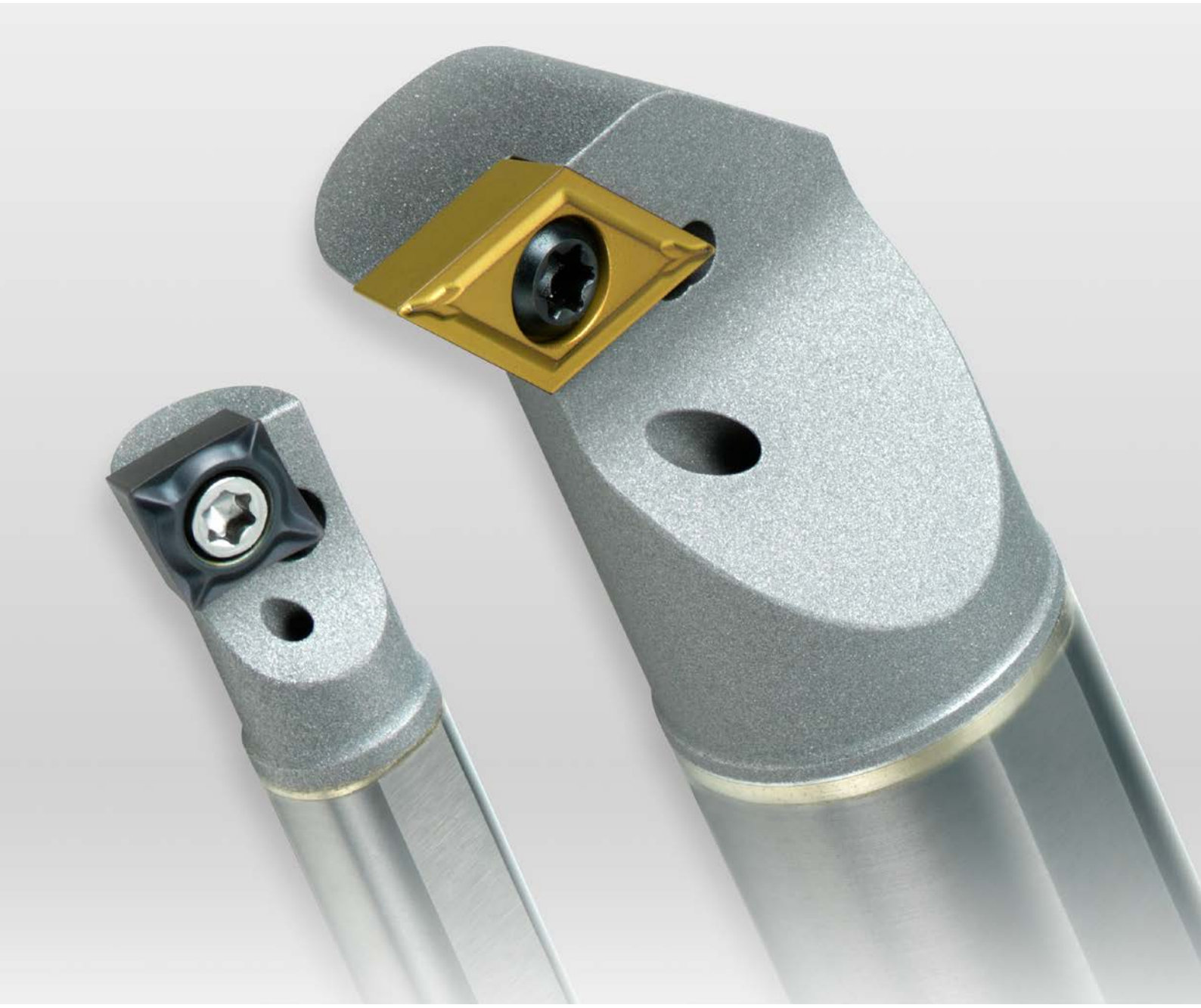
BORING BARS FOR SMALL PARTS MACHINING

COMPATIBLE WITH SWISS-TYPE AUTOMATIC LATHES



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DIA EDGE

BORING BARS FOR SMALL PARTS MACHINING

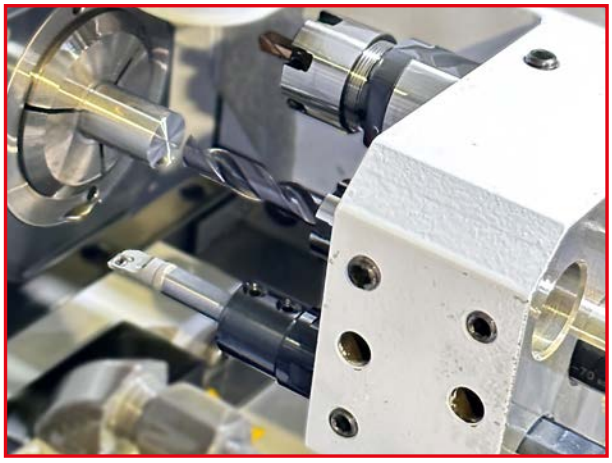
OVERALL LENGTH COMPATIBLE WITH SWISS-TYPE AUTOMATIC LATHES

SCREW-ON TYPE
Carbide shank:
80 mm, 90 mm, 140 mm, 180 mm

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 9.

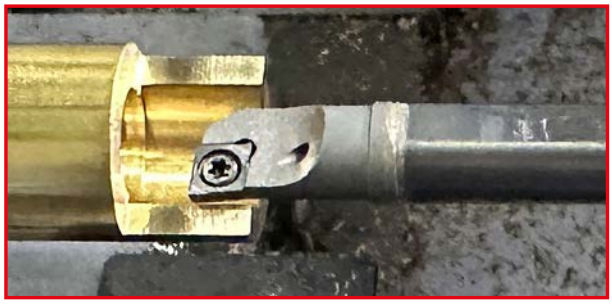
NO NEED TO SHORTEN THE SHANK
The length of the tools are compatible with Swiss-type automatic lathes, therefore no need to cut the shank to prevent interference.



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	
C	Carbide shank
S	Steel shank

4. Clamp structure	
S	Screw-on

5. Insert shape	
C	RHOMBIC 80°
D	RHOMBIC 55°
T	TRIANGULAR 60°
V	RHOMBIC 35°
W	TRIGON

6. Cutting angle KAPR	
U	93°
L	95°
Q	107.5°
P	117.5°

7. Insert clearance	
B	5° POSITIVE
C	7° POSITIVE
P	11° POSITIVE

2. Min. machining Diameter **DMIN (mm)**

3. Shank diameter **DCONMS (mm)**

C	18	-	16	S	C	L	C	R	09	-	180	-	C
1	2		3	4	5	6	7	8	9		10		11

8. Hand of tool	
R	Right Hand
L	Left Hand

9. Cutting edge length symbol and inscribed circle						
Inscribed circle (mm)	3.97	4.76	5.56	6.35	7.94	9.525
RHOMBIC 80°	03	04	—	06	08	09
RHOMBIC 55°	—	—	—	07	—	11
TRIANGULAR 60°	06	08	09	11	—	16
RHOMBIC 35°	—	08	—	11	—	16
TRIGON	02	L3	—	04	—	06

10. Tool length (mm)	
080	80
090	90
140	140
150	150
180	180
200	200

11. Coolant hole	
C	With coolant hole

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		◎			◎	11	29
			Carbide	90, 140, 180	9 – 34	8 – 32		◎		◎	◎	12	
			Steel	90, 150	14 – 34	12 – 32		◎		◎		13	
RHOMBIC 80° **Normal clearance 11°**	SCLP	95°	Carbide	140, 180	12 – 30	10 – 25		◎		◎	◎	14	37
			Steel	90, 150	14 – 30	12 – 25		◎		◎		15	
TRIANGULAR 60° **Normal clearance 7°**	STUC	93°	Carbide	90	7 – 8	6 – 7	◎				◎	16	46
			Carbide	90, 140, 180	9 – 32	8 – 25	◎			◎	◎	17	
			Steel	90, 150	14 – 40	12 – 32	◎			◎		18	
TRIANGULAR 60° **Normal clearance 11°**	STUP	93°	Carbide	90, 140, 180	10 – 34	8 – 25	◎			◎	◎	19	49
			Steel	90, 150	14 – 34	12 – 25	◎			◎		20	
RHOMBIC 55° **Normal clearance 7°**	SDUC	93°	Carbide	140, 180	14 – 32	10 – 25			◎	◎	◎	21	40
			Steel	150	16 – 32	12 – 25			◎	◎		22	
RHOMBIC 55° **Normal clearance 7°**	SDQC	107.5°	Carbide	140, 180	13 – 30	10 – 25			◎	◎	◎	23	40
			Steel	90, 150	16 – 30	12 – 25			◎	◎		24	
TRIGON **Normal clearance 7°**	SWUC	93°	Carbide	80, 90	6 – 8	5 – 7	◎	◎			◎	25	57
			Carbide	90, 140, 180	10 – 22	8 – 20	◎	◎		◎	◎	26	
			Steel	90, 150	14 – 22	12 – 20	◎	◎		◎		27	

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
CPGT0802○○ (Ø7.94)	TS3
CPGT0903○○ (Ø9.525)	TS4

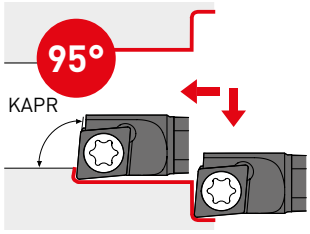
Insert type	Clamp screw
TPGX0802○○ (Ø4.76)	CS200T
TPGX/TPMX0902○○ (Ø5.56)	CS250T
TPGX/TPMX1103○○ (Ø9.525)	CS300890T

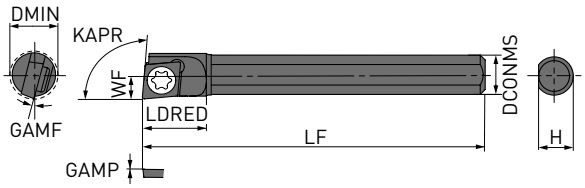
1. If the screw is too long the shorten is necessary.

NEW

C-SCLC

CARBIDE SHANK BORING BAR WITHOUT COOLANT HOLE





Right hand tool holder shown.

CC○○-Inserts

L-F

(03,04)

PCBN/PCD

(03,04)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
C05-04SCLCR03-080	●	R	5	4	80	7	2.5	3.7	15°	0°	CC○○	03S1○○
C05-04SCLCL03-080	●	L	5	4	80	7	2.5	3.7	15°	0°		03S1○○
C06-05SCLCR03-080	●	R	6	5	80	9	3.0	4.7	13°	0°		03S1○○
C06-05SCLCL03-080	●	L	6	5	80	9	3.0	4.7	13°	0°		03S1○○
C07-06SCLCR04-090	●	R	7	6	90	9	3.5	5.7	13°	0°		04T0○○
C07-06SCLCL04-090	●	L	7	6	90	9	3.5	5.7	13°	0°		04T0○○
C08-07SCLCR04-090	●	R	8	7	90	10	4.0	6.7	11°	0°		04T0○○
C08-07SCLCL04-090	●	L	8	7	90	10	4.0	6.7	11°	0°		04T0○○

28 Vc

SPARE PARTS

Boring bar type	Clamp screw *	Wrench
C○○-○○SCLCR/L03	TS16	TKY06F
C○○-○○SCLCR/L04	TS21	TKY06F

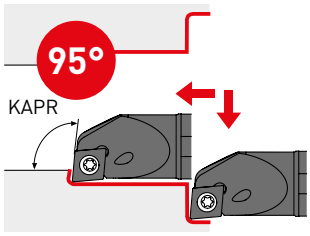
* Clamp Torque (Nm) : TS16 = 0.6, TS21 = 0.6

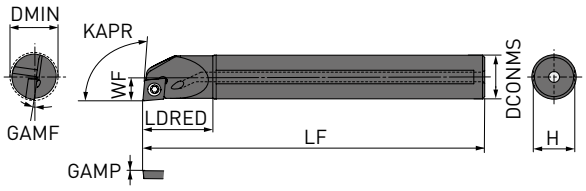
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

C-SCLC-C

CARBIDE SHANK BORING BAR WITH COOLANT HOLE





Right hand tool holder shown.

CC○○-Inserts

FS	FS-P	LS	LS-P
			
(06,09)	(06,09)	(06,09)	(06,09)
MP	MM	Flat Top	PCBN/PCD
			
(06,09)	(06,09)	(06,09)	(04,06,09)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number
C09-08SCLCR04-090-C	●	R	9	8	90	14	4.5	7	10°	0°	04T0○○
C10-08SCLCR04-090-C	●	R	10	8	90	14	5.0	7	9°	0°	04T0○○
C10-08SCLCR06-140-C	●	R	10	8	140	14	5.0	7	9°	0°	0602○○
C10-08SCLCL06-140-C	●	L	10	8	140	14	5.0	7	9°	0°	0602○○
C12-10SCLCR06-140-C	●	R	12	10	140	18	6.0	9	12°	0°	0602○○
C12-10SCLCL06-140-C	●	L	12	10	140	18	6.0	9	12°	0°	0602○○
C14-12SCLCR06-140-C	●	R	14	12	140	23	7.0	11	10°	0°	CC○○ 0602○○
C14-12SCLCL06-140-C	●	L	14	12	140	23	7.0	11	10°	0°	0602○○
C18-16SCLCR09-180-C	●	R	18	16	180	28	9.0	15	10°	0°	09T3○○
C18-16SCLCL09-180-C	●	L	18	16	180	28	9.0	15	10°	0°	09T3○○
C22-20SCLCR09-180-C	●	R	22	20	180	32	11.0	19	8°	0°	09T3○○
C27-25SCLCR09-180-C	★	R	27	25	180	38	13.5	24	6°	0°	09T3○○
C34-32SCLCR09-180-C	★	R	34	32	180	48	17.0	31	4°	0°	09T3○○

28 Vc

SPARE PARTS

Boring bar type	Clamp screw *	Wrench
C○○-○○SCLCR04	TS21	TKY06F
C○○-○○SCLCR/L06	TS25	TKY08F
C○○-○○SCLCR/L09	TS4	TKY15F

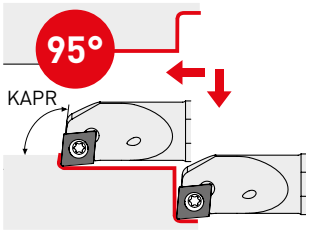
* Clamp Torque (Nm): TS21 = 0.6, TS25 = 1.0, TS4 = 3.5

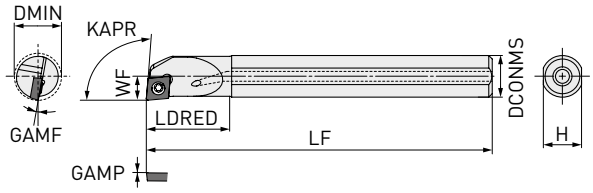
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

S-SCLC-C

STEEL SHANK BORING BAR WITH COOLANT HOLE





Right hand tool holder shown.

CC○○-Inserts

FS	FS-P	LS	LS-P
			
(06,09)	(06,09)	(06,09)	(06,09)
MP	MM	Flat Top	PCBN/PCD
			
(06,09)	(06,09)	(06,09)	(06,09)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
S14-12SCLCR06-090-C	●	R	14	12	90	24	7.0	11	10°	0°	CC○○	0602○○
S14-12SCLCL06-090-C	●	L	14	12	90	24	7.0	11	10°	0°		0602○○
S18-16SCLCR09-150-C	●	R	18	16	150	30	9.0	15	10°	0°		09T3○○
S18-16SCLCL09-150-C	●	L	18	16	150	30	9.0	15	10°	0°		09T3○○
S22-20SCLCR09-150-C	●	R	22	20	150	36	11.0	19	8°	0°		09T3○○
S22-20SCLCL09-150-C	●	L	22	20	150	36	11.0	19	8°	0°		09T3○○
S27-25SCLCR09-150-C	●	R	27	25	150	46	13.5	24	6°	0°		09T3○○
S27-25SCLCL09-150-C	●	L	27	25	150	46	13.5	24	6°	0°		09T3○○
S34-32SCLCR09-150-C	●	R	34	32	150	58	17.0	31	4°	0°		09T3○○
S34-32SCLCL09-150-C	★	L	34	32	150	58	17.0	31	4°	0°		09T3○○

1/1

28 Vc

SPARE PARTS

Boring bar type	Clamp screw *	Wrench
S14-12SCLCR/L06	TS25	TKY08F
S○○-○○SCLCR/L09	TS4	TKY15F

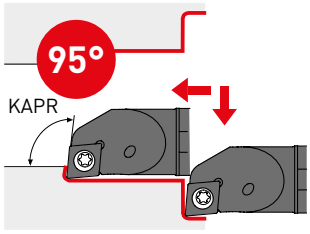
* Clamp Torque (Nm) : TS25 = 1.0, TS4 = 3.5

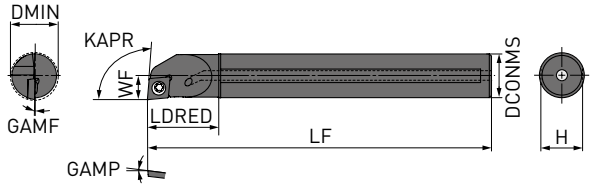
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

C-SCLP-C

CARBIDE SHANK BORING BAR WITH COOLANT HOLE





Right hand tool holder shown.

CP○○-Inserts

FV	FS	LM
		
(08,09)	(08,09)	(08,09)

MM	MS	PCBN/PCD
		
(08,09)	(08,09)	(08,09)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
C12-10SCLPR08-140-C	●	R	12	10	140	18	6.0	9	5°	5°	CP○○	0802○○
C12-10SCLPL08-140-C	●	L	12	10	140	18	6.0	9	5°	5°		0802○○
C14-12SCLPR08-140-C	●	R	14	12	140	23	7.0	11	4°	5°		0802○○
C14-12SCLPL08-140-C	●	L	14	12	140	23	7.0	11	4°	5°		0802○○
C16-12SCLPR09-140-C	●	R	16	12	140	23	8.0	11	4°	5°		0903○○
C16-12SCLPL09-140-C	●	L	16	12	140	23	8.0	11	4°	5°		0903○○
C18-16SCLPR09-180-C	●	R	18	16	180	28	9.0	15	3.5°	5°		0903○○
C18-16SCLPL09-180-C	●	L	18	16	180	28	9.0	15	3.5°	5°		0903○○
C22-20SCLPR09-180-C	●	R	22	20	180	32	11.0	19	2°	5°		0903○○
C22-20SCLPL09-180-C	●	L	22	20	180	32	11.0	19	2°	5°		0903○○
C27-25SCLPR09-180-C	★	R	27	25	180	38	13.5	24	0°	5°		0903○○
C30-25SCLPR09-180-C	★	R	30	25	180	38	15.0	24	0°	5°		0903○○

28 Vc

SPARE PARTS

Boring bar type	Clamp screw *	Wrench
C○○-○○SCLPR/L08	TS3D	TKY10F
C○○-○○SCLPR/L09	TS4D	TKY15F

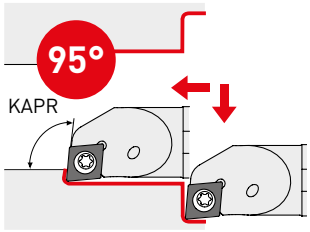
* Clamp Torque (Nm) : TS3D = 2.5, TS4D = 3.5
By changing the clamp screw, it is possible to use the inserts listed page 9 for details.

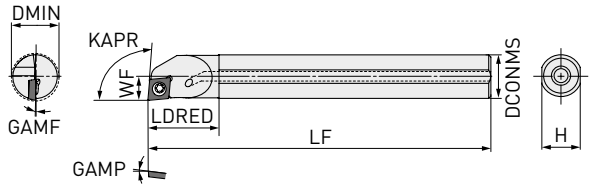
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

S-SCLP-C

STEEL SHANK BORING BAR WITH COOLANT HOLE





Right hand tool holder shown.

CP○○-Inserts

FV	FS	LM
		
(08,09)	(08,09)	(08,09)
MM	**MS**	**PCBN/PCD**
		
(08,09)	(08,09)	(08,09)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
S14-12SCLPR08-090-C	●	R	14	12	90	24	7.0	11	4°	5°	CP○○	0802○○
S14-12SCLPL08-090-C	●	L	14	12	90	24	7.0	11	4°	5°		0802○○
S16-12SCLPR09-090-C	★	R	16	12	90	24	8.0	11	4°	5°		0903○○
S16-12SCLPL09-090-C	★	L	16	12	90	24	8.0	11	4°	5°		0903○○
S18-16SCLPR09-150-C	★	R	18	16	150	30	9.0	15	3.5°	5°		0903○○
S18-16SCLPL09-150-C	★	L	18	16	150	30	9.0	15	3.5°	5°		0903○○
S22-20SCLPR09-150-C	★	R	22	20	150	36	11.0	19	2°	5°		0903○○
S22-20SCLPL09-150-C	★	L	22	20	150	36	11.0	19	2°	5°		0903○○
S27-25SCLPR09-150-C	★	R	27	25	150	46	13.5	24	0°	5°		0903○○
S27-25SCLPL09-150-C	★	L	27	25	150	46	13.5	24	0°	5°		0903○○
S30-25SCLPR09-150-C	●	R	30	25	150	46	15.0	24	0°	5°		0903○○
S30-25SCLPL09-150-C	★	L	30	25	150	46	15.0	24	0°	5°		0903○○

1/1

28 Vc

SPARE PARTS

Boring bar type	Clamp screw *	Wrench
S14-12SCLPR/L08	TS3D	TKY10F
S○○-○○SCLPR/L09	TS4D	TKY15F

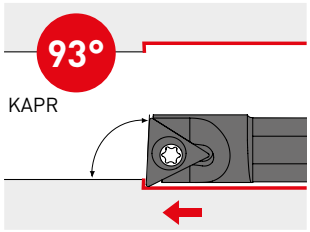
* Clamp Torque (Nm) : TS3D = 2.5, TS4D = 3.5
By changing the clamp screw, it is possible to use the inserts listed page 9 for details.

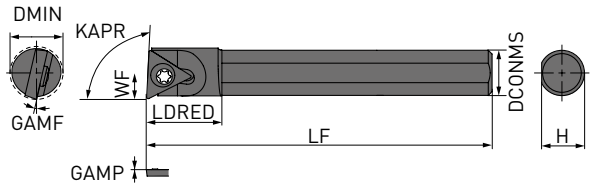
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

C-STUC

CARBIDE SHANK BORING BAR WITHOUT COOLANT HOLE





Right hand tool holder shown.

TC○○-Inserts

R/L-F

(06)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
C07-06STUCR06-090	●	R	7	6	90	10	3.5	5.7	13°	0°	TC○○	0601○○
C07-06STUCL06-090	●	L	7	6	90	10	3.5	5.7	13°	0°		0601○○
C08-07STUCR06-090	●	R	8	7	90	10	4.0	6.7	12°	0°		0601○○
C08-07STUCL06-090	●	L	8	7	90	10	4.0	6.7	12°	0°		0601○○

1/1

28 Vc

SPARE PARTS

Boring bar type	Clamp screw *	Wrench
C○○-○○STUCR/L06	TS2C	TKY06F

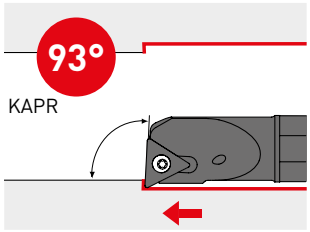
* Clamp Torque (Nm) : TS2C = 0.6

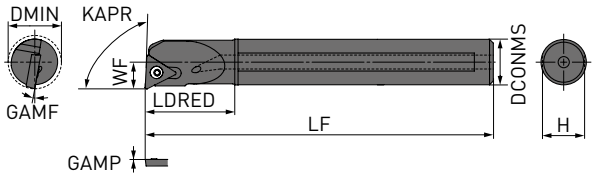
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

C-STUC-C

CARBIDE SHANK BORING BAR WITH COOLANT HOLE





Right hand tool holder shown.

TC○○-Inserts

FP	FM	LP	LM
			
(09,11,16)	(09,11,16)	(09,11,16)	(09,11,16)

MP	MM	Flat Top	PCBN/PCD
			
(09,11,16)	(09,11,16)	(11,16)	(06,09,11,16)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
C09-08STUCR06-090-C	●	R	9	8	90	14	4.5	7	11°	0°		0601○○
C10-08STUCR09-090-C	●	R	10	8	90	14	5.0	7	14°	0°		0902○○
C10-08STUCL09-090-C	●	L	10	8	90	14	5.0	7	14°	0°		0902○○
C12-10STUCR09-140-C	●	R	12	10	140	18	6.2	9	12°	0°		0902○○
C12-10STUCL09-140-C	●	L	12	10	140	18	6.2	9	12°	0°		0902○○
C14-12STUCR09-140-C	●	R	14	12	140	23	7.2	11	10°	0°		0902○○
C14-12STUCL09-140-C	●	L	14	12	140	23	7.2	11	10°	0°		0902○○
C18-16STUCR11-180-C	●	R	18	16	180	28	9.2	15	8°	0°	TC○○	1102○○
C18-16STUCL11-180-C	●	L	18	16	180	28	9.2	15	8°	0°		1102○○
C22-20STUCR11-180-C	●	R	22	20	180	32	11.2	19	6°	0°		1102○○
C22-20STUCL11-180-C	●	L	22	20	180	32	11.2	19	6°	0°		1102○○
C27-20STUCR11-180-C	●	R	27	20	180	32	13.5	19	5°	0°		1102○○
C27-20STUCL11-180-C	●	L	27	20	180	32	13.5	19	5°	0°		1102○○
C32-25STUCR16-180-C	●	R	32	25	180	38	17.0	24	5°	0°		16T3○○
C32-25STUCL16-180-C	★	L	32	25	180	38	17.0	24	5°	0°		16T3○○

1/1

28 Vc

SPARE PARTS

Boring bar type	Clamp screw *	Wrench
C09-08STUCR06	TS2C	TKY06F
C○○-○○STUCR/L09	TS22	TKY06F
C○○-○○STUCR/L11	TS25	TKY08F
C32-25STUCR/L16	TS4	TKY15F

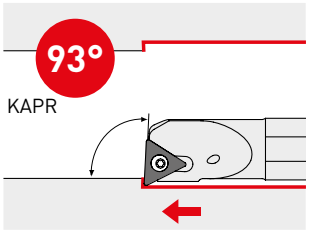
* Clamp Torque (Nm) : TS2C = 0.6, TS22 = 0.6, TS25 = 1.0, TS4 = 3.5

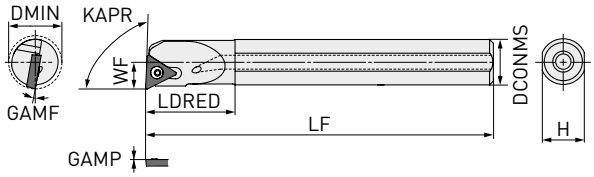
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

S-STUC-C

STEEL SHANK BORING BAR WITH COOLANT HOLE





Right hand tool holder shown.

TC○○-Inserts

FP	FM	LP	LM
			
(09,11,16)	(09,11,16)	(09,11,16)	(09,11,16)

MP	MM	Flat Top	PCBN/PCD
			
(09,11,16)	(09,11,16)	(11,16)	(09,11,16)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
S14-12STUCR09-090-C	●	R	14	12	90	24	7.2	11	10°	0°	TC○○	0902○○
S14-12STUCL09-090-C	●	L	14	12	90	24	7.2	11	10°	0°		0902○○
S18-16STUCR11-150-C	●	R	18	16	150	30	9.2	15	8°	0°		1102○○
S18-16STUCL11-150-C	●	L	18	16	150	30	9.2	15	8°	0°		1102○○
S22-20STUCR11-150-C	●	R	22	20	150	36	11.2	19	6°	0°		1102○○
S22-20STUCL11-150-C	●	L	22	20	150	36	11.2	19	6°	0°		1102○○
S27-20STUCR11-150-C	●	R	27	20	150	36	13.5	19	5°	0°		1102○○
S27-20STUCL11-150-C	●	L	27	20	150	36	13.5	19	5°	0°		1102○○
S32-25STUCR16-150-C	●	R	32	25	150	46	17.0	24	5°	0°		16T3○○
S32-25STUCL16-150-C	●	L	32	25	150	46	17.0	24	5°	0°		16T3○○
S40-32STUCR16-150-C	★	R	40	32	150	58	22.0	31	3°	0°		16T3○○
S40-32STUCL16-150-C	★	L	40	32	150	58	22.0	31	3°	0°		16T3○○

1/1

28 Vc

SPARE PARTS

Boring bar type	Clamp screw *	Wrench
S14-12STUCR/L09	TS22	TKY06F
S○○-○○STUCR/L11	TS25	TKY08F
S○○-○○STUCR/L16	TS4	TKY15F

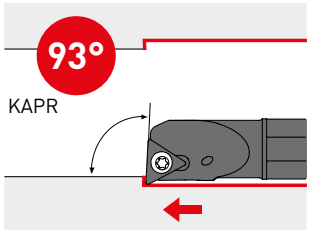
* Clamp Torque (Nm) : TS22 = 0.6, TS25 = 1.0, TS4 = 3.5

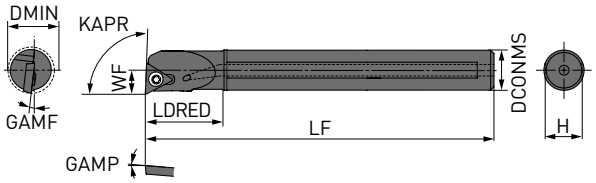
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

C-STUP-C

CARBIDE SHANK BORING BAR WITH COOLANT HOLE





Right hand tool holder shown.

TP○○-Inserts

FS	FV
	
(09,11)	(08,09,11)
PCBN/PCD	
LP	
	
(08,09,11)	(09,11)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
C10-08STUPR08-090-C	●	R	10	8	90	14	5.0	7	10°	5°	TP○○	0802○○
C10-08STUPL08-090-C	●	L	10	8	90	14	5.0	7	10°	5°		0802○○
C12-10STUPR09-140-C	●	R	12	10	140	18	6.2	9	8°	5°		0902○○
C12-10STUPL09-140-C	●	L	12	10	140	18	6.2	9	8°	5°		0902○○
C14-12STUPR09-140-C	●	R	14	12	140	23	7.2	11	7°	5°		0902○○
C14-12STUPL09-140-C	●	L	14	12	140	23	7.2	11	7°	5°		0902○○
C18-16STUPR11-180-C	●	R	18	16	180	28	9.2	15	3.5°	5°		1103○○
C18-16STUPL11-180-C	★	L	18	16	180	28	9.2	15	3.5°	5°		1103○○
C22-20STUPR11-180-C	●	R	22	20	180	32	11.2	19	2°	5°		1103○○
C22-20STUPL11-180-C	★	L	22	20	180	32	11.2	19	2°	5°		1103○○
C27-25STUPR11-180-C	★	R	27	25	180	38	13.7	24	0°	5°		1103○○
C27-25STUPL11-180-C	★	L	27	25	180	38	13.7	24	0°	5°		1103○○
C34-25STUPR11-180-C	★	R	34	25	180	38	17.2	24	0°	5°		1103○○
C34-25STUPL11-180-C	★	L	34	25	180	38	17.2	24	0°	5°		1103○○

28 Vc

SPARE PARTS

Boring bar type	Clamp screw *	Wrench
C10-08STUPR/L08	TS2D	TKY06F
C○○-○○STUPR/L09	TS25D	TKY08F
C○○-○○STUPR/L11	TS31D	TKY10F

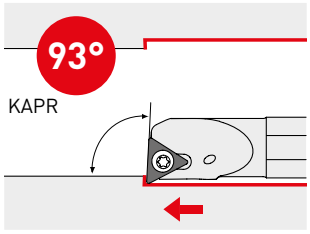
* Clamp Torque (Nm): TS2D = 0.6, TS25D = 1.6, TS31D = 2.5
By changing the clamp screw, it is possible to use the inserts listed page 9 for details.

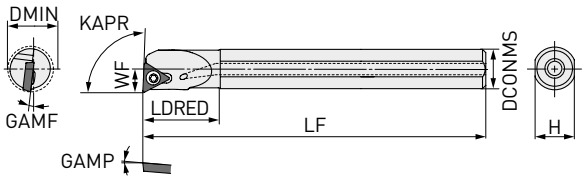
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

S-STUP-C

STEEL SHANK BORING BAR WITH COOLANT HOLE





Right hand tool holder shown.

TP○○-Inserts

FS	FV
	
(09,11)	(08,09,11)

LP	PCBN/PCD
	
(08,09,11)	(09,11)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
S14-12STUPR09-090-C	●	R	14	12	90	24	7.2	11	7°	5°	TP○○	0902○○
S14-12STUPL09-090-C	●	L	14	12	90	24	7.2	11	7°	5°		0902○○
S18-16STUPR11-150-C	●	R	18	16	150	30	9.2	15	3.5°	5°		1103○○
S18-16STUPL11-150-C	●	L	18	16	150	30	9.2	15	3.5°	5°		1103○○
S22-20STUPR11-150-C	★	R	22	20	150	36	11.2	19	2°	5°		1103○○
S22-20STUPL11-150-C	★	L	22	20	150	36	11.2	19	2°	5°		1103○○
S27-25STUPR11-150-C	★	R	27	25	150	46	13.7	24	0°	5°		1103○○
S27-25STUPL11-150-C	★	L	27	25	150	46	13.7	24	0°	5°		1103○○
S34-25STUPR11-150-C	★	R	34	25	150	46	17.2	24	0°	5°		1103○○
S34-25STUPL11-150-C	★	L	34	25	150	46	17.2	24	0°	5°		1103○○

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28 Vc

SPARE PARTS

Boring bar type	Clamp screw *	Wrench
S14-12STUPR/L09	TS25D	TKY08F
S○○-○○STUPR/L11	TS31D	TKY10F

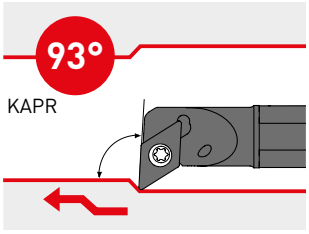
* Clamp Torque (Nm) : TS25D = 1.6, TS31D = 2.5
By changing the clamp screw, it is possible to use the inserts listed page 9 for details.

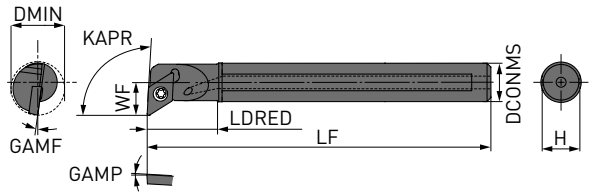
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

C-SDUC-C

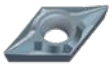
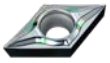
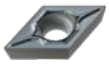
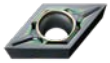
CARBIDE SHANK BORING BAR WITH COOLANT HOLE

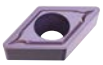
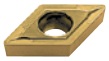
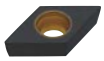




Right hand tool holder shown.

DC○○-Inserts

FS	FS-P	LS	LS-P
			
(07,11)	(07,11)	(07,11)	(07,11)

MP	MM	Standard	Flat Top
			
(07,11)	(07,11)	(07,11)	(07,11)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
C14-10SDUCR07-140-C	●	R	14	10	140	18	8.7	9	7.5°	3°	DC○○	0702○○
C14-10SDUCL07-140-C	●	L	14	10	140	18	8.7	9	7.5°	3°		0702○○
C16-12SDUCR07-180-C	●	R	16	12	180	23	9.7	11	6.5°	3°		0702○○
C16-12SDUCL07-180-C	●	L	16	12	180	23	9.7	11	6.5°	3°		0702○○
C20-16SDUCR07-180-C	●	R	20	16	180	28	11.7	15	5°	3°		0702○○
C20-16SDUCL07-180-C	●	L	20	16	180	28	11.7	15	5°	3°		0702○○
C23-16SDUCR07-180-C	●	R	23	16	180	28	14.5	15	5°	3°		0702○○
C23-16SDUCL07-180-C	●	L	23	16	180	28	14.5	15	5°	3°		0702○○
C27-20SDUCR11-180-C	●	R	27	20	180	32	16.5	19	5°	3°		11T3○○
C27-20SDUCL11-180-C	●	L	27	20	180	32	16.5	19	5°	3°		11T3○○
C32-25SDUCR11-180-C	●	R	32	25	180	38	19.0	24	5°	3°		11T3○○
C32-25SDUCL11-180-C	★	L	32	25	180	38	19.0	24	5°	3°		11T3○○

1/1

28 Vc

SPARE PARTS

Boring bar type	Clamp screw *	Wrench
C○○-○○SDUCR/L07	TS25	TKY08F
C○○-○○SDUCR/L11	TS4	TKY15F

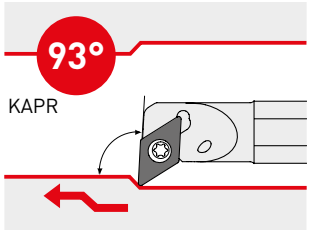
* Clamp Torque (Nm) : TS25 = 1.0, TS4 = 3.5

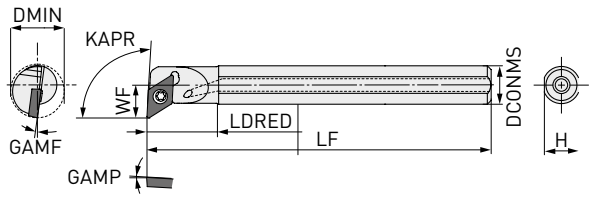
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

S-SDUC-C

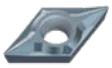
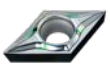
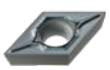
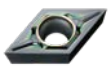
STEEL SHANK BORING BAR WITH COOLANT HOLE

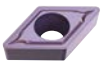
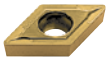
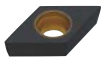




Right hand tool holder shown.

DC○○-Inserts

FS	FS-P	LS	LS-P
			
(07,11)	(07,11)	(07,11)	(07,11)

MP	MM	Standard	Flat Top
			
(07,11)	(07,11)	(07,11)	(07,11)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
S16-12SDUCR07-150-C	●	R	16	12	150	21	9.7	11	6.5°	3°	DC○○	0702○○
S16-12SDUCL07-150-C	●	L	16	12	150	21	9.7	11	6.5°	3°		0702○○
S20-16SDUCR07-150-C	●	R	20	16	150	21	11.7	15	5°	3°		0702○○
S20-16SDUCL07-150-C	●	L	20	16	150	21	11.7	15	5°	3°		0702○○
S23-16SDUCR07-150-C	●	R	23	16	150	21	14.5	15	5°	3°		0702○○
S23-16SDUCL07-150-C	●	L	23	16	150	21	14.5	15	5°	3°		0702○○
S27-20SDUCR11-150-C	●	R	27	20	150	23	16.5	19	5°	3°		11T3○○
S27-20SDUCL11-150-C	●	L	27	20	150	23	16.5	19	5°	3°		11T3○○
S32-25SDUCR11-150-C	●	R	32	25	150	24	19.0	24	5°	3°		11T3○○
S32-25SDUCL11-150-C	●	L	32	25	150	24	19.0	24	5°	3°		11T3○○

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28 Vc

SPARE PARTS

Boring bar type	Clamp screw *	Wrench
S○○-○○SDUCR/L07	TS25	TKY08F
S○○-○○SDUCR/L11	TS4	TKY15F

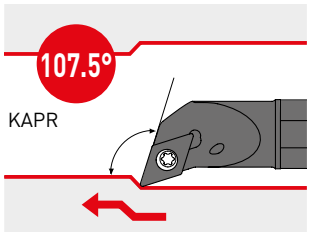
* Clamp Torque (Nm) : TS25 = 1.0, TS4 = 3.5

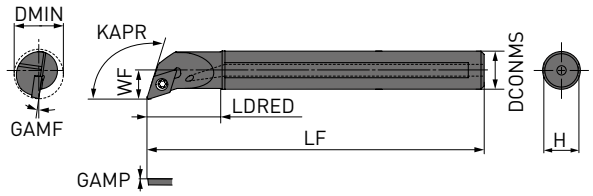
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

C-SDQC-C

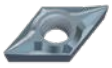
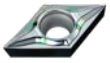
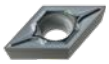
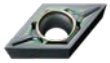
CARBIDE SHANK BORING BAR WITH COOLANT HOLE

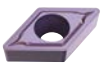
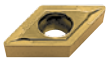
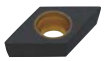




Right hand tool holder shown.

DC○○-Inserts

FS	FS-P	LS	LS-P
			
(07,11)	(07,11)	(07,11)	(07,11)

MP	MM	Standard	Flat Top
			
(07,11)	(07,11)	(07,11)	(07,11)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
C13-10SDQCR07-140-C	●	R	13	10	140	18	7.5	9	10°	0°	DC○○	0702○○
C13-10SDQCL07-140-C	●	L	13	10	140	18	7.5	9	10°	0°		0702○○
C16-12SDQCR07-140-C	●	R	16	12	140	23	9.25	11	8°	0°		0702○○
C16-12SDQCL07-140-C	●	L	16	12	140	23	9.25	11	8°	0°		0702○○
C20-16SDQCR07-180-C	●	R	20	16	180	28	11.3	15	6°	0°		0702○○
C20-16SDQCL07-180-C	●	L	20	16	180	28	11.3	15	6°	0°		0702○○
C23-16SDQCR07-180-C	●	R	23	16	180	28	12.8	15	5°	0°		0702○○
C23-16SDQCL07-180-C	●	L	23	16	180	28	12.8	15	5°	0°		0702○○
C25-20SDQCR11-180-C	●	R	25	20	180	32	14.4	19	5°	0°		11T3○○
C25-20SDQCL11-180-C	●	L	25	20	180	32	14.4	19	5°	0°		11T3○○
C30-25SDQCR11-180-C	★	R	30	25	180	38	16.9	24	4°	0°		11T3○○
C30-25SDQCL11-180-C	★	L	30	25	180	38	16.9	24	4°	0°		11T3○○

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28 Vc

SPARE PARTS

Boring bar type	Clamp screw *	Wrench
C○○-○○SDQCR/L07	TS25	TKY08F
C○○-○○SDQCR/L11	TS4	TKY15F

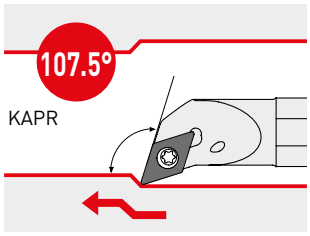
* Clamp Torque (Nm) : TS25 = 1.0, TS4 = 3.5

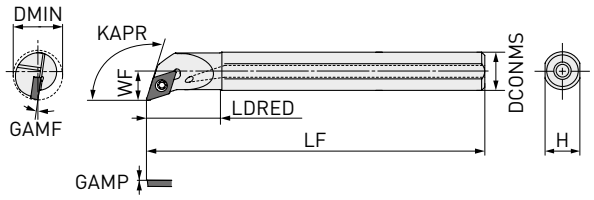
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

S-SDQC-C

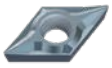
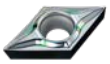
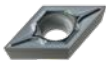
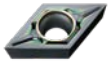
STEEL SHANK BORING BAR WITH COOLANT HOLE

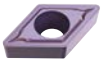
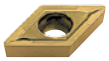
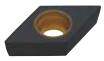




Right hand tool holder shown.

DC○○-Inserts

FS	FS-P	LS	LS-P
			
(07,11)	(07,11)	(07,11)	(07,11)

MP	MM	Standard	Flat Top
			
(07,11)	(07,11)	(07,11)	(07,11)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
S16-12SDQCR07-090-C	●	R	16	12	90	22	9.25	11	8°	0°	DC○○	0702○○
S16-12SDQCL07-090-C	●	L	16	12	90	22	9.25	11	8°	0°		0702○○
S20-16SDQCR07-150-C	●	R	20	16	150	25	11.3	15	6°	0°		0702○○
S20-16SDQCL07-150-C	●	L	20	16	150	25	11.3	15	6°	0°		0702○○
S23-16SDQCR07-150-C	●	R	23	16	150	25	12.8	15	5°	0°		0702○○
S23-16SDQCL07-150-C	●	L	23	16	150	25	12.8	15	5°	0°		0702○○
S25-20SDQCR11-150-C	●	R	25	20	150	31	14.4	19	5°	0°		11T3○○
S25-20SDQCL11-150-C	●	L	25	20	150	31	14.4	19	5°	0°		11T3○○
S30-25SDQCR11-150-C	●	R	30	25	150	38	16.9	24	4°	0°		11T3○○
S30-25SDQCL11-150-C	●	L	30	25	150	38	16.9	24	4°	0°		11T3○○

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28 Vc

SPARE PARTS

Boring bar type	 Clamp screw *	 Wrench
S○○-○○SDQCR/L07	TS25	TKY08F
S○○-○○SDQCR/L11	TS4	TKY15F

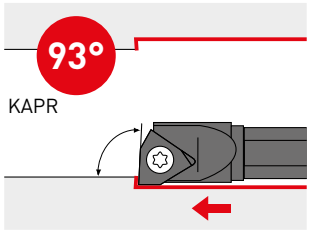
* Clamp Torque (Nm) : TS25 = 1.0, TS4 = 3.5

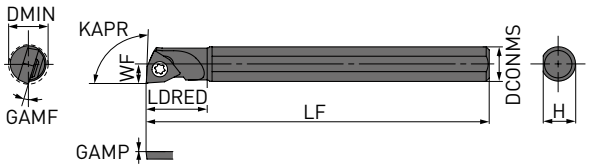
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

C-SWUC

CARBIDE SHANK BORING BAR WITHOUT COOLANT HOLE





Right hand tool holder shown.

WC○○-Inserts

FV

(02,L3)

PCBN/PCD

(L3)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
C06-05SWUCR02-080	●	R	6	5	80	9	3.0	4.7	17°	0°	WC○○	0201○○
C06-05SWUCL02-080	●	L	6	5	80	9	3.0	4.7	17°	0°		0201○○
C08-07SWUCRL3-090	●	R	8	7	90	10	4.0	6.7	15°	0°		L302○○
C08-07SWUCLL3-090	●	L	8	7	90	10	4.0	6.7	15°	0°		L302○○

1/1

28 Vc

SPARE PARTS

Boring bar type	Clamp screw *	Wrench
C06-05SWUCR/L02	TS21	TKY06F
C08-07SWUCR/LL3	TS2	TKY06F

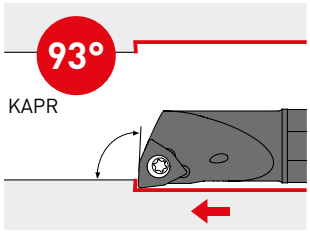
* Clamp Torque (Nm) : TS21 = 0.6, TS2 = 0.6

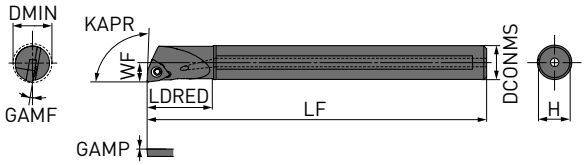
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

C-SWUC-C

CARBIDE SHANK BORING BAR WITH COOLANT HOLE





Right hand tool holder shown.

WC○○-Inserts

F

FV

(04,06)

M

MP

(04,06)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
C10-08SWUCR04-090-C	●	R	10	8	90	14	5.0	7	15°	0°	WC○○	0402○○
C10-08SWUCL04-090-C	●	L	10	8	90	14	5.0	7	15°	0°		0402○○
C12-10SWUCR04-090-C	●	R	12	10	90	18	6.0	9	12°	0°		0402○○
C12-10SWUCL04-090-C	●	L	12	10	90	18	6.0	9	12°	0°		0402○○
C14-12SWUCR04-140-C	●	R	14	12	140	23	7.0	11	10°	0°		0402○○
C14-12SWUCL04-140-C	●	L	14	12	140	23	7.0	11	10°	0°		0402○○
C16-12SWUCR06-140-C	●	R	16	12	140	23	8.0	11	12°	0°		06T3○○
C16-12SWUCL06-140-C	●	L	16	12	140	23	8.0	11	12°	0°		06T3○○
C18-16SWUCR06-140-C	●	R	18	16	140	28	9.0	15	10°	0°		06T3○○
C18-16SWUCL06-140-C	●	L	18	16	140	28	9.0	15	10°	0°		06T3○○
C22-20SWUCR06-180-C	●	R	22	20	180	32	11.0	19	7°	0°		06T3○○
C22-20SWUCL06-180-C	●	L	22	20	180	32	11.0	19	7°	0°		06T3○○

28 Vc

SPARE PARTS

Boring bar type	Clamp screw *	Wrench
C○○-○○SWUCR/L04	TS25	TKY08F
C○○-○○SWUCR/L06	TS4	TKY15F

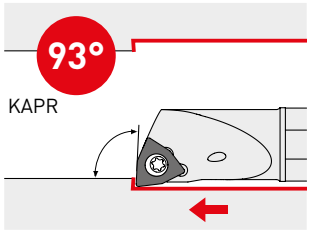
* Clamp Torque (Nm) : TS25 = 1.0, TS4 = 3.5

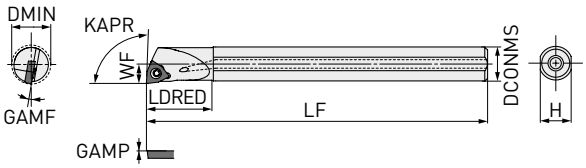
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

S-SWUC-C

STEEL SHANK BORING BAR WITH COOLANT HOLE





Right hand tool holder shown.

WC○○-Inserts

F

FV

(04,06)

M

MP

(04,06)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
S14-12SWUCR04-090-C	●	R	14	12	90	24	7.0	11	10°	0°	WC○○	0402○○
S14-12SWUCL04-090-C	●	L	14	12	90	24	7.0	11	10°	0°		0402○○
S16-12SWUCR06-090-C	●	R	16	12	90	24	8.0	11	12°	0°		06T3○○
S16-12SWUCL06-090-C	●	L	16	12	90	24	8.0	11	12°	0°		06T3○○
S18-16SWUCR06-090-C	●	R	18	16	90	30	9.0	15	10°	0°		06T3○○
S18-16SWUCL06-090-C	●	L	18	16	90	30	9.0	15	10°	0°		06T3○○
S22-20SWUCR06-150-C	●	R	22	20	150	36	11.0	19	7°	0°		06T3○○
S22-20SWUCL06-150-C	●	L	22	20	150	36	11.0	19	7°	0°		06T3○○

28 Vc

SPARE PARTS

Boring bar type	Clamp screw *	Wrench
S14-12SWUCR/L04	TS25	TKY08F
S○○-○○SWUCR/L06	TS4	TKY15F

* Clamp Torque (Nm) : TS25 = 1.0, TS4 = 3.5

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

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
	Carbon steel Alloy steel	180 – 280 HB	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 teel	—	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
	Soft magnetic stainless steel (X105CrMo17 / 1.4125, X42Cr13 / 1.2083, etc.)	230 HBW	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
	Precipitation hardened stainless steel (17-4PH / 1.4542, 17-7PH / X7CrNi-A117-7 / X5CrNi-CuNb17-4, etc.)	< 450 HB	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	Tensile strength < 350MPa	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

1. If chatter 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.

General Catalogue

CC TYPE INSERTS

80° WITH HOLE

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant alloy, titanium alloy

Order number	RE	Coated																						Coated Cermet				Cermet		Carbide						Shape
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTi20T	HTi05T	HTi10	TF15	
CCMT060202-FP	0.2	●	●	●	●	●		●																			●				●							FP
CCMT060204-FP	0.4	●	●	●	●	●		●																			●				●							
CCMT09T302-FP	0.2	●	●	●	●	★																					●				●							
CCMT09T304-FP	0.4	●	●	●	●	●		●																			●				●							
CCMT09T308-FP	0.8	●	●	●	●	★																					●				★							Finish cutting
CCMT060202-FM	0.2																						●															FM
CCMT060204-FM	0.4																						●															
CCMT09T302-FM	0.2																						●															
CCMT09T304-FM	0.4																						●															
CCMT09T308-FM	0.8																						●															Finish cutting
CCMT060202-FS	0.2																					●																FS
CCMT060204-FS	0.4																					●																
CCMT09T302-FS	0.2																					●																
CCMT09T304-FS	0.4																					●																
CCMT09T308-FS	0.8																					●																Finish cutting
CCGT060201M-FS	0.1*2																		●	●	●				●													FS
CCGT060202M-FS	0.2*2																		●	●	●				●													
CCGT060204M-FS	0.4*2																					●			●													
CCGT09T301M-FS	0.1*2																		●	●	●				●													
CCGT09T302M-FS	0.2*2																		●	●	●				●													
CCGT09T304M-FS	0.4*2																		●	●	●				●													Finish cutting
CCGT060201M-FS-P	0.1*2									●									●						●								●					FS-P
CCGT060202M-FS-P	0.2*2									●									●						●								●					
CCGT060204M-FS-P	0.4*2									●									●						●													
CCGT09T301M-FS-P	0.1*2									●									●						●								●					
CCGT09T302M-FS-P	0.2*2									●									●						●								●					
CCGT09T304M-FS-P	0.4*2									●									●						●								●					Finish cutting
CCMT060202-FV	0.2			●				●															●				●		●	●	●							FV
CCMT060204-FV	0.4			●				●															●				●		●	●	●							
CCMT09T302-FV	0.2			●				●																					●	●	★							
CCMT09T304-FV	0.4			●				●																			●		●	●	●							
CCMT09T308-FV	0.8			●				●																			●		●	●	★							Finish cutting
CCGT0602V5-FJ	0.05																						●															FJ
CCGT060201-FJ	0.1																						●															
CCGT060202-FJ	0.2																						●															
CCGT09T3V5-FJ	0.05																						●															
CCGT09T301-FJ	0.1																						●										●					
CCGT09T302-FJ	0.2																						●										●					
CCGT09T304-FJ	0.4																						●										●					Finish cutting

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*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.
(10 inserts in one case)

●: 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

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

CC TYPE INSERTS, 80° WITH HOLE

		Coated																						Coated Cermet				Cermet		Carbide					
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTI20T	HTI05T	HTI10	TF15
P	Steel	◐	●	◐	◶	❁	○	◶	❁														❁	✲	❁	◐	○	○	◶	○	◶			❁			○
M	Stainless steel									◐	●	◐	✲	○	✲				◐				◶	❁	✲	❁		○	○		○			❁			
K	Cast iron															●	●	✲					◶	❁				○	○		○			❁	○	◶	○
N	Non-ferrous metal																																			◶	○
S	Heat resistant alloy, titanium alloy																		●	●	◐	✲	◶	❁								●	◐			◶	

Order number		RE	Shape
CCGT060202-AZ		0.2	AZ
CCGT060204-AZ		0.4	
CCGT09T302-AZ		0.2	
CCGT09T304-AZ		0.4	Medium cutting ~ Finish cutting
CCGT09T308-AZ		0.8	
CCGT03S1V3L-F	*3	0.03	R/L-F
CCGT03S101L-F	*3	0.1	
CCGT03S102L-F	*3	0.2	
CCGT03S104L-F	*3	0.4	
CCGT04T0V3L-F	*3	0.03	
CCGT04T001L-F	*3	0.1	
CCGT04T002L-F	*3	0.2	
CCGT04T004L-F	*3	0.4	
CCGT03S101MR-F	*3	0.1*2	
CCGT03S101ML-F	*3	0.1*2	
CCGT03S102MR-F	*3	0.2*2	
CCGT03S102ML-F	*3	0.2*2	
CCGT03S104MR-F	*3	0.4*2	
CCGT03S104ML-F	*3	0.4*2	
CCGT04T001MR-F	*3	0.1*2	
CCGT04T001ML-F	*3	0.1*2	
CCGT04T002MR-F	*3	0.2*2	
CCGT04T002ML-F	*3	0.2*2	
CCGT04T004MR-F	*3	0.4*2	
CCGT04T004ML-F	*3	0.4*2	Finish cutting
CCGH060202R-F		0.2	R/L-F
CCGH060202L-F		0.2	
CCGH060204R-F		0.4	
CCGH060204L-F		0.4	
CCGH060202MR-F		0.2*2	
CCGH060202ML-F		0.2*2	
CCGH060204MR-F		0.4*2	
CCGH060204ML-F		0.4*2	Finish cutting
CCMT060202-LP		0.2	LP
CCMT060204-LP		0.4	
CCMT060208-LP		0.8	
CCMT09T304-LP		0.4	
CCMT09T308-LP		0.8	Light cutting

*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.
*3 Diameter of inscribed circle is special.

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

CC TYPE INSERTS, 80° WITH HOLE

		Coated																						Coated Cermet			Cermet		Carbide						
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTI20T	HTI05T	HTI10	TF15
P	Steel	◉	●	◉	◶	❁	○	◶	❁														❁	✲	❁	◉	○	○	◶	○	◶			❁			○
M	Stainless steel									◉	●	◉	✲	○	✲				◉				◶	❁	✲	❁		○	○		○			❁			
K	Cast iron															◉	●	✲					◶	❁				○	○		○			❁	○	◶	○
N	Non-ferrous metal																																			◶	○
S	Heat resistant alloy, titanium alloy																		◉	●	◉	✲	◶	❁								●	●			◶	

Order number	RE	Shape
CCMT060202-LM	0.2	LM
CCMT060204-LM	0.4	
CCMT060208-LM	0.8	
CCMT09T302-LM	0.2	
CCMT09T304-LM	0.4	
CCMT09T308-LM	0.8	Light cutting
CCMT060202-LS	0.2	LS
CCMT060204-LS	0.4	
CCMT09T302-LS	0.2	
CCMT09T304-LS	0.4	
CCMT09T308-LS	0.8	Light cutting
CCGT060201M-LS	0.1*2	LS
CCGT060202M-LS	0.2*2	
CCGT060204M-LS	0.4*2	
CCGT09T301M-LS	0.1*2	
CCGT09T302M-LS	0.2*2	
CCGT09T304M-LS	0.4*2	Light cutting
CCGT0602V5M-LS-P	0.05*2	LS-P
CCGT060201M-LS-P	0.1*2	
CCGT060202M-LS-P	0.2*2	
CCGT060204M-LS-P	0.4*2	
CCGT09T301M-LS-P	0.1*2	
CCGT09T302M-LS-P	0.2*2	
CCGT09T304M-LS-P	0.4*2	Light cutting
CCMH060202-SV	0.2	SV
CCMH060204-SV	0.4	
		Light cutting
CCMT060202-SW	0.2	SW*
CCMT060204-SW	0.4	
CCMT060208-SW	0.8	
CCMT09T302-SW	0.2	
CCMT09T304-SW	0.4	Light cutting (Wiper)
CCMT09T308-SW	0.8	

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*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.
(10 inserts in one case)

●: 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

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

CC TYPE INSERTS, 80° WITH HOLE

		Coated																						Coated Cermet				Cermet		Carbide						
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTI20T	HTI05T	HTI10	TF15
P	Steel	◐	●	◐	◔	❁	○	◔	❁														❁	✲	❁	◐	○	○	◔	○	◔			❁			○
M	Stainless steel									◐	●	◐	✲	○	✲				◐				◔	❁	✲	❁		○	○		○			❁			
K	Cast iron															◐	◐	✲					◔	❁				○	○		○			❁	○	◔	○
N	Non-ferrous metal																																			◔	○
S	Heat resistant alloy, titanium alloy																		◐	●	◐	✲	◔	❁								●	◐			◔	

Order number	RE	Shape
CCGT0602V3R-SS	0.03	R/L-SS
CCGT0602V3L-SS	0.03	
CCGT060201R-SS	0.1	
CCGT060201L-SS	0.1	
CCGT060202R-SS	0.2	
CCGT060202L-SS	0.2	
CCGT09T3V3R-SS	0.03	
CCGT09T3V3L-SS	0.03	
CCGT09T301R-SS	0.1	
CCGT09T301L-SS	0.1	
CCGT09T302R-SS	0.2	
CCGT09T302L-SS	0.2	
CCGT060201MR-SS	0.1*2	
CCGT060201ML-SS	0.1*2	
CCGT060202MR-SS	0.2*2	
CCGT060202ML-SS	0.2*2	
CCGT09T301MR-SS	0.1*2	
CCGT09T301ML-SS	0.1*2	
CCGT09T302MR-SS	0.2*2	
CCGT09T302ML-SS	0.2*2	
CCGT09T304MR-SS	0.4*2	
CCGT09T304ML-SS	0.4*2	Light cutting
CCMT060202-MP	0.2	MP
CCMT060204-MP	0.4	
CCMT060208-MP	0.8	
CCMT09T302-MP	0.2	
CCMT09T304-MP	0.4	
CCMT09T308-MP	0.8	Medium cutting
CCMT060202-MM	0.2	MM
CCMT060204-MM	0.4	
CCMT060208-MM	0.8	
CCMT09T302-MM	0.2	
CCMT09T304-MM	0.4	
CCMT09T308-MM	0.8	Medium cutting
CCMT060202-MK	0.2	MK
CCMT060204-MK	0.4	
CCMT060208-MK	0.8	
CCMT09T302-MK	0.2	
CCMT09T304-MK	0.4	
CCMT09T308-MK	0.8	Medium cutting

*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.
(10 inserts in one case)

●: 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

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

CC TYPE INSERTS, 80° WITH HOLE

		Coated																						Coated Cermet				Cermet		Carbide						
P	Steel	◐	●	◐	◔	❁	○	◔	❁													❁	✲	❁	◐	○	○	◔	○	◔			❁			○
M	Stainless steel									◐	●	◐	✲	○	✲				◐			◔	❁	✲	❁		○	○		○				❁			
K	Cast iron															◐	◐	✲				◔	❁			○	○		○			❁	○	◔	○
N	Non-ferrous metal																																	◔	○	
S	Heat resistant alloy, titanium alloy																	◐	●	◐	✲	◔	❁							●	◐			◔		

Order number	RE	MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTI20T	HTI05T	HTI10	TF15	Shape
CCMT060202-MS	0.2																		●	●	●											●						MS
CCMT060204-MS	0.4																		●	●	●											●						
CCMT060208-MS	0.8																		●	●	●											●						
CCMT09T302-MS	0.2																		●	●	●																	
CCMT09T304-MS	0.4																		●	●	●											●						
CCMT09T308-MS	0.8																		●	●	●											●						Medium cutting
CCMT060202	0.2							●	●						●												●	★			●	●		●				Standard
CCMT060204	0.4						●	●	●						●								●				●	★			●	●		●				
CCMT060208	0.8							●	●						●								●								★			●				
CCMT09T302	0.2							●	●						●												●	★			●	●						
CCMT09T304	0.4						●	●	●						●								●				●	★			●	●		●				
CCMT09T308	0.8						●	●	●						●								●				●	★			●	●		●				Medium cutting
CCMH060202-MV	0.2			●		●			●						●								●				●	★		★	★	★						MV
CCMH060204-MV	0.4			●		●			●					●	●		★						●				●	★		●	●	●						
																																						Medium cutting
CCMT060204-MW	0.4		●	●	●	●			●																		●		★		●							MW
CCMT060208-MW	0.8		●	●	●	●		●	●																		★		★		●							
CCMT09T304-MW	0.4		●	●	●	●		●	●					●													●		★		●							
CCMT09T308-MW	0.8		●	●	●	●		●	●					●													●		★		●							Medium cutting (Wiper)
CCET0602V3R-SR	0.03*2																						★								★					★		R/L-SR
CCET0602V3L-SR	0.03*2																						●								★					★		
CCET060201R-SR	0.1*2																						★								★					★		
CCET060201L-SR	0.1*2																						★								★					★		
CCET060202R-SR	0.2*2																						★								★					★		
CCET060202L-SR	0.2*2																						●								★					★		
CCET060204R-SR	0.4*2																						★								★					★		
CCET060204L-SR	0.4*2																						●								★					★		
CCET09T3V3R-SR	0.03*2																						★								★					★		
CCET09T3V3L-SR	0.03*2																						●								★					★		
CCET09T301R-SR	0.1*2																						●								★					★		
CCET09T301L-SR	0.1*2																						●								★					★		
CCET09T302R-SR	0.2*2																						★								★					★		
CCET09T302L-SR	0.2*2																						●								★					★		
CCET09T304R-SR	0.4*2																						●								★					★		
CCET09T304L-SR	0.4*2																						●								★					★		Medium cutting

5/8

*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.
(10 inserts in one case)

●: 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

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

CC TYPE INSERTS, 80° WITH HOLE

		Coated																						Coated Cermet				Cermet		Carbide						
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTi20T	HTi05T	HTi10	TF15
P	Steel	●	●	●	◶	❁	○	◶	❁														❁	❁	❁	●	○	○	◶	○	◶			❁			○
M	Stainless steel									●	●	●	❁	○	❁				●				◶	❁	❁		○	○		○				❁			
K	Cast iron															●	●	❁					◶	❁			○	○		○				❁	○	◶	○
N	Non-ferrous metal																																			◶	○
S	Heat resistant alloy, titanium alloy																		●	●	●	❁	◶	❁								●	●			◶	

Order number	RE	Shape
CCGT060201M-SMG	0.1*2	SMG
CCGT060202M-SMG	0.2*2	
CCGT060204M-SMG	0.4*2	
CCGT09T301M-SMG	0.1*2	
CCGT09T302M-SMG	0.2*2	
CCGT09T304M-SMG	0.4*2	Medium cutting
CCGT0602V3R-SN	0.03	R/L-SN
CCGT060201R-SN	0.1	
CCGT060201L-SN	0.1	
CCGT060202R-SN	0.2	
CCGT060202L-SN	0.2	
CCGT09T3V3R-SN	0.03	
CCGT09T3V3L-SN	0.03	
CCGT09T301R-SN	0.1	
CCGT09T301L-SN	0.1	
CCGT09T302R-SN	0.2	
CCGT09T302L-SN	0.2	
CCGT09T304R-SN	0.4	
CCGT09T304L-SN	0.4	
CCGT060201MR-SN	0.1*2	
CCGT060201ML-SN	0.1*2	
CCGT060202MR-SN	0.2*2	
CCGT060202ML-SN	0.2*2	
CCGT09T301MR-SN	0.1*2	
CCGT09T301ML-SN	0.1*2	
CCGT09T302MR-SN	0.2*2	
CCGT09T302ML-SN	0.2*2	
CCGT09T304MR-SN	0.4*2	
CCGT09T304ML-SN	0.4*2	Medium cutting

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*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.
(10 inserts in one case)

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

CC TYPE INSERTS, 80° WITH HOLE

		Coated																				Coated Cermet				Cermet		Carbide					
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTI20T	HTI05T	HTI10	TF15
P	Steel	◐	●	◐	◔	❁	○	◔	❁														❁	✣	❁	◐	○	○	◔	○	◔			❁			○
M	Stainless steel									◐	●	◐	✣	○	✣				◐				◔	❁	✣	❁		○	○		○			❁			
K	Cast iron															◐	◐	✣					◔	❁			○	○		○				❁	○	◔	○
N	Non-ferrous metal																																			◔	○
S	Heat resistant alloy, titanium alloy																		◐	●	◐	✣	◔	❁								●	◐			◔	

Order number	RE	Shape
CCET060200R-SN	0.0*2	R/L-SN
CCET060200L-SN	0.0*2	
CCET0602V3R-SN	0.03*2	
CCET0602V3L-SN	0.03*2	
CCET060201R-SN	0.1*2	
CCET060201L-SN	0.1*2	
CCET060202R-SN	0.2*2	
CCET060202L-SN	0.2*2	
CCET060204R-SN	0.4*2	
CCET060204L-SN	0.4*2	
CCET09T300R-SN	0.0*2	
CCET09T300L-SN	0.0*2	
CCET09T3V3R-SN	0.03*2	
CCET09T3V3L-SN	0.03*2	
CCET09T301R-SN	0.1*2	
CCET09T301L-SN	0.1*2	
CCET09T302R-SN	0.2*2	
CCET09T302L-SN	0.2*2	
CCET09T304R-SN	0.4*2	
CCET09T304L-SN	0.4*2	Medium cutting
CCET0602V3RW-SN	0.03*2	R/LW-SN
CCET0602V3LW-SN	0.03*2	
CCET09T3V3RW-SN	0.03*2	
CCET09T3V3LW-SN	0.03*2	Medium cutting (Wiper)

*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.
(10 inserts in one case)

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

CC TYPE INSERTS, 80° WITH HOLE

		Coated																						Coated Cermet				Cermet		Carbide					
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTI20T	HTI05T	HTI10	TF15
P	Steel	◐	●	◐	◶	❁	○	◶	❁														❁	✣	❁	◐	○	○	◶	○	◶			❁			○
M	Stainless steel									◐	●	◐	✣	○	✣				◐				◶	❁	✣	❁		○	○		○			❁			
K	Cast iron															◐	◐	✣					◶	❁				○	○		○			❁	○	◶	○
N	Non-ferrous metal																																		◶	○	
S	Heat resistant alloy, titanium alloy																		◐	●	◐	✣	◶	❁								●	◐		◶		
Order number	**RE**																																				
CCMW060202	0.2																																			●	
CCMW060204	0.4															●	●	★																●		●	
CCMW060208	0.8															★	●	★																			
CCMW09T304	0.4															●	●	●																		●	
CCMW09T308	0.8															●	●	●																●		●	
CCMW09T312	1.2															★	●	★																			
CCGW060200	0.0																													★							
CCGW0602V5	0.05																													●							
CCGW060201	0.1																																			★	
CCGW060202	0.2																																			★	
CCGW060204	0.4																																				
CCGW060208	0.8																																				
CCGW09T300	0.0																													●						★	
CCGW09T3V5	0.05																													●							
CCGW09T301	0.1																																			★	
CCGW09T302	0.2																																			★	
CCGW09T304	0.4																																			★	
CCGW060202E	0.2																																				
CCGW060204E	0.4																																				
CCGW060208E	0.8																																				

Flat Top

Flat Top

8/8

*1 To be replaced by new products.
(10 inserts in one case)

●: 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

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

CP TYPE INSERTS

80° WITH HOLE

		Coated																							Coated Cermet				Cermet		Carbide						
Order number	RE	MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTi20T	HTi05T	HTi10	TF15	Shape
CPMH080202-FM	0.2																							●														FM
CPMH080204-FM	0.4																							●														
CPMH090302-FM	0.2																							●														
CPMH090304-FM	0.4																							●														
CPMH090308-FM	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
CPGT080202	0.2																																			●			Standard
CPGT080204	0.4																																			●			
CPGT090302	0.2																																			★			
CPGT090304	0.4																																			●			Finish cutting
CPMH080204R-F	0.4																							●							★					★		R/L-F
CPMH080204L-F	0.4																							●							★					★		
CPMH090304R-F	0.4																							●							★					★		
CPMH090304L-F	0.4																							●			★				★					★		Finish cutting
CPGT080204R-F	0.4																														★							R/L-F
CPGT080204L-F	0.4																														★							
CPGT090302R-F	0.2																														★							
CPGT090302L-F	0.2																														★							
CPGT090304R-F	0.4																														★							
CPGT090304L-F	0.4																														★							Finish cutting

1/3

*1 To be replaced by new products.
(10 inserts in one case)

●: 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

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

CP TYPE INSERTS, 80° WITH HOLE

		Coated																						Coated Cermet				Cermet		Carbide						
P	Steel	●	●	●	○	◎	○	○	◎													◎	◎	◎		○	○	○	○	○	◎			◎			○
M	Stainless steel									●	●	●	◎	○	◎				●				◎	◎			○	○		○				◎			
K	Cast iron															●	●	◎					◎	◎			○	○		○			◎	◎	◎	○
N	Non-ferrous metal																																◎	○		
S	Heat resistant alloy, titanium alloy																		●	●	●	◎	◎							●	●			◎		

Order number	RE	MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTi20T	HTi05T	HTi10	TF15	Shape
CPMH080202-LP	0.2			●																																		LP
CPMH080204-LP	0.4			●																																		
CPMH090302-LP	0.2			●																																		
CPMH090304-LP	0.4			★																																		
CPMH090308-LP	0.8			★																																		Light cutting
CPMH080204-LM	0.4										●	●												●														LM
CPMH080208-LM	0.8										●	●												●														
CPMH090304-LM	0.4										●	●												●														
CPMH090308-LM	0.8										●	●												●														
																																						Light cutting
CPMH080204-LS	0.4																					●																LS
CPMH080208-LS	0.8																					●																
CPMH090304-LS	0.4																					●																
CPMH090308-LS	0.8																					●																
																																						Light cutting
CPMH080202-SV	0.2					●		●							●									●			★		★	●	★							SV
CPMH080204-SV	0.4					●		●							●									●			●		●	●	★							
CPMH090302-SV	0.2					●		●							●									●			★		★	★	★							
CPMH090304-SV	0.4					●		●							●									●			★		●	●	★							
CPMH090308-SV	0.8					●		●							●									●			★		★	●	★							Light cutting
CPMH080204	0.4		★	●																																		Standard
CPMH080208	0.8		★	●																																		
CPMH090304	0.4		★	●																																		
CPMH090308	0.8		★	●																																		
																																						Medium cutting
CPMX080204	0.4						★																		★													Standard
CPMX080208	0.8						★																		★													
CPMX090304	0.4						★																		★					★			★					
CPMX090308	0.8						★	★																	★								★					
																																						Medium cutting

*1 To be replaced by new products.
(10 inserts in one case)

●: 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

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

CP TYPE INSERTS, 80° WITH HOLE

		Coated																						Coated Cermet				Cermet		Carbide						
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTI20T	HTI05T	HTI10	TF15
P	Steel	◉	●	◉	◔	❁	○	◔	❁														❁	✲	❁	◉	○	○	◔	○	◔			❁			○
M	Stainless steel									◉	●	◉	✲	○	✲				◉				◔	❁	✲	❁		○	○		○			❁			
K	Cast iron															◉	◉	✲					◔	❁			○	○		○			❁	○	◔	○
N	Non-ferrous metal																																		◔	○
S	Heat resistant alloy, titanium alloy																		●	●	◉	✲	◔	❁								●	◉		◔		

Order number	RE	Shape
CPMH080204-MM	0.4	MM
CPMH080208-MM	0.8	
CPMH090304-MM	0.4	
CPMH090308-MM	0.8	
		Medium cutting
CPMH080204-MK	0.4	MK
CPMH080208-MK	0.8	
CPMH090304-MK	0.4	
CPMH090308-MK	0.8	
		Medium cutting
CPMH080204-MS	0.4	MS
CPMH080208-MS	0.8	
CPMH090304-MS	0.4	
CPMH090308-MS	0.8	
		Medium cutting
CPMH080204-MV	0.4	MV
CPMH080208-MV	0.8	
CPMH090304-MV	0.4	
CPMH090308-MV	0.8	
		Medium cutting
CPMB080202	0.2	Flat Top
CPMB080204	0.4	
CPMB080208	0.8	
CPMB090302	0.2	
CPMB090304	0.4	
CPMB090308	0.8	

3/3

*1 To be replaced by new products.
(10 inserts in one case)

●: 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

● : 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

Order number	RE	Coated																						Coated Cermet				Cermet		Carbide					Shape
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTi20T	HTi05T	HTi10	TF15	
DCMT070202-FP	0.2	●	●	●	●		●																			●				●							FP
DCMT070204-FP	0.4	●	●	●	●		●																			●				●							
DCMT11T302-FP	0.2	●	●	●	●		●																			●				●							
DCMT11T304-FP	0.4	●	●	●	●		●																			●				●							
DCMT11T308-FP	0.8	●	●	●	●		●																			●				●							Finish cutting
DCMT070202-FM	0.2																						●	●													FM
DCMT070204-FM	0.4																						●	●													
DCMT11T302-FM	0.2																						●	●													
DCMT11T304-FM	0.4																						●	●													
DCMT11T308-FM	0.8																						●	●													Finish cutting
DCMT070202-FS	0.2																					●															FS
DCMT070204-FS	0.4																					●															
DCMT11T302-FS	0.2																					●															
DCMT11T304-FS	0.4																					●															
DCMT11T308-FS	0.8																					●															Finish cutting
DCGT070201M-FS	0.1*2																		●	●	●			●													FS
DCGT070202M-FS	0.2*2																		●	●	●			●													
DCGT070204M-FS	0.4*2																		●	●	●			●													
DCGT11T301M-FS	0.1*2																		●	●	●			●													
DCGT11T302M-FS	0.2*2																		●	●	●			●													
DCGT11T304M-FS	0.4*2																		●	●	●			●													Finish cutting
DCGT070201M-FS-P	0.1*2									●									●					●								●					FS-P
DCGT070202M-FS-P	0.2*2									●									●					●								●					
DCGT070204M-FS-P	0.4*2									●									●					●								●					
DCGT11T301M-FS-P	0.1*2									●									●					●								●					
DCGT11T302M-FS-P	0.2*2									●									●					●								●					
DCGT11T304M-FS-P	0.4*2									●									●					●								●					Finish cutting
DCMT070202-FV	0.2	●	●				●	●														●		●	●		●			●	●						FV
DCMT070204-FV	0.4	●	●				●	●														●		●	●		●			●	●						
DCMT070208-FV	0.8		●					★																●							★	★						
DCMT11T302-FV	0.2		●					●																●							●	★						
DCMT11T304-FV	0.4	●	●				●	●														●		●	●		●			●	●						
DCMT11T308-FV	0.8	●	●				●	●														●		●	●		●			●	★						Finish cutting
DCGT070202-AZ	0.2																																		●		AZ
DCGT070204-AZ	0.4																																		●		
DCGT11T302-AZ	0.2																																		●		
DCGT11T304-AZ	0.4																																		●		
DCGT11T308-AZ	0.8																																		●		Medium cutting ~ Finish cutting

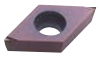
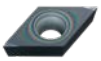
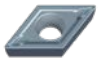
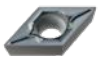
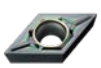
*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.
(10 inserts in one case)

●: 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
● : 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

Order number	RE	Coated																						Coated Cermet				Cermet		Carbide					Shape
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTI20T	HTI05T	HTI10	TF15	
DCGT070202R-F	0.2																						●							●						★		R/L-F
DCGT070202L-F	0.2																						●				★			●						★		
DCGT070204R-F	0.4																						●							●						★		
DCGT070204L-F	0.4																						●				★			●						★		
DCGT11T302R-F	0.2																						●							●						★		
DCGT11T302L-F	0.2																						●				★			●						★		
DCGT11T304R-F	0.4																						●							●						★		
DCGT11T304L-F	0.4																						●				★			●						★		Finish cutting
DCGT11T301MR-SRF	0.1*2									●									●																			R-SRF
DCGT11T302MR-SRF	0.2*2									●									●																			
DCGT11T304MR-SRF	0.4*2									●									●																			
																																						Finish cutting
DCMT070202-LP	0.2		●																																			LP
DCMT070204-LP	0.4	●	●	●	●		●																			★				●								
DCMT070208-LP	0.8	●	●	●	●		★																			★				★								
DCMT11T302-LP	0.2	●	●																																			
DCMT11T304-LP	0.4	●	●	●	●		●																			●				●								
DCMT11T308-LP	0.8	●	●	●	●		●																			●				★								Light cutting
DCMT070202-LM	0.2										●	●												●														LM
DCMT070204-LM	0.4										●	●	●										●	●														
DCMT070208-LM	0.8										●	●	●										★	●														
DCMT11T302-LM	0.2										●	●												●														
DCMT11T304-LM	0.4										●	●	●										●	●														
DCMT11T308-LM	0.8										●	●	●										●	●														Light cutting
DCMT070202-LS	0.2																			●	●	●										●						LS
DCMT070204-LS	0.4																			●	●	●										●						
DCMT070208-LS	0.8																					●																
DCMT11T302-LS	0.2																			●	●	●										●						
DCMT11T304-LS	0.4																			●	●	●										●						
DCMT11T308-LS	0.8																			●	●	●										●						Light cutting
DCGT070201M-LS	0.1*2																			●	●	●			●													LS
DCGT070202M-LS	0.2*2																			●	●	●			●													
DCGT070204M-LS	0.4*2																			●	●	●			●													
DCGT11T301M-LS	0.1*2																			●	●	●			●													
DCGT11T302M-LS	0.2*2																			●	●	●			●													
DCGT11T304M-LS	0.4*2																			●	●	●			●													Light cutting
DCGT0702V5M-LS-P	0.05*2																		●																			LS-P
DCGT070201M-LS-P	0.1*2	●								●									●													●						
DCGT070202M-LS-P	0.2*2	●								●									●													●						
DCGT070204M-LS-P	0.4*2	●								●									●													●						
DCGT11T301M-LS-P	0.1*2	●								●									●													●						
DCGT11T302M-LS-P	0.2*2	●								●									●													●						
DCGT11T304M-LS-P	0.4*2	●								●									●													●						Light cutting

2/6

*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.
(10 inserts in one case)

●: 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

● : 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

Order number	RE	Coated																				Coated Cermet			Cermet		Carbide					Shape
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTi20T	HTi05T	HTi10	TF15	
DCMT070202-SV	0.2							●							●								●						★	●	●							SV
DCMT070204-SV	0.4						●	●							●								●						●	●	●							
DCMT070208-SV	0.8						●	●							●								●						★	●	★							
DCMT11T302-SV	0.2						●	●							●								●						●	●	●							
DCMT11T304-SV	0.4						●	●							●								●						●	●	●							
DCMT11T308-SV	0.8						●	●							●								●						●	●	★							Light cutting
DCMX070202-SW	0.2																					●															SW
DCMX070204-SW	0.4																					●															
DCMX070208-SW	0.8																					●															
DCMX11T302-SW	0.2																					●															
DCMX11T304-SW	0.4																					●															
DCMX11T308-SW	0.8																					●															Light cutting
DCGT0702V3R-SS	0.03																						★														R/L-SS
DCGT0702V3L-SS	0.03																						★														
DCGT070201R-SS	0.1																						★														
DCGT070201L-SS	0.1																						●														
DCGT070202R-SS	0.2																						★														
DCGT070202L-SS	0.2																						★														
DCGT11T3V3R-SS	0.03																						●														
DCGT11T301R-SS	0.1																						●														
DCGT11T302R-SS	0.2																						●														
DCGT070201MR-SS	0.1*2	●																																			
DCGT070201ML-SS	0.1*2	●																																			
DCGT070202MR-SS	0.2*2	●																																			
DCGT070202ML-SS	0.2*2	●																																			
DCGT11T301MR-SS	0.1*2	●																																			
DCGT11T301ML-SS	0.1*2	●																																			
DCGT11T302MR-SS	0.2*2	●																																			
DCGT11T302ML-SS	0.2*2	●																																			
DCGT11T304MR-SS	0.4*2	●																																			
DCGT11T304ML-SS	0.4*2	●																																			Light cutting
DCMT070202-MP	0.2		●	●																																	MP
DCMT070204-MP	0.4		●	●	●	●		●																		●				★							
DCMT070208-MP	0.8		●	●	●	●		★																		★				★							
DCMT11T302-MP	0.2		●	●																																	
DCMT11T304-MP	0.4		●	●	●	●		●																		●				●							
DCMT11T308-MP	0.8		●	●	●	●		●																		●				★							
DCMT11T312-MP	1.2		●	●																																	Medium cutting
DCMT070202-MM	0.2										●	●												●														MM
DCMT070204-MM	0.4										●	●	●											●	●													
DCMT070208-MM	0.8										●	●	★											●	●													
DCMT11T302-MM	0.2										●	●													●													
DCMT11T304-MM	0.4										●	●	●											●	●													
DCMT11T308-MM	0.8										●	●	●											●	●													Medium cutting

3/6

*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.
(10 inserts in one case)

●: 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

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

DC TYPE INSERTS, 55° WITH HOLE

		Coated																				Coated Cermet				Cermet		Carbide						
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTI20T	HTI05T	HTI10	TF15
P	Steel	●	●	●	◔	❁	○	◔	❁														❁	❁	❁	●	○	○	◔	○	◔			❁			○
M	Stainless steel									●	●	●	❁	○	❁				●				◔	❁	❁		○	○		○				❁			
K	Cast iron															●	●	❁					◔	❁			○	○		○				❁	○	◔	○
N	Non-ferrous metal																																			◔	○
S	Heat resistant alloy, titanium alloy																		●	●	●	❁	◔	❁								●	●			◔	

Order number	RE	Shape
DCMT070202-MK	0.2	MK
DCMT070204-MK	0.4	
DCMT070208-MK	0.8	
DCMT11T302-MK	0.2	
DCMT11T304-MK	0.4	
DCMT11T308-MK	0.8	Medium cutting
DCMT070202-MS	0.2	MS
DCMT070204-MS	0.4	
DCMT070208-MS	0.8	
DCMT11T302-MS	0.2	
DCMT11T304-MS	0.4	
DCMT11T308-MS	0.8	
DCMT11T312-MS	1.2	Medium cutting
DCMT070202	0.2	Standard
DCMT070204	0.4	
DCMT070208	0.8	
DCMT11T302	0.2	
DCMT11T304	0.4	
DCMT11T308	0.8	
DCMT11T312	1.2	Medium cutting
DCMT070202-MV	0.2	MV
DCMT070204-MV	0.4	
DCMT070208-MV	0.8	
DCMT11T302-MV	0.2	
DCMT11T304-MV	0.4	
DCMT11T308-MV	0.8	Medium cutting
DCET0702V3R-SR	0.03*2	R/L-SR
DCET0702V3L-SR	0.03*2	
DCET070201R-SR	0.1*2	
DCET070201L-SR	0.1*2	
DCET070202R-SR	0.2*2	
DCET070202L-SR	0.2*2	
DCET070204R-SR	0.4*2	
DCET070204L-SR	0.4*2	
DCET11T3V3R-SR	0.03*2	
DCET11T3V3L-SR	0.03*2	
DCET11T301R-SR	0.1*2	
DCET11T301L-SR	0.1*2	
DCET11T302R-SR	0.2*2	
DCET11T302L-SR	0.2*2	
DCET11T304R-SR	0.4*2	
DCET11T304L-SR	0.4*2	Medium cutting

4/6

*1 To be replaced by new products.
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(10 inserts in one case)

●: 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

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

DC TYPE INSERTS, 55° WITH HOLE

		Coated																						Coated Cermet				Cermet		Carbide						
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTi20T	HTi05T	HTi10	TF15
P	Steel	●	●	●	◔	❁	○	◔	❁														❁	❁	❁	◔	○	○	◔	○	◔			❁			○
M	Stainless steel									◔	●	◔	❁	○	❁				◔				◔	❁	❁	❁		○	○		○				❁			
K	Cast iron															●	●	❁					◔	❁				○	○		○				❁	○	◔	○
N	Non-ferrous metal																																			◔	○
S	Heat resistant alloy, titanium alloy																		●	●	◔	❁	◔	❁								●	●			◔	

Order number	RE	Shape
DCGT070201M-SMG	0.1*2	SMG
DCGT070202M-SMG	0.2*2	
DCGT070204M-SMG	0.4*2	
DCGT11T301M-SMG	0.1*2	
DCGT11T302M-SMG	0.2*2	
DCGT11T304M-SMG	0.4*2	Medium cutting
DCGT0702V3R-SN	0.03	R/L-SN
DCGT070201R-SN	0.1	
DCGT070202R-SN	0.2	
DCGT070202L-SN	0.2	
DCGT11T3V3R-SN	0.03	
DCGT11T3V3L-SN	0.03	
DCGT11T301R-SN	0.1	
DCGT11T301L-SN	0.1	
DCGT11T302R-SN	0.2	
DCGT11T302L-SN	0.2	
DCGT11T304R-SN	0.4	
DCGT11T304L-SN	0.4	
DCGT070201MR-SN	0.1*2	
DCGT070201ML-SN	0.1*2	
DCGT070202MR-SN	0.2*2	
DCGT070202ML-SN	0.2*2	
DCGT070204MR-SN	0.4*2	
DCGT11T301MR-SN	0.1*2	
DCGT11T301ML-SN	0.1*2	
DCGT11T302MR-SN	0.2*2	
DCGT11T302ML-SN	0.2*2	
DCGT11T304MR-SN	0.4*2	
DCGT11T304ML-SN	0.4*2	Medium cutting

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*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.
(10 inserts in one case)

●: 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

● : 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

Order number	RE	Coated																						Coated Cermet				Cermet		Carbide					Shape
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTi20T	HTi05T	HTi10	TF15	
DCET070200R-SN	0.0*2																						●							★						★		R/L-SN
DCET070200L-SN	0.0*2																						★							★						★		
DCET0702V3R-SN	0.03*2																						●							★						★		
DCET0702V3L-SN	0.03*2																						★							★						★		
DCET070201R-SN	0.1*2																						●							★						★		
DCET070201L-SN	0.1*2																						●							★						★		
DCET070202R-SN	0.2*2																						●							★						★		
DCET070202L-SN	0.2*2																						●							★						★		
DCET070204R-SN	0.4*2																						★							★						★		
DCET070204L-SN	0.4*2																						●							★						★		
DCET11T300R-SN	0.0*2																						★							★						★		
DCET11T300L-SN	0.0*2																						★							★						★		
DCET11T3V3R-SN	0.03*2																						●							★						★		
DCET11T3V3L-SN	0.03*2																						★							★						★		
DCET11T301R-SN	0.1*2																						●							★						★		
DCET11T301L-SN	0.1*2																						●							★						★		
DCET11T302R-SN	0.2*2																						●							★						★		
DCET11T302L-SN	0.2*2																						●							★						★		
DCET11T304R-SN	0.4*2																						●							★						★		
DCET11T304L-SN	0.4*2																						●							★						★		Medium cutting
DCET0702V3RW-SN	0.03*2																						●															R/LW-SN
DCET0702V3LW-SN	0.03*2																						★															
DCET11T3V3RW-SN	0.03*2																						●															
DCET11T3V3LW-SN	0.03*2																						★															Medium cutting (Wiper)
DCMW070204	0.4															●	★	★																		●		Flat Top
DCMW11T304	0.4															●	●	★															★			●		
DCMW11T308	0.8															●	●	●																		●		
DCGW070200	0.0																													★								Flat Top
DCGW0702V5	0.05																													★								
DCGW070201	0.1																																			★		
DCGW070202	0.2																																			★		
DCGW11T300	0.0																													★								
DCGW11T3V5	0.05																													●								
DCGW11T301	0.1																																			★		
DCGW11T302	0.2																																			★		
DCGW11T304	0.4																																			★		

6/6

*1 To be replaced by new products.
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(10 inserts in one case)

●: 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

● : 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

Order number	RE	Coated																				Coated Cermet				Cermet		Carbide						Shape
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTi20T	HTi05T	HTi10	TF15	
TCMT090202-FP	0.2		●	★	●	●		★																		★				★							FP
TCMT090204-FP	0.4		●	●	●	●		★																		●				●							
TCMT110202-FP	0.2		●	★	●	●		★																		●				★							
TCMT110204-FP	0.4		●	●	●	●		●																		●				★							
TCMT16T304-FP	0.4		●	●	●	●		●																		●				●							Finish cutting
TCMT090202-FM	0.2																						★														FM
TCMT090204-FM	0.4																						●														
TCMT110202-FM	0.2																						●														
TCMT110204-FM	0.4																						●														
TCMT16T304-FM	0.4																						●														Finish cutting
TCMT110204-FV	0.4			●					●																		●		●	●	●						FV
TCMT16T304-FV	0.4			●					●																		●			●	●						
																																					Finish cutting
TCGT110202-AZ	0.2																																		●		AZ
TCGT110204-AZ	0.4																																		●		
TCGT110208-AZ	0.8																																		●		
TCGT16T302-AZ	0.2																																		●		
TCGT16T304-AZ	0.4																																		●		Medium cutting – Finish cutting
TCGT16T308-AZ	0.8																																		●		
TCGT0601V3L-F	0.03																													★							R/L-F
TCGT060101L-F	0.1																						●							●							
TCGT060102R-F	0.2																						★							★					★		
TCGT060102L-F	0.2																						●							●					★		
TCGT060104R-F	0.4																													●					★		
TCGT060104L-F	0.4																						●							●					★		
TCGT060101MR-F	0.1*2	●																																			
TCGT060101ML-F	0.1*2	●																																			
TCGT060102MR-F	0.2*2	●																																			
TCGT060102ML-F	0.2*2	●																																			
TCGT060104MR-F	0.4*2	●																																			
TCGT060104ML-F	0.4*2	●																																			Finish cutting
TCMT090204-LP	0.4		●	●	●	●		★																		●				★							LP
TCMT090208-LP	0.8		●	★	●	●		★																		★				★							
TCMT110204-LP	0.4		●	●	●	●		★																		★				●							
TCMT110208-LP	0.8		●	●	●	●		★																		★				★							
TCMT16T304-LP	0.4		●	●	●	●		★																		●				★							
TCMT16T308-LP	0.8		●	●	●	●		★																		★				★							Light cutting

*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.
(10 inserts in one case)

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

TC TYPE INSERTS, 60° WITH HOLE

		Coated																						Coated Cermet				Cermet		Carbide						
P	Steel	●	●	●	◶	❁	○	◶	❁													❁	✲	❁	●	○	○	◶	○	◶			❁		○	
M	Stainless steel									●	●	●	✲	○	✲				●			◶	❁	✲	❁		○	○		○				❁			
K	Cast iron														●	●	✲					◶	❁			○	○		○				❁	○	◶	○
N	Non-ferrous metal																																		◶	○
S	Heat resistant alloy, titanium alloy																	●	●	●	✲	◶	❁							●	●			◶		

Order number	RE	MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTI20T	HTI05T	HTI10	TF15	Shape
TCMT090204-LM	0.4											●	★											●														LM
TCMT090208-LM	0.8											★	★											★														
TCMT110204-LM	0.4											●	●											●														
TCMT110208-LM	0.8											●	●											●														
TCMT16T304-LM	0.4											●	★											●														
TCMT16T308-LM	0.8											●	★											●														Light cutting
TCMT110202-LK	0.2															●	●	●																				LK
TCMT110204-LK	0.4															●	●	●																				
TCMT110208-LK	0.8															●	●	●																				Light cutting
TCMT090202-LS	0.2																			●	●	●										●						LS
TCMT110202-LS	0.2																			●	●	●										●						
																																						Light cutting
TCMX090204-SW	0.4																					●																SW
TCMX110204-SW	0.4																					●																
																																						Light cutting (Wiper)
TCMT090204-MP	0.4		●	★	●	●		★																			★				★							MP
TCMT090208-MP	0.8		●	★	●	●		★																			★				★							
TCMT110202-MP	0.2		●	●																																		
TCMT110204-MP	0.4		●	★	●	●		●																			●				★							
TCMT110208-MP	0.8		●	★	●	●		★																			★				★							
TCMT16T304-MP	0.4		●	●	●	●		●																			★				★							
TCMT16T308-MP	0.8		●	●	●	●		●																			●				●							
TCMT16T312-MP	1.2		●	●	●	●		★																			★				★							Medium cutting
TCMT090204-MM	0.4											●	★											●														MM
TCMT090208-MM	0.8											★	★											★														
TCMT110204-MM	0.4											●	●											●														
TCMT110208-MM	0.8											●	★											●														
TCMT16T304-MM	0.4											●	●											●														
TCMT16T308-MM	0.8											●	●											●														
TCMT16T312-MM	1.2											●	●											●														Medium cutting
TCMT110204-MK	0.4															★	●	★																				MK
TCMT110208-MK	0.8															★	●	★																				
TCMT16T304-MK	0.4															●	●	★																				
TCMT16T308-MK	0.8															●	●	●																				
TCMT16T312-MK	1.2															●	●	●																				Medium cutting

*1 To be replaced by new products.
(10 inserts in one case)

●: 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

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

TC TYPE INSERTS, 60° WITH HOLE

		Coated																				Coated Cermet				Cermet		Carbide					
Order number	RE	MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTI20T	HTI05T	HTI10	TF15	Shape
TCMT090204-MS	0.4																		●	●	●											●						MS
TCMT090208-MS	0.8																		●	●	●											●						
TCMT110204-MS	0.4																		●	●	●																	
TCMT110208-MS	0.8																		●	●	●																	
TCMT16T304-MS	0.4																		●	●	●											●						
TCMT16T308-MS	0.8																		●	●	●											●						
TCMT16T312-MS	1.2																		●	●	●											●						Medium cutting
TCMT090204	0.4						●	★							★									★			★	●			●			●				Standard
TCMT110202	0.2						●	★							●									★			★	★			●							
TCMT110204	0.4					★	●	●							●									●			●	★			●			●				
TCMT110208	0.8					★	●																	★			●											
TCMT16T304	0.4					●	●	●							●									★			●	★			●			●				
TCMT16T308	0.8					●	●	●							●									●			●	★			●			●				
TCMT16T312	1.2						●																															Medium cutting
TCMW110204	0.4														●	●	★																			●		Flat Top
TCMW16T304	0.4														●	●	●																			●		
TCMW16T308	0.8														●	●	●																			●		
TCMW16T312	1.2														●	●	★																					
TCGW110201	0.1																																			★		Flat Top
TCGW110202	0.2																																			★		
TCGW110204	0.4																																			★		
TCGW110208	0.8																																					
TCGW110204E	0.4																																					
TCGW110208E	0.8																																					

*1 To be replaced by new products.
(10 inserts in one case)

●: 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

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

TP TYPE INSERTS

60° WITH HOLE

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant alloy, titanium alloy

Order number	RE	Coated																						Coated Cermet				Cermet		Carbide					Shape
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UT120T	HTI05T	HTI10	TF15	
TPMH090202-FM	0.2																							●													FM
TPMH090204-FM	0.4																							●													
TPMH110302-FM	0.2																							●													
TPMH110304-FM	0.4																							●													
TPMH110308-FM	0.8																							●													Finish cutting
TPMH080202-FV	0.2			★				●																●		★				★	★						FV
TPMH080204-FV	0.4			★				●																●		★				★	★						
TPMH090202-FV	0.2			★				★														●		●	●	●					●	★						
TPMH090204-FV	0.4			●				●														●		●	●	★					★	★						
TPMH110302-FV	0.2			★				★																●		●					★	★						
TPMH110304-FV	0.4			●				●														●		●	●	●					★	★						
TPMH110308-FV	0.8			●				★														●		★	●	★					●	★						Finish cutting
TPMH090202-FS	0.2																					●															FS
TPMH090204-FS	0.4																					●															
TPMH110302-FS	0.2																					●															
TPMH110304-FS	0.4																					●															
TPMH110308-FS	0.8																					●															Finish cutting
TPGH080202R-FS	0.2																							●						★					★		R/L-FS
TPGH080202L-FS	0.2																							●		★	●			★					★		
TPGH080204R-FS	0.4																							●						★					★		
TPGH080204L-FS	0.4																							●		★	●			★					★		
TPGH090202R-FS	0.2																							●						★					★		
TPGH090202L-FS	0.2																							●		★	●			★					★		
TPGH090204R-FS	0.4																							●						★					★		
TPGH090204L-FS	0.4																							●		●	★			★					★		
TPGH110302R-FS	0.2																							●						●					★		
TPGH110302L-FS	0.2																							●		★	●			★					★		
TPGH110304R-FS	0.4																							●						★					★		
TPGH110304L-FS	0.4																							●		●	●			●					★		Finish cutting

1/3

*1 To be replaced by new products.
(10 inserts in one case)

●: 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

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

TP TYPE INSERTS, 60° WITH HOLE

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant alloy, titanium alloy

Order number	RE	Coated																						Coated Cermet				Cermet		Carbide					Shape
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTI20T	HTI05T	HTI10	TF15	
TPGX080202R	0.2																													●							R/L
TPGX080202L	0.2																													●			●		★		
TPGX080204R	0.4																													●					★		
TPGX080204L	0.4																								●					●			●		●		
TPGX090202R	0.2																													●							
TPGX090202L	0.2																													●			●		●		
TPGX090204R	0.4																													●					●		
TPGX090204L	0.4																								●					●			●		●		
TPGX090208R	0.8																																		★		
TPGX090208L	0.8																													●					●		
TPGX110302L	0.2																													●			●		●		
TPGX110304R	0.4																								●					●					★		
TPGX110304L	0.4																								●					●			●		●		
TPGX110308R	0.8																													★					★		
TPGX110308L	0.8																								●					●			●	★	●		Finish cutting
TPMX090204L	0.4																													★							L
TPMX110304L	0.4																													★							
																																				Finish cutting
TPMH080202-LP	0.2			●																																	LP
TPMH080204-LP	0.4			●																																	
TPMH090202-LP	0.2			★																																	
TPMH090204-LP	0.4			●																																	
TPMH110302-LP	0.2			★																																	
TPMH110304-LP	0.4			●																																	
TPMH110308-LP	0.8			★																																	Light cutting
TPMH090202-LM	0.2										●	●													●												LM
TPMH090204-LM	0.4										●	●													●												
TPMH110302-LM	0.2										●	●													●												
TPMH110304-LM	0.4										●	●													●												
TPMH110308-LM	0.8										●	●													●												Light cutting
TPMH110302-LK	0.2															●	●	●																			LK
TPMH110304-LK	0.4															●	●	●																			
TPMH110308-LK	0.8															●	●	●																			
																																				Light cutting

2/3

*1 To be replaced by new products.
(10 inserts in one case)

●: 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

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

TP TYPE INSERTS, 60° WITH HOLE

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant alloy, titanium alloy

Order number	RE	Coated																				Coated Cermet				Cermet		Carbide					Shape
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTi20T	HTi05T	HTi10	TF15	
TPMH090202-LS	0.2																					●															LS
TPMH090204-LS	0.4																					●															
TPMH110302-LS	0.2																					●															
TPMH110304-LS	0.4																					●															
TPMH110308-LS	0.8																					●															Light cutting
TPMH080202-SV	0.2					●		★							★								●			★				●	★						SV
TPMH080204-SV	0.4					●		●							●								●			★			★	●	★						
TPMH090202-SV	0.2					●		●							●								●			★				★	★						
TPMH090204-SV	0.4					●		●							●								●			★			●	●	★						
TPMH110302-SV	0.2					●		●							●								★			★			★	★	★						
TPMH110304-SV	0.4					●		●							●								●			★			★	●	●						
TPMH110308-SV	0.8					●		●							★								★			★			●	★	★						Light cutting
TPMX090202-SW	0.2																					●															SW
TPMX090204-SW	0.4																					●															
TPMX090208-SW	0.8																					●															
TPMX110302-SW	0.2																					●															
TPMX110304-SW	0.4																					●															Light cutting (Wiper)
TPMX110308-SW	0.8																					●															
TPMX110304	0.4																									★				★	★						Standard
TPMX110308	0.8																									★				★	★						
																																					Medium cutting
TPMH080202-MV	0.2			●		●		●							●								★			★				★	★						MV
TPMH080204-MV	0.4			●		●		●						●	●		●						●			★	★		★	●	★						
TPMH090202-MV	0.2			●		●		●							●								●			★				●	★						
TPMH090204-MV	0.4			●		●		●						●	●		★						●			★	●		★	●	★						
TPMH090208-MV	0.8			●		●		●									★						●			★					★						
TPMH110302-MV	0.2			●		●		●							★								★			★	★		★	●	★						
TPMH110304-MV	0.4			●		●		●						●	●		★						●			★	★		★	●	★						
TPMH110308-MV	0.8			●		●		●						★	●		★						●			★	★		★	★	★						Medium cutting
TPGX080202	0.2																																		●		Flat Top
TPGX080204	0.4																								★					●			★		●		
TPGX080208	0.8																													★			★		★		
TPGX090202	0.2																																		●		
TPGX090204	0.4																								★					●			●		●		
TPGX090208	0.8																								★					●			★		★		
TPGX110302	0.2																																		●		
TPGX110304	0.4																								★					●			●	★	●		
TPGX110308	0.8																								★					●			★	★	●		

3/3

*1 To be replaced by new products.
(10 inserts in one case)

●: 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

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

VB TYPE INSERTS

35° WITH HOLE

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant alloy, titanium alloy

Order number	RE	Coated																						Coated Cermet				Cermet		Carbide						Shape
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTi20T	HTi05T	HTi10	TF15	
VBMT110302-FP	0.2		●	●	●	●		●																		●				●								FP
VBMT110304-FP	0.4		●	●	●	●		●																		●				●								
VBMT110308-FP	0.8		●	★	●	●		★																		★				★								
VBMT160404-FP	0.4		●	●	●	●		●																		●				●								
VBMT160408-FP	0.8		●	●	●	●		●																		●				●								Finish cutting
VBMT110302-FM	0.2																						●	●														FM
VBMT110304-FM	0.4																						●	●														
VBMT110308-FM	0.8																						★	●														
VBMT160404-FM	0.4																						●	●														
VBMT160408-FM	0.8																						★	●														
VBMT160412-FM	1.2																							●														Finish cutting
VBMT110302-FS	0.2																					●																FS
VBMT110304-FS	0.4																					●																
VBMT110308-FS	0.8																					●																
VBMT160404-FS	0.4																					●																
VBMT160408-FS	0.8																					●																
VBMT160412-FS	1.2																					●																Finish cutting
VBMT110304-FV	0.4			●				●														●		●	●					●	★							FV
VBMT110308-FV	0.8			●				★																●						★	★							
VBMT160404-FV	0.4			●				●														●		●	●					●	★							
VBMT160408-FV	0.8			●				●														●		●	●					★	★							
																																						Finish cutting
VBGT110302R-F	0.2																							●			★	★			★					★		R/L-F
VBGT110302L-F	0.2																							●			●	★			★					★		
VBGT110304R-F	0.4																							●				★			★					★		
VBGT110304L-F	0.4																							●				★			★					★		
VBGT160402R-F	0.2																							●				★			★					★		
VBGT160402L-F	0.2																							●				★			★					★		
VBGT160404R-F	0.4																							●				★			★					★		
VBGT160404L-F	0.4																							●				★			★					★		Finish cutting
VBMT110304-LP	0.4		●	●	●	●		★																			●				★							LP
VBMT110308-LP	0.8		●	●	●	●		●																			★				●							
VBMT160404-LP	0.4		●	●	●	●		●																			●				●							
VBMT160408-LP	0.8		●	●	●	●		●																			●				●							
																																						Light cutting
VBMT110304-LM	0.4										●	●	●											●	●													LM
VBMT110308-LM	0.8										●	★	★											●	●													
VBMT160404-LM	0.4										●	●	●											●													
VBMT160408-LM	0.8										●	●	★											●													
VBMT160412-LM	1.2										●	●																										Light cutting

1/3

*1 To be replaced by new products.
(10 inserts in one case)

●: 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

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

VB TYPE INSERTS, 35° WITH HOLE

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant alloy, titanium alloy

Order number	RE	Coated																						Coated Cermet				Cermet		Carbide						Shape
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTI20T	HTI05T	HTI10	TF15	
VBMT110302-LS	0.2																		●	●	●											●						LS
VBMT110304-LS	0.4																		●	●	●											●						
VBMT110308-LS	0.8																		●	●	●											●						
VBMT160404-LS	0.4																		●	●	●											●						
VBMT160408-LS	0.8																		●	●	●											●						
VBMT160412-LS	1.2																					●																Light cutting
VBMT110304-SV	0.4							●																●							★							SV
VBMT110308-SV	0.8							★																●							●							
VBMT160404-SV	0.4							●																●							●							
VBMT160408-SV	0.8							●																●							★							
																																						Light cutting
VBMT160404-MP	0.4		●	●	●	●	●																			●				★								MP
VBMT160408-MP	0.8		●	●	●	●	●																			★				★								
																																						Medium cutting
VBMT160404-MM	0.4											●	●											●														MM
VBMT160408-MM	0.8											●	●											●														
																																						Medium cutting
VBMT160404-MK	0.4															★	●	★																				MK
VBMT160408-MK	0.8															★	●	★																				
																																						Medium cutting
VBMT160402-MS	0.2																		●	●	●											●						MS
VBMT160404-MS	0.4																		●	●	●											●						
VBMT160408-MS	0.8																		●	●	●											●						
VBMT160412-MS	1.2																		●	●	●											●						
																																						Medium cutting
VBMT160404	0.4							●																														Standard
VBMT160408	0.8							●																														
																																						Medium cutting
VBMT110304-MV	0.4			●		●			●					●	●		●							●			●		★	●	★							MV
VBMT110308-MV	0.8			●		●			●						★		●							●			★		★	●	★							
VBMT160404-MV	0.4			●		●			●					●	●		●							●			●		●	●	●							
VBMT160408-MV	0.8			★		●			●						●		●							●			●		★	●	★							
																																						Medium cutting

2/3

*1 To be replaced by new products.
(10 inserts in one case)

●: 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

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

VB TYPE INSERTS, 35° WITH HOLE

		Coated																				Coated Cermet				Cermet		Carbide						
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTI20T	HTI05T	HTI10	TF15
P	Steel	◐	●	◐	◶	❁	○	◶	❁														❁	✲	❁	◐	○	○	◶	○	◶			❁			○
M	Stainless steel									◐	●	◐	✲	○	✲				◐				◶	❁	✲	❁		○	○		○			❁			
K	Cast iron															●	●	✲					◶	❁			○	○		○				❁	○	◶	○
N	Non-ferrous metal																																			◶	○
S	Heat resistant alloy, titanium alloy																		◐	●	◐	✲	◶	❁								●	◐			◶	

Order number	RE	Shape
VBET1103V3R-SR	0.03*2	R/L-SR
VBET1103V3L-SR	0.03*2	
VBET110301R-SR	0.1*2	
VBET110301L-SR	0.1*2	
VBET110302R-SR	0.2*2	
VBET110302L-SR	0.2*2	
VBET110304R-SR	0.4*2	
VBET110304L-SR	0.4*2	Medium cutting
VBET110300R-SN	0.0*2	R/L-SN
VBET110300L-SN	0.0*2	
VBET1103V3R-SN	0.03*2	
VBET1103V3L-SN	0.03*2	
VBET110301R-SN	0.1*2	
VBET110301L-SN	0.1*2	
VBET110302R-SN	0.2*2	
VBET110302L-SN	0.2*2	
VBET110304R-SN	0.4*2	
VBET110304L-SN	0.4*2	Medium cutting
VBET1103V3RW-SN	0.03*2	R/LW-SN
VBET1103V3LW-SN	0.03*2	
		Medium cutting (Wiper)
VBMW160408	0.8	Flat Top

3/3

*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.
(10 inserts in one case)

●: 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

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

VC TYPE INSERTS

35° WITH HOLE

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant alloy, titanium alloy

Order number	RE	Coated																				Coated Cermet				Cermet		Carbide						Shape
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UT120T	HTI05T	HTI10	TF15	
VCMT080202-FM	0.2																							●												FM
VCMT080204-FM	0.4																							●												
																																				Finish cutting
VCMT080202-FV	0.2			●		●			★															●		★				●	★						FV
VCMT080204-FV	0.4			●		●			★															●		★				●	★						
																																					Finish cutting
VCMT080202-FS	0.2																				●																FS
VCMT080204-FS	0.4																				●																
																																					Finish cutting
VCMT080202-LP	0.2			★																																	LP
VCMT080204-LP	0.4			●																																	
																																					Light cutting
VCMT080202-LM	0.2																							●													LM
VCMT080204-LM	0.4																							●													
																																					Light cutting
VCMT080202-LS	0.2																				●																LS
VCMT080204-LS	0.4																				●																
																																					Light cutting

1/2

*1 To be replaced by new products.
(10 inserts in one case)

●: 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

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

VC TYPE INSERTS, 35° WITH HOLE

		Coated																				Coated Cermet				Cermet		Carbide							
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTi20T	HTi05T	HTi10	TF15
P	Steel	◐	●	◐	◶	❁	○	◶	❁														❁	✲	❁	◐	○	○	◶	○	◶			❁			○
M	Stainless steel									◐	●	◐	✲	○	✲				◐				◶	❁	✲	❁		○	○		○			❁			
K	Cast iron															◐	◐	✲					◶	❁				○	○		○			❁	○	◶	○
N	Non-ferrous metal																																		◶	○
S	Heat resistant alloy, titanium alloy																		●	◐	●	✲	◶	❁								●	◐			◶	

Order number	RE	Shape
VCGT080202R-F	0.2	R/L-F
VCGT080202L-F	0.2	
VCGT080204R-F	0.4	
VCGT080204L-F	0.4	
		Finish cutting
VCMT080202-SV	0.2	SV
VCMT080204-SV	0.4	
		Light cutting
VCMT080202-MV	0.2	MV
VCMT080204-MV	0.4	
		Medium cutting

*1 To be replaced by new products.
(10 inserts in one case)

●: 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

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

WC TYPE INSERTS

80° WITH HOLE

		Coated																							Coated Cermet				Cermet		Carbide					
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTi20T	HTi05T	HTi10	TF15
P	Steel	◐	●	◐	◶	❁	○	◶	❁														❁	✣	❁	◐	○	○	◶	○	◶			❁			○
M	Stainless steel									◐	●	◐	✣	○	✣				◐			◶	❁	✣	❁		○	○		○				❁			
K	Cast iron															◐	●	✣					◶	❁			○	○		○				❁	○	◶	○
N	Non-ferrous metal																																			◶	○
S	Heat resistant alloy, titanium alloy																		◐	●	◐	✣	◶	❁								●	◐			◶	

Order number	RE	Shape
WCGT020102R	0.2	R/L
WCGT020102L	0.2	
WCGT020104R	0.4	
WCGT020104L	0.4	
WCGTL30202L	0.2	
WCGTL30204L	0.4	Finish cutting
WCMT020102-FV	0.2	FV
WCMT020104-FV	0.4	
WCMTL30202-FV	0.2	
WCMTL30204-FV	0.4	
WCMT040202-FV	0.2	
WCMT040204-FV	0.4	
WCMT06T302-FV	0.2	
WCMT06T304-FV	0.4	Finish cutting
WCMT020102-MP	0.2	Standard
WCMT020104-MP	0.4	
WCMTL30202-MP	0.2	
WCMTL30204-MP	0.4	
WCMT040202-MP	0.2	
WCMT040204-MP	0.4	
WCMT040208-MP	0.8	
WCMT06T304-MP	0.4	
WCMT06T308-MP	0.8	Medium cutting
WCMT020102	0.2	Standard
WCMT020104	0.4	
WCMTL30202	0.2	
WCMTL30204	0.4	
WCMT040202	0.2	
WCMT040204	0.4	
WCMT040208	0.7	
WCMT06T304	0.4	
WCMT06T308	0.8	Medium cutting

1/1

*1 To be replaced by new products.
(10 inserts in one case)

●: 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

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

INSERTS FOR OTHER TYPES OF BORING BARS

POSITIVE WITH HOLE

		Coated																						Coated Cermet				Cermet		Carbide						
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTi20T	HTi05T	HTi10	TF15
P	Steel	◐	●	◐	◶	❁	○	◶	❁														❁	✲	❁	◐	○	○	◶	○	◶			❁			○
M	Stainless steel									◐	●	◐	✲	○	✲				◐				◶	❁	✲	❁		○	○		○			❁			
K	Cast iron															●	●	✲					◶	❁				○	○		○			❁	○	◶	○
N	Non-ferrous metal																																			◶	○
S	Heat resistant alloy, titanium alloy																		◐	●	◐	✲	◶	❁									●	◐		◶	

Order number	RE	Shape
CCMT120404-MM	0.4	MM
CCMT120408-MM	0.8	
CCMT120412-MM	1.2	Medium cutting
TCGW080201	0.1	Flat Top
TCGW080202	0.2	
TPMH160304-FV	0.4	FV
		Finish cutting
TPMH160302-LM	0.2	LM
TPMH160304-LM	0.4	
TPMH160308-LM	0.8	Light cutting
TPMH160302-LS	0.2	LS
TPMH160304-LS	0.4	
TPMH160308-LS	0.8	Light cutting
VCMT160404-FM	0.4	FM
VCMT160408-FM	0.8	Finish cutting
VCMT160404-FS	0.4	FS
VCMT160408-FS	0.8	Finish cutting
VCGT110301M-FS-P	0.1*2	FS-P
VCGT110302M-FS-P	0.2*2	Finish cutting

1/1

*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.
(10 inserts in one case)

●: 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

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

INSERTS FOR OTHER TYPES OF BORING BARS

POSITIVE WITHOUT HOLE

		Coated																						Coated Cermet				Cermet		Carbide								
		MS6015	MC6115	MC6125	MC6015*1	MC6025*1	UE6105*1	UE6110*1	UE6020*1	MS7025	MC7015	MC7025	MP7035	US7020	US735	MC5105	MC5115	MC5125	MS9025	MP9005	MP9015	MP9025	VP10RT	VP15TF	VP30RT	UP20M	MP3025	AP25N	VP25N	VP45N	NX2525	NX3035	MT9005	RT9010	UTI20T	HTI05T	HTI10	TF15
P	Steel	◐	●	◐	◶	❁	○	◶	❁														❁	✥	❁	◐	○	○	◶	○	◶			❁			○
M	Stainless steel									◐	●	◐	✥	○	✥				◐				◶	❁	✥	❁		○	○		○			❁				
K	Cast iron															●	●	✥					◶	❁				○	○		○			❁	○	◶	○
N	Non-ferrous metal																																			◶	○
S	Heat resistant alloy, titanium alloy																		●	●	◐	✥	◶	❁								●	◐			◶	
Order number		**RE**																																				
TPMR110304-LM		0.4										●												●														
TPMR110308-LM		0.8										●												●														
TPMR160304-LM		0.4										●												●														
TPMR160308-LM		0.8										●												●														
TPMR110304-MM		0.4										●												●														
TPMR110308-MM		0.8										●												●														
TPMR160304-MM		0.4										●												●														
TPMR160308-MM		0.8										●												●														

Shape

LM

Light cutting

MM

Medium cutting

1/1

*1 To be replaced by new products.
(10 inserts in one case)

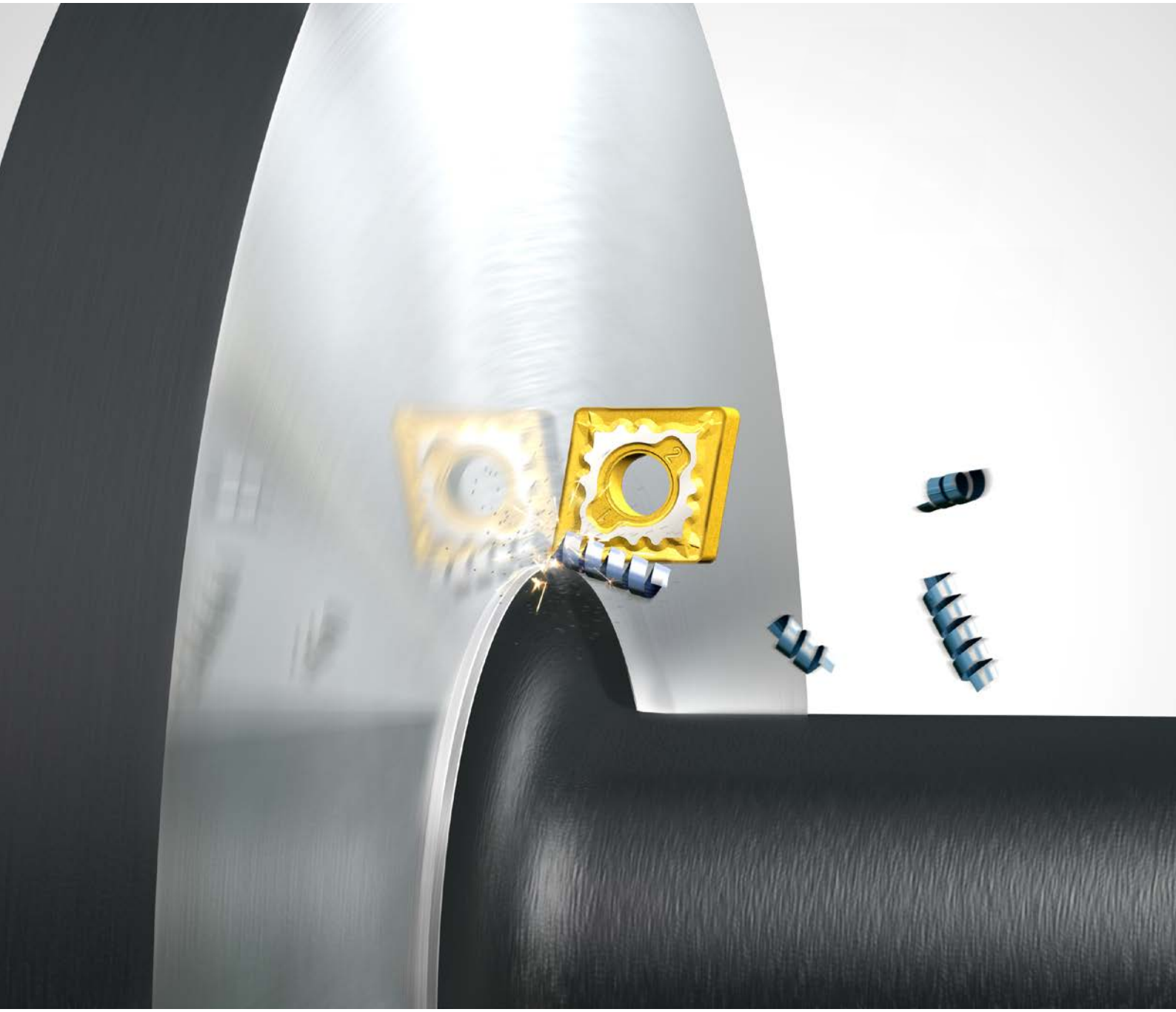
●: Stable Cutting (1st recommendation)
○: Stable Cutting (2nd recommendation)
◐: General Cutting (1st recommendation)
◶: General Cutting (2nd recommendation)
✥: Unstable Cutting (1st recommendation)
❁: Unstable Cutting (2nd recommendation)

● / ★ = Expansion

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

MC6100 SERIES

BRINGING THE ULTIMATE HIGH SPEED CUTTING PERFORMANCE



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MC6100 SERIES

CVD COATED GRADE FOR STEEL TURNING

Dramatic increase in stability and wear resistance, enabled by utilising the improved coating adhesion and crystal orientation technology.

MC6115

For high speed turning

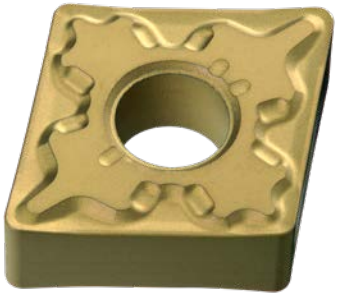
MC6125

First recommendation for a wide range of applications

NEW

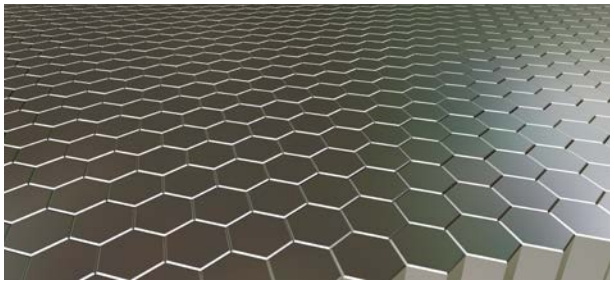
MC6135

For fracture resistance

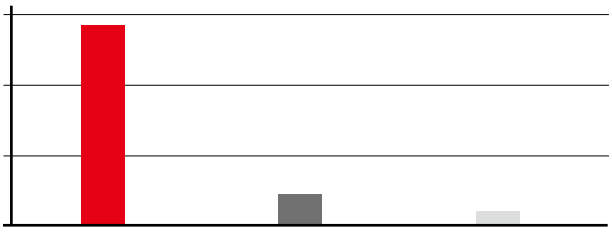


"SUPER" NANO TEXTURE TECHNOLOGY

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.



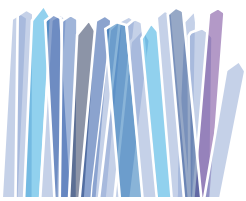
CRYSTAL ORIENTATION
(Image)



The ratio of Al_2O_3 crystal grains with the same orientation

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.

MC6100 SERIES

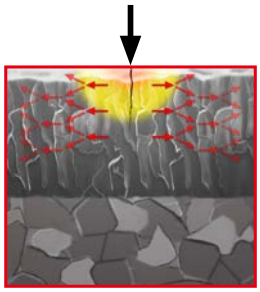
PROTECTION AGAINST SUDDEN FRACTURING

STRENGTHENED CHIPPING RESISTANCE

Cracks that occur during unstable machining are prevented due to the relaxing of the tensile stress in the coating. MC6100 series has an 80 % reduction in coating tensile stress compared to conventional CVD inserts.

RELAXING THE TENSILE STRESS

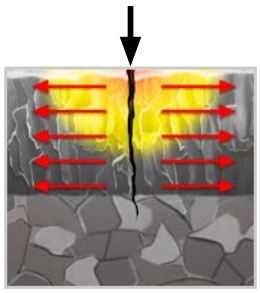
Impact stress during machining



Reduced tensile stress

MC6100 Series

MC6100 series has a much lower level of stress than conventional CVD coatings due to the surface treatment. This divides the force of impacts during machining and protects from sudden fracturing.



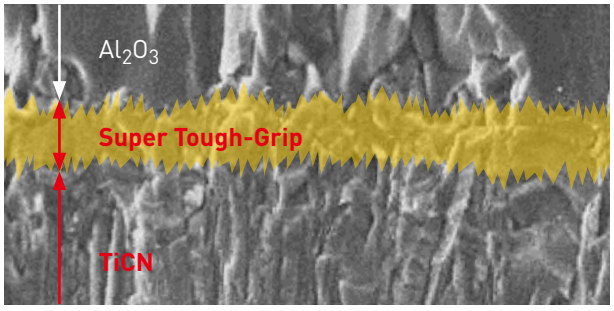
Large tensile stress

Conventional CVD inserts

Cracks are generated in the surface of coatings during machining. They propagate through the coating into the substrate due to the large tensile stress in the coating structure. This creates one of the main causes of sudden insert breakage.

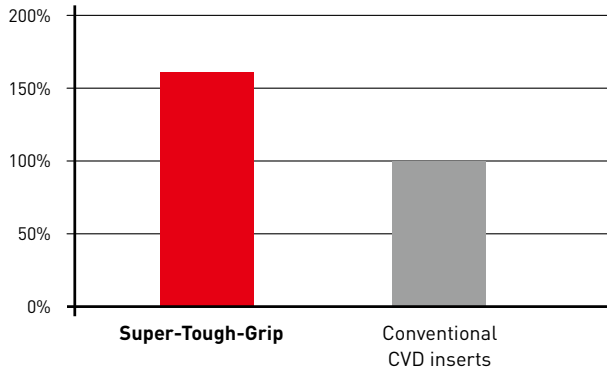
SUPER-TOUGH-GRIP

The Super Tough-Grip layer has finer crystal grains that enhance the strength of the adhesion between the coating layers.



(Image)

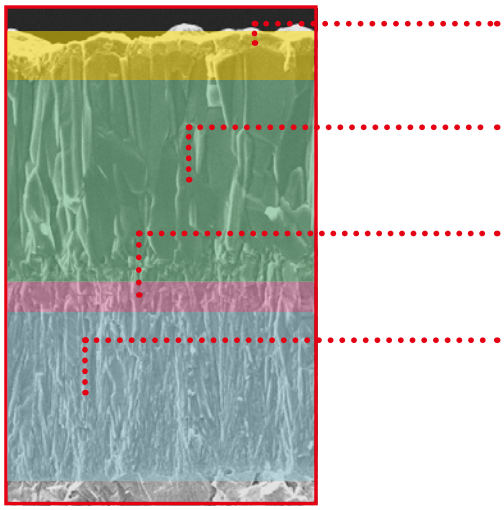
Adhesion strength evaluation*



*Adhesion strength measurement is obtained from a scratch test that records the force needed to peel the coating layers.

MC6115

MC6115 IMPROVES HIGH SPEED MACHINING AND PROCESS EFFICIENCY WITH A DRAMATIC INCREASE IN RESISTANCE TO WEAR AND HEAT



Outer Layer

Better identification of corner use.

Super Nano Texture Al_2O_3 Layer

Outstanding wear resistance especially at high temperatures.

Super Tough-Grip

Strong adhesion between the tough coating layers.

Fine Granular TiCN Layer

Coating for high wear resistance.

IMPROVED OUTER COATING (LAYER)

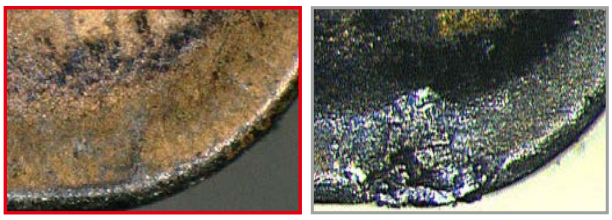
The outer layer of MC6115 restricts chip welding thereby improving the dimensional accuracy and surface roughness of components. This also enables easy recognition of whether the insert corner can continue machining.

EXAMPLE WHEN MACHINING DIN 20MNCR5

MACHINING DIN 20MNCR5: COMPARISON OF WEAR RESISTANCE

Material	DIN 20MnCr5 170HB
Insert	CNMG120408-MH
Vc (m/min)	200
f (mm/rev)	0.3
ap (mm)	1.5
Cutting mode	Dry cutting
Results	When comparing the high edge strength MH breaker with a conventional low resistance chipbreaker, it shows that MC6115 accomplishes both high welding and wear resistance.

AFTER 2 MINUTES OF MACHINING CHROME STEEL

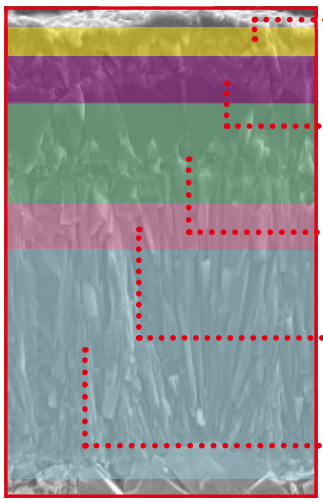


MC6115
MH Breaker

Conventional CVD insert

MC6125

FIRST RECOMMENDED GRADE FOR STEEL TURNING INCREASING TOOL LIFE WITH STABLE PERFORMANCE OVER A WIDER RANGE OF APPLICATIONS



Outer Layer

Better identification of corner use.

Multiple Layers of Ti compounds and an Al_2O_3 Layer

Achieves excellent wear resistance.

Super Nano Texture Al_2O_3 Layer

Outstanding wear resistance especially at high temperatures.

Super Tough-Grip

Strong adhesion between the tough coating layers.

Fine Granular TiCN Layer

Coating for high wear resistance.

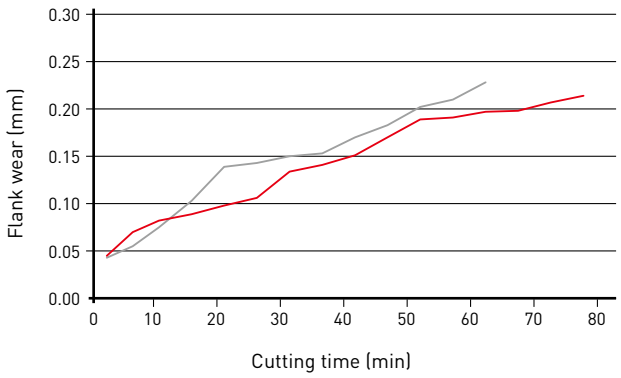
SPECIAL SMOOTH SURFACE TREATMENT

MC6125 uses a new surface treatment at the cutting edge for increased stability. Additionally, the single layers are made with a special smoothening preparation that provides greater adhesion to enable a wider range of applications.

EXAMPLE WHEN MACHINING C45

MACHINING S45C: COMPARISON OF WEAR RESISTANCE

Material	C45
Insert	CNMG120408-MH
Vc (m/min)	200
f (mm/rev)	0.3
ap (mm)	1.5
Cutting mode	Wet cutting
Results	The surface treatment has improved stability and provided longer tool life.

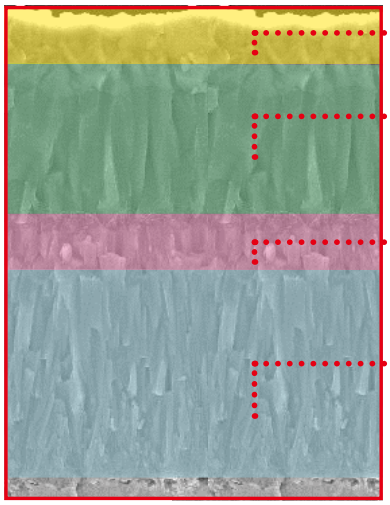


■ : **MC6125** ■ : Conventional CVD Insert

NEW

MC6135

OPTIMAL VERSATILITY FOR MACHINING CONTINUOUS THROUGH TO INTERMITTENT APPLICATIONS



Outer Layer

Better identification of corner use.

Super Nano Texture Al_2O_3 Layer

Outstanding wear resistance especially at high temperatures.

Super Tough-Grip

Strong adhesion between the tough coating layers.

Fine Granular TiCN Layer

Coating for high wear resistance.

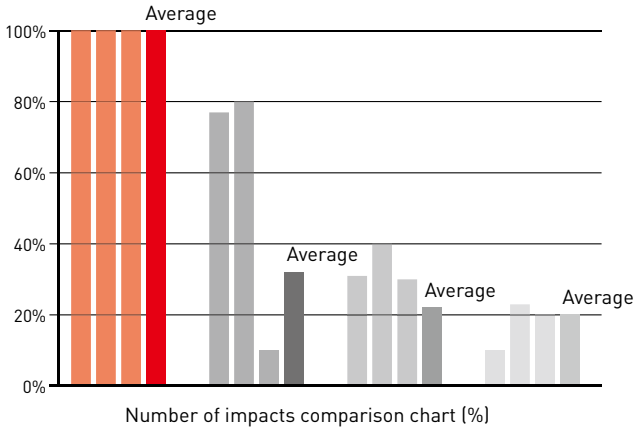
THINNER COATINGS OPTIMISED FOR GENERAL PURPOSE MACHINING

Industry-leading crystal orientation control technology enables thinner but still impact-resistant coatings provide improved chipping and wear resistance which is optimal for general-purpose use.
(50 % thinner compared to our conventional coating).

MACHINING DIN 41CRMO4: COMPARISON OF TOUGHNESS DURING INTERRUPTED CUTTING

MC6135 shows high stability even during interrupted cutting and can be used over a wide area of applications.

Material	DIN 41CrMo4
Insert	CNMG120408-○○
Vc (m/min)	200
f (mm/rev)	0.35
ap (mm)	2.5
Cutting mode	Wet cutting
Results	Pre-set tool life limit or until damage deteriorates the performance.

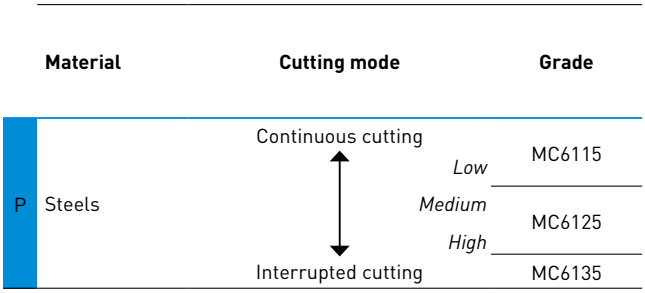


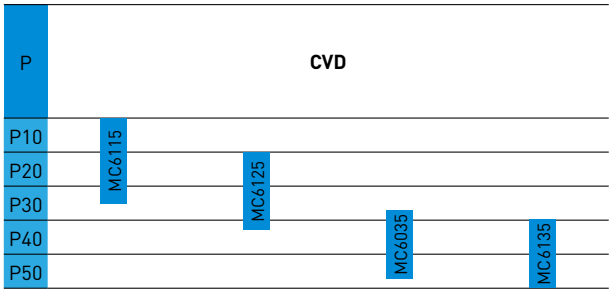
Number of impacts comparison chart (%)

■ : **MC6135** ■ A ■ B ■ C : Conventional tool

MC6100 SERIES

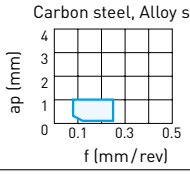
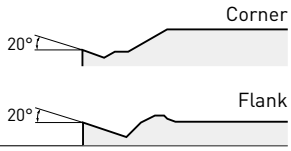
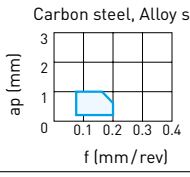
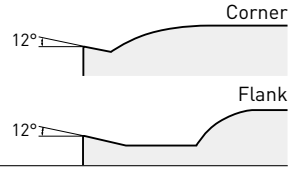
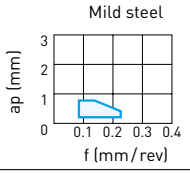
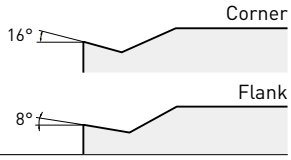
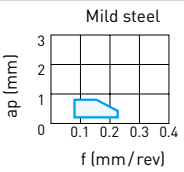
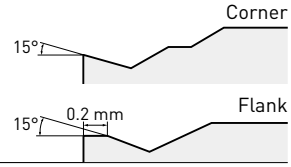
SELECTION CRITERIA AND APPLICATION RANGE





CHIPBREAKER SYSTEM FOR STEEL TURNING

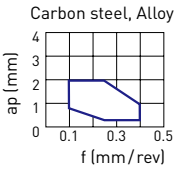
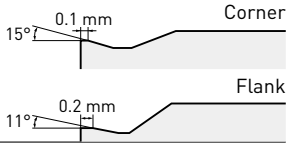
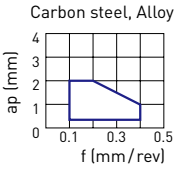
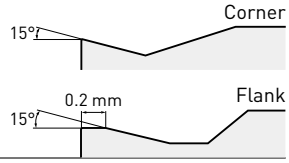
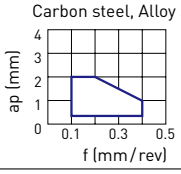
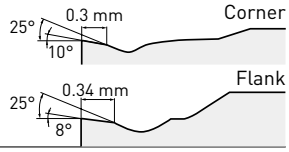
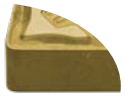
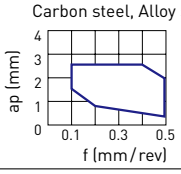
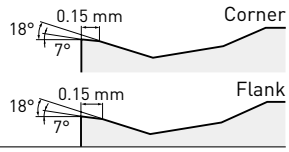
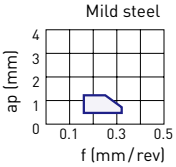
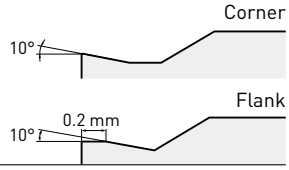
NEGATIVE INSERTS

Tolerance		Features	Cross section geometry
FINISH CUTTING			
M	 FP	**FIRST RECOMMENDATION FOR FINISHING CARBON STEEL AND ALLOY STEEL** Controls chip clogging during high-feed cutting and prevents chips of soft workpiece materials from running onto their surfaces. Large rake angle suppress chatter vibration and deformation in machining of low rigidity workpiece material.	 
	 FH	**FIRST RECOMMENDATION FOR FINISHING CARBON STEEL AND ALLOY STEEL** Stable chip control even at small depths of cut.	 
	 FS	**ALTERNATIVE CHIPBREAKER FOR FINISHING MILD STEEL** Stable chip control even at small depths of cut. Sharp edge gives best performance.	 
	 FY	**FIRST RECOMMENDATION FOR FINISHING MILD STEEL** Effectively controls adhesive chips. Suitable for mild steel finishing.	 

MC6100 SERIES

CHIPBREAKER SYSTEM FOR STEEL TURNING

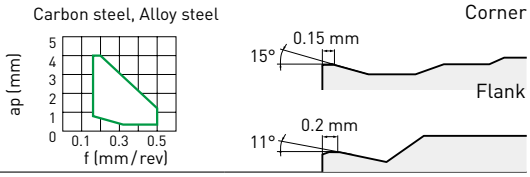
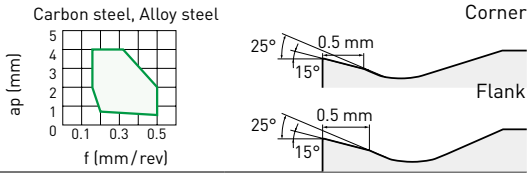
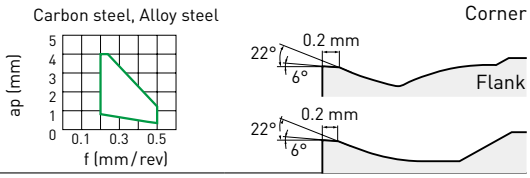
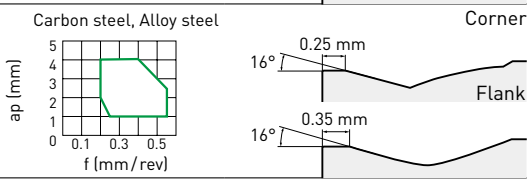
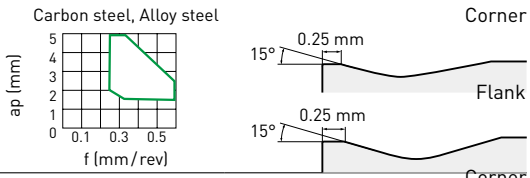
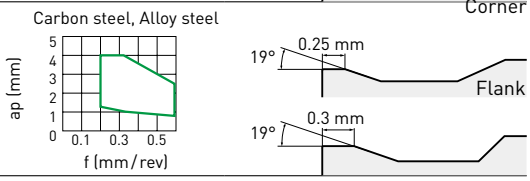
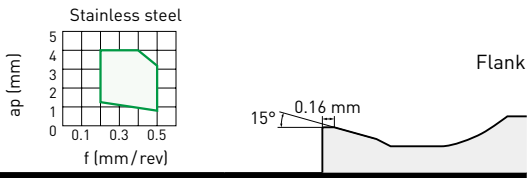
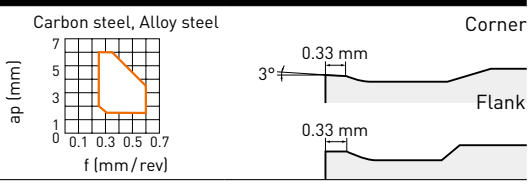
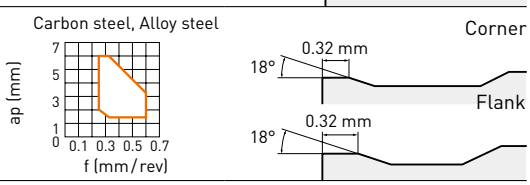
NEGATIVE INSERTS

Tolerance		Features		Cross section geometry
LIGHT CUTTING				
M	 LP	**FIRST RECOMMENDATION FOR LIGHT CUTTING OF CARBON STEEL AND ALLOY STEEL** Stable chip control in the light cutting range. The curved edge allows smooth chip discharge.		
	 SH	**ALTERNATIVE CHIPBREAKER FOR LIGHT CUTTING OF CARBON STEEL AND ALLOY STEEL** Can be used at low depth of cuts and high feed rates. The curved edge allows smooth chip discharge. Recommended for workpieces in the 160–250HB range.		
	 SA	**ALTERNATIVE CHIPBREAKER FOR LIGHT CUTTING OF CARBON STEEL AND ALLOY STEEL** Superior chip control at small depths of cuts. Covers copying and back turning with a wavy edge. Recommended for workpieces in the 200–300HB range.		
	 SW	**WIPER INSERT FOR LIGHT CUTTING OF CARBON STEEL, ALLOY STEEL, STAINLESS STEEL AND CAST IRON** In comparison to conventional chipbreakers, the surface finish is maintained even if the feed per revolution is doubled. Wiper design for increased productivity and improved surface finishes.		
	 SY	**FIRST RECOMMENDATION FOR LIGHT CUTTING OF MILD STEEL** Effectively controls adhesive chips. Suitable for mild steel light cutting.		

MC6100 SERIES

CHIPBREAKER SYSTEM FOR STEEL TURNING

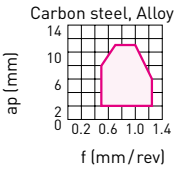
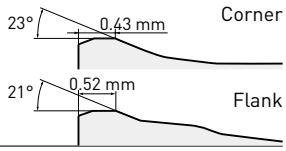
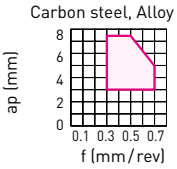
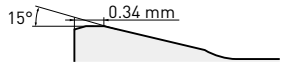
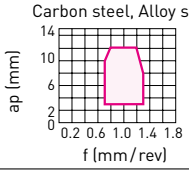
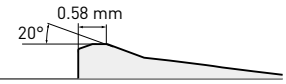
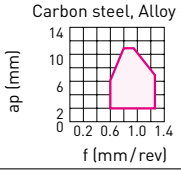
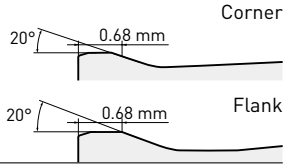
NEGATIVE INSERTS

Tolerance		Features	Cross section geometry
MEDIUM CUTTING			
M	 MP	**FIRST RECOMMENDATION FOR MEDIUM CUTTING OF CARBON STEEL AND ALLOY STEEL** Suitable for medium to light cutting. Breaker geometry appropriate for copying and back turning. Cutting edge geometry for an optimum balance of sharpness and fracture resistance.	
	 MS	**ALTERNATIVE CHIPBREAKER FOR MEDIUM CUTTING** The sharp edge gives best performance. Flat top chipbreaker shape offers high edge strength. Applicable to grades other than MP9005, MP9015, MP9025, MT9015.	
	 MA	**FIRST RECOMMENDATION FOR MEDIUM CUTTING OF CARBON STEEL AND ALLOY STEEL** Ideal for general cutting applications. Positive land provides sharp cutting action.	
	 MH	**ALTERNATIVE CHIPBREAKER FOR MEDIUM CUTTING OF CARBON STEEL AND ALLOY STEEL** Flat land offers high edge strength. Good chip control with a suitable chip pocket.	
	 Standard	**ALTERNATIVE CHIPBREAKER FOR MEDIUM CUTTING OF CARBON STEEL AND ALLOY STEEL** Flat land offers high edge strength. Flat top breaker shape offers high edge strength.	
	 MW	**WIPER INSERT FOR MEDIUM CUTTING CARBON STEEL, ALLOY STEEL, STAINLESS STEEL AND CAST IRON** The wiper allows up to two times higher feed. A wide chip pocket prevents chip jamming.	
	 R/L-ES	**ALTERNATIVE CHIPBREAKER FOR MEDIUM CUTTING OF STAINLESS STEEL** Good balance of edge strength and sharpness. Right- or left-hand chipbreaker for unidirectional chip control.	
ROUGH CUTTING			
M	 RP	**FIRST RECOMMENDATION FOR ROUGH CUTTING OF CARBON STEEL AND ALLOY STEEL** For interrupted cutting and removing scale. Good balance of cutting edge strength and low cutting resistance because of a suitable rake angle.	
	 GH	**ALTERNATIVE CHIPBREAKER FOR ROUGH CUTTING OF CARBON STEEL, ALLOY STEEL AND CAST IRON** For interrupted cutting and removing scale. A combination of a wide land and a large chip pocket allows high feed rates.	

MC6100 SERIES

CHIPBREAKER SYSTEM FOR STEEL TURNING

NEGATIVE INSERTS

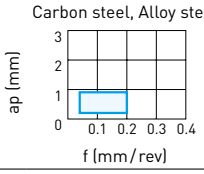
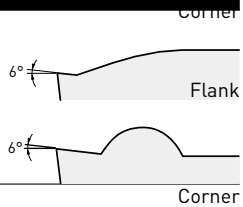
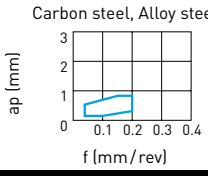
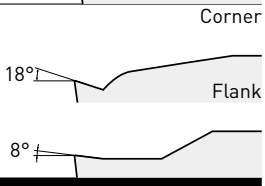
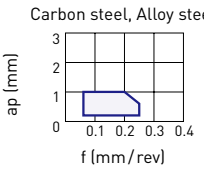
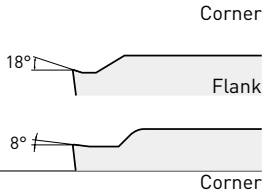
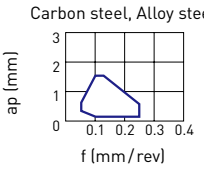
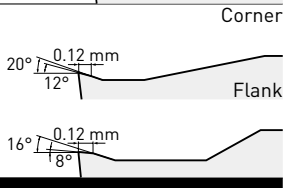
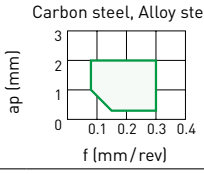
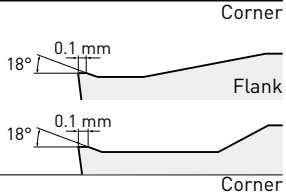
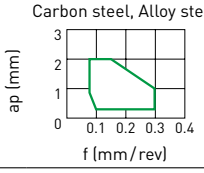
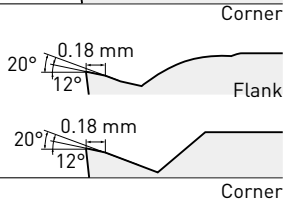
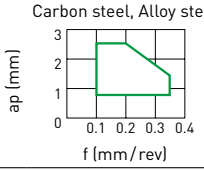
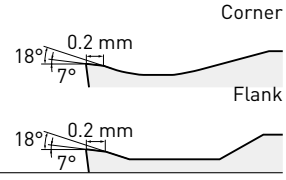
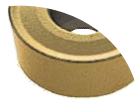
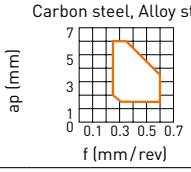
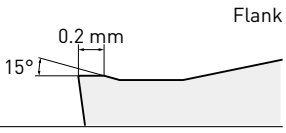
Tolerance		Features		Cross section geometry
HEAVY CUTTING				
M	 HX	**FIRST RECOMMENDATION FOR HEAVY CUTTING OF CARBON STEEL AND ALLOY STEEL** Covers the medium range of the heavy cutting region. Owing to the straight edge and chamfer, it gives a balance of sharpness and strength. Variable land and a wavy chipbreaker for good chip control.		
	 HL	**FIRST RECOMMENDATION FOR HEAVY CUTTING ALTERNATIVE CHIPBREAKER FOR HEAVY CUTTING OF CARBON STEEL AND ALLOY STEEL** Low resistance due to narrow flat land. Achieves high chip breaking ability.		
	 HR	**ALTERNATIVE CHIPBREAKER FOR HEAVY CUTTING OF CARBON STEEL AND ALLOY STEEL** High cutting edge strength. Excellent chip discharge even with high feed and high depth of cut.		
	 HV	**ALTERNATIVE CHIPBREAKER FOR HEAVY CUTTING OF CARBON STEEL AND ALLOY STEEL** Covers the upper end of the heavy cutting region. Wide land and large chamfer offer high edge strength. A wide chipbreaker prevents chip jamming.		

NEW

MC6100 SERIES

CHIPBREAKER SYSTEM FOR STEEL TURNING

5°, 7° POSITIVE INSERTS

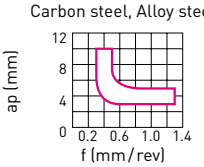
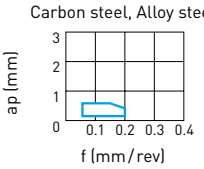
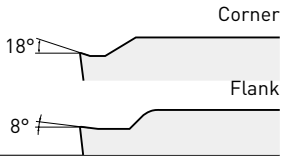
Tolerance		Features		Cross section geometry
FINISH CUTTING				
M	 FP	**FIRST RECOMMENDATION FOR FINISHING CARBON STEEL, ALLOY STEEL AND MILD STEEL** Chipbreaker protrusion at the corner tip controls chips even at small depth of cut. Maintains the edge strength at the corner and prevents sudden fractures.		
	 FV	**ALTERNATIVE CHIPBREAKER FOR FINISHING CARBON STEEL, ALLOY STEEL, MILD STEEL AND STAINLESS STEEL** Suitable for low depths of cut and low feed rates. Sharp cutting edge and low resistance design achieves excellent cutting performance.		
LIGHT CUTTING				
M	 LP	**FIRST RECOMMENDATION FOR LIGHT CUTTING OF CARBON STEEL, ALLOY STEEL AND MILD STEEL** Sharp cutting edge due to a large rake angle. Prevents welding of the insert and controls white turbidity of the surface finish. Chipbreaker protrusion suitable for depth of cut area achieves a wide range of chip control.		
	 SW	**WIPER INSERT FOR LIGHT CUTTING OF CARBON STEEL, ALLOY STEEL, MILD STEEL AND STAINLESS STEEL** In comparison to conventional chipbreakers, the surface finish is maintained even if the feed per revolution is doubled. Positive land improves sharpness.		
MEDIUM CUTTING				
M	 MP	**FIRST RECOMMENDATION FOR MEDIUM CUTTING OF CARBON STEEL, ALLOY STEEL AND MILD STEEL** Good balance of wear resistance and fracture resistance because of the flat land cutting edge. A wide chip pocket controls increasing of the cutting resistance and reduces vibration and chip jamming even at large depths of cut.		
	 MV	**ALTERNATIVE CHIPBREAKER FOR MEDIUM CUTTING OF CARBON STEEL, ALLOY STEEL, MILD STEEL AND STAINLESS STEEL** A positive insert and the large rake angle achieve sharp cutting edge performance. The double breakers and round shape in the rake face achieve a wide range of chip discharge.		
	 MW	**WIPER INSERT FOR MEDIUM CUTTING OF CARBON STEEL, ALLOY STEEL, MILD STEEL AND STAINLESS STEEL** The wiper allows up to two times higher feed. A wide chip pocket prevents chip jamming.		
	 Standard	**ALTERNATIVE CHIPBREAKER FOR MEDIUM CUTTING OF CARBON STEEL, ALLOY STEEL, MILD STEEL, STAINLESS STEEL AND CAST IRON** Balance of edge strength and sharpness due to a combination of a flat land and large rake angle.		

NEW

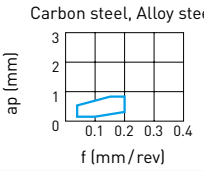
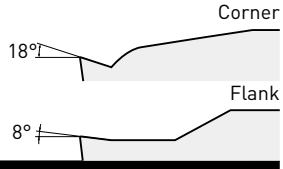
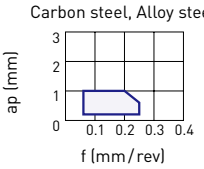
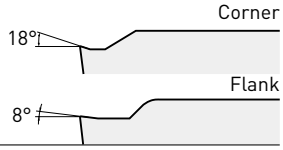
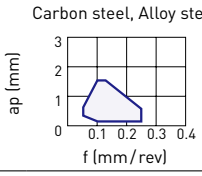
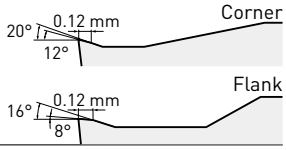
MC6100 SERIES

CHIPBREAKER SYSTEM FOR STEEL TURNING

7° POSITIVE INSERTS

Tolerance		Features		Cross section geometry
HEAVY CUTTING				
M	 RR	**CHIPBREAKER FOR HEAVY CUTTING OF CARBON STEEL AND ALLOY STEEL** A wide groove chipbreaker prevents chips from jamming at large depths of cut. Small dimples improve chip control at small depths of cut.		
FINISH CUTTING				
M	 SVX	**ALTERNATIVE CHIPBREAKER FOR LIGHT CUTTING OF CARBON STEEL AND ALLOY STEEL** Chip control is improved by having a chipbreaker geometry suitable for copying.		

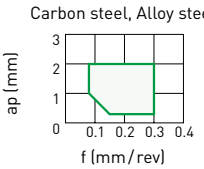
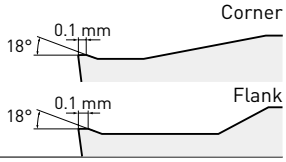
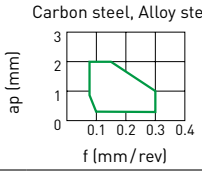
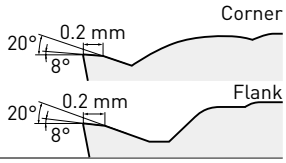
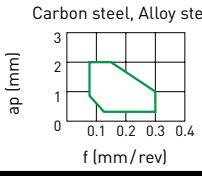
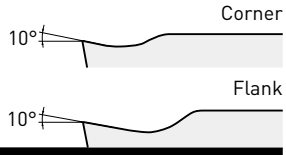
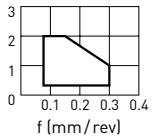
11° POSITIVE INSERTS

Tolerance		Features		Cross section geometry
FINISH CUTTING				
M	 FV	**FIRST RECOMMENDATION FOR FINISHING CARBON STEEL, ALLOY STEEL, MILD STEEL AND STAINLESS STEEL** Suitable for low depths of cut and low feed rates. Sharp cutting edge and low resistance design achieves excellent cutting performance.		
LIGHT CUTTING				
M	 LP	**FIRST RECOMMENDATION FOR LIGHT CUTTING OF CARBON STEEL, ALLOY STEEL AND MILD STEEL** Sharp cutting edge due to a large rake angle. Prevents welding of the insert and controls white turbidity of the surface finish. Chipbreaker protrusion suitable for depth of cut area achieves a wide range of chip control.		
	 SW	**WIPER INSERT FOR LIGHT CUTTING OF CARBON STEEL, ALLOY STEEL, MILD STEEL AND STAINLESS STEEL** In comparison to conventional chip breakers, the surface finish is maintained even if the feed per revolution is doubled. Positive land improves sharpness.		

MC6100 SERIES

CHIPBREAKER SYSTEM FOR STEEL TURNING

11° POSITIVE INSERTS

Tolerance		Features		Cross section geometry
MEDIUM CUTTING				
M	 MP	**FIRST RECOMMENDATION FOR MEDIUM CUTTING OF CARBON STEEL, ALLOY STEEL AND MILD STEEL** Good balance of wear resistance and fracture resistance because of the flat land cutting edge. A wide chip pocket controls increasing of the cutting resistance and reduces vibration and chip jamming even at large depths of cut.		
	 MV	**FIRST RECOMMENDATION FOR MEDIUM CUTTING OF CARBON STEEL, ALLOY STEEL, MILD STEEL, STAINLESS STEEL AND CAST IRON** A positive insert and large rake angle achieves sharp cutting edge performance. Double chipbreaker in the rake face achieve a wide range of chip discharge.		
	 Standard	**ALTERNATIVE CHIPBREAKER FOR MEDIUM CUTTING OF CARBON STEEL, ALLOY STEEL AND STAINLESS STEEL** Standard, general purpose chipbreaker.		
FOR CAST IRON				
M	 Flat Top	**CHIPBREAKER FOR HEAVY CUTTING OF CAST IRON** Flat top. Most effective for unstable machining due to its high edge strength.		

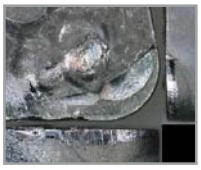
MC6115

CUTTING PERFORMANCE

MACHINING C45: COMPARISON OF WEAR RESISTANCE DURING CONTINUOUS DRY CUTTING

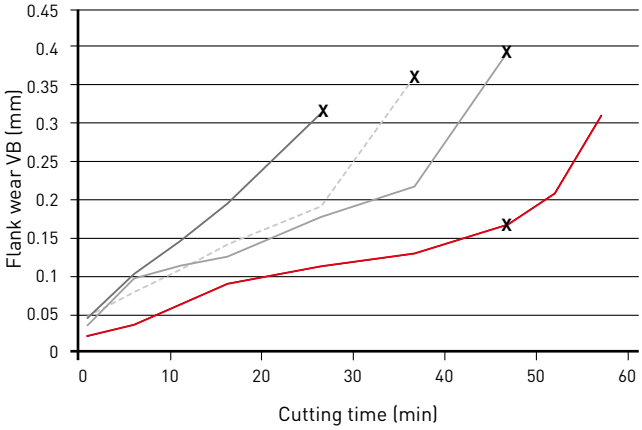
Material	C45
Insert	CNMG120408-○○
Vc (m/min)	300
f (mm/rev)	0.3
ap (mm)	1.5
Cutting mode	Dry cutting

MC6115
10 min



Conventional A
10 min

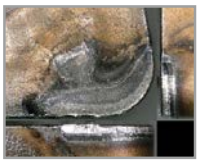
Conventional B
8 min



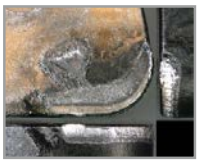
MACHINING DIN 100CR6: COMPARISON OF WEAR RESISTANCE DURING CONTINUOUS WET CUTTING

Material	DIN 100Cr6
Insert	CNMG120408-○○
Vc (m/min)	300
f (mm/rev)	0.3
ap (mm)	1.5
Cutting mode	Wet cutting

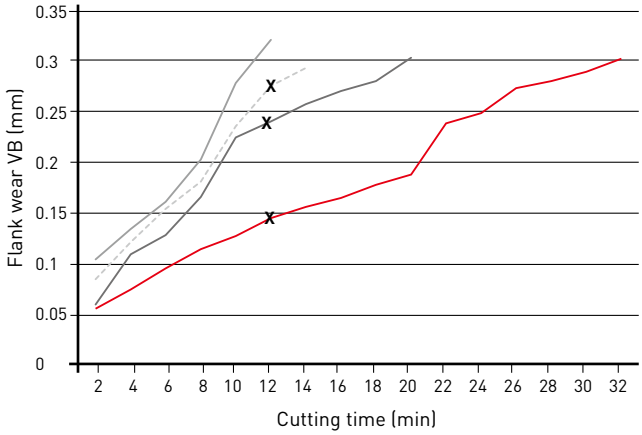
MC6115
12 min



Conventional A
12 min



Conventional B
12 min



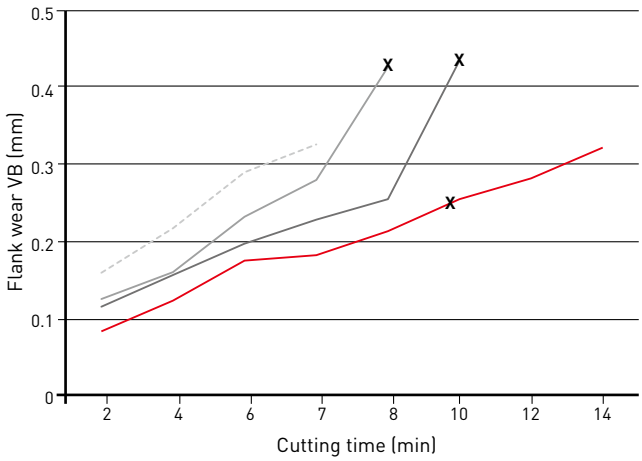
MACHINING DIN41CRMO4: COMPARISON OF WEAR RESISTANCE DURING CONTINUOUS WET CUTTING

Material	DIN 41CrMo4
Insert	CNMG120408-○○
Vc (m/min)	350
f (mm/rev)	0.3
ap (mm)	1.5
Cutting mode	Wet cutting

MC6115
10 min

Conventional A
10 min

Conventional B
8 min



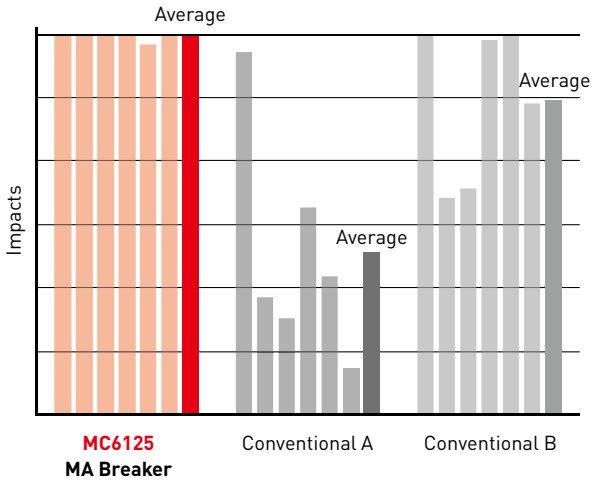
■ : **MC6115** ■ A ■ B ■ C : Conventional tool

MC6125

CUTTING PERFORMANCE

COMPARISON OF TOUGHNESS DURING INTERRUPTED CUTTING

Material	DIN 42CrMo4
Insert	CNMG120408-○○
Vc (m/min)	200
f (mm/rev)	0.25
ap (mm)	1.5
Cutting mode	Wet cutting

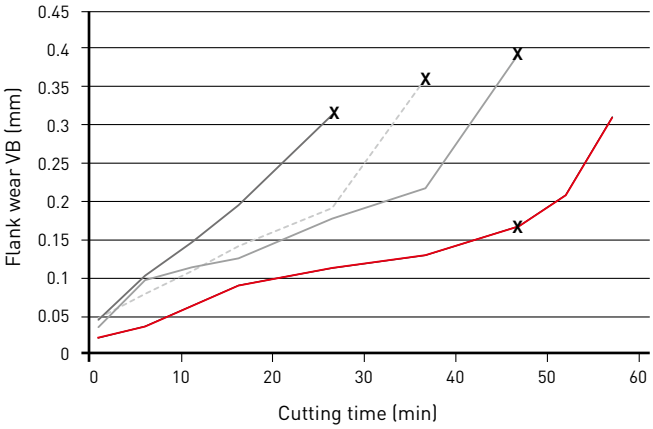


MACHINING DIN 20MNCR5: COMPARISON OF WEAR RESISTANCE DURING CONTINUOUS WET CUTTING

Material	DIN 20MNCr5
Insert	CNMG120408-○○
Vc (m/min)	300
f (mm/rev)	0.3
ap (mm)	1.5
Cutting mode	Wet cutting

MC6125
46 min

Conventional A
46 min



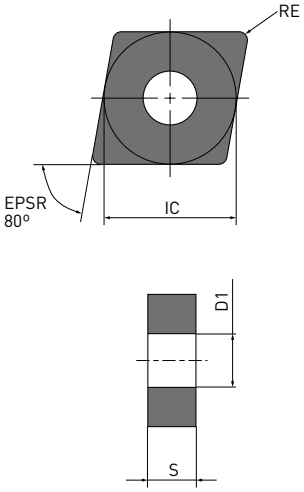
■ : **MC6125** ■ A ■ B ■ C : Conventional tool

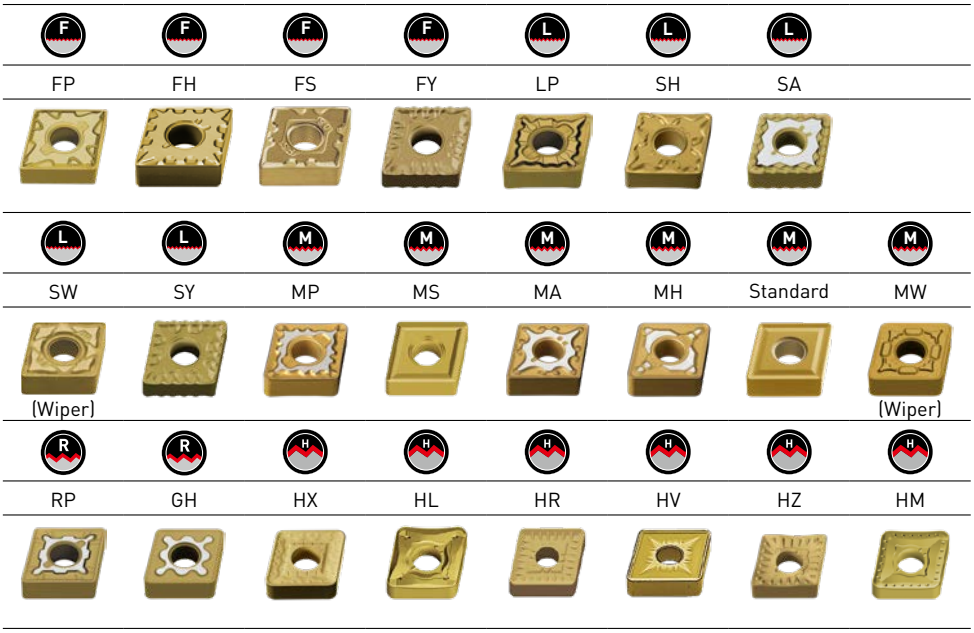
CNMG, CNMM

NEGATIVE INSERTS (WITH HOLE)

M Class

CNMG, CNMM





Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
CNMG120402-FP	F	★	★	★	12.7	4.76	0.2	5.16
CNMG120404-FP	F	●	★	★	12.7	4.76	0.4	5.16
CNMG120408-FP	F	●	★	★	12.7	4.76	0.8	5.16
CNMG120412-FP	F	★	★	★	12.7	4.76	1.2	5.16
CNMG120402-FH	F	★	★	★	12.7	4.76	0.2	5.16
CNMG120404-FH	F	★	★	★	12.7	4.76	0.4	5.16
CNMG120408-FH	F	★	★		12.7	4.76	0.8	5.16
CNMG120404-FS	F		★	★	12.7	4.76	0.4	5.16
CNMG120404-FY	F	●	★	★	12.7	4.76	0.4	5.16
CNMG120408-FY	F	●	●	★	12.7	4.76	0.8	5.16
CNMG120404-LP	L	●	●	★	12.7	4.76	0.4	5.16
CNMG120408-LP	L	●	●	★	12.7	4.76	0.8	5.16
CNMG120412-LP	L	●	●	★	12.7	4.76	1.2	5.16
CNMG09T304-SH	L	★	●		9.525	3.97	0.4	3.81
CNMG09T308-SH	L	★	●		9.525	3.97	0.8	3.81
CNMG120404-SH	L	★	★	★	12.7	4.76	0.4	5.16
CNMG120408-SH	L	★	★	★	12.7	4.76	0.8	5.16
CNMG120412-SH	L	★	★	★	12.7	4.76	1.2	5.16
CNMG120404-SA	L	★	★	★	12.7	4.76	0.4	5.16
CNMG120408-SA	L	●	★	★	12.7	4.76	0.8	5.16
CNMG120412-SA	L	★	★	★	12.7	4.76	1.2	5.16
CNMG120404-SW	L	●	★		12.7	4.76	0.4	5.16
CNMG120408-SW	L	●	★		12.7	4.76	0.8	5.16
CNMG120412-SW	L	●	★		12.7	4.76	1.2	5.16
CNMG120404-SY	L	★	★	★	12.7	4.76	0.4	5.16
CNMG120408-SY	L	●	●	★	12.7	4.76	0.8	5.16

(10 inserts in one case)

● / ★ = Expansion

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

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CNMG, CNMM – NEGATIVE INSERTS (WITH HOLE)

Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
CNMG120404-MP	M	●	●	●	12.7	4.76	0.4	5.16
CNMG120408-MP	M	●	●	●	12.7	4.76	0.8	5.16
CNMG120412-MP	M	●	●	●	12.7	4.76	1.2	5.16
CNMG120416-MP	M	●	●	★	12.7	4.76	1.6	5.16
CNMG160608-MP	M	★	●	★	15.875	6.35	0.8	6.35
CNMG160612-MP	M	★	●	★	15.875	6.35	1.2	6.35
CNMG160616-MP	M	★	●	★	15.875	6.35	1.6	6.35
CNMG090308-MS	M	★	★		9.525	3.18	0.8	3.81
CNMG09T308-MS	M	★	●		9.525	3.97	0.8	3.81
CNMG120404-MS	M	★	★	★	12.7	4.76	0.4	5.16
CNMG120408-MS	M	●	★	★	12.7	4.76	0.8	5.16
CNMG120412-MS	M	★	★		12.7	4.76	1.2	5.16
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-MH	M	★	●	★	12.7	4.76	0.4	5.16
CNMG120408-MH	M	●	●	★	12.7	4.76	0.8	5.16
CNMG120412-MH	M	●	●	★	12.7	4.76	1.2	5.16
CNMG120416-MH	M	★	●	★	12.7	4.76	1.6	5.16
CNMG160608-MH	M	★	★		15.875	6.35	0.8	6.35
CNMG160612-MH	M	●	●	★	15.875	6.35	1.2	6.35
CNMG160616-MH	M	★	★		15.875	6.35	1.6	6.35
CNMG190612-MH	M	●	●	★	19.05	6.35	1.2	7.93
CNMG190616-MH	M	★	●	★	19.05	6.35	1.6	7.93
CNMG090308	M	★	★		9.525	3.18	0.8	3.81
CNMG09T304	M	★	★	★	9.525	3.97	0.4	3.81
CNMG09T308	M	★	★	★	9.525	3.97	0.8	3.81
CNMG120404	M	●	●	★	12.7	4.76	0.4	5.16
CNMG120408	M	●	●	★	12.7	4.76	0.8	5.16
CNMG120412	M	●	●	●	12.7	4.76	1.2	5.16
CNMG120416	M	●	●	★	12.7	4.76	1.6	5.16
CNMG160608	M	●	●	★	15.875	6.35	0.8	6.35
CNMG160612	M	●	●	★	15.875	6.35	1.2	6.35
CNMG160616	M	●	●	★	15.875	6.35	1.6	6.35
CNMG190608	M	●	●	★	19.05	6.35	0.8	7.93
CNMG190612	M	●	●	★	19.05	6.35	1.2	7.93
CNMG190616	M	●	●	★	19.05	6.35	1.6	7.93
CNMG120408-MW	M	●	●	★	12.7	4.76	0.8	5.16
CNMG120412-MW	M	●	●	★	12.7	4.76	1.2	5.16

2/3

(10 inserts in one case)

● / ★ = Expansion

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

CNMG, CNMM – NEGATIVE INSERTS (WITH HOLE)

Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
CNMG120408-RP	R	●	●	●	12.7	4.76	0.8	5.16
CNMG120412-RP	R	●	●	●	12.7	4.76	1.2	5.16
CNMG120416-RP	R	●	●	★	12.7	4.76	1.6	5.16
CNMG160612-RP	R	●	●	●	15.875	6.35	1.2	6.35
CNMG160616-RP	R	●	●	●	15.875	6.35	1.6	6.35
CNMG190612-RP	R	●	●	●	19.05	6.35	1.2	7.93
CNMG190616-RP	R	●	●	●	19.05	6.35	1.6	7.93
CNMG120408-GH	R	★	●	★	12.7	4.76	0.8	5.16
CNMG120412-GH	R	★	●	★	12.7	4.76	1.2	5.16
CNMG120416-GH	R	★	★		12.7	4.76	1.6	5.16
CNMG160612-GH	R	★	●	★	15.875	6.35	1.2	6.35
CNMG160616-GH	R	★	●		15.875	6.35	1.6	6.35
CNMG190612-GH	R	★	●	★	19.05	6.35	1.2	7.93
CNMG190616-GH	R	★	●	★	19.05	6.35	1.6	7.93
CNMM120408-HX	H		★	★	12.7	4.76	0.8	5.16
CNMM120412-HX	H		★	★	12.7	4.76	1.2	5.16
CNMM160612-HX	H		★	★	15.875	6.35	1.2	6.35
CNMM160616-HX	H		★	★	15.875	6.35	1.6	6.35
CNMM190612-HX	H	★	●	★	19.05	6.35	1.2	7.93
CNMM190616-HX	H	★	●	★	19.05	6.35	1.6	7.93
CNMM190624-HX	H	★	●	★	19.05	6.35	2.4	7.93
CNMM250924-HX	H	●	★	●	25.4	9.52	2.4	9.12
CNMM120408-HL	H		●	●	12.7	4.76	0.8	5.16
CNMM120412-HL	H		●	★	12.7	4.76	1.2	5.16
CNMM120416-HL	H			●	12.7	4.76	1.6	5.16
CNMM160612-HL	H		●	●	15.875	6.35	1.2	6.35
CNMM160616-HL	H		★	★	15.875	6.35	1.6	6.35
CNMM190612-HL	H		●	●	19.05	6.35	1.2	7.93
CNMM190616-HL	H		●	★	19.05	6.35	1.6	7.93
CNMM190624-HL	H		★	★	19.05	6.35	2.4	7.93
CNMM250924-HR	H	●	●	●	25.4	9.52	2.4	9.12
CNMM190616-HV	H	★	●	★	19.05	6.35	1.6	7.93
CNMM190624-HV	H	★	★	★	19.05	6.35	2.4	7.93
CNMM250924-HV	H	★	●	●	25.4	9.52	2.4	9.12
CNMM120408-HZ	H	●	●	★	12.7	4.76	0.8	5.16
CNMM120412-HZ	H	●	●	★	12.7	4.76	1.2	5.16
CNMM120416-HZ	H			★	12.7	4.76	1.6	5.16
CNMM160612-HZ	H	●	●	★	15.875	6.35	1.2	6.35
CNMM160616-HZ	H	★	★	★	15.875	6.35	1.6	6.35
CNMM190612-HZ	H	★	●	★	19.05	6.35	1.2	7.93
CNMM190616-HZ	H	★	●	★	19.05	6.35	1.6	7.93
CNMM160612-HM	H		●	★	15.875	6.35	1.2	6.35
CNMM160616-HM	H		★	★	15.875	6.35	1.6	6.35
CNMM190612-HM	H		●	●	19.05	6.35	1.2	7.93
CNMM190616-HM	H		●	★	19.05	6.35	1.6	7.93
CNMM190624-HM	H		★	★	19.05	6.35	2.4	7.93
CNMM250924-HM	H	★	★	●	25.4	9.52	2.4	9.12

(10 inserts in one case)

● / ★ = Expansion

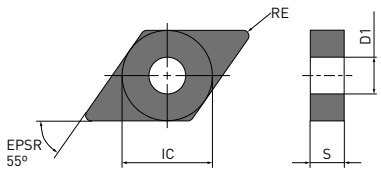
● : Inventory maintained. ★ : Inventory maintained in Japan.

DNMG, DNMX, DNMM, RNMG

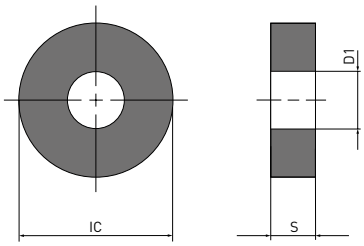
NEGATIVE INSERTS (WITH HOLE)

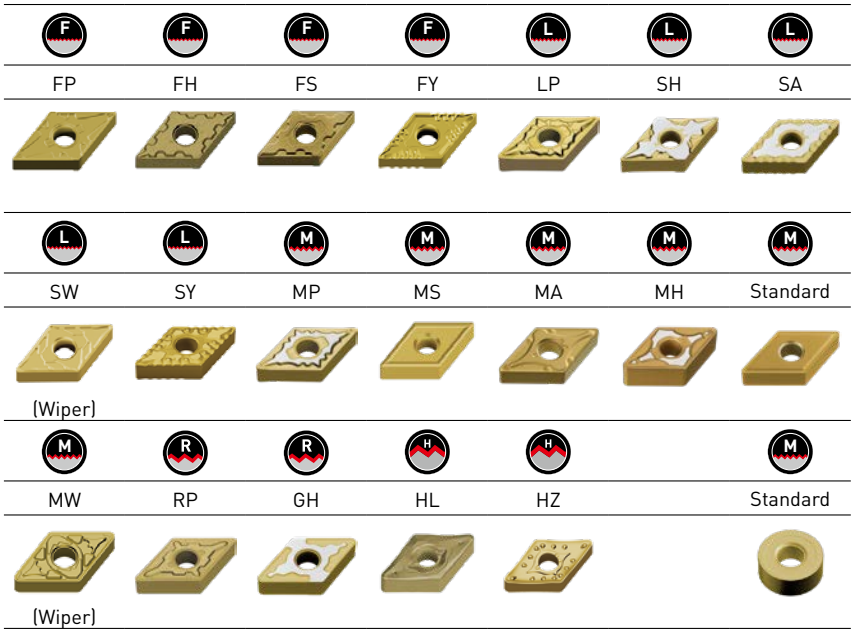
M Class

DNMG, DNMX, DNMM



RNMG





Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
DNMG150402-FP	F	★	★	★	12.7	4.76	0.2	5.16
DNMG150404-FP	F	★	★	★	12.7	4.76	0.4	5.16
DNMG150408-FP	F	★	★	★	12.7	4.76	0.8	5.16
DNMG150412-FP	F	★	★	★	12.7	4.76	1.2	5.16
DNMG150602-FP	F	★	★	★	12.7	6.35	0.2	5.16
DNMG150604-FP	F	●	★	★	12.7	6.35	0.4	5.16
DNMG150608-FP	F	●	★	★	12.7	6.35	0.8	5.16
DNMG150612-FP	F	★	★	★	12.7	6.35	1.2	5.16
DNMG150402-FH	F	★	★	★	12.7	4.76	0.2	5.16
DNMG150404-FH	F	★	★		12.7	4.76	0.4	5.16
DNMG150408-FH	F	★	★		12.7	4.76	0.8	5.16
DNMG150602-FH	F	★	★	★	12.7	6.35	0.2	5.16
DNMG150604-FH	F	●	★	★	12.7	6.35	0.4	5.16
DNMG150608-FH	F	★	★	★	12.7	6.35	0.8	5.16
DNMG150408-FS	F		★	★	12.7	4.76	0.8	5.16
DNMG150404-FY	F	★	★	★	12.7	4.76	0.4	5.16
DNMG150408-FY	F	★	★	★	12.7	4.76	0.8	5.16
DNMG150608-FY	F	●	●	★	12.7	6.35	0.8	5.16

1/3

(10 inserts in one case)

106 Vc

● / ★ = Expansion

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

DNMG, DNMX, DNMM, RNMG – NEGATIVE INSERTS (WITH HOLE)

Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
DNMG110404-LP	L	●	●	●	9.525	4.76	0.4	3.81
DNMG110408-LP	L	●	●	●	9.525	4.76	0.8	3.81
DNMG150404-LP	L	●	●	★	12.7	4.76	0.4	5.16
DNMG150408-LP	L	●	●	★	12.7	4.76	0.8	5.16
DNMG150412-LP	L	●	●	★	12.7	4.76	1.2	5.16
DNMG150604-LP	L	●	●	★	12.7	6.35	0.4	5.16
DNMG150608-LP	L	●	●	★	12.7	6.35	0.8	5.16
DNMG150612-LP	L	●	●	★	12.7	6.35	1.2	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
DNMG150412-SH	L	★	★	★	12.7	4.76	1.2	5.16
DNMG150604-SH	L	★	★		12.7	6.35	0.4	5.16
DNMG150608-SH	L	★	★		12.7	6.35	0.8	5.16
DNMG150612-SH	L	★	★		12.7	6.35	1.2	5.16
DNMG150404-SA	L	★	★	★	12.7	4.76	0.4	5.16
DNMG150408-SA	L	★	★	★	12.7	4.76	0.8	5.16
DNMG150412-SA	L	★	★	★	12.7	4.76	1.2	5.16
DNMG150604-SA	L	★	●	★	12.7	6.35	0.4	5.16
DNMG150608-SA	L	★	●	★	12.7	6.35	0.8	5.16
DNMG150612-SA	L	●	●	★	12.7	6.35	1.2	5.16
DNMX110404-SW	L	●	●		9.525	4.76	0.4	3.81
DNMX110408-SW	L	●	●		9.525	4.76	0.8	3.81
DNMX150404-SW	L	●	●		12.7	4.76	0.4	5.16
DNMX150408-SW	L	●	●		12.7	4.76	0.8	5.16
DNMX150412-SW	L	●	★		12.7	4.76	1.2	5.16
DNMX150604-SW	L	●	●		12.7	6.35	0.4	5.16
DNMX150608-SW	L	●	●		12.7	6.35	0.8	5.16
DNMX150612-SW	L	●	●		12.7	6.35	1.2	5.16
DNMG150404-SY	L	●	●	★	12.7	4.76	0.4	5.16
DNMG150408-SY	L	●	●	★	12.7	4.76	0.8	5.16
DNMG150608-SY	L	●	●	★	12.7	6.35	0.8	5.16
DNMG150404-MP	M	●	●	★	12.7	4.76	0.4	5.16
DNMG150408-MP	M	●	●	★	12.7	4.76	0.8	5.16
DNMG150412-MP	M	●	●	★	12.7	4.76	1.2	5.16
DNMG150416-MP	M	★	●	★	12.7	4.76	1.6	5.16
DNMG150604-MP	M	●	●	●	12.7	6.35	0.4	5.16
DNMG150608-MP	M	●	●	●	12.7	6.35	0.8	5.16
DNMG150612-MP	M	●	●	★	12.7	6.35	1.2	5.16
DNMG150616-MP	M	●	●	●	12.7	6.35	1.6	5.16
DNMG110408-MS	M	★	●		9.525	4.76	0.8	3.81
DNMG150404-MS	M	★	★	★	12.7	4.76	0.4	5.16
DNMG150408-MS	M	★	★		12.7	4.76	0.8	5.16
DNMG150412-MS	M	★	★		12.7	4.76	1.2	5.16
DNMG150604-MS	M	●	●		12.7	6.35	0.4	5.16
DNMG150608-MS	M	★	★		12.7	6.35	0.8	5.16
DNMG150612-MS	M	★	★		12.7	6.35	1.2	5.16

(10 inserts in one case)

● / ★ = Expansion

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

DNMG, DNMX, DNMM, RNMG – NEGATIVE INSERTS (WITH HOLE)

Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
DNMG110404-MA	M	●	●	★	9.525	4.76	0.4	3.81
DNMG110408-MA	M	●	●	★	9.525	4.76	0.8	3.81
DNMG110412-MA	M	●	★	★	9.525	4.76	1.2	3.81
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
DNMG150616-MA	M	●	●		12.7	6.35	1.6	5.16
DNMG150404-MH	M	★	★	★	12.7	4.76	0.4	5.16
DNMG150408-MH	M	●	●	★	12.7	4.76	0.8	5.16
DNMG150412-MH	M	●	●	★	12.7	4.76	1.2	5.16
DNMG150604-MH	M	★	★		12.7	6.35	0.4	5.16
DNMG150608-MH	M	●	●	★	12.7	6.35	0.8	5.16
DNMG150612-MH	M	●	●	★	12.7	6.35	1.2	5.16
DNMG110408	M	★	●		9.525	4.76	0.8	3.81
DNMG150404	M	●	●	★	12.7	4.76	0.4	5.16
DNMG150408	M	●	●	★	12.7	4.76	0.8	5.16
DNMG150412	M	●	●	★	12.7	4.76	1.2	5.16
DNMG150416	M	★	★	★	12.7	4.76	1.6	5.16
DNMG150604	M	●	●	★	12.7	6.35	0.4	5.16
DNMG150608	M	●	●	★	12.7	6.35	0.8	5.16
DNMG150612	M	●	●	★	12.7	6.35	1.2	5.16
DNMG150616	M	●	★	★	12.7	6.35	1.6	5.16
DNMX150408-MW	M	●	★		12.7	4.76	0.8	5.16
DNMX150412-MW	M	●	★		12.7	4.76	1.2	5.16
DNMX150608-MW	M	●	●		12.7	6.35	0.8	5.16
DNMX150612-MW	M	●	●		12.7	6.35	1.2	5.16
DNMG150408-RP	R	●	●	★	12.7	4.76	0.8	5.16
DNMG150412-RP	R	●	●	★	12.7	4.76	1.2	5.16
DNMG150416-RP	R	★	★	★	12.7	4.76	1.6	5.16
DNMG150608-RP	R	●	●	●	12.7	6.35	0.8	5.16
DNMG150612-RP	R	●	●	●	12.7	6.35	1.2	5.16
DNMG150616-RP	R	●	●	●	12.7	6.35	1.6	5.16
DNMG150408-GH	R	★	●	★	12.7	4.76	0.8	5.16
DNMG150412-GH	R	★	★	★	12.7	4.76	1.2	5.16
DNMG150608-GH	R	★	●	★	12.7	6.35	0.8	5.16
DNMG150612-GH	R	★	●	★	12.7	6.35	1.2	5.16
DNMM150408-HL	H		★	★	12.7	4.76	0.8	5.16
DNMM150412-HL	H		★	★	12.7	4.76	1.2	5.16
DNMM150608-HL	H		●	●	12.7	6.35	0.8	5.16
DNMM150612-HL	H		●	★	12.7	6.35	1.2	5.16
DNMM150408-HZ	H	★	★	★	12.7	4.76	0.8	5.16
DNMM150412-HZ	H	★	★	★	12.7	4.76	1.2	5.16
DNMM150608-HZ	H	★	●	★	12.7	6.35	0.8	5.16
DNMM150612-HZ	H	★	★	★	12.7	6.35	1.2	5.16
RNMG120400	M	★	●	★	12.0	4.76	—	5.16

(10 inserts in one case)

● / ★ = Expansion

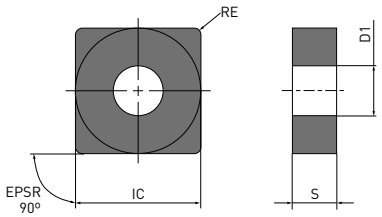
● : Inventory maintained. ★ : Inventory maintained in Japan.

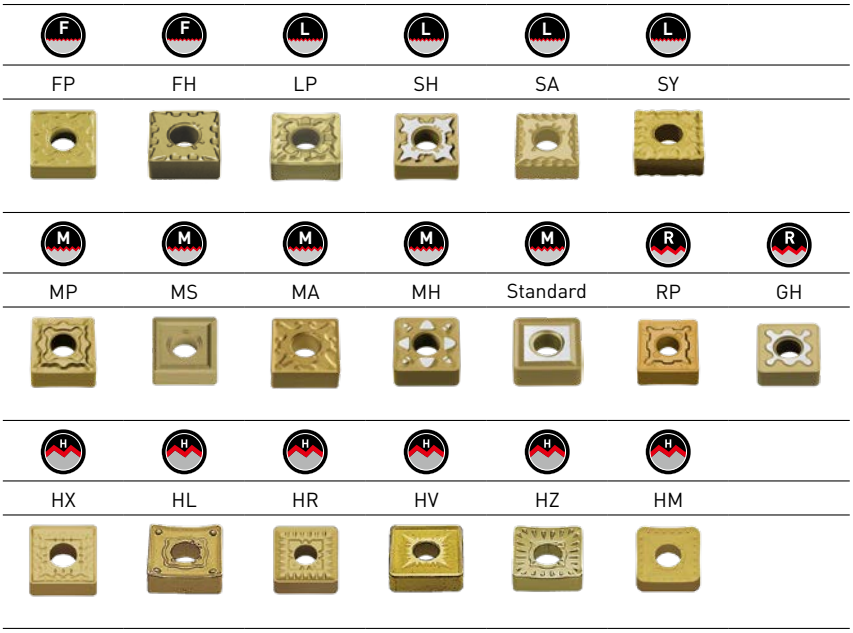
SNMG, SNMM

NEGATIVE INSERTS (WITH HOLE)

M Class

SNMG, SNMM





Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
SNMG120404-FP	F	★	★	★	12.7	4.76	0.4	5.16
SNMG120408-FP	F	★	★	★	12.7	4.76	0.8	5.16
SNMG120412-FP	F	★	★	★	12.7	4.76	1.2	5.16
SNMG120404-FH	F	★	★		12.7	4.76	0.4	5.16
SNMG120408-FH	F	★	★		12.7	4.76	0.8	5.16
SNMG120404-LP	L	●	●	★	12.7	4.76	0.4	5.16
SNMG120408-LP	L	●	●	●	12.7	4.76	0.8	5.16
SNMG120412-LP	L	●	●	★	12.7	4.76	1.2	5.16
SNMG120404-SH	L	★	★		12.7	4.76	0.4	5.16
SNMG120408-SH	L	★	●	★	12.7	4.76	0.8	5.16
SNMG120412-SH	L	★	★	★	12.7	4.76	1.2	5.16
SNMG120404-SA	L	★	★		12.7	4.76	0.4	5.16
SNMG120408-SA	L	★	●	★	12.7	4.76	0.8	5.16
SNMG120412-SA	L	●	●	★	12.7	4.76	1.2	5.16
SNMG120408-SY	L	●	★	★	12.7	4.76	0.8	5.16

(10 inserts in one case)

106 Vc

● / ★ = Expansion

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

SNMG, SNMM – NEGATIVE INSERTS (WITH HOLE)

Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
SNMG120404-MP	M	●	●	★	12.7	4.76	0.4	5.16
SNMG120408-MP	M	●	●	★	12.7	4.76	0.8	5.16
SNMG120412-MP	M	●	●	★	12.7	4.76	1.2	5.16
SNMG120404-MS	M	★	★		12.7	4.76	0.4	5.16
SNMG120408-MS	M	★	★	★	12.7	4.76	0.8	5.16
SNMG120412-MS	M	★	★		12.7	4.76	1.2	5.16
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
SNMG150616-MA	M	★	★	★	15.875	6.35	1.6	6.35
SNMG190612-MA	M	●	●	★	19.05	6.35	1.2	7.93
SNMG190616-MA	M	●	●	★	19.05	6.35	1.6	7.93
SNMG120408-MH	M	●	●	★	12.7	4.76	0.8	5.16
SNMG120412-MH	M	●	●	★	12.7	4.76	1.2	5.16
SNMG190612-MH	M	★	●	★	19.05	6.35	1.2	7.93
SNMG190616-MH	M	★	●	★	19.05	6.35	1.6	7.93
SNMG090304	M	★	●	★	9.525	3.18	0.4	3.81
SNMG090308	M	●	●	★	9.525	3.18	0.8	3.81
SNMG120404	M	●	●	★	12.7	4.76	0.4	5.16
SNMG120408	M	●	●	●	12.7	4.76	0.8	5.16
SNMG120412	M	●	●	★	12.7	4.76	1.2	5.16
SNMG120416	M	★	●	★	12.7	4.76	1.6	5.16
SNMG120420	M	★	●	★	12.7	4.76	2.0	5.16
SNMG150612	M	●	●	★	15.875	6.35	1.2	6.35
SNMG150616	M	★	★	★	15.875	6.35	1.6	6.35
SNMG190612	M	●	●	★	19.05	6.35	1.2	7.93
SNMG190616	M	●	●	★	19.05	6.35	1.6	7.93

2/3

(10 inserts in one case)

106 Vc

● / ★ = Expansion

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

SNMG, SNMM – NEGATIVE INSERTS (WITH HOLE)

Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
SNMG120408-RP	R	●	●	★	12.7	4.76	0.8	5.16
SNMG120412-RP	R	●	●	●	12.7	4.76	1.2	5.16
SNMG120416-RP	R	●	●	★	12.7	4.76	1.6	5.16
SNMG150612-RP	R	●	●	●	15.875	6.35	1.2	6.35
SNMG150616-RP	R	●	●	★	15.875	6.35	1.6	6.35
SNMG190612-RP	R	●	●	●	19.05	6.35	1.2	7.93
SNMG190616-RP	R	●	●	★	19.05	6.35	1.6	7.93
SNMG120408-GH	R	★	●	★	12.7	4.76	0.8	5.16
SNMG120412-GH	R	★	●	★	12.7	4.76	1.2	5.16
SNMG120416-GH	R	★	★		12.7	4.76	1.6	5.16
SNMG150612-GH	R	★	●		15.875	6.35	1.2	6.35
SNMG150616-GH	R	●	●		15.875	6.35	1.6	6.35
SNMG190612-GH	R	★	●		19.05	6.35	1.2	7.93
SNMG190616-GH	R	★	●		19.05	6.35	1.6	7.93
SNMM120408-HX	H		★	★	12.7	4.76	0.8	5.16
SNMM120412-HX	H		★	★	12.7	4.76	1.2	5.16
SNMM150612-HX	H		★	★	15.875	6.35	1.2	6.35
SNMM190612-HX	H	★	●	★	19.05	6.35	1.2	7.93
SNMM190616-HX	H	★	●	★	19.05	6.35	1.6	7.93
SNMM190624-HX	H	●	★	★	19.05	6.35	2.4	7.93
SNMM250724-HX	H	★	★	●	25.4	7.94	2.4	9.12
SNMM250924-HX	H	★	★	●	25.4	9.52	2.4	9.12
SNMM120408-HL	H		●	★	12.7	4.76	0.8	5.16
SNMM120412-HL	H		●	★	12.7	4.76	1.2	5.16
SNMM150612-HL	H		●	●	15.875	6.35	1.2	6.35
SNMM190612-HL	H		●	★	19.05	6.35	1.2	7.93
SNMM190616-HL	H		●	★	19.05	6.35	1.6	7.93
SNMM190624-HL	H		★	★	19.05	6.35	2.4	7.93
SNMM250724-HR	H	●	★	●	25.4	7.94	2.4	9.12
SNMM250924-HR	H	●	★	●	25.4	9.52	2.4	9.12
SNMM190616-HV	H	★	●	★	19.05	6.35	1.6	7.93
SNMM190624-HV	H	★	★	★	19.05	6.35	2.4	7.93
SNMM250724-HV	H	★	●	●	25.4	7.94	2.4	9.12
SNMM250924-HV	H	★	●	●	25.4	9.52	2.4	9.12
SNMM120408-HZ	H	★	★	★	12.7	4.76	0.8	5.16
SNMM120412-HZ	H	★	★	★	12.7	4.76	1.2	5.16
SNMM150612-HZ	H	★	★	★	15.875	6.35	1.2	6.35
SNMM190612-HZ	H	★	●	●	19.05	6.35	1.2	7.93
SNMM190616-HZ	H	★	●	★	19.05	6.35	1.6	7.93
SNMM150612-HM	H		★	★	15.875	6.35	1.2	6.35
SNMM190612-HM	H		★	★	19.05	6.35	1.2	7.93
SNMM190616-HM	H		●	★	19.05	6.35	1.6	7.93
SNMM190624-HM	H		★	●	19.05	6.35	2.4	7.93
SNMM250724-HM	H	★	★	●	25.4	7.94	2.4	9.12
SNMM250924-HM	H	★	★	●	25.4	9.52	2.4	9.12

(10 inserts in one case)

● / ★ = Expansion

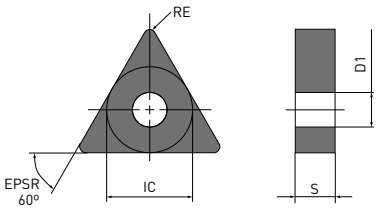
● : Inventory maintained. ★ : Inventory maintained in Japan.

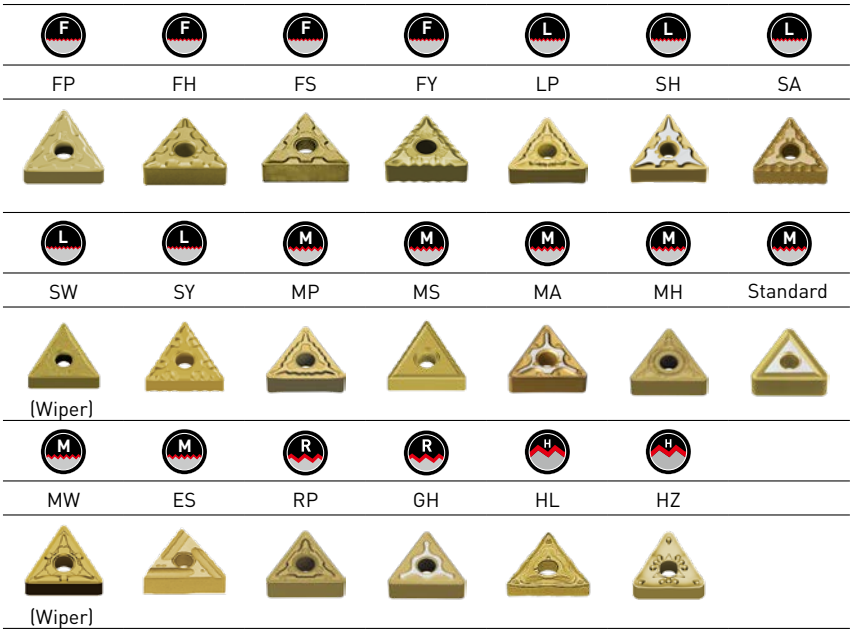
TNMG, TNMX, TNMM

NEGATIVE INSERTS (WITH HOLE)

M Class

TNMG, TNMX, TNMM





Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
TNMG160402-FP	F	★	★	★	9.525	4.76	0.2	3.81
TNMG160404-FP	F	●	★	★	9.525	4.76	0.4	3.81
TNMG160408-FP	F	★	★	★	9.525	4.76	0.8	3.81
TNMG160412-FP	F	★	★	★	9.525	4.76	1.2	3.81
TNMG160402-FH	F	★	★	★	9.525	4.76	0.2	3.81
TNMG160404-FH	F	●	★		9.525	4.76	0.4	3.81
TNMG160408-FH	F	●	★	★	9.525	4.76	0.8	3.81
TNMG160404-FS	F		★	★	9.525	4.76	0.4	3.81
TNMG160408-FS	F		★	★	9.525	4.76	0.8	3.81
TNMG160404-FY	F	●	●	★	9.525	4.76	0.4	3.81
TNMG160408-FY	F	●	★	★	9.525	4.76	0.8	3.81
TNMG160404-LP	L	●	●	★	9.525	4.76	0.4	3.81
TNMG160408-LP	L	●	●	★	9.525	4.76	0.8	3.81
TNMG160412-LP	L	●	●	★	9.525	4.76	1.2	3.81
TNMG220408-LP	L	●	●	★	12.7	4.76	0.8	5.16
TNMG220412-LP	L	●	●	★	12.7	4.76	1.2	5.16
TNMG160404-SH	L	★	★	★	9.525	4.76	0.4	3.81
TNMG160408-SH	L	★	★	★	9.525	4.76	0.8	3.81
TNMG220408-SH	L	★	★		12.7	4.76	0.8	5.16

1/3

(10 inserts in one case)

106 Vc

● / ★ = Expansion

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

TNMG, TNMX, TNMM – NEGATIVE INSERTS (WITH HOLE)

Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
TNMG160404-SA	L	★	★	★	9.525	4.76	0.4	3.81
TNMG160408-SA	L	★	★	★	9.525	4.76	0.8	3.81
TNMG160412-SA	L	★	●	★	9.525	4.76	1.2	3.81
TNMG220408-SA	L	●	★	★	12.7	4.76	0.8	5.16
TNMG220412-SA	L	★	★		12.7	4.76	1.2	5.16
TNMX160404-SW	L	●	●		9.525	4.76	0.4	3.81
TNMX160408-SW	L	●	●		9.525	4.76	0.8	3.81
TNMG160404-SY	L	●	★	★	9.525	4.76	0.4	3.81
TNMG160408-SY	L	●	●	★	9.525	4.76	0.8	3.81
TNMG160404-MP	M	●	●	★	9.525	4.76	0.4	3.81
TNMG160408-MP	M	●	●	★	9.525	4.76	0.8	3.81
TNMG160412-MP	M	●	●	★	9.525	4.76	1.2	3.81
TNMG220408-MP	M	●	●	★	12.7	4.76	0.8	5.16
TNMG220412-MP	M	●	●	★	12.7	4.76	1.2	5.16
TNMG160404-MS	M	★	★		9.525	4.76	0.4	3.81
TNMG160408-MS	M	★	★	★	9.525	4.76	0.8	3.81
TNMG160412-MS	M	★	★		9.525	4.76	1.2	3.81
TNMG220408-MS	M	★	★		12.7	4.76	0.8	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
TNMG270608-MA	M	★	★	★	15.875	6.35	0.8	6.35
TNMG270612-MA	M	★	★	★	15.875	6.35	1.2	6.35
TNMG160404-MH	M	★	●	★	9.525	4.76	0.4	3.81
TNMG160408-MH	M	●	●	★	9.525	4.76	0.8	3.81
TNMG160412-MH	M	●	●	★	9.525	4.76	1.2	3.81
TNMG220408-MH	M	●	●	★	12.7	4.76	0.8	5.16
TNMG220412-MH	M	●	●	★	12.7	4.76	1.2	5.16
TNMG110304	M	★	●	★	6.35	3.18	0.4	2.26
TNMG110308	M	★	★	★	6.35	3.18	0.8	2.26
TNMG160304	M	★	★	★	9.525	3.18	0.4	3.81
TNMG160308	M	★	★	★	9.525	3.18	0.8	3.81
TNMG160404	M	●	●	★	9.525	4.76	0.4	3.81
TNMG160408	M	●	●	★	9.525	4.76	0.8	3.81
TNMG160412	M	●	●	★	9.525	4.76	1.2	3.81
TNMG160416	M	★	★	★	9.525	4.76	1.6	3.81
TNMG220404	M	●	●	★	12.7	4.76	0.4	5.16
TNMG220408	M	●	●	★	12.7	4.76	0.8	5.16
TNMG220412	M	●	●	★	12.7	4.76	1.2	5.16
TNMG220416	M	★	★	★	12.7	4.76	1.6	5.16
TNMG270608	M	★	★	★	15.875	6.35	0.8	6.35
TNMG270612	M	★	★	★	15.875	6.35	1.2	6.35
TNMG270616	M	★	★	★	15.875	6.35	1.6	6.35

2/3

(10 inserts in one case)

● / ★ = Expansion

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

TNMG, TNMX, TNMM – NEGATIVE INSERTS (WITH HOLE)

Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
TNMX160408-MW	M	●	●		9.525	4.76	0.8	3.81
TNMX160412-MW	M	●	●		9.525	4.76	1.2	3.81
TNMG160404R-ES	M	★	★		9.525	4.76	0.4	3.81
TNMG160404L-ES	M	★	★		9.525	4.76	0.4	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-RP	R	●	●	★	9.525	4.76	0.8	3.81
TNMG160412-RP	R	●	●	★	9.525	4.76	1.2	3.81
TNMG220408-RP	R	●	●	●	12.7	4.76	0.8	5.16
TNMG220412-RP	R	●	●	★	12.7	4.76	1.2	5.16
TNMG220416-RP	R	●	●	★	12.7	4.76	1.6	5.16
TNMG270612-RP	R	★	★	★	15.875	6.35	1.2	6.35
TNMG270616-RP	R	★	★	★	15.875	6.35	1.6	6.35
TNMG160408-GH	R	★	★	★	9.525	4.76	0.8	3.81
TNMG160412-GH	R	★	★		9.525	4.76	1.2	3.81
TNMG220408-GH	R	★	★	★	12.7	4.76	0.8	5.16
TNMG220412-GH	R	★	★	★	12.7	4.76	1.2	5.16
TNMG220416-GH	R	★	★		12.7	4.76	1.6	5.16
TNMG270612-GH	R	★	★	★	15.875	6.35	1.2	6.35
TNMG270616-GH	R	★	★		15.875	6.35	1.6	6.35
TNMM160408-HL	H		●	★	9.525	4.76	0.8	3.81
TNMM160412-HL	H		●	●	9.525	4.76	1.2	3.81
TNMM220408-HL	H		●	★	12.7	4.76	0.8	5.16
TNMM220412-HL	H		●	●	12.7	4.76	1.2	5.16
TNMM220416-HL	H		★	★	12.7	4.76	1.6	5.16
TNMM160408-HZ	H	★	★	★	9.525	4.76	0.8	3.81
TNMM160412-HZ	H		★	★	9.525	4.76	1.2	3.81
TNMM220408-HZ	H	★	●	★	12.7	4.76	0.8	5.16
TNMM220412-HZ	H	★	●	★	12.7	4.76	1.2	5.16
TNMM220416-HZ	H	★	●	★	12.7	4.76	1.6	5.16

(10 inserts in one case)

106 Vc

● / ★ = Expansion

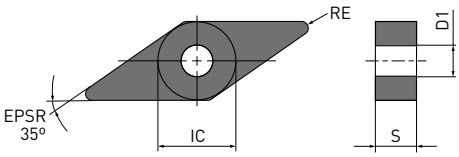
● : Inventory maintained. ★ : Inventory maintained in Japan.

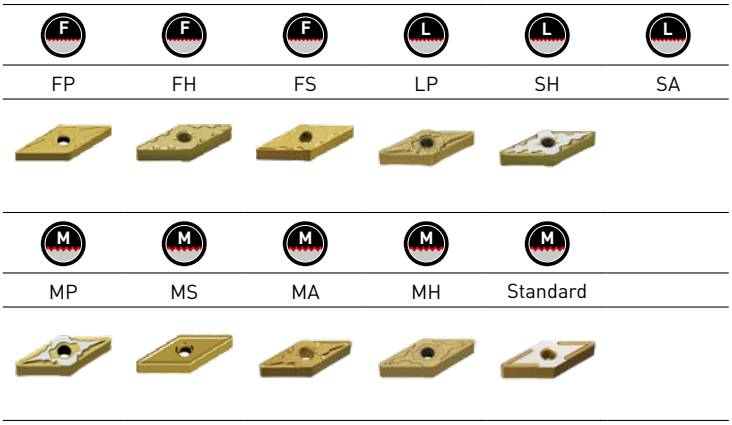
VNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

VNMG





Order number	F L M R N	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
VNMG160402-FP	F	★	★	★	9.525	4.76	0.2	3.81
VNMG160404-FP	F	●	★	★	9.525	4.76	0.4	3.81
VNMG160408-FP	F	★	★	★	9.525	4.76	0.8	3.81
VNMG160412-FP	F	★	★	★	9.525	4.76	1.2	3.81
VNMG160402-FH	F	★	★	★	9.525	4.76	0.2	3.81
VNMG160404-FH	F	★	★	★	9.525	4.76	0.4	3.81
VNMG160408-FH	F	★	★	★	9.525	4.76	0.8	3.81
VNMG160404-FS	F		★	★	9.525	4.76	0.4	3.81
VNMG160408-FS	F		★	★	9.525	4.76	0.8	3.81
VNMG160404-LP	L	●	●	★	9.525	4.76	0.4	3.81
VNMG160408-LP	L	●	●	★	9.525	4.76	0.8	3.81
VNMG160404-SH	L	★	★	★	9.525	4.76	0.4	3.81
VNMG160408-SH	L	★	★	★	9.525	4.76	0.8	3.81
VNMG160404-SA	L	★	★	★	9.525	4.76	0.4	3.81
VNMG160408-SA	L	★	●	★	9.525	4.76	0.8	3.81
VNMG160404-MP	M	●	●	★	9.525	4.76	0.4	3.81
VNMG160408-MP	M	●	●	●	9.525	4.76	0.8	3.81
VNMG160412-MP	M	●	●	★	9.525	4.76	1.2	3.81
VNMG160404-MS	M	★	●		9.525	4.76	0.4	3.81
VNMG160408-MS	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-MH	M	★	★	★	9.525	4.76	0.4	3.81
VNMG160408-MH	M	●	●	★	9.525	4.76	0.8	3.81
VNMG160404	M	●	●	★	9.525	4.76	0.4	3.81
VNMG160408	M	●	●	★	9.525	4.76	0.8	3.81
VNMG160412	M	●	●	★	9.525	4.76	1.2	3.81

(10 inserts in one case)

106 Vc

● / ★ = Expansion

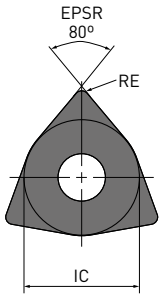
● : Inventory maintained. ★ : Inventory maintained in Japan.

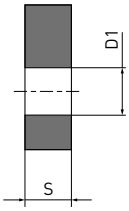
WNMG

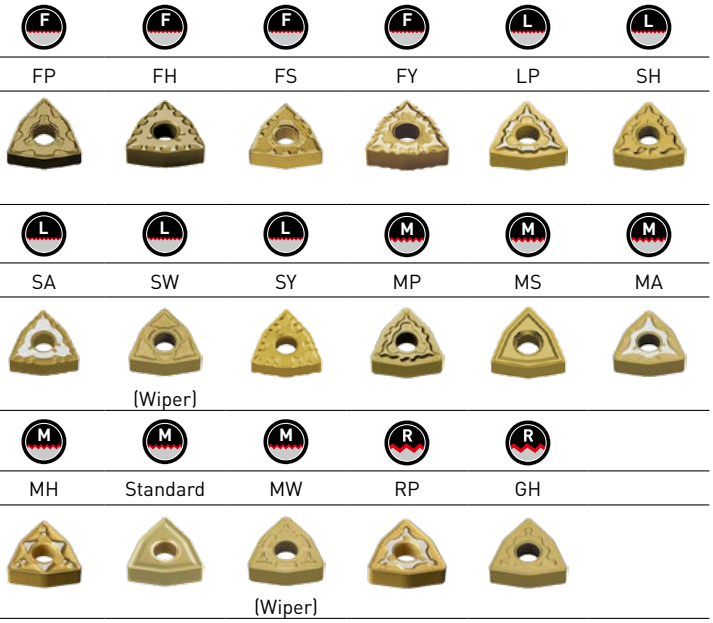
NEGATIVE INSERTS (WITH HOLE)

M Class

WNMG







Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
WNMG080402-FP	F	★	★	★	12.7	4.76	0.2	5.16
WNMG080404-FP	F	★	★	★	12.7	4.76	0.4	5.16
WNMG080408-FP	F	★	★	★	12.7	4.76	0.8	5.16
WNMG080412-FP	F	★	★	★	12.7	4.76	1.2	5.16
WNMG080404-FH	F	★	★		12.7	4.76	0.4	5.16
WNMG080408-FH	F	★	★		12.7	4.76	0.8	5.16
WNMG080404-FS	F		★	★	12.7	4.76	0.4	5.16
WNMG080408-FS	F		★	★	12.7	4.76	0.8	5.16
WNMG080408-FY	F	★	★	★	12.7	4.76	0.8	5.16
WNMG06T304-LP	L	★	★	●	9.525	3.97	0.4	3.81
WNMG06T308-LP	L	●	★	●	9.525	3.97	0.8	3.81
WNMG060404-LP	L	●	●	●	9.525	4.76	0.4	3.81
WNMG060408-LP	L	●	●	●	9.525	4.76	0.8	3.81
WNMG080404-LP	L	●	●	★	12.7	4.76	0.4	5.16
WNMG080408-LP	L	●	●	★	12.7	4.76	0.8	5.16
WNMG080412-LP	L	●	●	★	12.7	4.76	1.2	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
WNMG080412-SH	L	★	★	★	12.7	4.76	1.2	5.16
WNMG080404-SA	L	★	★	★	12.7	4.76	0.4	5.16
WNMG080408-SA	L	★	★	★	12.7	4.76	0.8	5.16
WNMG080412-SA	L	★	★	★	12.7	4.76	1.2	5.16

1/2

(10 inserts in one case)

● / ★ = Expansion

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

WNMG – NEGATIVE INSERTS (WITH HOLE)

Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
WNMG060404-SW	L	●	★		9.525	4.76	0.4	3.81
WNMG060408-SW	L	●	●		9.525	4.76	0.8	3.81
WNMG080404-SW	L	●	★		12.7	4.76	0.4	5.16
WNMG080408-SW	L	●	★		12.7	4.76	0.8	5.16
WNMG080412-SW	L	●	★		12.7	4.76	1.2	5.16
WNMG080408-SY	L	●	●	★	12.7	4.76	0.8	5.16
WNMG06T304-MP	M	●	●	●	9.525	3.97	0.4	3.81
WNMG06T308-MP	M	●	●	●	9.525	3.97	0.8	3.81
WNMG06T312-MP	M	●	●	●	9.525	3.97	1.2	3.81
WNMG060404-MP	M	●	●	●	9.525	4.76	0.4	3.81
WNMG060408-MP	M	●	●	●	9.525	4.76	0.8	3.81
WNMG060412-MP	M	●	●	●	9.525	4.76	1.2	3.81
WNMG080404-MP	M	●	●	★	12.7	4.76	0.4	5.16
WNMG080408-MP	M	●	●	●	12.7	4.76	0.8	5.16
WNMG080412-MP	M	●	●	★	12.7	4.76	1.2	5.16
WNMG080416-MP	M	●	●	★	12.7	4.76	1.6	5.16
WNMG06T304-MS	M	★	●		9.525	3.97	0.4	3.81
WNMG06T308-MS	M	★	★		9.525	3.97	0.8	3.81
WNMG060404-MS	M	★	★		9.525	4.76	0.4	3.81
WNMG060408-MS	M	★	★		9.525	4.76	0.8	3.81
WNMG080404-MS	M	★	★	★	12.7	4.76	0.4	5.16
WNMG080408-MS	M	★	★	★	12.7	4.76	0.8	5.16
WNMG080412-MS	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
WNMG060404-MA	M	●	●	★	9.525	4.76	0.4	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
WNMG080416-MA	M	●	●		12.7	4.76	1.6	5.16
WNMG100612-MA	M		★	★	15.875	6.35	1.2	6.35
WNMG080404-MH	M	★	●	★	12.7	4.76	0.4	5.16
WNMG080408-MH	M	●	●	★	12.7	4.76	0.8	5.16
WNMG080412-MH	M	●	●	★	12.7	4.76	1.2	5.16
WNMG080404	M	●	●	★	12.7	4.76	0.4	5.16
WNMG080408	M	●	●	★	12.7	4.76	0.8	5.16
WNMG080412	M	●	●	★	12.7	4.76	1.2	5.16
WNMG060408-MW	M	●	●	★	9.525	4.76	0.8	3.81
WNMG060412-MW	M	●	●	★	9.525	4.76	1.2	3.81
WNMG080408-MW	M	●	●	★	12.7	4.76	0.8	5.16
WNMG080412-MW	M	●	●	★	12.7	4.76	1.2	5.16
WNMG080408-RP	R	●	●	●	12.7	4.76	0.8	5.16
WNMG080412-RP	R	●	●	●	12.7	4.76	1.2	5.16
WNMG080416-RP	R	●	●		12.7	4.76	1.6	5.16
WNMG080408-GH	R	★	●	★	12.7	4.76	0.8	5.16
WNMG080412-GH	R	★	●	★	12.7	4.76	1.2	5.16

(10 inserts in one case)

● / ★ = Expansion

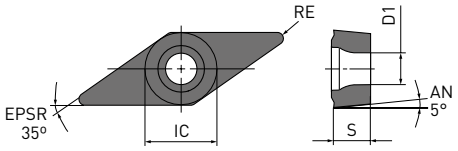
● : Inventory maintained. ★ : Inventory maintained in Japan.

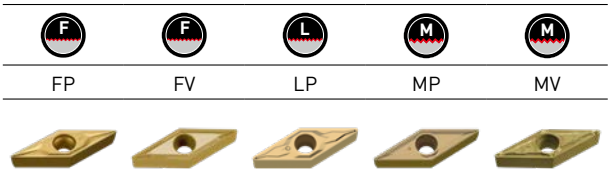
VBMT

5° POSITIVE INSERTS (WITH HOLE)

M Class

VBMT





Order number	F L M R N	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
VBMT110302-FP	F	●	●	★	6.35	3.18	0.2	2.9
VBMT110304-FP	F	●	●	★	6.35	3.18	0.4	2.9
VBMT110308-FP	F	●	★	★	6.35	3.18	0.8	2.9
VBMT160404-FP	F	●	●	★	9.525	4.76	0.4	4.4
VBMT160408-FP	F	●	●	★	9.525	4.76	0.8	4.4
VBMT160412-FP	F	●	●	●	9.525	4.76	1.2	4.4
VBMT110304-FV	F	●	●	★	6.35	3.18	0.4	2.9
VBMT110308-FV	F		●	★	6.35	3.18	0.8	2.9
VBMT160404-FV	F	●	●	★	9.525	4.76	0.4	4.4
VBMT160408-FV	F	●	●	★	9.525	4.76	0.8	4.4
VBMT110304-LP	L	●	●	★	6.35	3.18	0.4	2.9
VBMT110308-LP	L	●	●	★	6.35	3.18	0.8	2.9
VBMT160404-LP	L	●	●	★	9.525	4.76	0.4	4.4
VBMT160408-LP	L	●	●	★	9.525	4.76	0.8	4.4
VBMT160412-LP	L	●	●	●	9.525	4.76	1.2	4.4
VBMT160404-MP	M	●	●	★	9.525	4.76	0.4	4.4
VBMT160408-MP	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

(10 inserts in one case)

109 Vc

● / ★ = Expansion

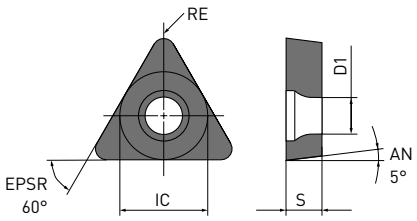
● : Inventory maintained. ★ : Inventory maintained in Japan.

TBMT, WBMT

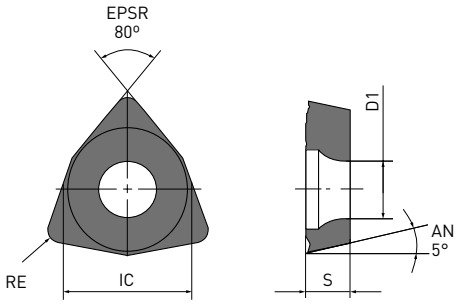
5° POSITIVE INSERTS (WITH HOLE)

M Class

TBMT



WBMT



F
FV

M
MV

Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
TBMT060102-FV	F	●		●	3.97	1.59	0.2	2.3
TBMT060104-FV	F	●		●	3.97	1.59	0.4	2.3
WBMTL30202R-MV	M		●	★	4.76	2.38	0.2	2.3
WBMTL30202L-MV	M		★	★	4.76	2.38	0.2	2.3
WBMTL30204R-MV	M		★	★	4.76	2.38	0.4	2.3
WBMTL30204L-MV	M		★	★	4.76	2.38	0.4	2.3

1/1

(10 inserts in one case)

109 Vc

● / ★ = Expansion

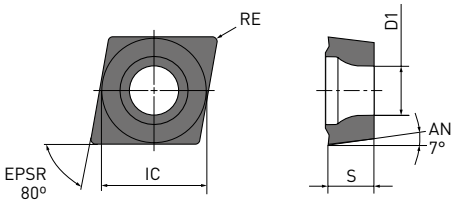
● : Inventory maintained. ★ : Inventory maintained in Japan.

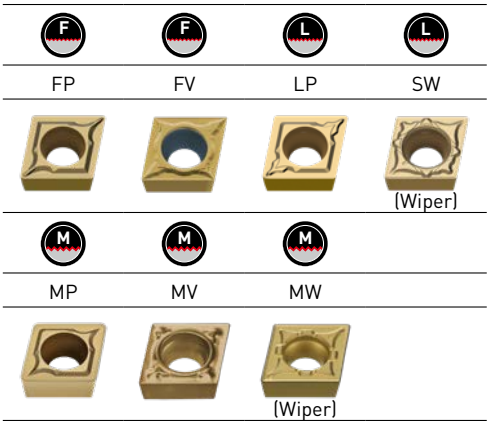
CCMT, CCMH

7° POSITIVE INSERTS (WITH HOLE)

M Class

CCMT, CCMH





Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
CCMT060202-FP	F	●	●	★	6.35	2.38	0.2	2.8
CCMT060204-FP	F	●	●	★	6.35	2.38	0.4	2.8
CCMT09T302-FP	F	●	●	★	9.525	3.97	0.2	4.4
CCMT09T304-FP	F	●	●	★	9.525	3.97	0.4	4.4
CCMT09T308-FP	F	●	●	★	9.525	3.97	0.8	4.4
CCMT060202-FV	F		●	★	6.35	2.38	0.2	2.8
CCMT060204-FV	F		●	★	6.35	2.38	0.4	2.8
CCMT09T302-FV	F		●	★	9.525	3.97	0.2	4.4
CCMT09T304-FV	F		●	★	9.525	3.97	0.4	4.4
CCMT09T308-FV	F		●	★	9.525	3.97	0.8	4.4
CCMT060202-LP	L	●	●	★	6.35	2.38	0.2	2.8
CCMT060204-LP	L	●	●	★	6.35	2.38	0.4	2.8
CCMT060208-LP	L	●	●	★	6.35	2.38	0.8	2.8
CCMT09T302-LP	L	●	●	●	9.525	3.97	0.2	4.4
CCMT09T304-LP	L	●	●	★	9.525	3.97	0.4	4.4
CCMT09T308-LP	L	●	●	★	9.525	3.97	0.8	4.4
CCMT060202-SW	L	●	●	★	6.35	2.38	0.2	2.8
CCMT060204-SW	L	●	●	★	6.35	2.38	0.4	2.8
CCMT060208-SW	L	●	●	●	6.35	2.38	0.8	2.8
CCMT09T302-SW	L	●	●	★	9.525	3.97	0.2	4.4
CCMT09T304-SW	L	●	●	★	9.525	3.97	0.4	4.4
CCMT09T308-SW	L	●	●	●	9.525	3.97	0.8	4.4

1/2

(10 inserts in one case)

109 Vc

● / ★ = Expansion

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

CCMT, CCMH – 7° POSITIVE INSERTS (WITH HOLE)

Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
CCMT060202-MP	M	●	●	★	6.35	2.38	0.2	2.8
CCMT060204-MP	M	●	●	★	6.35	2.38	0.4	2.8
CCMT060208-MP	M	●	●	★	6.35	2.38	0.8	2.8
CCMT080302-MP	M	★	★		7.94	3.18	0.2	3.4
CCMT080304-MP	M	●	★		7.94	3.18	0.4	3.4
CCMT080308-MP	M	●	★		7.94	3.18	0.8	3.4
CCMT09T302-MP	M	●	●	★	9.525	3.97	0.2	4.4
CCMT09T304-MP	M	●	●	★	9.525	3.97	0.4	4.4
CCMT09T308-MP	M	●	●	★	9.525	3.97	0.8	4.4
CCMT120404-MP	M	●	●	★	12.7	4.76	0.4	5.5
CCMT120408-MP	M	●	●	★	12.7	4.76	0.8	5.5
CCMT120412-MP	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
CCMT060204-MW	M	●	●	★	6.35	2.38	0.4	2.8
CCMT060208-MW	M	●	●	★	6.35	2.38	0.8	2.8
CCMT09T304-MW	M	●	●	★	9.525	3.97	0.4	4.4
CCMT09T308-MW	M	●	●	★	9.525	3.97	0.8	4.4
CCMT120404-MW	M	●	●	★	12.7	4.76	0.4	5.5
CCMT120408-MW	M	●	●	★	12.7	4.76	0.8	5.5

(10 inserts in one case)

109 Vc

● / ★ = Expansion

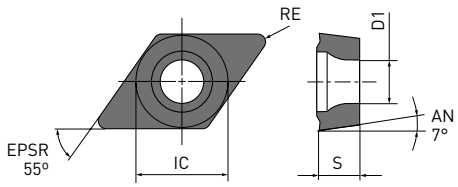
● : Inventory maintained. ★ : Inventory maintained in Japan.

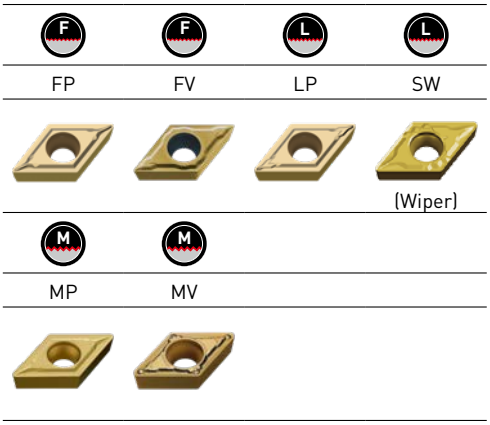
DCMT, DCMX

7° POSITIVE INSERTS (WITH HOLE)

M Class

DCMT, DCMX





Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
DCMT070202-FP	F	●	●	★	6.35	2.38	0.2	2.8
DCMT070204-FP	F	●	●	★	6.35	2.38	0.4	2.8
DCMT11T302-FP	F	●	●	★	9.525	3.97	0.2	4.4
DCMT11T304-FP	F	●	●	★	9.525	3.97	0.4	4.4
DCMT11T308-FP	F	●	●	★	9.525	3.97	0.8	4.4
DCMT070202-FV	F	●	●	★	6.35	2.38	0.2	2.8
DCMT070204-FV	F	●	●	★	6.35	2.38	0.4	2.8
DCMT070208-FV	F		●	★	6.35	2.38	0.8	2.8
DCMT11T302-FV	F		●	★	9.525	3.97	0.2	4.4
DCMT11T304-FV	F	●	●	★	9.525	3.97	0.4	4.4
DCMT11T308-FV	F	●	●	★	9.525	3.97	0.8	4.4
DCMT070202-LP	L	●	●	★	6.35	2.38	0.2	2.8
DCMT070204-LP	L	●	●	★	6.35	2.38	0.4	2.8
DCMT070208-LP	L	●	●	★	6.35	2.38	0.8	2.8
DCMT11T302-LP	L	●	●	★	9.525	3.97	0.2	4.4
DCMT11T304-LP	L	●	●	★	9.525	3.97	0.4	4.4
DCMT11T308-LP	L	●	●	★	9.525	3.97	0.8	4.4
DCMX070202-SW	L	●	●	●	6.35	2.38	0.2	2.8
DCMX070204-SW	L	●	●	●	6.35	2.38	0.4	2.8
DCMX070208-SW	L	●	●	●	6.35	2.38	0.8	2.8
DCMX11T302-SW	L	●	●	●	9.525	3.97	0.2	4.4
DCMX11T304-SW	L	●	●	●	9.525	3.97	0.4	4.4
DCMX11T308-SW	L	●	●	●	9.525	3.97	0.8	4.4

1/2

(10 inserts in one case)

109 Vc

● / ★ = Expansion

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

DCMT, DCMX – 7° POSITIVE INSERTS (WITH HOLE)

Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
DCMT070202-MP	M	●	●	★	6.35	2.38	0.2	2.8
DCMT070204-MP	M	●	●	★	6.35	2.38	0.4	2.8
DCMT070208-MP	M	●	●	★	6.35	2.38	0.8	2.8
DCMT11T302-MP	M	●	●	★	9.525	3.97	0.2	4.4
DCMT11T304-MP	M	●	●	★	9.525	3.97	0.4	4.4
DCMT11T308-MP	M	●	●	★	9.525	3.97	0.8	4.4
DCMT11T312-MP	M	●	●		9.525	3.97	1.2	4.4
DCMT150404-MP	M	●	●	★	12.7	4.76	0.4	5.5
DCMT150408-MP	M	●	●	★	12.7	4.76	0.8	5.5
DCMT150412-MP	M	●	●		12.7	4.76	1.2	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

(10 inserts in one case)

109 Vc

● / ★ = Expansion

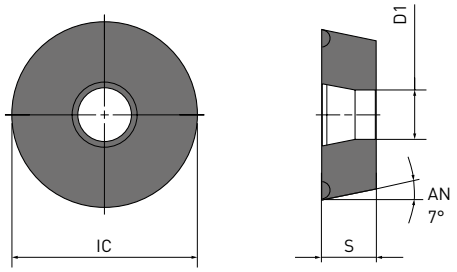
● : Inventory maintained. ★ : Inventory maintained in Japan.

RCMT, RCMX, SCMT

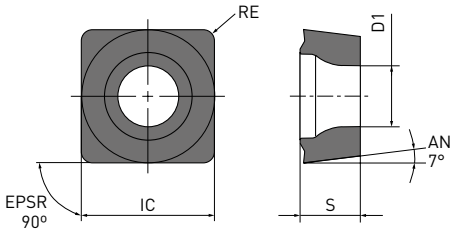
7° POSITIVE INSERTS (WITH HOLE)

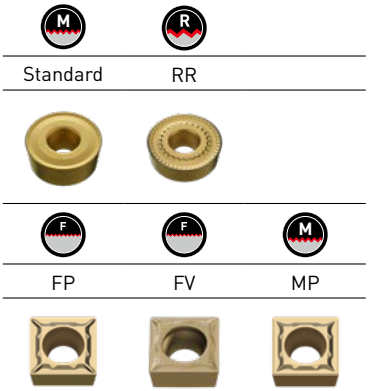
M Class

RCMT, RCMX



SCMT





Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
RCMT0602M0	M	●	●		6	2.38	—	2.8
RCMT0803M0	M	●	●		8	3.18	—	3.4
RCMX1003M0	M	●	●	★	10	3.18	—	3.6
RCMX1204M0	M	★	●	★	12	4.76	—	4.2
RCMX1606M0	M	★	●	★	16	6.35	—	5.2
RCMX2006M0	M	●	●	●	20	6.35	—	6.5
RCMX2507M0	M	★	●	★	25	7.94	—	7.2
RCMX3209M0	M	★	★	★	32	9.52	—	9.5
RCMX1606M0-RR	R	★	●	●	16	6.35	—	5.2
RCMX2006M0-RR	R	●	★	●	20	6.35	—	6.5
RCMX2507M0-RR	R	★	●	●	25	7.94	—	7.2
RCMX3209M0-RR	R	★	★	★	32	9.52	—	9.5
SCMT09T304-FP	F	●	●	★	9.525	3.97	0.4	4.4
SCMT09T308-FP	F	●	●	★	9.525	3.97	0.8	4.4
SCMT09T304-FV	F		●	★	9.525	3.97	0.4	4.4
SCMT09T304-LP	L	●	●	★	9.525	3.97	0.4	4.4
SCMT09T308-LP	L	●	●	★	9.525	3.97	0.8	4.4
SCMT09T304-MP	M	●	●	★	9.525	3.97	0.4	4.4
SCMT09T308-MP	M	●	●	★	9.525	3.97	0.8	4.4
SCMT120404-MP	M	●	●	★	12.7	4.76	0.4	5.5
SCMT120408-MP	M	●	●	★	12.7	4.76	0.8	5.5
SCMT120412-MP	M	●	★		12.7	4.76	1.2	5.5

1/1

(10 inserts in one case)

● / ★ = Expansion

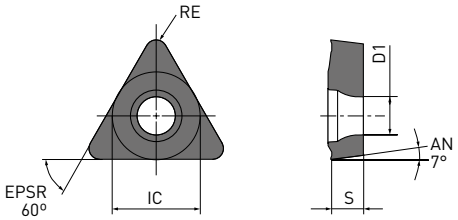
● : Inventory maintained. ★ : Inventory maintained in Japan.

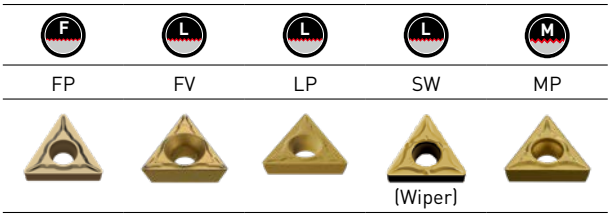
TCMT, TCMX

7° POSITIVE INSERTS (WITH HOLE)

M Class

TCMT, TCMX





Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
TCMT090202-FP	F	●	★	★	5.56	2.38	0.2	2.5
TCMT090204-FP	F	●	●	★	5.56	2.38	0.4	2.5
TCMT110202-FP	F	●	★	★	6.35	2.38	0.2	2.8
TCMT110204-FP	F	●	●	★	6.35	2.38	0.4	2.8
TCMT16T304-FP	F	●	●	★	9.525	3.97	0.4	4.4
TCMT110204-FV	F		●	★	6.35	2.38	0.4	2.8
TCMT16T304-FV	F		●	★	9.525	3.97	0.4	4.4
TCMT090204-LP	L	●	●	★	5.56	2.38	0.4	2.5
TCMT090208-LP	L	●	★	★	5.56	2.38	0.8	2.5
TCMT110202-LP	L	●	●	●	6.35	2.38	0.2	2.8
TCMT110204-LP	L	●	●	★	6.35	2.38	0.4	2.8
TCMT110208-LP	L	●	●	★	6.35	2.38	0.8	2.8
TCMT16T304-LP	L	●	●	★	9.525	3.97	0.4	4.4
TCMT16T308-LP	L	●	●	★	9.525	3.97	0.8	4.4
TCMX090204-SW	L	●	●	●	5.56	2.38	0.4	2.5
TCMX110204-SW	L	●	●	●	6.35	2.38	0.4	2.8
TCMT090204-MP	M	●	★	★	5.56	2.38	0.4	2.5
TCMT090208-MP	M	●	★	★	5.56	2.38	0.8	2.5
TCMT110202-MP	M	●	●	★	6.35	2.38	0.2	2.8
TCMT110204-MP	M	●	★	★	6.35	2.38	0.4	2.8
TCMT110208-MP	M	●	★	★	6.35	2.38	0.8	2.8
TCMT130304-MP	M	●	●	★	7.94	3.18	0.4	3.4
TCMT16T304-MP	M	●	●	★	9.525	3.97	0.4	4.4
TCMT16T308-MP	M	●	●	★	9.525	3.97	0.8	4.4
TCMT16T312-MP	M	●	●	★	9.525	3.97	1.2	4.4

(10 inserts in one case)

109 Vc

● / ★ = Expansion

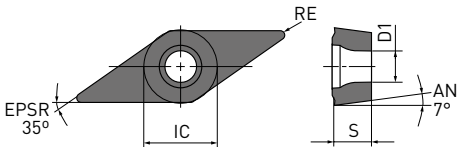
● : Inventory maintained. ★ : Inventory maintained in Japan.

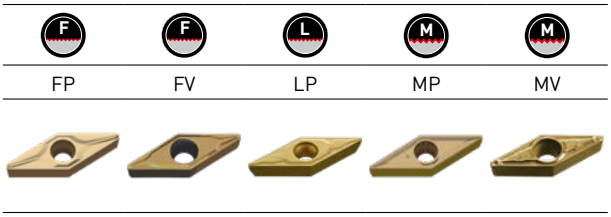
VCMT

7° POSITIVE INSERTS (WITH HOLE)

M Class

VCMT





Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
VCMT080202-FP	F	●	●	●	4.76	2.38	0.2	2.4
VCMT080204-FP	F	●	●	●	4.76	2.38	0.4	2.4
VCMT110302-FP	F	●	●	★	6.35	3.18	0.2	2.8
VCMT110304-FP	F	●	●	★	6.35	3.18	0.4	2.8
VCMT160404-FP	F	●	●	★	9.525	4.76	0.4	4.4
VCMT160408-FP	F	●	●	★	9.525	4.76	0.8	4.4
VCMT080202-FV	F		●	★	4.76	2.38	0.2	2.4
VCMT080204-FV	F		●	★	4.76	2.38	0.4	2.4
VCMT160404-FV	F	●	●	★	9.525	4.76	0.4	4.4
VCMT160408-FV	F	●	●	★	9.525	4.76	0.8	4.4
VCMT080202-LP	L	●	★	★	4.76	2.38	0.2	2.4
VCMT080204-LP	L	●	●	★	4.76	2.38	0.4	2.4
VCMT110304-LP	L	●	●	★	6.35	3.18	0.4	2.8
VCMT110308-LP	L	●	●	★	6.35	3.18	0.8	2.8
VCMT160404-LP	L	●	●	★	9.525	4.76	0.4	4.4
VCMT160408-LP	L	●	●	★	9.525	4.76	0.8	4.4
VCMT110304-MP	M	●	●	★	6.35	3.18	0.4	2.8
VCMT160404-MP	M	●	●	★	9.525	4.76	0.4	4.4
VCMT160408-MP	M	●	●	★	9.525	4.76	0.8	4.4
VCMT160412-MP	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

1/1

(10 inserts in one case)

109 Vc

● / ★ = Expansion

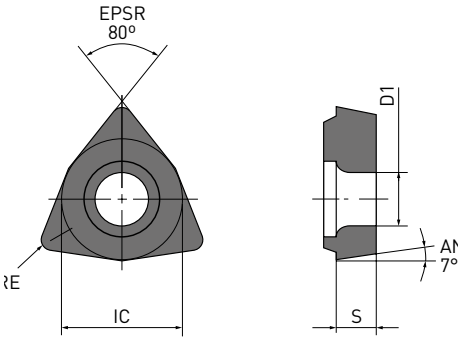
● : Inventory maintained. ★ : Inventory maintained in Japan.

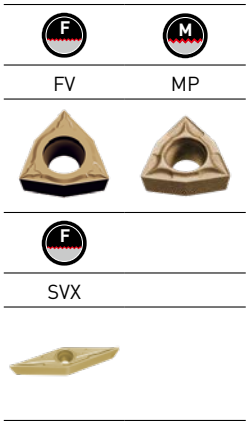
WCMT, XCMT

7° POSITIVE INSERTS (WITH HOLE)

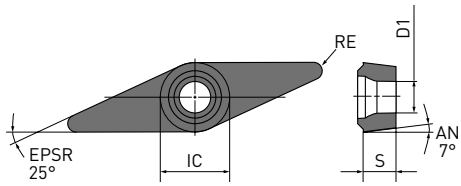
M Class

WCMT





XCMT



Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
WCMT020102-FV	F		●		3.97	1.59	0.2	2.3
WCMT020104-FV	F		●		3.97	1.59	0.4	2.3
WCMTL30202-FV	F		●		4.76	2.38	0.2	2.3
WCMTL30204-FV	F		●		4.76	2.38	0.4	2.3
WCMT040202-FV	F		●		6.35	2.38	0.2	2.8
WCMT040204-FV	F		●		6.35	2.38	0.4	2.8
WCMT06T302-FV	F		●		9.525	3.97	0.2	4.4
WCMT06T304-FV	F		●		9.525	3.97	0.4	4.4
WCMT020102-MP	M	★	★	★	3.97	1.59	0.2	2.3
WCMT020104-MP	M	★	★	★	3.97	1.59	0.4	2.3
WCMTL30202-MP	M	★	★		4.76	2.38	0.2	2.3
WCMTL30204-MP	M	★	★		4.76	2.38	0.4	2.3
WCMT040202-MP	M	★	★	★	6.35	2.38	0.2	2.8
WCMT040204-MP	M	★	★	★	6.35	2.38	0.4	2.8
WCMT040208-MP	M		★	★	6.35	2.38	0.8	2.8
WCMT06T304-MP	M	★	★	★	9.525	3.97	0.4	4.4
WCMT06T308-MP	M	★	★	★	9.525	3.97	0.8	4.4
XCMT150304-SVX	F		●	★	6.35	3.18	0.4	2.85
XCMT150308-SVX	F		●	★	6.35	3.18	0.8	2.85

1/1

(10 inserts in one case)

109 Vc

● / ★ = Expansion

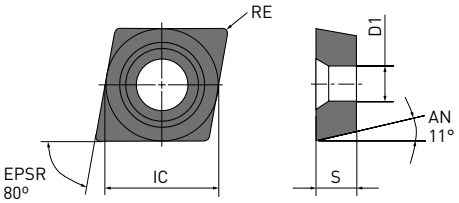
● : Inventory maintained. ★ : Inventory maintained in Japan.

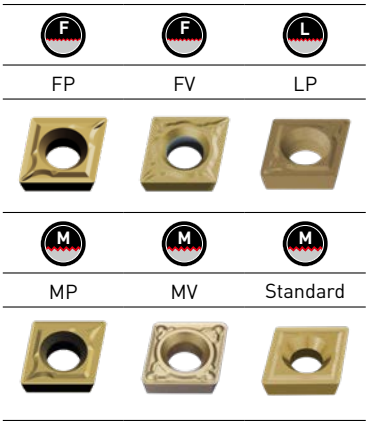
CPMH

11° POSITIVE INSERTS (WITH HOLE)

M Class

CPMH





Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
CPMH080202-FP	F		●	●	7.94	2.38	0.2	3.5
CPMH080204-FP	F		●	●	7.94	2.38	0.4	3.5
CPMH090302-FP	F		●	●	9.525	3.18	0.2	4.5
CPMH090304-FP	F		●	●	9.525	3.18	0.4	4.5
CPMH090308-FP	F		●	●	9.525	3.18	0.8	4.5
CPMH080202-FV	F		★	★	7.94	2.38	0.2	3.5
CPMH080204-FV	F		●	★	7.94	2.38	0.4	3.5
CPMH090302-FV	F		★	★	9.525	3.18	0.2	4.5
CPMH090304-FV	F		●	★	9.525	3.18	0.4	4.5
CPMH090308-FV	F		●	★	9.525	3.18	0.8	4.5
CPMH080202-LP	L		●	★	7.94	2.38	0.2	3.5
CPMH080204-LP	L	●	●	★	7.94	2.38	0.4	3.5
CPMH080208-LP	L	●	●	●	7.94	2.38	0.8	3.5
CPMH090302-LP	L		●	★	9.525	3.18	0.2	4.5
CPMH090304-LP	L	●	★	★	9.525	3.18	0.4	4.5
CPMH090308-LP	L	●	★	★	9.525	3.18	0.8	4.5
CPMH080204-MP	M	●	●	●	7.94	2.38	0.4	3.5
CPMH080208-MP	M	●	●	●	7.94	2.38	0.8	3.5
CPMH090304-MP	M	●	●	●	9.525	3.18	0.4	4.5
CPMH090308-MP	M	●	●	●	9.525	3.18	0.8	4.5
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	4.5
CPMH090308-MV	M		●	★	9.525	3.18	0.8	4.5
CPMH080204	M	★	●		7.94	2.38	0.4	3.5
CPMH080208	M	★	●		7.94	2.38	0.8	3.5
CPMH090304	M	★	●		9.525	3.18	0.4	4.5
CPMH090308	M	★	●	★	9.525	3.18	0.8	4.5

(10 inserts in one case)

111 Vc

● / ★ = Expansion

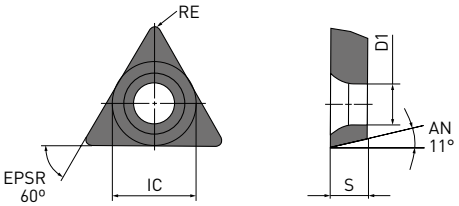
● : Inventory maintained. ★ : Inventory maintained in Japan.

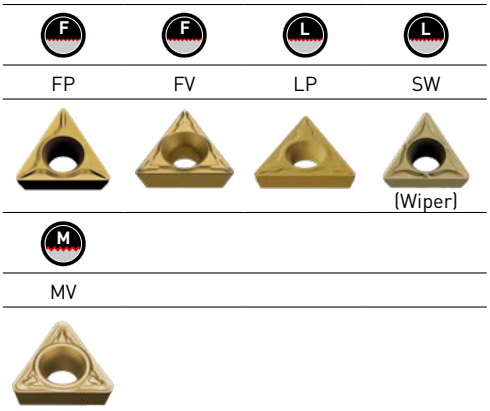
TPMH, TPMX

11° POSITIVE INSERTS (WITH HOLE)

M Class

TPMH, TPMX





Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
TPMH090202-FP	F	●	●	●	5.56	2.38	0.2	2.9
TPMH090204-FP	F	●	●	●	5.56	2.38	0.4	2.9
TPMH110302-FP	F	●	●	●	6.35	3.18	0.2	3.4
TPMH110304-FP	F	●	●	●	6.35	3.18	0.4	3.4
TPMH110308-FP	F	●	●	●	6.35	3.18	0.8	3.4
TPMH080202-FV	F		★	★	4.76	2.38	0.2	2.4
TPMH080204-FV	F		★	★	4.76	2.38	0.4	2.4
TPMH090202-FV	F		★	★	5.56	2.38	0.2	2.9
TPMH090204-FV	F		●	★	5.56	2.38	0.4	2.9
TPMH110302-FV	F		★	★	6.35	3.18	0.2	3.4
TPMH110304-FV	F	●	●	★	6.35	3.18	0.4	3.4
TPMH110308-FV	F	●	●	★	6.35	3.18	0.8	3.4
TPMH160302-FV	F		●	★	9.525	3.18	0.2	4.4
TPMH160304-FV	F	●	★	★	9.525	3.18	0.4	4.4
TPMH160308-FV	F		●	★	9.525	3.18	0.8	4.4
TPMH080202-LP	L		●	★	4.76	2.38	0.2	2.4
TPMH080204-LP	L		●	★	4.76	2.38	0.4	2.4
TPMH090202-LP	L	●	★	★	5.56	2.38	0.2	2.9
TPMH090204-LP	L	●	●	★	5.56	2.38	0.4	2.9
TPMH110302-LP	L	●	★	★	6.35	3.18	0.2	3.4
TPMH110304-LP	L	●	●	★	6.35	3.18	0.4	3.4
TPMH110308-LP	L	●	★	★	6.35	3.18	0.8	3.4
TPMH160302-LP	L	●	★	★	9.525	3.18	0.2	4.4
TPMH160304-LP	L	●	★	★	9.525	3.18	0.4	4.4
TPMH160308-LP	L	●	★	★	9.525	3.18	0.8	4.4
TPMX090202-SW	L	●	●	●	5.56	2.38	0.2	2.9
TPMX090204-SW	L	●	●	●	5.56	2.38	0.4	2.9
TPMX090208-SW	L	●	●	●	5.56	2.38	0.8	2.9
TPMX110302-SW	L	●	●	●	6.35	3.18	0.2	3.4
TPMX110304-SW	L	●	●	●	6.35	3.18	0.4	3.4
TPMX110308-SW	L	●	●	●	6.35	3.18	0.8	3.4

1/2

(10 inserts in one case)

111 Vc

● / ★ = Expansion

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

TPMH, TPMX – 11° POSITIVE INSERTS (WITH HOLE)

Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
TPMH080202-MV	M		●	★	4.76	2.38	0.2	2.4
TPMH080204-MV	M		●	★	4.76	2.38	0.4	2.4
TPMH090202-MV	M		●	★	5.56	2.38	0.2	2.9
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

(10 inserts in one case)

111 Vc

● / ★ = Expansion

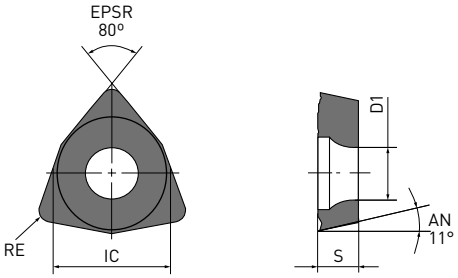
● : Inventory maintained. ★ : Inventory maintained in Japan.

WPMT

11° POSITIVE INSERTS (WITH HOLE)

M Class

WPMT



MV

Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
WPMT040202-MV	M		●	★	6.35	2.38	0.2	2.8
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

1/1

(10 inserts in one case)

111 Vc

● / ★ = Expansion

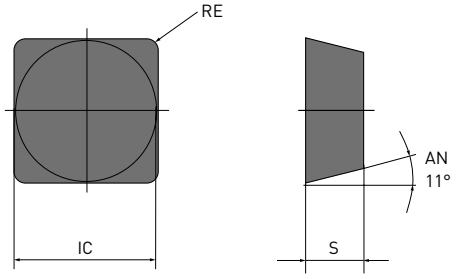
● : Inventory maintained. ★ : Inventory maintained in Japan.

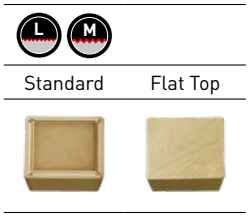
SPMR, SPMN

11° POSITIVE INSERTS (WITHOUT HOLE)

M Class

SPMR, SPMN





Order number	F L M R H	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
SPMR090304	M	★	★	★	9.525	3.18	0.4	—
SPMR090308	M	●	★	★	9.525	3.18	0.8	—
SPMR120304	M	●	★	★	12.7	3.18	0.4	—
SPMR120308	M	●	★	★	12.7	3.18	0.8	—
SPMN090308	—	★			9.525	3.18	0.8	—
SPMN120304	—	★			12.7	3.18	0.4	—
SPMN120308	—	●			12.7	3.18	0.8	—
SPMN120312	—	●		★	12.7	3.18	1.2	—

1/1

(10 inserts in one case)

111 Vc

● / ★ = Expansion

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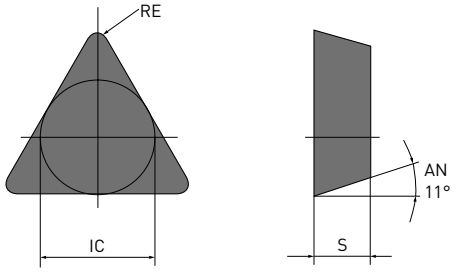
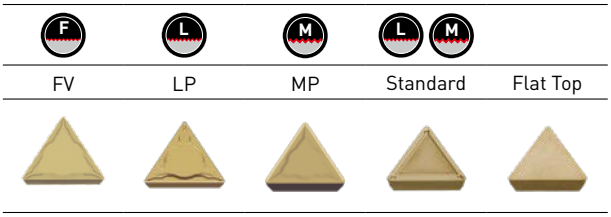
TPMR, TPMN

11° POSITIVE INSERTS (WITHOUT HOLE)

M Class

TPMR, TPMN





Order number	F L M R N	MC6115	MC6125	NEW MC6135	IC	S	RE	D1
TPMR160304-FV	F		●	●	9.525	3.18	0.4	—
TPMR110304-LP	L		●	●	6.35	3.18	0.4	—
TPMR110308-LP	L		●	●	6.35	3.18	0.8	—
TPMR160304-LP	L	●	●	●	9.525	3.18	0.4	—
TPMR160308-LP	L	●	●	●	9.525	3.18	0.8	—
TPMR110304-MP	M	●	●	●	6.35	3.18	0.4	—
TPMR110308-MP	M	●	●	●	6.35	3.18	0.8	—
TPMR160304-MP	M	●	●	●	9.525	3.18	0.4	—
TPMR160308-MP	M	●	●	●	9.525	3.18	0.8	—
TPMR110304	M	●	★	★	6.35	3.18	0.4	—
TPMR110308	M	●	★	★	6.35	3.18	0.8	—
TPMR160304	M	●	★	★	9.525	3.18	0.4	—
TPMR160308	M	●	★	★	9.525	3.18	0.8	—
TPMR160312	M	●	★		9.525	3.18	1.2	—
TPMN110304	—	●			6.35	3.18	0.4	—
TPMN110308	—	★			6.35	3.18	0.8	—
TPMN160304	—	●			9.525	3.18	0.4	—
TPMN160308	—	●			9.525	3.18	0.8	—
TPMN160312	—	★			9.525	3.18	1.2	—
TPMN220404	—	★			12.7	4.76	0.4	—
TPMN220408	—	★		★	12.7	4.76	0.8	—
TPMN220412	—	★			12.7	4.76	1.2	—

1/1

(10 inserts in one case)

111 Vc

● / ★ = Expansion

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MC6100 SERIES

RECOMMENDED CUTTING CONDITIONS

NEGATIVE INSERTS (FOR EXTERNAL TURNING)

	Material	Properties	Conditions	F L M R	Priority	Grade		Vc	f	ap
P	Mild steel	≤180 HB	✣	F	1	MC6125	FY	385 – 605	0.09 – 0.23	0.20 – 0.80
			✣	F	2	MC6135	FY	315 – 480	0.09 – 0.23	0.20 – 0.80
			✣	L	1	MC6125	SY	350 – 550	0.16 – 0.33	0.50 – 1.20
			✣	L	2	MC6135	SY	290 – 435	0.16 – 0.33	0.50 – 1.20
	Carbon and alloy steel	180 – 280 HB	●	F	1	MC6115	FP	250 – 480	0.08 – 0.25	0.10 – 1.00
			●	F	2	MC6125	FP	275 – 425	0.08 – 0.25	0.10 – 1.00
			●	L	1	MC6115	LP	250 – 480	0.10 – 0.40	0.30 – 2.00
			●	L	2	MC6125	LP	275 – 425	0.10 – 0.40	0.30 – 2.00
			●	L	3	MC6115	SH	250 – 480	0.10 – 0.40	0.30 – 2.00
			●	L	4	MC6125	SH	275 – 425	0.10 – 0.40	0.30 – 2.00
			●	L	5	MC6115	SA	250 – 480	0.10 – 0.40	0.30 – 2.00
			●	L	6	MC6125	SA	275 – 425	0.10 – 0.40	0.30 – 2.00
			●	L	7	MC6115	SW	250 – 480	0.10 – 0.50	0.30 – 2.50
			●	L	8	MC6125	SW	275 – 425	0.10 – 0.50	0.30 – 2.50
			●	M	1	MC6115	MP	230 – 440	0.16 – 0.50	0.30 – 4.00
			●	M	2	MC6125	MP	250 – 390	0.16 – 0.50	0.30 – 4.00
			●	M	3	MC6115	MA	230 – 440	0.20 – 0.50	0.30 – 4.00
			●	M	4	MC6125	MA	250 – 390	0.20 – 0.50	0.30 – 4.00
			●	M	5	MC6115	Std	230 – 440	0.25 – 0.60	1.50 – 5.00
			●	M	6	MC6125	Std	250 – 390	0.25 – 0.60	1.50 – 5.00
			●	M	7	MC6115	MW	230 – 440	0.20 – 0.60	0.90 – 4.00
			●	M	8	MC6125	MW	250 – 390	0.20 – 0.60	0.90 – 4.00
			●	R	1	MC6115	RP	215 – 415	0.25 – 0.60	1.50 – 6.00
			●	R	2	MC6125	RP	235 – 370	0.25 – 0.60	1.50 – 6.00
			●	R	3	MC6115	GH	215 – 415	0.25 – 0.60	1.50 – 6.00
			●	R	4	MC6125	GH	235 – 370	0.25 – 0.60	1.50 – 6.00
			●	H	1	MC6125	HX	210 – 330	0.50 – 1.26	3.00 – 11.00
			●	H	2	MC6135	HX	170 – 260	0.50 – 1.26	3.00 – 11.00
			●	H	3	MC6125	HV	175 – 270	0.58 – 1.26	4.00 – 12.00
			●	H	4	MC6135	HV	140 – 215	0.58 – 1.26	4.00 – 12.00

1/3

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

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	FP	250 – 480	0.08 – 0.25	0.10 – 1.00
			●	F	2	MC6125	FP	275 – 425	0.08 – 0.25	0.10 – 1.00
			●	L	1	MC6115	LP	250 – 480	0.10 – 0.40	0.30 – 2.00
			●	L	2	MC6125	LP	275 – 425	0.10 – 0.40	0.30 – 2.00
			●	L	3	MC6115	SH	250 – 480	0.10 – 0.40	0.30 – 2.00
			●	L	4	MC6125	SH	275 – 425	0.10 – 0.40	0.30 – 2.00
			●	L	5	MC6115	SA	250 – 480	0.10 – 0.40	0.30 – 2.00
			●	L	6	MC6125	SA	275 – 425	0.10 – 0.40	0.30 – 2.00
			●	L	7	MC6115	SW	250 – 480	0.10 – 0.50	0.30 – 2.50
			●	L	8	MC6125	SW	275 – 425	0.10 – 0.50	0.30 – 2.50
			●	M	1	MC6125	MP	250 – 390	0.16 – 0.50	0.30 – 4.00
			●	M	2	MC6135	MP	205 – 310	0.16 – 0.50	0.30 – 4.00
			●	M	3	MC6125	MA	250 – 390	0.20 – 0.50	0.30 – 4.00
			●	M	4	MC6135	MA	205 – 310	0.20 – 0.50	0.30 – 4.00
			●	M	5	MC6125	MH	250 – 390	0.20 – 0.55	1.00 – 4.00
			●	M	6	MC6135	MH	205 – 310	0.20 – 0.55	1.00 – 4.00
			●	M	7	MC6125	Std	250 – 390	0.25 – 0.60	1.50 – 5.00
			●	M	8	MC6135	Std	205 – 310	0.25 – 0.60	1.50 – 5.00
			●	M	9	MC6125	MW	250 – 390	0.20 – 0.60	0.90 – 4.00
			●	M	10	MC6135	MW	205 – 310	0.20 – 0.60	0.90 – 4.00
			●	R	1	MC6135	RP	190 – 290	0.25 – 0.60	1.50 – 6.00
			●	R	2	MC6125	RP	235 – 370	0.25 – 0.60	1.50 – 6.00
			●	R	3	MC6135	GH	190 – 290	0.25 – 0.60	1.50 – 6.00
			●	R	4	MC6125	GH	235 – 370	0.25 – 0.60	1.50 – 6.00
			●	H	1	MC6135	HX	170 – 260	0.50 – 1.26	3.00 – 11.00
			●	H	2	MC6125	HX	210 – 330	0.50 – 1.26	3.00 – 11.00
			●	H	3	MC6135	HV	140 – 215	0.58 – 1.26	4.00 – 12.00
			●	H	4	MC6125	HV	175 – 270	0.58 – 1.26	4.00 – 12.00

2/3

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

MC6100 SERIES

RECOMMENDED CUTTING CONDITIONS

NEGATIVE INSERTS (FOR EXTERNAL TURNING)

	Material	Properties	Conditions	F L M R	Priority	Grade		Vc	f	ap
P	Carbon and alloy steel	180 – 280 HB	✣	F	1	MC6135	FP	245 – 370	0.08 – 0.25	0.10 – 1.00
			✣	F	2	MC6125	FP	300 – 465	0.08 – 0.25	0.10 – 1.00
			✣	L	1	MC6135	LP	225 – 340	0.10 – 0.40	0.30 – 2.00
			✣	L	2	MC6125	LP	275 – 425	0.10 – 0.40	0.30 – 2.00
			✣	L	3	MC6135	SH	225 – 340	0.10 – 0.40	0.30 – 2.00
			✣	L	4	MC6125	SH	275 – 425	0.10 – 0.40	0.30 – 2.00
			✣	L	5	MC6135	SA	225 – 340	0.10 – 0.40	0.30 – 2.00
			✣	L	6	MC6125	SA	275 – 425	0.10 – 0.40	0.30 – 2.00
			✣	M	1	MC6135	MP	205 – 310	0.16 – 0.50	0.30 – 4.00
			✣	M	2	MC6125	MP	250 – 390	0.16 – 0.50	0.30 – 4.00
			✣	M	3	MC6135	MA	205 – 310	0.20 – 0.50	0.30 – 4.00
			✣	M	4	MC6125	MA	250 – 390	0.20 – 0.50	0.30 – 4.00
			✣	M	5	MC6135	MH	205 – 310	0.20 – 0.55	1.00 – 4.00
			✣	M	6	MC6125	MH	250 – 390	0.20 – 0.55	1.00 – 4.00
			✣	M	7	MC6135	Std	205 – 310	0.25 – 0.60	1.50 – 5.00
			✣	M	8	MC6125	Std	250 – 390	0.25 – 0.60	1.50 – 5.00
			✣	M	9	MC6135	MW	205 – 310	0.20 – 0.60	0.90 – 4.00
			✣	M	10	MC6125	MW	250 – 390	0.20 – 0.60	0.90 – 4.00
			✣	R	1	MC6135	RP	190 – 290	0.25 – 0.60	1.50 – 6.00
			✣	R	2	MC6125	RP	235 – 370	0.25 – 0.60	1.50 – 6.00
			✣	R	3	MC6135	GH	190 – 290	0.25 – 0.60	1.50 – 6.00
			✣	R	4	MC6125	GH	235 – 370	0.25 – 0.60	1.50 – 6.00
			✣	H	1	MC6135	HX	170 – 260	0.50 – 1.26	3.00 – 11.00
			✣	H	2	MC6125	HX	210 – 330	0.50 – 1.26	3.00 – 11.00

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

MC6100 SERIES

RECOMMENDED CUTTING CONDITIONS

5°, 7° POSITIVE INSERTS (FOR EXTERNAL TURNING)

	Material	Properties	Conditions		Priority	Grade		Vc	f	ap
P	Mild steel	≤180 HB	●	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 and alloy steel	180 – 280 HB	●	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
			✣	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

1/2

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.
2. Please scan the QR code for a pamphlet of the recommended conditions for the XCMT profile holder insert.

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

MC6100 SERIES

RECOMMENDED CUTTING CONDITIONS

5° 7° POSITIVE INSERTS (FOR EXTERNAL TURNING)

	Material	Properties	Conditions	F L M R	Priority	Grade		Vc	f	ap
P	Carbon and alloy steel	280 – 350 HB	●	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

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.
2. Please scan the QR code for a pamphlet of the recommended conditions for the XCMT profile holder insert.

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

MC6100 SERIES

RECOMMENDED CUTTING CONDITIONS

11° POSITIVE INSERTS (FOR EXTERNAL TURNING)

	Material	Properties	Conditions		Priority	Grade		Vc	f	ap
P	Mild steel	≤180 HB	●	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 and alloy steel	180 – 280 HB	●	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

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

MC5100 SERIES

CVD COATED GRADES FOR CAST IRON TURNING
FROM HIGH SPEED THROUGH TO INTERRUPTED TURNING

Interested in more...

B269

www.mhg-mediastore.net

DIA EDGE

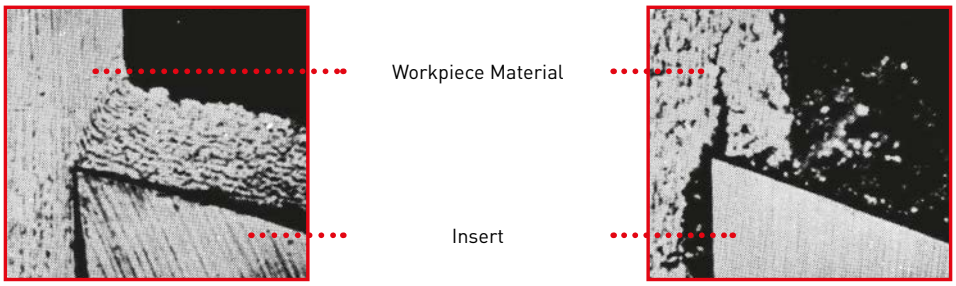
MC5100 SERIES

CVD COATED GRADES FOR CAST IRON TURNING

A CHOICE OF DIFFERENT GRADES IDEALLY SUITED TO ALL TYPES OF CAST IRON MACHINING

The process of casting iron enables complex geometries to be formed in the component that is produced. Different types of cast irons produce different chips when machined and can cause various types of damage to an insert. The complex shapes produced in castings also creates challenges because contact with the workpiece can suddenly change from continuous to interrupted cutting. In response to these challenges, Mitsubishi Materials has created a series of grades that are able to successfully machine all types of cast iron materials and component geometries.

CHIP MORPHOLOGY OF CAST IRON



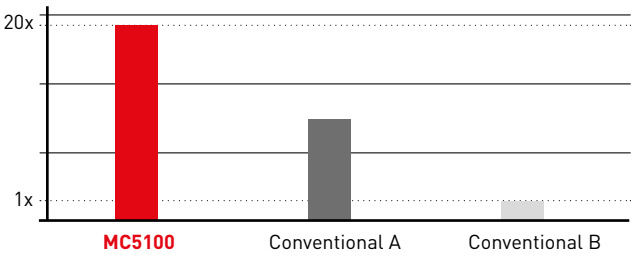
Ductile cast iron
Continuous type

Gray cast iron
Crack type

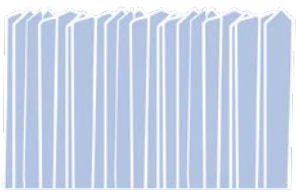
"SUPER" NANO TEXTURE TECHNOLOGY

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 fine, dense crystal growth process.

CRYSTAL ORIENTATION
(Image)



The ratio of Al_2O_3 crystal grains with the same orientation



"Super" Nano Texture

Uniformity of the growth direction has drastically improved.

Nano Texture

Uniformity of the grain size and growth direction has improved.

Conventional CVD inserts

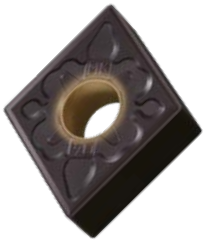
Grain size and growth direction are uneven.

MC5100 SERIES

CVD COATED GRADES FOR CAST IRON TURNING

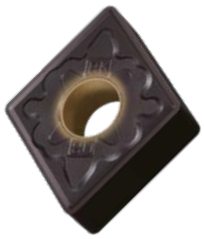
MC5105

FOR HIGH SPEED CUTTING OF GRAY CAST IRON
Provides outstanding wear resistance when turning gray cast iron at up to 1000 m/min cutting speeds.



MC5115

FIRST RECOMMENDED GRADE FOR DUCTILE CAST IRON
Prevents abnormal cutting edge damage and displays excellent wear and fracture resistance when machining ductile cast iron.



MC5125

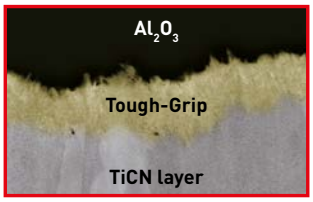
FOR HEAVY INTERRUPTED CUTTING OF DUCTILE CAST IRON
Demonstrates excellent fracture resistance that can withstand heavy interrupted cutting of high strength ductile cast iron.

TOUGH AND SUB GRIP LAYERS FOR DUCTILE CAST IRON GRADES

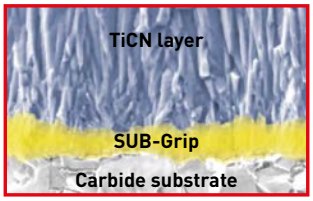
The extra strength of the adhesion between the coating layers (1.3 times stronger) suppresses peeling during machining of ductile cast iron.

Adhesion is 1.3 times* greater!

TOUGH-GRIP
The interface between the layers is controlled at the nano level, allowing the Tough-Grip layer extremely high levels of adhesion to prevent delamination.



SUB-GRIP
By increasing the degree of adhesion between the carbide substrate and the coating layer, a coating layer has been developed that is resistant to peeling even during strong intermittent machining.



*Compared with conventional grades from Mitsubishi Materials.

FROM THE DEVELOPERS

Since gray cast iron tends to be machined at high speeds (500 – 1000 m/min), it is important to make the Al_2O_3 film coating as strong as possible in order to ensure wear resistance. The focus was on the formation of crystals and the improvement of the intermediate layer of the coating. The coating has also been adjusted to provide excellent intermittent performance despite using a harder carbide substrate compared to conventional products.

Ductile cast iron is machined at relatively low speeds (100 – 300 m/min) and TiCN has a higher hardness. As for the intermittent cutting performance it was difficult to identify the cause of the edge chipping, but the investigation results revealed that the peeling of the coating was the cause of chipping so a stronger adhesion layer was introduced.

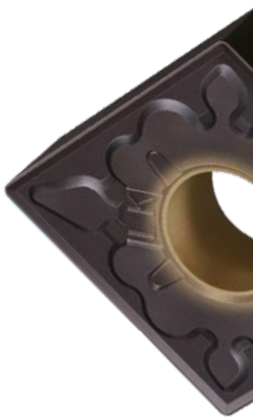
The MC5100 series has been expanded to include grades that are optimal for each type of cast iron turning. These grades will become an indispensable tool for customers that machine cast iron materials.

MC5100 SERIES

MC5105

FOR HIGH SPEED CUTTING OF GRAY CAST IRON
Harder and with outstanding wear resistance

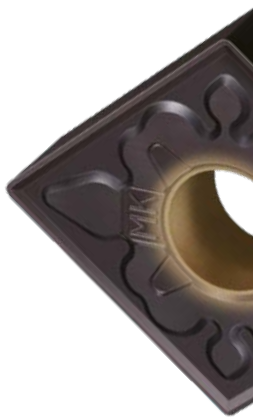
- A thick top coating layer.
- Intermediate layer suitable for high speed cutting.
- The substrate adopts a high hardness carbide material.



MC5115

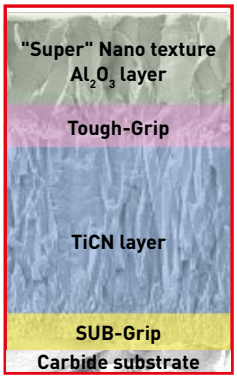
FIRST RECOMMENDED GRADE FOR DUCTILE CAST IRON
Excellent durability and resistance to impacts

- Al_2O_3 layer with excellent wear resistance.
- Intermediate layer with microstructure suitable for ductile cast iron.
- Thick TiCN layer suitable for coping with the hardness of ductile cast iron.
- New adhesion layer with an enhanced resistance to peeling.

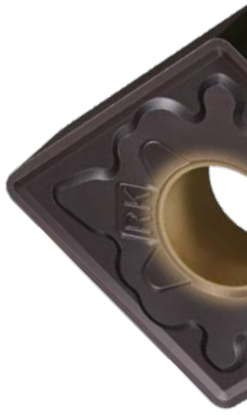


MC5125

FOR HEAVY INTERRUPTED CUTTING OF DUCTILE CAST IRON
Excellent stability and fracture resistance



- Al_2O_3 layer with excellent wear resistance.
- Intermediate layer with microstructure suitable for ductile cast iron.
- TiCN layer for hardness for heavy interrupted cutting.
- New adhesion layer with an enhanced resistance to peeling.



MC5100 SERIES

WAY TO SELECT MC5100 SERIES

GRAY CAST IRON

MC5105 is the first recommendation for high speed machining of gray cast iron.
Select a suitable chipbreaker to optimise tool life and reduce wear.
MC5115 is also capable of reliable machining at speeds of 100 – 300 m/min and for unstable cutting conditions.

HIGH SPEED CUTTING 200 – 1000 M/MIN

MC5105 → Change to a chipbreaker with a stronger cutting edge geometry.

In case of fracture

CUTTING SPEED 100 – 300 M/MIN

MC5115 → Change to a chipbreaker with a sharper cutting edge geometry.

In case of fracture

DUCTILE CAST IRON

MC5115 is the first recommendation for ductile cast iron, including high strength ductile cast iron.
In order to prevent breakage and wear, select a suitable chipbreaker.
MC5125 is also effective for heavy, interrupted and unstable cutting conditions.

FIRST RECOMMENDATION

MC5115 → Change to a chipbreaker with a stronger cutting edge geometry.

In case of fracture

↓

↑ In case of wear

HEAVY, INTERRUPTED CUTTING

MC5125 → Change to a chipbreaker with a sharper cutting edge geometry.

In case of wear

GRAY CAST IRON

DUCTILE CAST IRON

Cutting conditions: ● : Stable cutting ◕ : General cutting ✣ : Unstable cutting

MC5100 SERIES

CHIPBREAKER SYSTEM FOR CAST IRON TURNING

The entire range of new chipbreakers has been designed by taking advantage of the properties of the new grades. Each breaker has the optimum suitability for each respective application.

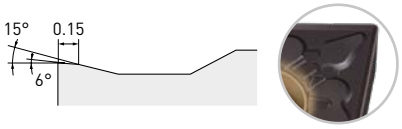
SELECT A CHIPBREAKER ACCORDING TO THE MACHINING CONDITIONS

Stable cutting (continuous cutting, without scale, etc.) / Low cutting resistance machining

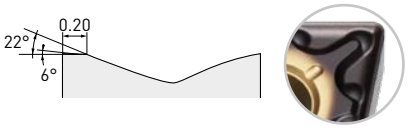
Focus on cutting edge sharpness

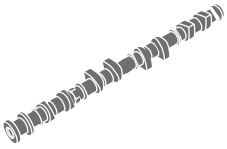
NEGATIVE INSERTS

LK breaker
Positive land provides a sharp cutting edge and low cutting resistance.

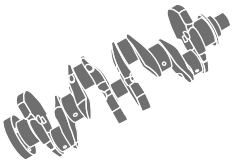


MA breaker
Positive land provides a sharp cutting edge.





MK breaker
Optimum balance between sharpness and high edge strength for general use.



RK breaker
Extra wide land provides a stable cutting edge for interrupted machining and removal of scale.

GK breaker
Versatile standard breaker.
Flat land maintains a stable cutting edge.

Flat top
Flat top focusing on high edge strength.

Focus on cutting edge strength

Unstable cutting (interrupted cutting, with scale, etc.) / General to heavy cutting

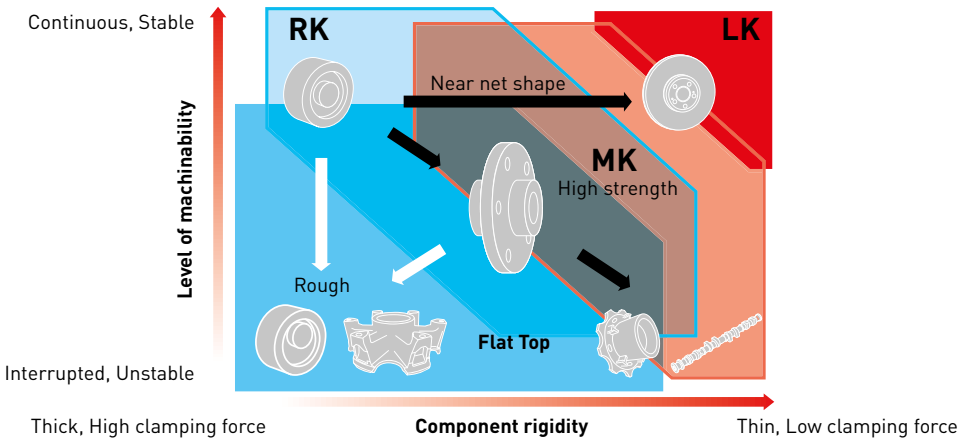
MC5100 SERIES

CHIPBREAKER SYSTEM FOR CAST IRON TURNING

CHPBREAKER SELECTION

		Features
LIGHT CUTTING		
SH		Can be used at low depths of cut and high feed rates. The curved edge allows smooth chip discharge.
SW		In comparison to conventional chip breakers, the component surface finish is maintained even if the feed per revolution is doubled. A wide chip pocket prevents chip jamming.
MEDIUM CUTTING		
MP		Suitable for medium to light cutting. Chip breaker geometry appropriate for copying and back turning. Cutting edge geometry for an optimum balance of sharpness and fracture resistance.
MW		The wiper allows up to double the feed rate. A wide chip pocket prevents chip jamming.
MH		A flat land offers high edge strength. Good chip control with a suitable chip pocket.
ROUGHING		
GH		For interrupted cutting and removing scale. The combination of a wide land and a large chip pocket allows high feed rates.

APPLICATION MAP FOR CAST IRON



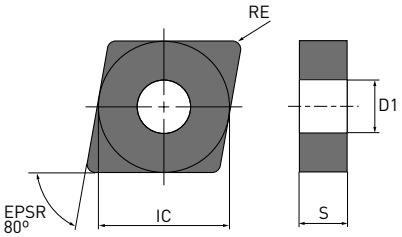
CNMG, CNMA

NEGATIVE INSERTS (WITH HOLE)

K

M-Class

Order number		MC5105	MC5115	MC5125	IC	S	RE	D1	Geometry
CNMG120404-LK	L	●	●	★	12.7	4.76	0.4	5.16	
CNMG120408-LK	L	●	●	★	12.7	4.76	0.8	5.16	
CNMG120412-LK	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	
CNMG120404-SW	L	★	●	★	12.7	4.76	0.4	5.16	
CNMG120408-SW	L	●	●	●	12.7	4.76	0.8	5.16	
									Wiper
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	
CNMG120408-MH	M		●		12.7	4.76	0.8	5.16	
CNMG120412-MH	M		●		12.7	4.76	1.2	5.16	
CNMG120416-MH	M		●		12.7	4.76	1.6	5.16	
CNMG160608-MH	M		●		15.875	6.35	0.8	6.35	
CNMG160612-MH	M		●		15.875	6.35	1.2	6.35	
CNMG160616-MH	M		●		15.875	6.35	1.6	6.35	
CNMG190612-MH	M		●		19.05	6.35	1.2	7.93	
CNMG120404-MK	M	●	●	●	12.7	4.76	0.4	5.16	
CNMG120408-MK	M	●	●	●	12.7	4.76	0.8	5.16	
CNMG120412-MK	M	●	●	●	12.7	4.76	1.2	5.16	
CNMG120416-MK	M	★	●	●	12.7	4.76	1.6	5.16	
CNMG160608-MK	M	★	●	★	15.875	6.35	0.8	6.35	
CNMG160612-MK	M	●	●	●	15.875	6.35	1.2	6.35	
CNMG160616-MK	M	●	●	★	15.875	6.35	1.6	6.35	
CNMG190612-MK	M	★	●	★	19.05	6.35	1.2	7.93	
CNMG190616-MK	M	★	●	★	19.05	6.35	1.6	7.93	



1/2

(10 inserts in one case)

131 Vc

● / ★ = Expansion

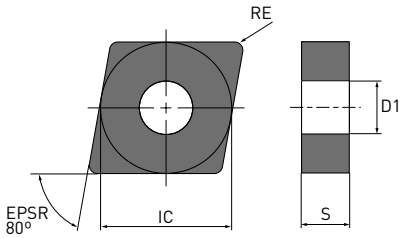
● : Inventory maintained. ★ : Inventory maintained in Japan.

CNMG, CNMA – NEGATIVE INSERTS (WITH HOLE)

K

M-Class

Order number		MC5105	MC5115	MC5125	IC	S	RE	D1	Geometry
CNMG120404-MP	M		●		12.7	4.76	0.4	5.16	
CNMG120408-MP	M		●		12.7	4.76	0.8	5.16	
CNMG120412-MP	M		●		12.7	4.76	1.2	5.16	
CNMG120416-MP	M		●		12.7	4.76	1.6	5.16	
CNMG160608-MP	M		★		15.875	6.35	0.8	6.35	
CNMG160612-MP	M		★		15.875	6.35	1.2	6.35	
CNMG160616-MP	M		★		15.875	6.35	1.6	6.35	
CNMG120408-MW	M	●	●	●	12.7	4.76	0.8	5.16	
CNMG120412-MW	M	●	●	●	12.7	4.76	1.2	5.16	
									Wiper
CNMG120404-GK	M	●	●	●	12.7	4.76	0.4	5.16	
CNMG120408-GK	M	●	●	●	12.7	4.76	0.8	5.16	
CNMG120412-GK	M	●	●	●	12.7	4.76	1.2	5.16	
CNMG120416-GK	M	●	●	★	12.7	4.76	1.6	5.16	
CNMG160612-GK	M	●	●	★	15.875	6.35	1.2	6.35	
CNMG160616-GK	M	●	●	★	15.875	6.35	1.6	6.35	
CNMG190612-GK	M	●	●	★	19.05	6.35	1.2	7.93	
CNMG190616-GK	M		●	★	19.05	6.35	1.6	7.93	
CNMG120408-GH	R	●	●	●	12.7	4.76	0.8	5.16	
CNMG120412-GH	R	●	●	●	12.7	4.76	1.2	5.16	
CNMG120416-GH	R	●	●	●	12.7	4.76	1.6	5.16	
CNMG160612-GH	R	●	●	●	15.875	6.35	1.2	6.35	
CNMG160616-GH	R	●	●	●	15.875	6.35	1.6	6.35	
CNMG190612-GH	R	●	●	★	19.05	6.35	1.2	7.93	
CNMG190616-GH	R	●	●	★	19.05	6.35	1.6	7.93	
CNMG120408-RK	R	●	●	●	12.7	4.76	0.8	5.16	
CNMG120412-RK	R	●	●	●	12.7	4.76	1.2	5.16	
CNMG120416-RK	R	●	●	●	12.7	4.76	1.6	5.16	
CNMG160608-RK	R	★	●	★	15.875	6.35	0.8	6.35	
CNMG160612-RK	R	●	●	●	15.875	6.35	1.2	6.35	
CNMG160616-RK	R	●	●	●	15.875	6.35	1.6	6.35	
CNMG190612-RK	R	★	●	★	19.05	6.35	1.2	7.93	
CNMG190616-RK	R	★	●	★	19.05	6.35	1.6	7.93	
CNMA120404	—	●	●	●	12.7	4.76	0.4	5.16	
CNMA120408	—	●	●	●	12.7	4.76	0.8	5.16	
CNMA120412	—	●	●	●	12.7	4.76	1.2	5.16	
CNMA120416	—	●	●	●	12.7	4.76	1.6	5.16	
CNMA160612	—	●	●	●	15.875	6.35	1.2	6.35	
CNMA160616	—	●	●	●	15.875	6.35	1.6	6.35	
CNMA190612	—	●	●	●	19.05	6.35	1.2	7.93	
CNMA190616	—	●	●	●	19.05	6.35	1.6	7.93	Flat top
CNMA190624	—	●	●	★	19.05	6.35	2.4	7.93	



(10 inserts in one case)

131 Vc

● / ★ = Expansion

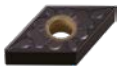
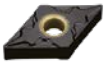
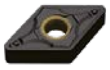
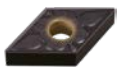
● : Inventory maintained. ★ : Inventory maintained in Japan.

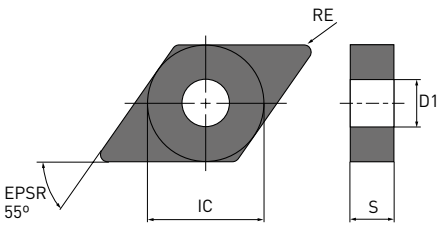
DNMG, DNMA

NEGATIVE INSERTS (WITH HOLE)

K

M-Class

Order number		MC5105	MC5115	MC5125	IC	S	RE	D1		Geometry
DNMG110408-LK	L	●	●	★	9.525	4.76	0.8	3.81		
DNMG150404-LK	L	●	●	★	12.7	4.76	0.4	5.16		
DNMG150408-LK	L	★	●	★	12.7	4.76	0.8	5.16		
DNMG150412-LK	L	★	★	★	12.7	4.76	1.2	5.16		
DNMG150604-LK	L	●	●	★	12.7	6.35	0.4	5.16		
DNMG150608-LK	L	●	●	★	12.7	6.35	0.8	5.16		
DNMG150612-LK	L	●	●	★	12.7	6.35	1.2	5.16		
DNMG150404-SH	L		★		12.7	4.76	0.4	5.16		
DNMG150408-SH	L		★		12.7	4.76	0.8	5.16		
DNMG150412-SH	L		★		12.7	4.76	1.2	5.16		
DNMG150608-SH	L		●		12.7	6.35	0.8	5.16		
DNMG150612-SH	L		●		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		
DNMG150408-MH	M		★		12.7	4.76	0.8	5.16		
DNMG150412-MH	M		★		12.7	4.76	1.2	5.16		
DNMG150604-MH	M		★		12.7	6.35	0.4	5.16		
DNMG150608-MH	M		●		12.7	6.35	0.8	5.16		
DNMG150612-MH	M		●		12.7	6.35	1.2	5.16		
DNMG110408-MK	M	★	●	●	9.525	4.76	0.8	3.81		
DNMG150404-MK	M	●	●	★	12.7	4.76	0.4	5.16		
DNMG150408-MK	M	●	●	●	12.7	4.76	0.8	5.16		
DNMG150412-MK	M	●	●	★	12.7	4.76	1.2	5.16		
DNMG150604-MK	M	●	●	●	12.7	6.35	0.4	5.16		
DNMG150608-MK	M	●	●	●	12.7	6.35	0.8	5.16		
DNMG150612-MK	M	●	●	●	12.7	6.35	1.2	5.16		
DNMG150404-MP	M		★		12.7	4.76	0.4	5.16		
DNMG150408-MP	M		★		12.7	4.76	0.8	5.16		
DNMG150412-MP	M		★		12.7	4.76	1.2	5.16		
DNMG150416-MP	M		★		12.7	4.76	1.6	5.16		
DNMG150604-MP	M		●		12.7	6.35	0.4	5.16		
DNMG150608-MP	M		●		12.7	6.35	0.8	5.16		
DNMG150612-MP	M		●		12.7	6.35	1.2	5.16		
DNMG150616-MP	M		●		12.7	6.35	1.6	5.16		
DNMX150408-MW	M	●	★	★	12.7	4.76	0.8	5.16		
DNMX150412-MW	M	★	★	★	12.7	4.76	1.2	5.16		
DNMX150608-MW	M	●	●	●	12.7	6.35	0.8	5.16		
DNMX150612-MW	M	●	●	★	12.7	6.35	1.2	5.16	Wiper	



(10 inserts in one case)

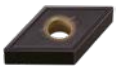
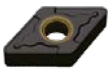
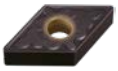
● / ★ = Expansion

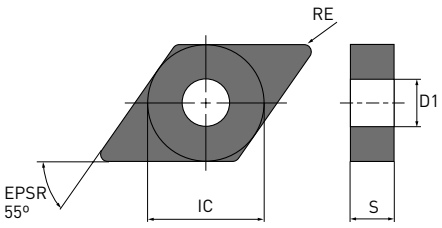
● : Inventory maintained. ★ : Inventory maintained in Japan.

DNMG, DNMA – NEGATIVE INSERTS (WITH HOLE)

K

M-Class

Order number		MC5105	MC5115	MC5125	IC	S	RE	D1		Geometry
DNMG110408-GK	M	●	●	★	9.525	4.76	0.8	3.81		
DNMG150404-GK	M	★	●	★	12.7	4.76	0.4	5.16		
DNMG150408-GK	M	★	●	★	12.7	4.76	0.8	5.16		
DNMG150412-GK	M	★	●	★	12.7	4.76	1.2	5.16		
DNMG150604-GK	M	●	●	★	12.7	6.35	0.4	5.16		
DNMG150608-GK	M	●	●	●	12.7	6.35	0.8	5.16		
DNMG150612-GK	M	●	●	★	12.7	6.35	1.2	5.16		
DNMG150408-GH	R	●	●	★	12.7	4.76	0.8	5.16		
DNMG150412-GH	R	●	●	★	12.7	4.76	1.2	5.16		
DNMG150608-GH	R	●	●	●	12.7	6.35	0.8	5.16		
DNMG150612-GH	R	●	●	●	12.7	6.35	1.2	5.16		
DNMG150408-RK	R	●	●	★	12.7	4.76	0.8	5.16		
DNMG150412-RK	R	●	●	★	12.7	4.76	1.2	5.16		
DNMG150608-RK	R	●	●	●	12.7	6.35	0.8	5.16		
DNMG150612-RK	R	●	●	●	12.7	6.35	1.2	5.16		
DNMA150404	—	●	●	★	12.7	4.76	0.4	5.16		
DNMA150408	—	●	●	★	12.7	4.76	0.8	5.16		
DNMA150412	—	●	●	★	12.7	4.76	1.2	5.16		
DNMA150604	—	●	●	★	12.7	6.35	0.4	5.16		
DNMA150608	—	●	●	●	12.7	6.35	0.8	5.16		
DNMA150612	—	●	●	●	12.7	6.35	1.2	5.16	Flat top	



2/2

(10 inserts in one case)

131 Vc

● / ★ = Expansion

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

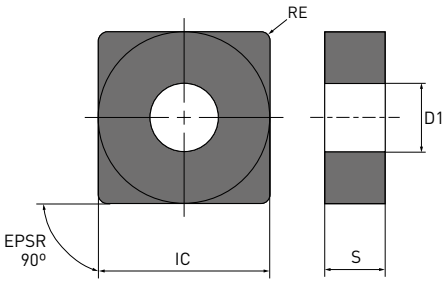
SNMG, SNMA

NEGATIVE INSERTS (WITH HOLE)

K

M-Class

Order number		MC5105	MC5115	MC5125	IC	S	RE	D1	Geometry
SNMG120408-LK	L	★	●	★	12.7	4.76	0.8	5.16	
SNMG120412-LK	L	★	●	★	12.7	4.76	1.2	5.16	
SNMG120404-SH	L		●		12.7	4.76	0.4	5.16	
SNMG120408-SH	L		●		12.7	4.76	0.8	5.16	
SNMG120412-SH	L		●		12.7	4.76	1.2	5.16	
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	
SNMG120416-MA	M	●	●	★	12.7	4.76	1.6	5.16	
SNMG150612-MA	M		●	●	15.875	6.35	1.2	6.35	
SNMG190612-MA	M		●	★	19.05	6.35	1.2	7.93	
SNMG120408-MH	M		★		12.7	4.76	0.8	5.16	
SNMG120412-MH	M		★		12.7	4.76	1.2	5.16	
SNMG190612-MH	M		★		19.05	6.35	1.2	7.93	
SNMG120408-MK	M	●	●	★	12.7	4.76	0.8	5.16	
SNMG120412-MK	M	●	●	★	12.7	4.76	1.2	5.16	
SNMG120416-MK	M	★	●	★	12.7	4.76	1.6	5.16	
SNMG150612-MK	M	★	●	★	15.875	6.35	1.2	6.35	
SNMG150616-MK	M	★	●	★	15.875	6.35	1.6	6.35	
SNMG190612-MK	M	★	★	★	19.05	6.35	1.2	7.93	
SNMG190616-MK	M	★	★	★	19.05	6.35	1.6	7.93	
SNMG120404-MP	M		★		12.7	4.76	0.4	5.16	
SNMG120408-MP	M		★		12.7	4.76	0.8	5.16	
SNMG120412-MP	M		★		12.7	4.76	1.2	5.16	
SNMG120404-GK	M	★	●	★	12.7	4.76	0.4	5.16	
SNMG120408-GK	M	★	●	●	12.7	4.76	0.8	5.16	
SNMG120412-GK	M	★	●	●	12.7	4.76	1.2	5.16	
SNMG120416-GK	M	●	●	★	12.7	4.76	1.6	5.16	
SNMG150612-GK	M	●	●	★	15.875	6.35	1.2	6.35	
SNMG190612-GK	M	●	★	★	19.05	6.35	1.2	7.93	
SNMG190616-GK	M		★	★	19.05	6.35	1.6	7.93	



1/2

(10 inserts in one case)

131 Vc

● / ★ = Expansion

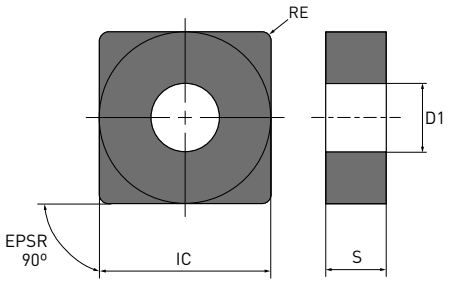
● : Inventory maintained. ★ : Inventory maintained in Japan.

SNMG, SNMA – NEGATIVE INSERTS (WITH HOLE)

K

M-Class

Order number		MC5105	MC5115	MC5125	IC	S	RE	D1	Geometry
SNMG120408-GH	R	●	●	★	12.7	4.76	0.8	5.16	
SNMG120412-GH	R	●	●	★	12.7	4.76	1.2	5.16	
SNMG120408-RK	R	●	●	★	12.7	4.76	0.8	5.16	
SNMG120412-RK	R	●	●	●	12.7	4.76	1.2	5.16	
SNMG120416-RK	R	●	●	★	12.7	4.76	1.6	5.16	
SNMG150612-RK	R	★	●	★	15.875	6.35	1.2	6.35	
SNMG150616-RK	R	★	●	★	15.875	6.35	1.6	6.35	
SNMG190612-RK	R	★	●	★	19.05	6.35	1.2	7.93	
SNMG190616-RK	R	★	●	★	19.05	6.35	1.6	7.93	
SNMA090308	—	★	★	★	9.525	3.18	0.8	3.81	
SNMA120408	—	●	●	★	12.7	4.76	0.8	5.16	
SNMA120412	—	●	●	●	12.7	4.76	1.2	5.16	
SNMA120416	—	●	●	●	12.7	4.76	1.6	5.16	
SNMA150612	—	●	●	★	15.875	6.35	1.2	6.35	
SNMA150616	—	●	●	●	15.875	6.35	1.6	6.35	
SNMA190612	—	●	●	★	19.05	6.35	1.2	7.93	Flat top
SNMA190616	—	●	●	●	19.05	6.35	1.6	7.93	



2/2

(10 inserts in one case)

131 Vc

● / ★ = Expansion

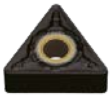
● : Inventory maintained. ★ : Inventory maintained in Japan.

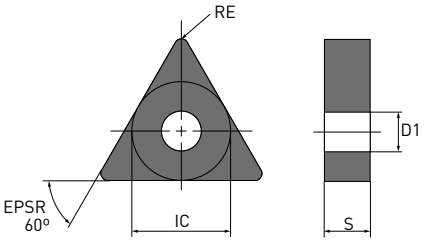
TNMG, TNMA, TNMX

NEGATIVE INSERTS (WITH HOLE)

K

M-Class

Order number		MC5105	MC5115	MC5125	IC	S	RE	D1	Geometry
TNMG160404-LK	L	●	●	★	9.525	4.76	0.4	3.81	
TNMG160408-LK	L	●	●	★	9.525	4.76	0.8	3.81	
TNMG160412-LK	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	
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	
TNMG160416-MA	M	●	●	★	9.525	4.76	1.6	3.81	
TNMG220408-MA	M	★	★	★	12.7	4.76	0.8	5.16	
TNMG220412-MA	M	★	★	★	12.7	4.76	1.2	5.16	
TNMG220416-MA	M		●	●	12.7	4.76	1.6	5.16	
TNMG160404-MH	M		★		9.525	4.76	0.4	3.81	
TNMG160408-MH	M		★		9.525	4.76	0.8	3.81	
TNMG160412-MH	M		★		9.525	4.76	1.2	3.81	
TNMG220408-MH	M		★		12.7	4.76	0.8	5.16	
TNMG220412-MH	M		★		12.7	4.76	1.2	5.16	
TNMG160404-MK	M	●	●	★	9.525	4.76	0.4	3.81	
TNMG160408-MK	M	●	●	●	9.525	4.76	0.8	3.81	
TNMG160412-MK	M	●	●	★	9.525	4.76	1.2	3.81	
TNMG220408-MK	M	★	●	★	12.7	4.76	0.8	5.16	
TNMG220412-MK	M	★	★	★	12.7	4.76	1.2	5.16	
TNMG220416-MK	M	★	★	★	12.7	4.76	1.6	5.16	
TNMG160404-MP	M		★		9.525	4.76	0.4	3.81	
TNMG160408-MP	M		★		9.525	4.76	0.8	3.81	
TNMG160412-MP	M		★		9.525	4.76	1.2	3.81	
TNMG220408-MP	M		★		12.7	4.76	0.8	5.16	
TNMG220412-MP	M		★		12.7	4.76	1.2	5.16	
TNMG160404-GK	M	★	●	★	9.525	4.76	0.4	3.81	
TNMG160408-GK	M	●	●	●	9.525	4.76	0.8	3.81	
TNMG160412-GK	M	★	●	★	9.525	4.76	1.2	3.81	
TNMG160416-GK	M	●	●	★	9.525	4.76	1.6	3.81	
TNMG220408-GK	M	★	●	★	12.7	4.76	0.8	5.16	
TNMG220412-GK	M	★	★	★	12.7	4.76	1.2	5.16	
TNMX160408-MW	M	●	●	★	9.525	4.76	0.8	3.81	
TNMX160412-MW	M	●	●	★	9.525	4.76	1.2	3.81	 Wiper



1/2

(10 inserts in one case)

131 Vc

● / ★ = Expansion

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

TNMG, TNMA – NEGATIVE INSERTS (WITH HOLE)

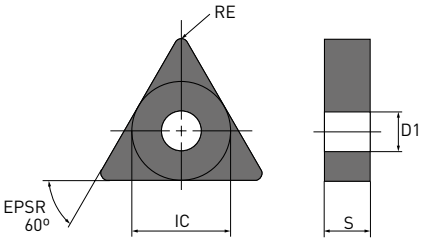
K

M-Class

Order number		MC5105	MC5115	MC5125	IC	S	RE	D1
TNMG160408-GH	R	●	●	●	9.525	4.76	0.8	3.81
TNMG160412-GH	R		●	★	9.525	4.76	1.2	3.81
TNMG220408-GH	R		●	★	12.7	4.76	0.8	5.16
TNMG220412-GH	R	●	●	★	12.7	4.76	1.2	5.16
TNMG160408-RK	R	●	●	●	9.525	4.76	0.8	3.81
TNMG160412-RK	R	●	●	●	9.525	4.76	1.2	3.81
TNMG160416-RK	R	●	●	★	9.525	4.76	1.6	3.81
TNMG220408-RK	R	●	●	★	12.7	4.76	0.8	5.16
TNMG220412-RK	R	●	●	★	12.7	4.76	1.2	5.16
TNMG220416-RK	R	●	●	★	12.7	4.76	1.6	5.16
TNMA160404	—	●	●	★	9.525	4.76	0.4	3.81
TNMA160408	—	●	●	●	9.525	4.76	0.8	3.81
TNMA160412	—	●	●	●	9.525	4.76	1.2	3.81
TNMA160416	—	●	●	●	9.525	4.76	1.6	3.81
TNMA160420	—	★	★	★	9.525	4.76	2.0	3.81
TNMA220408	—	●	●	★	12.7	4.76	0.8	5.16
TNMA220412	—	●	●	★	12.7	4.76	1.2	5.16
TNMA220416	—	●	●	●	12.7	4.76	1.6	5.16

Flat top

Geometry



2/2

(10 inserts in one case)

131 Vc

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

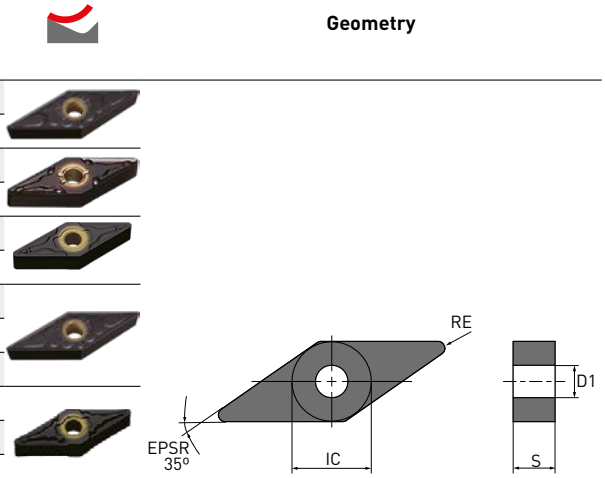
VNMG, VNMA

NEGATIVE INSERTS (WITH HOLE)

K

M-Class

Order number		MC5105	MC5115	MC5125	IC	S	RE	D1	
VNMG160404-LK	L	●	●	★	9.525	4.76	0.4	3.81	
VNMG160408-LK	L	★	●	★	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-MH	M		★		9.525	4.76	0.4	3.81	
VNMG160408-MH	M		★		9.525	4.76	0.8	3.81	
VNMG160404-MK	M	●	●	★	9.525	4.76	0.4	3.81	
VNMG160408-MK	M	●	●	●	9.525	4.76	0.8	3.81	
VNMG160412-MK	M	●	●	●	9.525	4.76	1.2	3.81	
VNMG160404-MP	M		★		9.525	4.76	0.4	3.81	
VNMG160408-MP	M		★		9.525	4.76	0.8	3.81	
VNMG160412-MP	M		★		9.525	4.76	1.2	3.81	
VNMG160404-GK	M	★	●	★	9.525	4.76	0.4	3.81	
VNMG160408-GK	M	★	●	★	9.525	4.76	0.8	3.81	
VNMG160412-GK	M	★	●	★	9.525	4.76	1.2	3.81	
VNMA160404	—	★	●	★	9.525	4.76	0.4	3.81	
VNMA160408	—	★	●	●	9.525	4.76	0.8	3.81	
VNMA160412	—	★	●	★	9.525	4.76	1.2	3.81	Flat top



Geometry

1/1

(10 inserts in one case)

131 Vc

● / ★ = Expansion

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

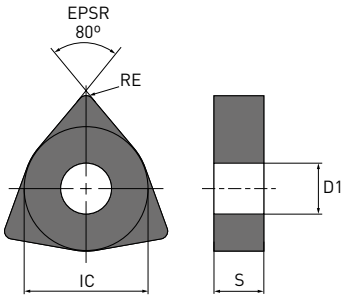
WNMG, WNMA

NEGATIVE INSERTS (WITH HOLE)

K

M-Class

Order number		MC5105	MC5115	MC5125	IC	S	RE	D1		Geometry
WNMG080404-LK	L	●	●	★	12.7	4.76	0.4	5.16		
WNMG080408-LK	L	●	●	★	12.7	4.76	0.8	5.16		
WNMG080412-LK	L	★	●	★	12.7	4.76	1.2	5.16		
WNMG080404-SH	L		★		12.7	4.76	0.4	5.16		
WNMG080408-SH	L		★		12.7	4.76	0.8	5.16		
WNMG080412-SH	L		★		12.7	4.76	1.2	5.16		
WNMG080404-SW	L	★	★	★	12.7	4.76	0.4	5.16		
WNMG080408-SW	L	★	●	●	12.7	4.76	0.8	5.16		
									Wiper	
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		
WNMG080416-MA	M	●	●	★	12.7	4.76	1.6	5.16		
WNMG080408-MH	M		●		12.7	4.76	0.8	5.16		
WNMG080412-MH	M		●		12.7	4.76	1.2	5.16		
WNMG080404-MK	M	●	●	★	12.7	4.76	0.4	5.16		
WNMG080408-MK	M	●	●	●	12.7	4.76	0.8	5.16		
WNMG080412-MK	M	●	●	●	12.7	4.76	1.2	5.16		
WNMG080416-MK	M	★	●	★	12.7	4.76	1.6	5.16		



(10 inserts in one case)

131 Vc

● / ★ = Expansion

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

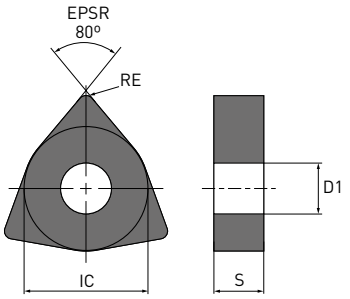
WNMG, WNMA – NEGATIVE INSERTS (WITH HOLE)

K

M-Class

Order number		MC5105	MC5115	MC5125	IC	S	RE	D1	Geometry
WNMG060404-MP	M		●		9.525	4.76	0.4	3.81	
WNMG060408-MP	M		●		9.525	4.76	0.8	3.81	
WNMG060412-MP	M		●		9.525	4.76	1.2	3.81	
WNMG06T304-MP	M		●		9.525	3.97	0.4	3.81	
WNMG06T308-MP	M		●		9.525	3.97	0.8	3.81	
WNMG06T312-MP	M		●		9.525	3.97	1.2	3.81	
WNMG080404-MP	M		●		12.7	4.76	0.4	5.16	
WNMG080408-MP	M		●		12.7	4.76	0.8	5.16	
WNMG080412-MP	M		●		12.7	4.76	1.2	5.16	
WNMG080416-MP	M		●		12.7	4.76	1.6	5.16	
WNMG060408-MW	M	●	●	★	9.525	4.76	0.8	3.81	
WNMG060412-MW	M	★	●	★	9.525	4.76	1.2	3.81	
WNMG080408-MW	M	●	●	●	12.7	4.76	0.8	5.16	
WNMG080412-MW	M	●	●	★	12.7	4.76	1.2	5.16	
									Wiper
WNMG060404-GK	M	★	★	●	9.525	4.76	0.4	3.81	
WNMG060408-GK	M	●	●	★	9.525	4.76	0.8	3.81	
WNMG080404-GK	M	★	●	★	12.7	4.76	0.4	5.16	
WNMG080408-GK	M	●	●	●	12.7	4.76	0.8	5.16	
WNMG080412-GK	M	●	●	●	12.7	4.76	1.2	5.16	
WNMG080416-GK	M	●	●	★	12.7	4.76	1.6	5.16	
WNMG080408-GH	R	●	●	●	12.7	4.76	0.8	5.16	
WNMG080412-GH	R	●	●	●	12.7	4.76	1.2	5.16	
WNMG080408-RK	R	●	●	●	12.7	4.76	0.8	5.16	
WNMG080412-RK	R	●	●	●	12.7	4.76	1.2	5.16	
WNMG080416-RK	R	●	●	●	12.7	4.76	1.6	5.16	
WNMA060408	—	★	●	★	9.525	4.76	0.8	3.81	
WNMA060412	—	★	●	★	9.525	4.76	1.2	3.81	
WNMA080404	—	●	●	★	12.7	4.76	0.4	5.16	
WNMA080408	—	●	●	●	12.7	4.76	0.8	5.16	
WNMA080412	—	●	●	●	12.7	4.76	1.2	5.16	
WNMA080416	—	●	●	★	12.7	4.76	1.6	5.16	

Flat top



2/2

(10 inserts in one case)

131 Vc

● / ★ = Expansion

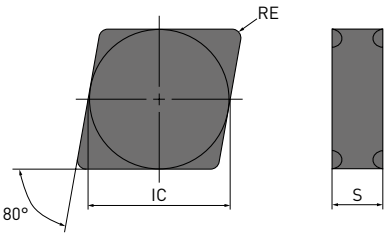
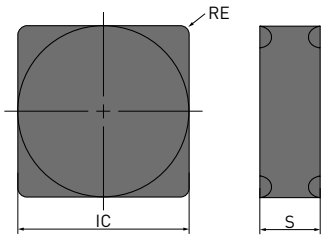
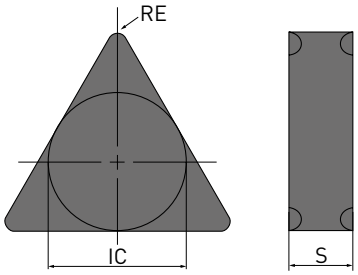
● : Inventory maintained. ★ : Inventory maintained in Japan.

CNMN, SNMN, TNMN

NEGATIVE INSERTS (WITHOUT HOLE)

K

M-Class

Order number	L M R	MC5105	MC5115	MC5125	IC	S	RE	D1		Geometry
CNMN120408	—	★	●	★	12.7	4.76	0.8	–	 Flat top	
CNMN120412	—	★	●	★	12.7	4.76	1.2	–		
CNMN120416	—	★	●	★	12.7	4.76	1.6	–		
SNMN120408	—	★	●	★	12.7	4.76	0.8	–	 Flat top	
SNMN120412	—	★	●	●	12.7	4.76	1.2	–		
SNMN120416	—	★	★	★	12.7	4.76	1.6	–		
SNMN120420	—	★	●	★	12.7	4.76	2.0	–		
TNMN160408	—	★	●	★	9.525	4.76	0.8	–	 Flat top	
TNMN160412	—	★	●	★	9.525	4.76	1.2	–		
TNMN160416	—	★	★	●	9.525	4.76	1.6	–		
TNMN160420	—	★	●	★	9.525	4.76	2.0	–		

1/1

(10 inserts in one case)

131 Vc

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

MC5100 SERIES

RECOMMENDED CUTTING CONDITIONS

NEGATIVE INSERTS (FOR EXTERNAL TURNING)

	Material	Hardness	Cutting conditions	Grade	Vc
K	Grey cast iron	Tensile Strength ≤ 350MPa	●	MC5105	230 – 700
			◔	MC5105	210 – 640
			✣	MC5105	195 – 605
			✣	MC5115	190 – 350
		Tensile Strength ≤ 450MPa	●	MC5115	195 – 365
			◔	MC5115	180 – 330
			✣	MC5125	95 – 190
	Ductile cast iron	Tensile Strength ≤ 800MPa	●	MC5115	175 – 325
			◔	MC5115	160 – 295
			✣	MC5125	85 – 170

1/1

	f	ap
LIGHT CUTTING		
LK	0.15 – 0.50	0.5 – 2.5
SH	0.10 – 0.40	0.3 – 2.0
SW	0.10 – 0.50	0.3 – 2.5
MEDIUM CUTTING		
MK	0.20 – 0.55	0.5 – 4.0
GK	0.20 – 0.60	1.5 – 5.0
MP	0.16 – 0.50	0.3 – 4.0
MA	0.20 – 0.50	0.3 – 4.0
MH	0.20 – 0.55	1.0 – 4.0
MW	0.20 – 0.60	0.9 – 4.0
ROUGH CUTTING		
RK	0.20 – 0.60	1.5 – 6.0
GH	0.25 – 0.60	1.5 – 6.0
HEAVY CUTTING		
Flat	0.20 – 0.60	2.5 – 6.0

Cutting conditions: ●: Stable cutting ◔: General cutting ✣: Unstable cutting

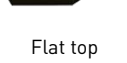
VBMT, VBMW

5° POSITIVE INSERTS (WITH HOLE)

K

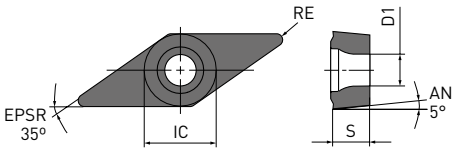
M-Class

Order number		MC5105	MC5115	MC5125	IC	S	RE	D1	
VBMT160404-MK	M	★	●	★	9.525	4.76	0.4	4.4	
VBMT160408-MK	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	
VBMW160408	—	★	★	★	9.525	4.76	0.8	4.4	



Flat top

Geometry



1/1

(10 inserts in one case)

139 Vc

● / ★ = Expansion

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

CCMT, CCMH, CCMW

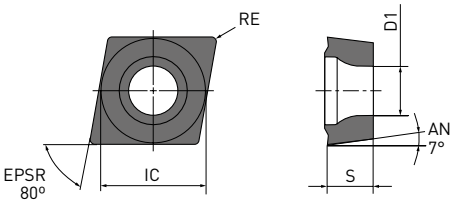
7° POSITIVE INSERTS (WITH HOLE)

K

M-Class

Order number	L M R	MC5105	MC5115	MC5125	IC	S	RE	D1	
CCMT060204-SW	L		●		6.35	2.38	0.4	2.8	
CCMT09T302-SW	L		●		9.525	3.97	0.2	4.4	
CCMT09T304-SW	L		●		9.525	3.97	0.4	4.4	
									Wiper
CCMT060202-MK	M	●	●	●	6.35	2.38	0.2	2.8	
CCMT060204-MK	M	●	●	●	6.35	2.38	0.4	2.8	
CCMT060208-MK	M	●	●	★	6.35	2.38	0.8	2.8	
CCMT09T302-MK	M	●	●	●	9.525	3.97	0.2	4.4	
CCMT09T304-MK	M	●	●	●	9.525	3.97	0.4	4.4	
CCMT09T308-MK	M	●	●	●	9.525	3.97	0.8	4.4	
CCMT120404-MK	M	●	●	★	12.7	4.76	0.4	5.5	
CCMT120408-MK	M	●	●	●	12.7	4.76	0.8	5.5	
CCMT120412-MK	M	★	●	★	12.7	4.76	1.2	5.5	
CCMH060204-MV	M		★		6.35	2.38	0.4	2.8	
CCMT120404-MW	M		●		12.7	4.76	0.4	5.5	
CCMT120408-MW	M		●		12.7	4.76	0.8	5.5	
									Wiper
CCMW060204	—	●	●	★	6.35	2.38	0.4	2.8	
CCMW060208	—	★	●	★	6.35	2.38	0.8	2.8	
CCMW09T304	—	●	●	●	9.525	3.97	0.4	4.4	
CCMW09T308	—	●	●	●	9.525	3.97	0.8	4.4	
CCMW09T312	—	★	●	★	9.525	3.97	1.2	4.4	
CCMW120404	—	●	●	★	12.7	4.76	0.4	5.5	
CCMW120408	—	●	●	●	12.7	4.76	0.8	5.5	Flat top
CCMW120412	—	★	●	★	12.7	4.76	1.2	5.5	

Geometry



1/1

(10 inserts in one case)

139 Vc

● / ★ = Expansion

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

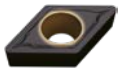
DCMT, DCMW

7° POSITIVE INSERTS (WITH HOLE)

K

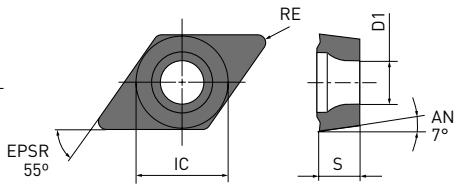
M-Class

Order number	L M R	MC5105	MC5115	MC5125	IC	S	RE	D1	
DCMT070202-MK	M	●	●	●	6.35	2.38	0.2	2.8	
DCMT070204-MK	M	★	●	★	6.35	2.38	0.4	2.8	
DCMT070208-MK	M	★	●	★	6.35	2.38	0.8	2.8	
DCMT11T302-MK	M	●	●	●	9.525	3.97	0.2	4.4	
DCMT11T304-MK	M	●	●	●	9.525	3.97	0.4	4.4	
DCMT11T308-MK	M	●	●	●	9.525	3.97	0.8	4.4	
DCMT150404-MK	M	★	●	★	12.7	4.76	0.4	5.5	
DCMT150408-MK	M	★	●	★	12.7	4.76	0.8	5.5	
DCMT070204-MV	M		●		6.35	2.38	0.4	2.8	
DCMT070208-MV	M		●		6.35	2.38	0.8	2.8	
DCMT11T304-MV	M		●		9.525	3.97	0.4	4.4	
DCMT11T308-MV	M		●		9.525	3.97	0.8	4.4	
DCMW070204	—	●	★	★	6.35	2.38	0.4	2.8	
DCMW11T304	—	●	●	★	9.525	3.97	0.4	4.4	
DCMW11T308	—	●	●	●	9.525	3.97	0.8	4.4	



Flat top

Geometry



1/1

(10 inserts in one case)

139 Vc

● / ★ = Expansion

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

RCMX, SCMT, SCMW

7° POSITIVE INSERTS (WITH HOLE)

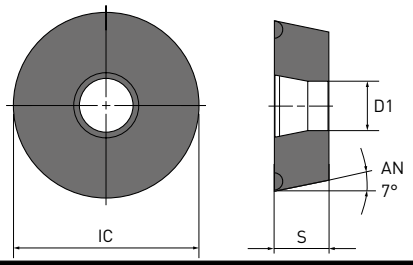
K

M-Class

RCMX

Order number	L M R	MC5105	MC5115	MC5125	IC	S	RE	D1
RCMX1204M0	M		●		12	4.76	–	4.2

Standard



1/1

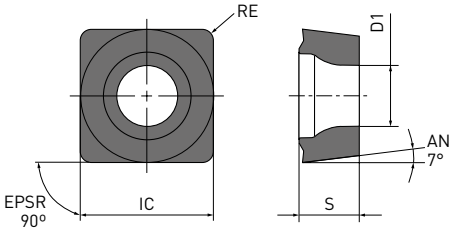
(10 inserts in one case)

139 Vc

SCMT, SCMW

Order number	L M R	MC5105	MC5115	MC5125	IC	S	RE	D1
SCMT09T304-MK	M	★	●	★	9.525	3.97	0.4	4.4
SCMT09T308-MK	M	●	●	●	9.525	3.97	0.8	4.4
SCMT120404-MK	M	★	●	★	12.7	4.76	0.4	5.5
SCMT120408-MK	M	●	●	●	12.7	4.76	0.8	5.5
SCMW09T304	—	●	●	★	9.525	3.97	0.4	4.4
SCMW09T308	—	●	●	●	9.525	3.97	0.8	4.4
SCMW120408	—	●	●	★	12.7	4.76	0.8	5.5

Flat top



1/1

(10 inserts in one case)

139 Vc

● / ★ = Expansion

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

TCMT, TCMW, VCMT, VCMW

7° POSITIVE INSERTS (WITH HOLE)

K

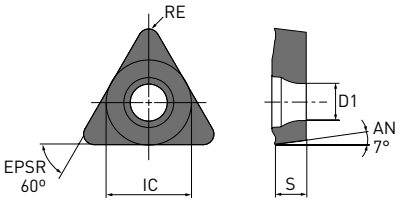
M-Class

TCMT, TCMW

Order number	L M R	MC5105	MC5115	MC5125	IC	S	RE	D1
TCMT110202-LK	L	●	●	●	6.35	2.38	0.2	2.8
TCMT110204-LK	L	●	●	●	6.35	2.38	0.4	2.8
TCMT110208-LK	L	●	●	●	6.35	2.38	0.8	2.8
TCMT110204-MK	M	★	●	★	6.35	2.38	0.4	2.8
TCMT110208-MK	M	★	●	★	6.35	2.38	0.8	2.8
TCMT16T304-MK	M	●	●	★	9.525	3.97	0.4	4.4
TCMT16T308-MK	M	●	●	●	9.525	3.97	0.8	4.4
TCMT16T312-MK	M	●	●	●	9.525	3.97	1.2	4.4
TCMW110204	—	●	●	★	6.35	2.38	0.4	2.8
TCMW16T304	—	●	●	●	9.525	3.97	0.4	4.4
TCMW16T308	—	●	●	●	9.525	3.97	0.8	4.4
TCMW16T312	—	●	●	★	9.525	3.97	1.2	4.4

Flat top

Geometry



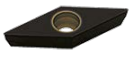
1/1

(10 inserts in one case)

139 Vc

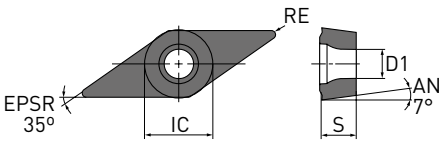
VCMT, VCMW

Order number	L M R	MC5105	MC5115	MC5125	IC	S	RE	D1
VCMT160404-MK	M	●	●	●	9.525	4.76	0.4	4.4
VCMT160408-MK	M	●	●	●	9.525	4.76	0.8	4.4
VCMT080204-MV	M		●		4.76	2.38	0.4	2.4
VCMW160404	—	●	●	★	9.525	4.76	0.4	4.4
VCMW160408	—	●	●	★	9.525	4.76	0.8	4.4



Flat top

Geometry



1/1

(10 inserts in one case)

139 Vc

● / ★ = Expansion

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

CPMH, TPMH

11° POSITIVE INSERTS (WITH HOLE)

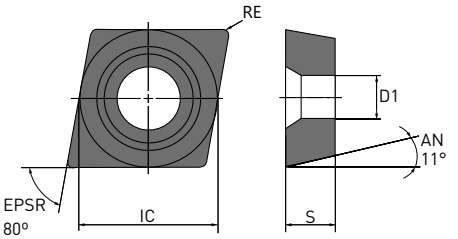
K

M-Class

CPMH

Order number	L M R	MC5105	MC5115	MC5125	IC	S	RE	D1
CPMH080204-MK	M	●	●	●	7.94	2.38	0.4	3.5
CPMH080208-MK	M	●	●	●	7.94	2.38	0.8	3.5
CPMH090304-MK	M	●	●	●	9.525	3.18	0.4	4.5
CPMH090308-MK	M	●	●	●	9.525	3.18	0.8	4.5
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	4.5
CPMH090308-MV	M		★		9.525	3.18	0.8	4.5

Geometry



1/1

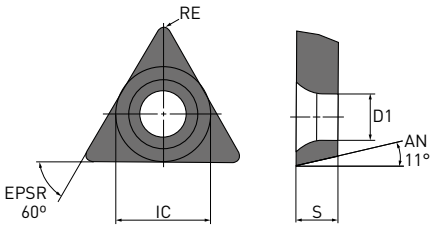
(10 inserts in one case)

139 Vc

TPMH

Order number	L M R	MC5105	MC5115	MC5125	IC	S	RE	D1
TPMH110302-LK	L	●	●	●	6.35	3.18	0.2	3.4
TPMH110304-LK	L	●	●	●	6.35	3.18	0.4	3.4
TPMH110308-LK	L	●	●	●	6.35	3.18	0.8	3.4
TPMH160302-LK	L	●	●	●	9.525	3.18	0.2	4.4
TPMH160304-LK	L	●	●	●	9.525	3.18	0.4	4.4
TPMH160308-LK	L	●	●	●	9.525	3.18	0.8	4.4
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
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

Geometry



1/1

(10 inserts in one case)

139 Vc

● / ★ = Expansion

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

WPMT

11° POSITIVE INSERTS (WITH HOLE)

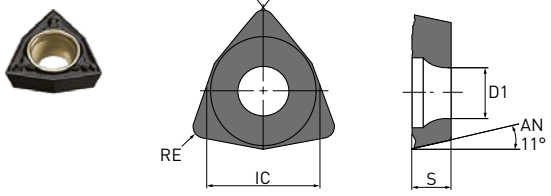
K

M-Class

WPMT

Order number	L M R	MC5105	MC5115	MC5125	IC	S	RE	D1
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

Geometry



1/1

(10 inserts in one case)

139 Vc

TPMR, TPMN

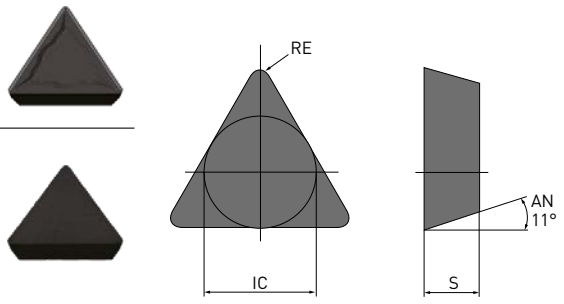
11° POSITIVE INSERTS (WITHOUT HOLE)

K

M-Class

Order number	L M R	MC5105	MC5115	MC5125	IC	S	RE	D1
TPMR110304-MK	M	●	●	●	6.35	3.18	0.4	–
TPMR110308-MK	M	●	●	●	6.35	3.18	0.8	–
TPMR160304-MK	M	●	●	●	9.525	3.18	0.4	–
TPMR160308-MK	M	●	●	●	9.525	3.18	0.8	–
TPMN110304	—	★	●	★	6.35	3.18	0.4	–
TPMN110308	—	●	●	★	6.35	3.18	0.8	–
TPMN160304	—	●	●	★	9.525	3.18	0.4	–
TPMN160308	—	●	●	★	9.525	3.18	0.8	–
TPMN160312	—	★	●	★	9.525	3.18	1.2	–

Geometry



Flat top

1/1

(10 inserts in one case)

139 Vc

● / ★ = Expansion

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

MC5100 SERIES

RECOMMENDED CUTTING CONDITIONS

5°, 7° POSITIVE INSERTS (FOR EXTERNAL TURNING)

	Material	Hardness	Cutting conditions	Grade	Vc
K	Gray cast iron	Tensile Strength ≤ 350MPa	●	MC5115	190 – 350
			◐	MC5115	140 – 270
			✣	MC5115	80 – 150
	Ductile cast iron	Tensile Strength ≤ 450MPa	●	MC5115	170 – 320
			◐	MC5115	130 – 250
			✣	MC5125	60 – 130
		Tensile Strength ≤ 800MPa	●	MC5115	125 – 240
			◐	MC5115	105 – 200
			✣	MC5125	55 – 115

1/1

11° POSITIVE INSERTS (FOR EXTERNAL TURNING)

	Material	Hardness	Cutting conditions	Grade	Vc
K	Gray cast iron	Tensile Strength ≤ 350MPa	●	MC5115	150 – 300
			◐	MC5115	140 – 270
			✣	MC5115	80 – 150
	Ductile cast iron	Tensile Strength ≤ 450MPa	●	MC5115	170 – 320
			◐	MC5115	130 – 250
			✣	MC5125	60 – 130
		Tensile Strength ≤ 800MPa	●	MC5115	125 – 240
			◐	MC5115	105 – 200
			✣	MC5125	55 – 115

1/1

	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	0.08 – 0.30	0.3 – 2.0

Cutting conditions: ●: Stable cutting ◐: General cutting ✣: Unstable cutting

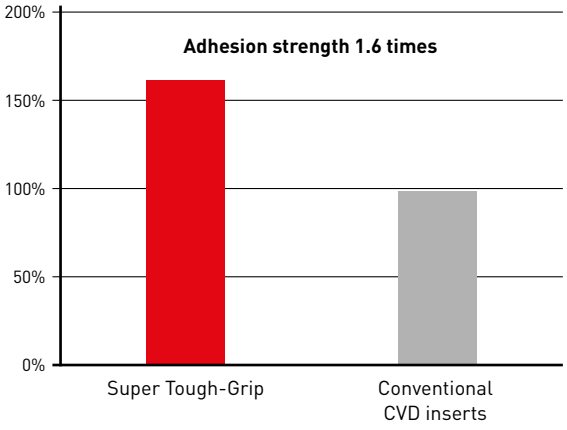
APPLICATION EXAMPLES

MC5105

COMPARISON OF WEAR RESISTANCE WHEN TURNING DIN GG30 AT CUTTING SPEEDS OF 1000 M/MIN

Adhesion strength evaluation:
Adhesion strength measurement is obtained from a scratch test that records the force needed to peel the coating layers.

Material	DIN GG30
Tool	CNMA120412
Vc (m/min)	1.000
f (mm/rev.)	0.3
ap (mm)	2.0
Coolant	Dry cutting



After machining for 4 minutes

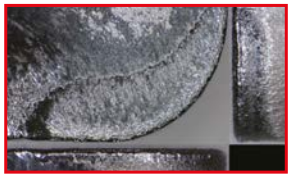
MC5105

Conventional A

Conventional B

Final image

After machining for 23 min



MC5105

After machining for 18 min

Conventional A

After machining for 23 min

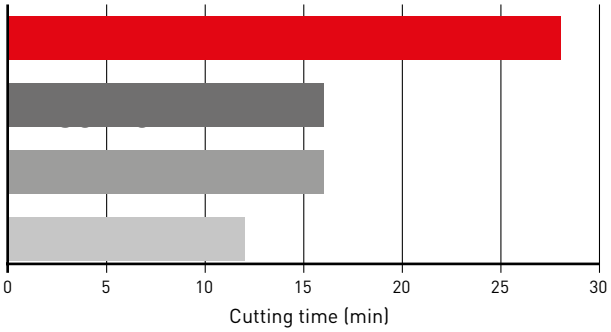
Conventional B

APPLICATION EXAMPLES

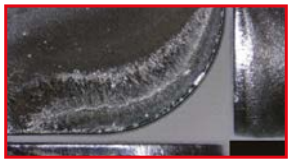
MC5115

COMPARISON OF WEAR RESISTANCE DURING CONTINUOUS CUTTING OF DIN GGG70

Material	DIN GGG70
Tool	CNMA120412
Vc (m/min)	250
f (mm/rev.)	0.3
ap (mm)	2.0
Coolant	Wet cutting



After machining for 16 min

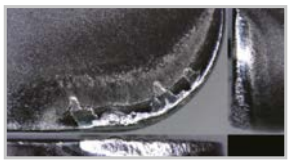


MC5115

After machining for 12 min

Conventional A

Conventional B

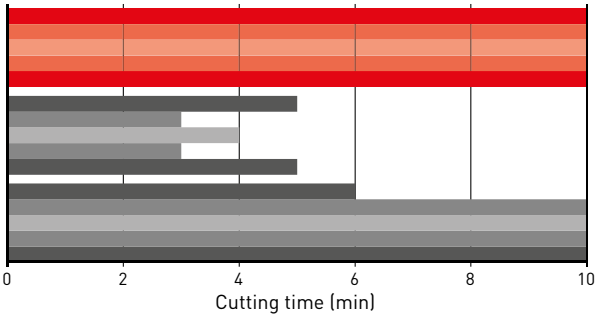


Conventional C

MC5125

COMPARISON OF FRACTURE RESISTANCE AFTER 10 PASSES OF INTERRUPTED CUTTING OF DIN GGG70

Material	DIN GGG70
Tool	CNMA120412
Vc (m/min)	150
f (mm/rev.)	0.25
ap (mm)	1.5
Coolant	Wet cutting



After machining for 10 passes

MC5125

After machining for 5 passes

Conventional A

After machining for 10 passes

Conventional B

: MC5100 A B C : Conventional tool

MS6015 / MS7025 / MS9025

MS TURNING SERIES – PVD COATED GRADES FOR HIGH PRECISION AND SMALL PARTS MACHINING

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DIA EDGE

MS6015/MS7025/MS9025

TRANSFORMATION OF MACHINING ON SWISS TYPE AUTOMATIC LATHES

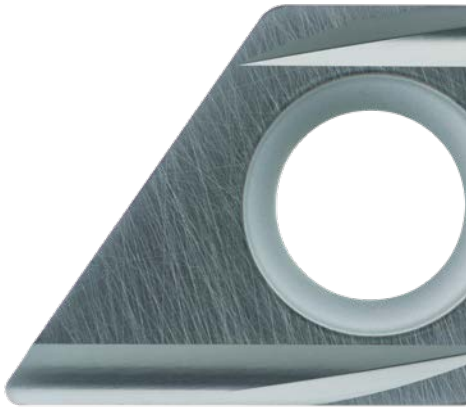
The first parts to be machined on Swiss type automatic lathes were watch components. The use soon expanded to machining electrical parts for home appliances, printers as well as automobile component applications such as sensors and electrification technology parts. The high precision capability of Swiss type lathes has also lent itself to the machining of parts essential to daily life. These parts include robotic and medical implants as well as simple but essential parts for water taps. Expanding the type of workpieces is not the only modern advancement, even higher precision, productivity and quality has become necessary.

DUE TO CHANGES IN MATERIALS AND COMPONENT GEOMETRIES, VARIOUS PROBLEMS HAVE ARISEN THAT NEED SOLUTIONS:

- Complex workpiece shapes
- Ever more difficult-to-cut materials
- Tighter dimensional tolerances

MITSUBISHI MATERIALS IS COMMITTED TO PRODUCT DEVELOPMENT AND THE COMMERCIALISATION OF NEW TOOLS THAT HAVE THE CUTTING CAPABILITY AND MACHINE TOOL ADAPTABILITY THAT CUSTOMERS DESIRE AS FOLLOWS:

- Development of new coating adapted to workpiece materials and machining methods
- Optimisation of welding, wear and fracture resistance
- High precision machining enabled by the development of high quality cutting edge geometries

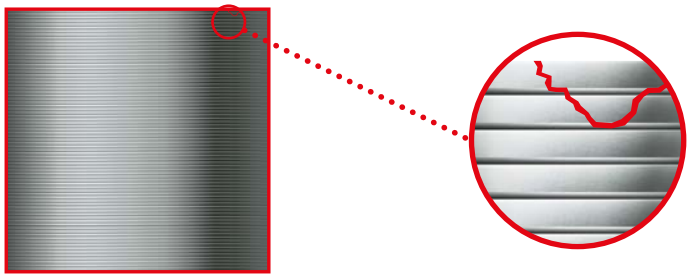


MS7025

DRAMATICALLY IMPROVED WELDING AND WEAR RESISTANCE IN LOW FEED MACHINING ENABLED BY A MORE PRECISE NANO-MULTILAYER COATING

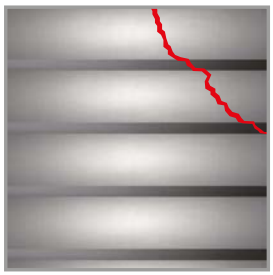
NANO-MULTILAYER COATING

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

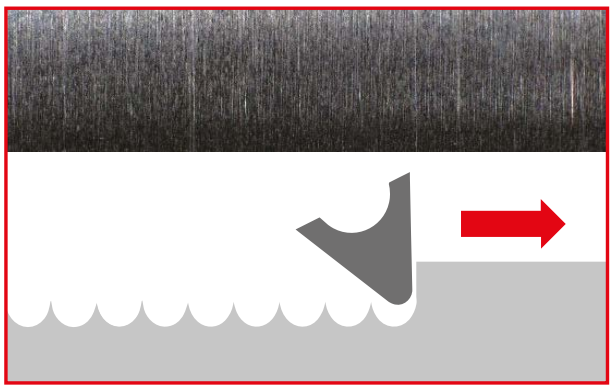


Conventional multilayer coating

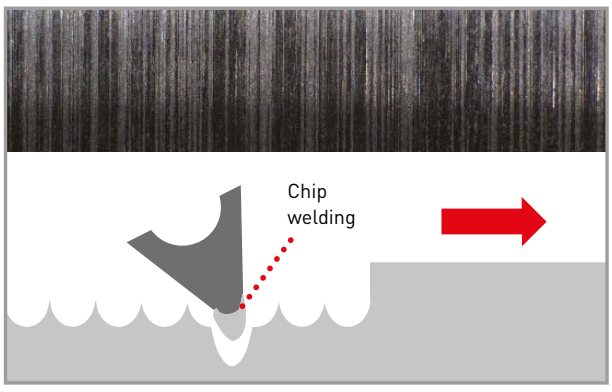
EFFECTS OF THE HIGH LUBRICATION LAYER

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

Surface finish



MS7025



Conventional

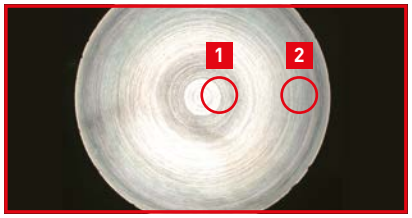
MS7025

CUTTING PERFORMANCE

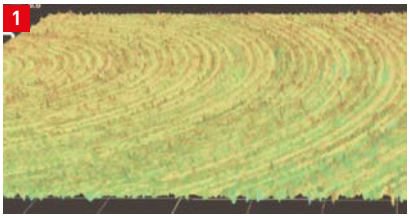
COMPARISON OF END FACE MACHINED SURFACES USING 3D ANALYSIS

Achieves stable machining even during end face machining where the cutting speed is liable to change.

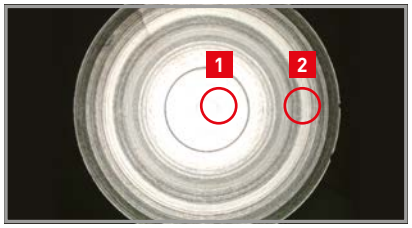
Workpiece material: C45



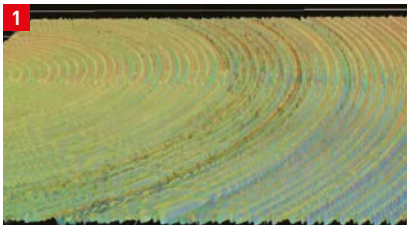
MS7025

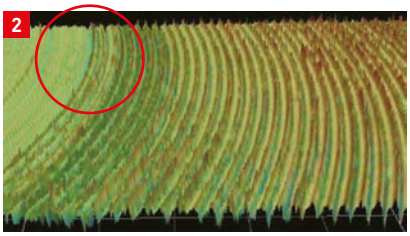


Good surface finish



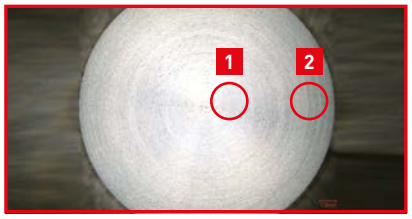
Conventional



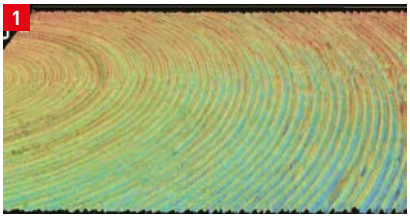


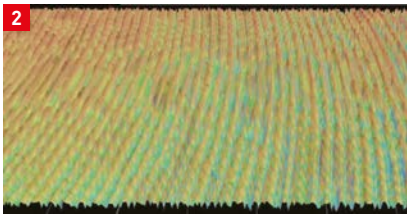
Changes in surface quality that cause machining marks

Workpiece material: X5CrNi18-10 (1.4301)

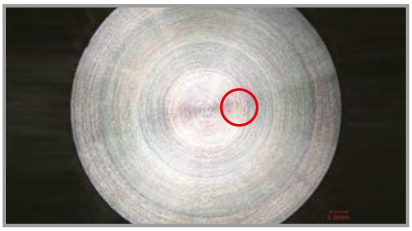


MS7025

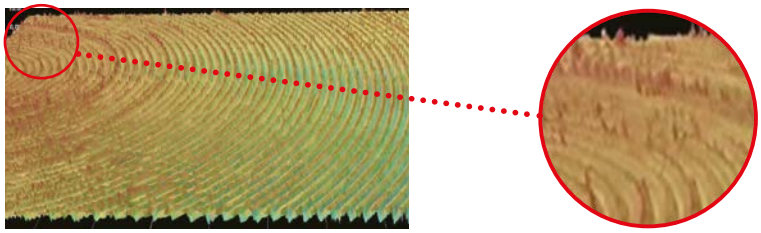




Good surface finish



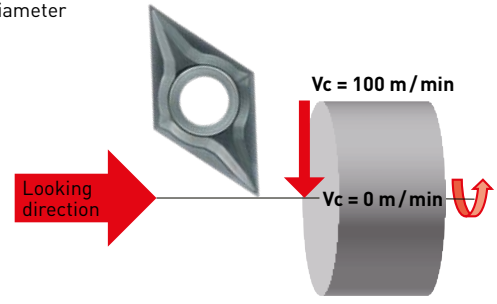
Conventional



Roughness can occur in the low speed area (near the centre)

Workpiece material	Notation above
Insert	DCGT11T302
Vc max. (m/min)	100
f (mm/rev)	0.02
ap (mm)	0.2
Cutting mode	Wet cutting (Oil)

Image of facing
Workpiece diameter
16 mm



MS7025

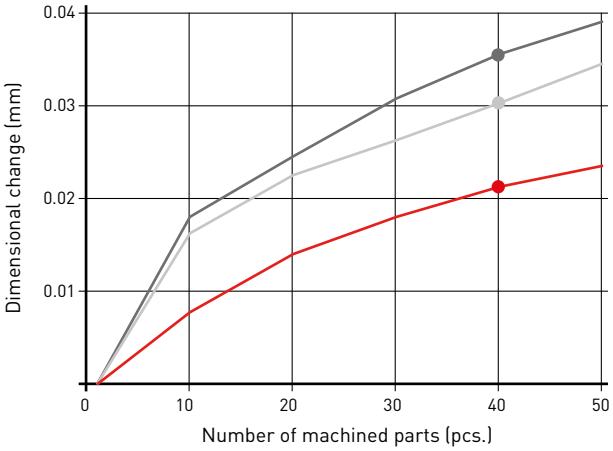
CUTTING PERFORMANCE

COMPARISON OF DIMENSIONAL CHANGE DURING LOW FEED MACHINING

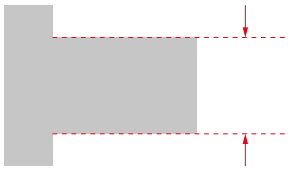
When machining with MS7025 at low feed rate conditions, dimensional changes are reduced and the quality of the machined surface is improved.

Workpiece Material: X105CrMo17 (DIN 1.4125)

Workpiece material	X105CrMo17 (DIN 1.4125)
Insert	DCGT11T301
Vc (m/min)	70
f (mm/rev)	0.02
ap (mm)	1.5
Cutting mode	Wet cutting (Oil)



Dimensional Change
The measured dimensional change is based on the first machined component



After machining 40 pieces

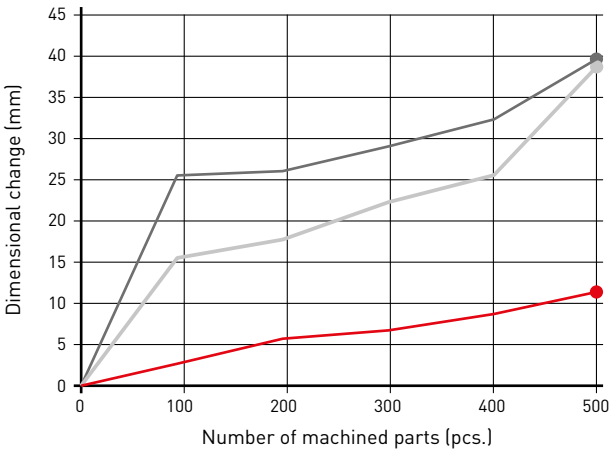
MS7025

Conventional A

Conventional B

Workpiece Material: ELCH2S

Workpiece material	ELCH2S
Insert	DCGT11T302
Vc (m/min)	240
f (mm/rev)	0.03
ap (mm)	0.3
Cutting mode	Wet cutting (Oil)



After machining 500 pieces

MS7025

Conventional A

Conventional B

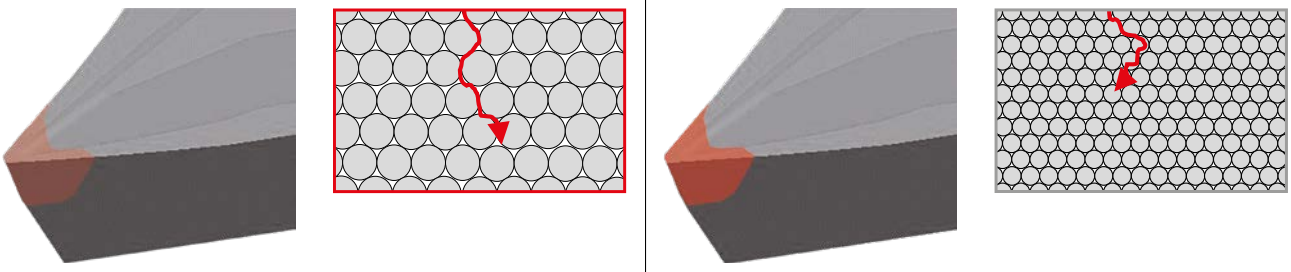
MS9025

EFFECTIVE REDUCTION OF NOTCH WEAR WITH A BALANCE OF WEAR AND FRACTURE RESISTANCE

IMPROVED CEMENTED CARBIDE

Thermal conductivity has been improved by optimising the grain size and therefore reducing the boundary contact between the WC particles. This optimisation reduces the temperature of the cutting edge during machining.

MS9025	Conventional
Reducing the cutting edge temperature by improved thermal conductivity.	Higher cutting edge temperatures due to more particle boundary contact.

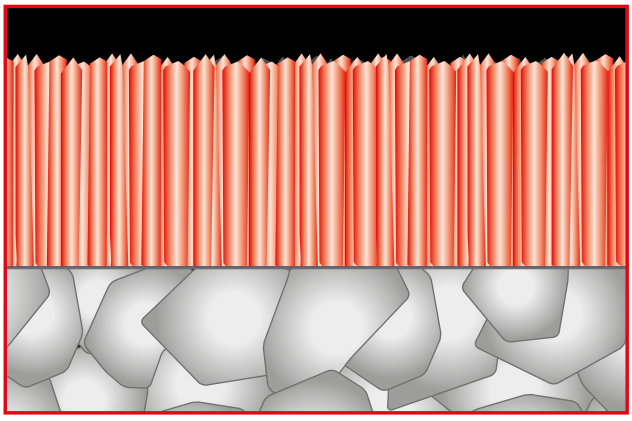


SMOOTH SURFACE OF THE COATING

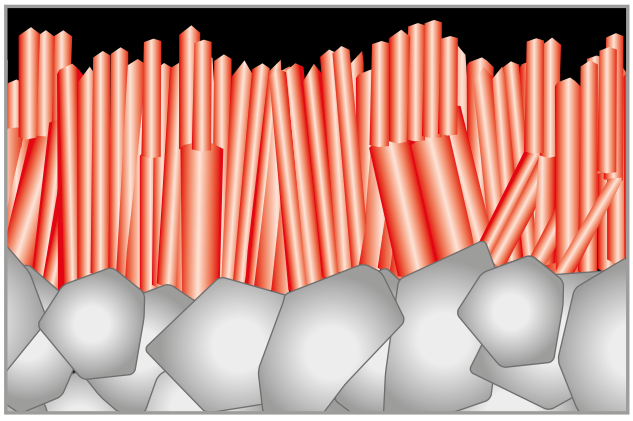
The even surface of the coating has been achieved by first making the carbide substrate smooth then by promoting straight growth of the coating crystals. This leads to excellent welding resistance.

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

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



MS9025



Conventional

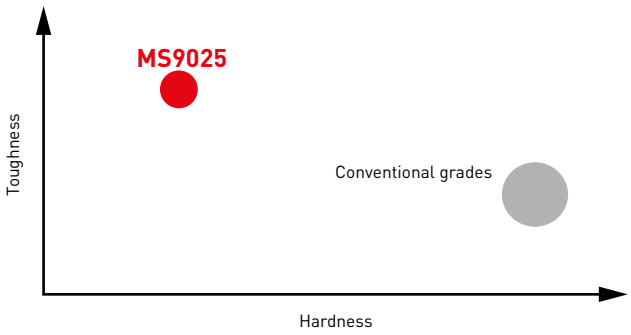
MS9025

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

Al-rich (Al,Ti)N
- Superior flank wear resistance
- Superior crater wear resistance
- Excellent welding resistance

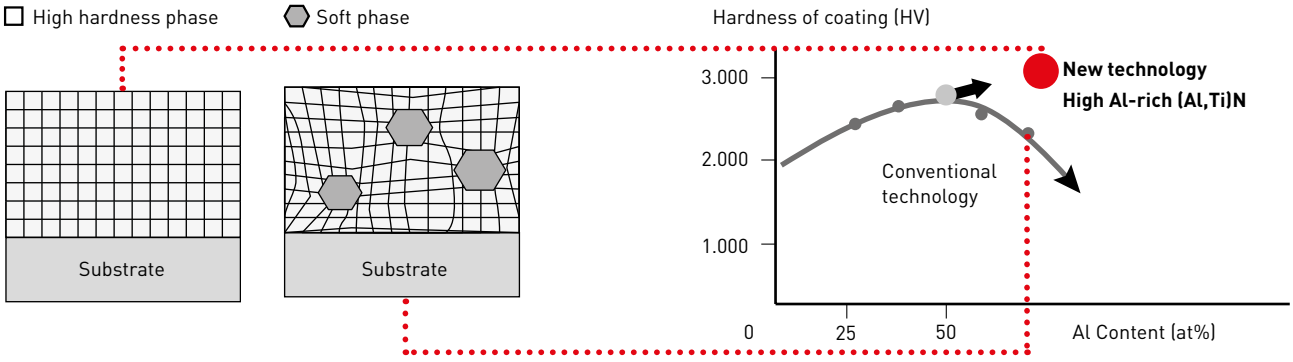
Special cemented carbide for MS9025
- Superior fracture resistance
- Excellent chipping resistance

Cemented carbide base material properties



HIGH AL AND CONVENTIONAL COATING COMPARISON

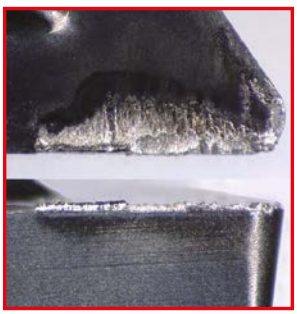
The high Al-rich (Al,Ti)N single layer coating provides stabilization of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance.



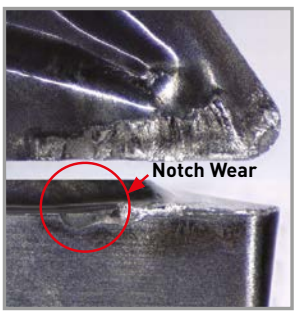
STAINLESS STEEL DIN X5CRNI18-10 (1.4301), CUTTING EDGE COMPARISON

After machining 500 parts

Workpiece material	X5CrNi18-10 (DIN 1.4301)
Insert	DCGT11T302
Vc (m/min)	57
f (mm/rev)	0.03
ap (mm)	Rough: 0.05 Finish: 0.02
Cutting mode	External Continuous cutting Wet cutting (Oil)



MS9025 VB = 0.03 mm



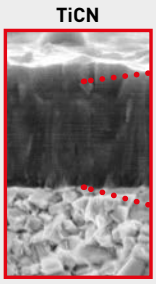
Conventional VB = 0.07 mm

MS6015

IDEAL FOR TURNING PURE IRON, CARBON AND FREE CUTTING STEELS WHILST ALSO PROVIDING EXCELLENT DIMENSIONAL ACCURACY AND GOOD SURFACE FINISHES

The unique combination of a special carbide substrate and a new PVD coating greatly improves wear resistance.

	MS6015	Conventional
Coating	TiCN Multi-layer	TiAlN
Hardness (HV)	3000	2800
Friction coefficient	Low	High
Base material hardness (HRA)	92.0	92.0
T.R.S (GPa)	2.0	2.0



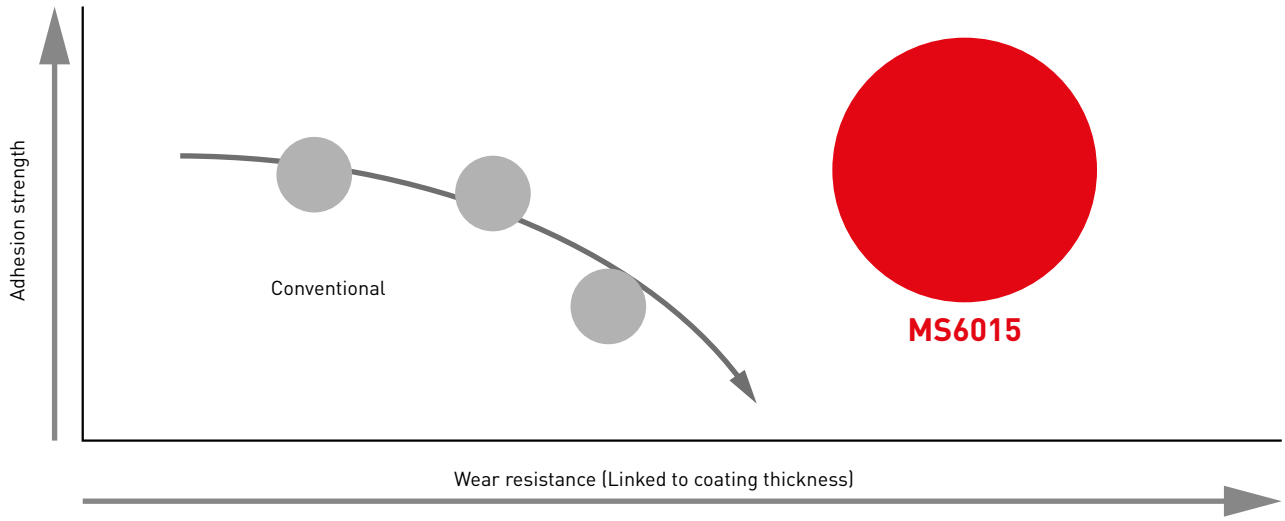
Superior wear and welding resistance for efficient machining of carbon steel.

Minute multi-layers remarkably improves adhesion between layers.

Excellent chip discharge with a reduced coefficient of friction creates a stable surface finish.

OPTIMISING THE LAMINATED STRUCTURE

Optimising the laminated structure enables the thickening of coating which leads to significant wear resistance.



MS6015 / MS7025 / MS9025

APPLICATION RANGE

Material		Cutting mode		Grade
P	Steel	Continuous cutting	*Low*	MS6015
			Medium	
			High	MS7025
		Interrupted cutting		

P	PVD
P10	MS6015
P20	
P30	MS7025
P40	
P50	

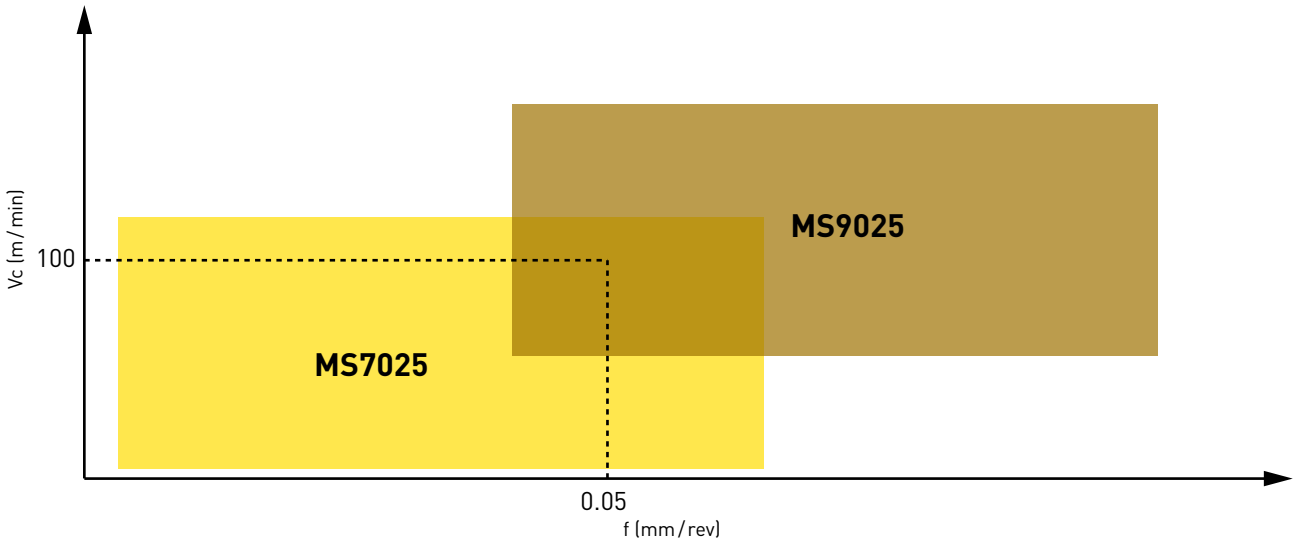
Material		Cutting mode		Grade
M	Stainless steel	Continuous cutting	*Low*	MS7025 MS9025
			Medium	
			High	
		Interrupted cutting		

M	PVD
M10	
M20	MS7025
M30	MS9025
M40	
M50	

Material		Cutting mode		Grade
S	Titanium alloy (HRSA)	Continuous cutting	*Low*	MS9025
			Medium	
			High	
		Interrupted cutting		

S	PVD
S10	
S20	
S30	MS9025
S40	
S50	

CORRECT AREA OF USE WHEN MACHINING STAINLESS STEEL



MS6015 / MS7025 / MS9025

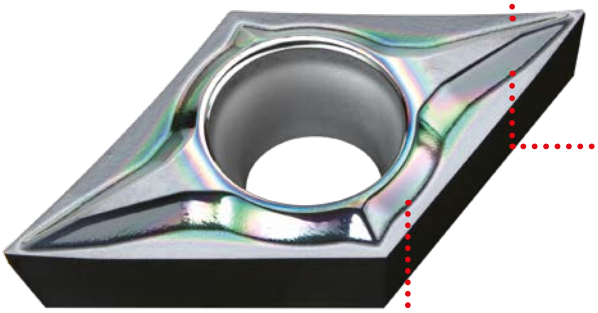
IDEAL INSERTS FOR TURNING SMALL PARTS

Set the corner radius to a minus tolerance.

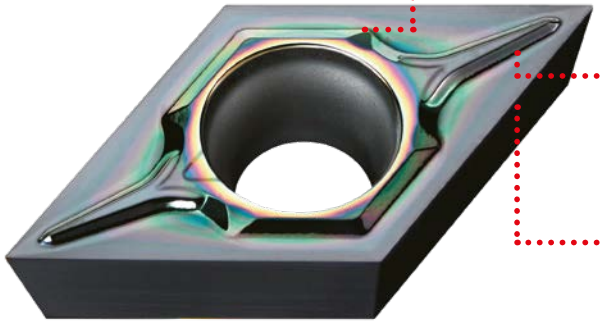
Order number	DCGT11T3**02 M** R-SN	→	02M R 0.2 mm (R 0.15 – R 0.20 mm)
	DCGT11T3**04 M** -SMG		04M R 0.4 mm (R 0.35 – R 0.40 mm)

NEW BREAKER SYSTEM FOR FRONT TURNING

FS-P Breaker
For micro-low depth of cut



LS-P Breaker
For medium to high depth of cut



Curved cutting edge

The curved cutting edge reduces cutting resistance and enables smooth chip evacuation. It also enables good initial entry to the workpiece and resists vibration and oscillation during machining.

High breaker wall

The high chipbreaker wall ensures that the chips separate properly and prevents the workpiece from being damaged when chips are discharged.

Polishing (Mirror-surface)

Welding resistance and chip evacuation are greatly improved.

Large pocket

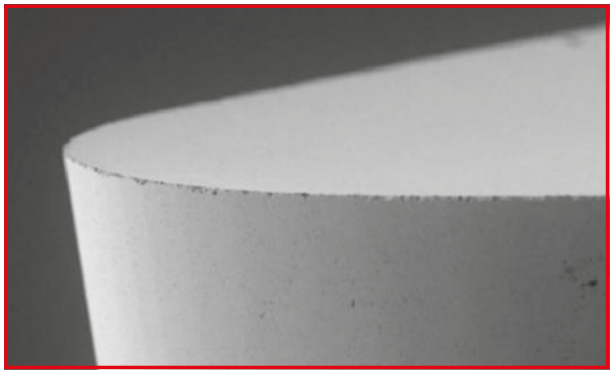
The large pocket enhances chip evacuation during high depths of cut and suppresses chip clogging.

Parallel cutting edge

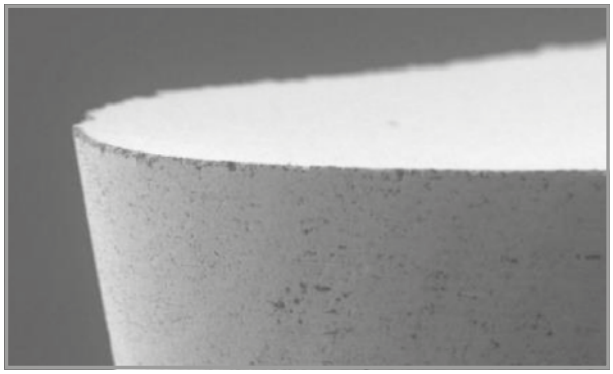
The parallel cutting edge greatly improves fracture resistance during high depths of cut.

EXTREMELY HIGH QUALITY CUTTING EDGE

Technology that provides superior dimensional stability and reduces burrs.



MS7025 / MS9025 Rz = 0.14 µm



Conventional Rz = 0.61 µm

MS9025

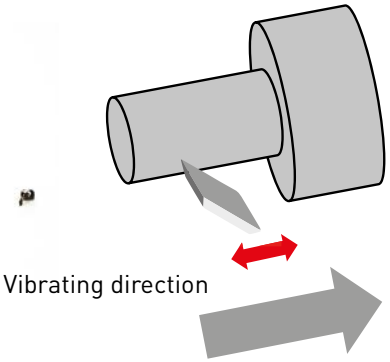
NEW TECHNOLOGY – CONTROLLED VIBRATION OF THE CUTTING TOOL

Using new machine technology to deliberately vibrate the tool in relation to the cutting direction is an effective way of breaking chips. This reduces production costs by reducing chip entanglement.

Without controlled vibration

With controlled vibration frequency = 0.75/rev

With controlled vibration frequency = 1.25/rev



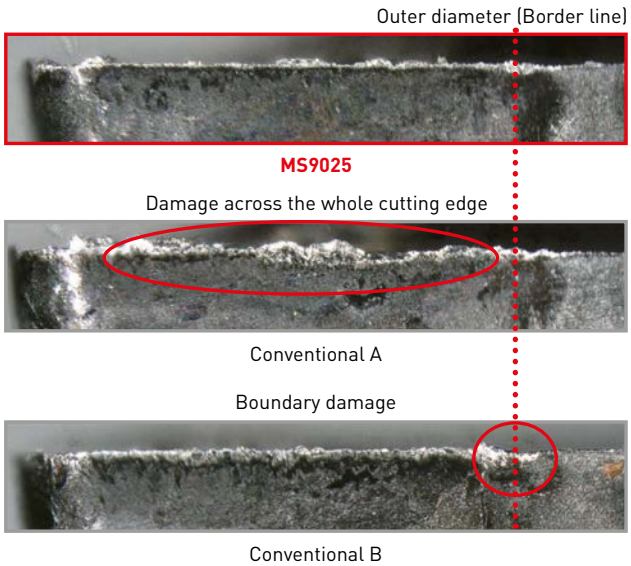
Challenges of controlled vibration machining:
Compared to standard machining there is a greater chance of chipping due to the extra stress on the cutting edge and also because of the consequences of work hardening.

BENEFITS OF USING MS9025 FOR CONTROLLED VIBRATION MACHINING

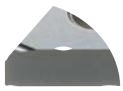
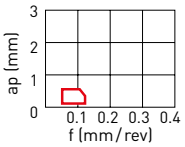
1. Excellent fracture resistance due to the inherent toughness of the base material.
2. Effectively suppresses boundary wear damage during machining of difficult-to-cut materials. This is achieved by the optimised cemented carbide grain size that increases thermal conductivity and heating of the cutting edge.

After 500 passes at 15 m per pass

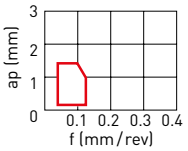
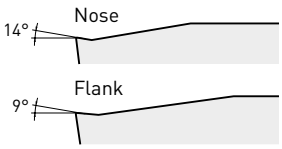
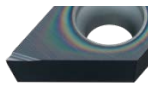
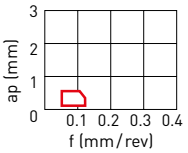
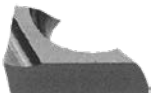
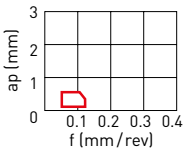
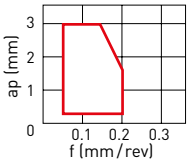
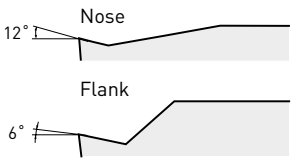
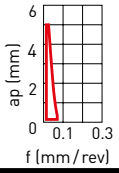
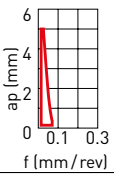
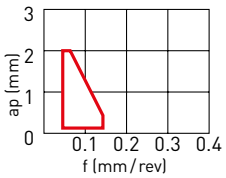
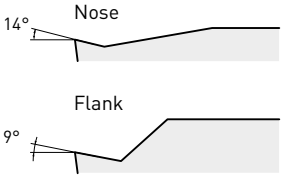
Workpiece material	DIN X5CrNi18-10 (1.4301)
Insert	DCGT11T302M
Vc (m/min)	100
f (mm/rev)	0.08
ap (mm)	1.0
The number of vibration	D = 1.25/rev
Cutting mode	External Continuous cutting Wet cutting (Oil)



BREAKER SYSTEM – NEGATIVE INSERTS

Tolerance		Features	Carbon steel/Alloy steel	Cross section geometry
FINISH CUTTING				
G	 R/L-FS	**PRECISION FINISHING** Double-sided chipbreaker. A narrow lead chipbreaker for good chip control. Sharp cutting edge gives a good surface finish.		

BREAKER SYSTEM – POSITIVE INSERTS

Tolerance		Features	Carbon steel/Alloy steel	Cross section geometry
FINISH CUTTING				
G	 FS-P	**FIRST RECOMMENDATION FOR FINISHING TITANIUM ALLOYS** Ideal for cobalt chromium alloy and copper alloy. The sharp edge produces a good surface finish. The curved edge allows smooth chip discharge. Lapping of the top surface gives a mirror finish for improved welding resistance.		
E	 R/L - SRF	**FINISHING** Lead chipbreaker controls chip flow. Sharp cutting edge gives a good surface finish.		
G	 R/L-F	**FINISH MACHINING ON AUTOMATIC LATHES** Lead chipbreaker controls chip flow. Sharp cutting edge gives a good surface finish.		
LIGHT CUTTING				
G	 LS-P	**LIGHT MACHINING ON AUTOMATIC LATHES** Designed with parallel cutting edges. Achieves stable chip control over a wide range, from low to medium depths of cut. Polished (mirror-surface) finish of insert surface drastically improves welding resistance and extends tool life.		
	 R/L-SS	**LIGHT MACHINING ON AUTOMATIC LATHES** Parallel chipbreaker geometry. Excellent chip control at low feed rates.		
MEDIUM CUTTING				
G	 R/L-SN	**MEDIUM CUTTING OF AUTOMATIC LATHE MACHINING** A parallel chipbreaker. Excellent chip control at low to medium feed rates.		
	 SMG	**MEDIUM CUTTING** 3D moulded chipbreaker provides good chip control. G class insert provides a sharp cutting action, allowing high precision machining. Breaker geometry is suitable for copying and back turning.		

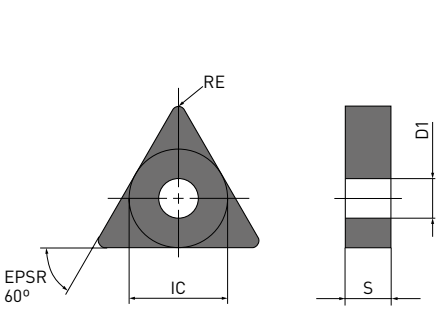
TNGG

NEGATIVE INSERTS (WITH HOLE)

P M S

G Class

R/L-FS



Order number		MS6015	MS7025	MS9025	IC	S	RE	D1
TNGG160402R-FS	F	●			9.525	4.76	0.2	3.81
TNGG160402L-FS	F	●			9.525	4.76	0.2	3.81
TNGG160404R-FS	F	●			9.525	4.76	0.4	3.81
TNGG160404L-FS	F	●			9.525	4.76	0.4	3.81
TNGG160408R-FS	F	●			9.525	4.76	0.8	3.81
TNGG160408L-FS	F	●			9.525	4.76	0.8	3.81

1/1

163 Vc

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

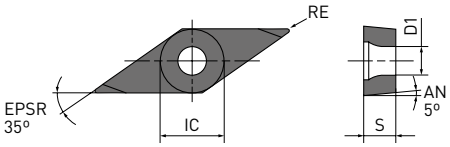
VBGT

5° POSITIVE INSERTS (WITH HOLE)

P M S

G Class

FS-P



Order number		MS6015	MS7025	MS9025	IC	S	RE	D1
VBGT110301M-FS-P	F			●	6.35	3.18	0.1	2.9
VBGT110302M-FS-P	F			●	6.35	3.18	0.2	2.9
VBGT110304M-FS-P	F			●	6.35	3.18	0.4	2.9
VBGT160401M-FS-P	F			●	9.525	4.76	0.1	4.4
VBGT160402M-FS-P	F			●	9.525	4.76	0.2	4.4
VBGT160404M-FS-P	F			●	9.525	4.76	0.4	4.4
VBGT160408M-FS-P	F			●	9.525	4.76	0.8	4.4

1/1

163 Vc

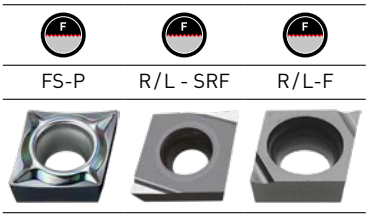
● : Inventory maintained. ★ : Inventory maintained in Japan.

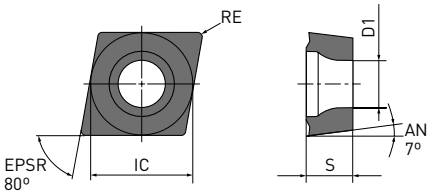
CCGH/CCET/CCGT

7° POSITIVE INSERTS (WITH HOLE)

P M S

E, G Class





	Order number		MS6015	MS7025	MS9025	IC	S	RE*2	D1
	CCGT060201M-FS-P	F		●	●	6.35	2.38	0.1	2.8
	CCGT060202M-FS-P	F		●	●	6.35	2.38	0.2	2.8
	CCGT060204M-FS-P	F		●	●	6.35	2.38	0.4	2.8
	CCGT09T301M-FS-P	F		●	●	9.525	3.97	0.1	4.4
	CCGT09T302M-FS-P	F		●	●	9.525	3.97	0.2	4.4
	CCGT09T304M-FS-P	F		●	●	9.525	3.97	0.4	4.4
NEW	CCET060201MR-SRF	F			●	6.35	2.38	0.1	2.8
NEW	CCET060201ML-SRF	F			●	6.35	2.38	0.1	2.8
NEW	CCET060202MR-SRF	F			●	6.35	2.38	0.2	2.8
NEW	CCET060202ML-SRF	F			●	6.35	2.38	0.2	2.8
NEW	CCET060204MR-SRF	F			●	6.35	2.38	0.4	2.8
NEW	CCET060204ML-SRF	F			●	6.35	2.38	0.4	2.8
NEW	CCET09T301MR-SRF	F			●	9.525	3.97	0.1	4.4
NEW	CCET09T301ML-SRF	F			●	9.525	3.97	0.1	4.4
NEW	CCET09T302MR-SRF	F			●	9.525	3.97	0.2	4.4
NEW	CCET09T302ML-SRF	F			●	9.525	3.97	0.2	4.4
NEW	CCET09T304MR-SRF	F			●	9.525	3.97	0.4	4.4
NEW	CCET09T304ML-SRF	F			●	9.525	3.97	0.4	4.4
	CCGT03S101MR-F	F	●			3.57*1	1.39	0.1	2.0
	CCGT03S101ML-F	F	●			3.57*1	1.39	0.1	2.0
	CCGT03S102MR-F	F	●			3.57*1	1.39	0.2	2.0
	CCGT03S102ML-F	F	●			3.57*1	1.39	0.2	2.0
	CCGT03S104MR-F	F	●			3.57*1	1.39	0.4	2.0
	CCGT03S104ML-F	F	●			3.57*1	1.39	0.4	2.0
	CCGT04T001MR-F	F	●			4.37*1	1.79	0.1	2.4
	CCGT04T001ML-F	F	●			4.37*1	1.79	0.1	2.4
	CCGT04T002MR-F	F	●			4.37*1	1.79	0.2	2.4
	CCGT04T002ML-F	F	●			4.37*1	1.79	0.2	2.4
	CCGT04T004MR-F	F	●			4.37*1	1.79	0.4	2.4
	CCGT04T004ML-F	F	●			4.37*1	1.79	0.4	2.4
	CCGH060202MR-F	F	●			6.35	2.38	0.2	2.8
	CCGH060202ML-F	F	●			6.35	2.38	0.2	2.8
	CCGH060204MR-F	F	●			6.35	2.38	0.4	2.8
	CCGH060204ML-F	F	●			6.35	2.38	0.4	2.8

*1 Diameter of inscribed circle is non-ISO standard. (For SCLC type)
*2 Nominal value (Max.)

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

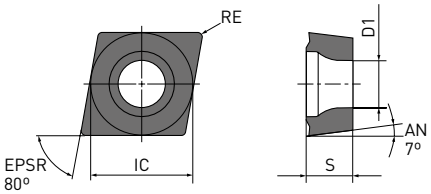
● = Expansion

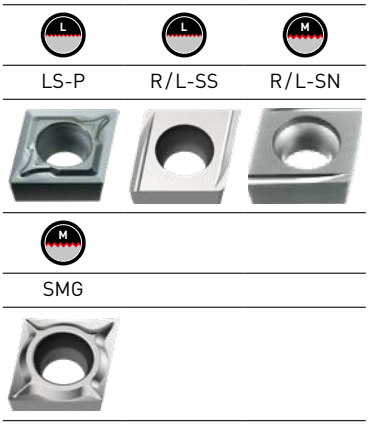
CCGT

7° POSITIVE INSERTS (WITH HOLE)

P M S

G Class





Order number		MS6015	MS7025	MS9025	IC	S	RE*	D1
CCGT0602V5M-LS-P	L			●	6.35	2.38	0.05	2.8
CCGT060201M-LS-P	L	●	●	●	6.35	2.38	0.1	2.8
CCGT060202M-LS-P	L	●	●	●	6.35	2.38	0.2	2.8
CCGT060204M-LS-P	L		●	●	6.35	2.38	0.4	2.8
CCGT09T301M-LS-P	L	●	●	●	9.525	3.97	0.1	4.4
CCGT09T302M-LS-P	L	●	●	●	9.525	3.97	0.2	4.4
CCGT09T304M-LS-P	L	●	●	●	9.525	3.97	0.4	4.4
CCGT060201MR-SS	L	●			6.35	2.38	0.1	2.8
CCGT060201ML-SS	L	●			6.35	2.38	0.1	2.8
CCGT060202MR-SS	L	●			6.35	2.38	0.2	2.8
CCGT060202ML-SS	L	●			6.35	2.38	0.2	2.8
CCGT09T301MR-SS	L	●			9.525	3.97	0.1	4.4
CCGT09T301ML-SS	L	●			9.525	3.97	0.1	4.4
CCGT09T302MR-SS	L	●			9.525	3.97	0.2	4.4
CCGT09T302ML-SS	L	●			9.525	3.97	0.2	4.4
CCGT09T304MR-SS	L	●			9.525	3.97	0.4	4.4
CCGT09T304ML-SS	L	●			9.525	3.97	0.4	4.4
CCGT060201MR-SN	M	●	●	●	6.35	2.38	0.1	2.8
CCGT060201ML-SN	M	●			6.35	2.38	0.1	2.8
CCGT060202MR-SN	M	●	●	●	6.35	2.38	0.2	2.8
CCGT060202ML-SN	M	●			6.35	2.38	0.2	2.8
CCGT09T301MR-SN	M	●	●	●	9.525	3.97	0.1	4.4
CCGT09T301ML-SN	M	●			9.525	3.97	0.1	4.4
CCGT09T302MR-SN	M	●	●	●	9.525	3.97	0.2	4.4
CCGT09T302ML-SN	M	●			9.525	3.97	0.2	4.4
CCGT09T304MR-SN	M	●	●	●	9.525	3.97	0.4	4.4
CCGT09T304ML-SN	M	●			9.525	3.97	0.4	4.4
CCGT060201M-SMG	M	●			6.35	2.38	0.1	2.8
CCGT060202M-SMG	M	●			6.35	2.38	0.2	2.8
CCGT060204M-SMG	M	●			6.35	2.38	0.4	2.8
CCGT09T301M-SMG	M	●			9.525	3.97	0.1	4.4
CCGT09T302M-SMG	M	●			9.525	3.97	0.2	4.4
CCGT09T304M-SMG	M	●			9.525	3.97	0.4	4.4

* Nominal value (Max.)

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

● = Expansion

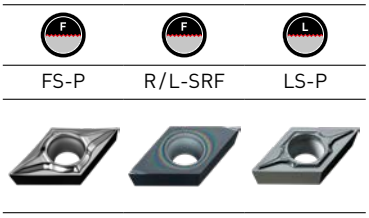
163 Vc

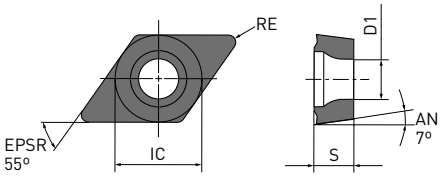
DCET / DCGT

7° POSITIVE INSERTS (WITH HOLE)

P M S

E, G Class





Order number		MS6015	MS7025	MS9025	IC	S	RE*	D1
DCGT070201M-FS-P	F		●	●	6.35	2.38	0.1	2.8
DCGT070202M-FS-P	F		●	●	6.35	2.38	0.2	2.8
DCGT070204M-FS-P	F		●	●	6.35	2.38	0.4	2.8
DCGT11T301M-FS-P	F		●	●	9.525	3.97	0.1	4.4
DCGT11T302M-FS-P	F		●	●	9.525	3.97	0.2	4.4
DCGT11T304M-FS-P	F		●	●	9.525	3.97	0.4	4.4
NEW DCET070201MR-SRF	F			●	6.35	2.38	0.1	2.8
NEW DCET070201ML-SRF	F			●	6.35	2.38	0.1	2.8
NEW DCET070202MR-SRF	F			●	6.35	2.38	0.2	2.8
NEW DCET070202ML-SRF	F			●	6.35	2.38	0.2	2.8
NEW DCET070204MR-SRF	F			●	6.35	2.38	0.4	2.8
NEW DCET070204ML-SRF	F			●	6.35	2.38	0.4	2.8
NEW DCET11T301ML-SRF	F			●	9.525	3.97	0.1	4.4
NEW DCET11T302ML-SRF	F			●	9.525	3.97	0.2	4.4
NEW DCET11T304ML-SRF	F			●	9.525	3.97	0.4	4.4
DCGT11T301MR-SRF	F		●	●	9.525	3.97	0.1	4.4
DCGT11T302MR-SRF	F		●	●	9.525	3.97	0.2	4.4
DCGT11T304MR-SRF	F		●	●	9.525	3.97	0.4	4.4
DCGT0702V5M-LS-P	L			●	6.35	2.38	0.05	2.8
DCGT070201M-LS-P	L	●	●	●	6.35	2.38	0.1	2.8
DCGT070202M-LS-P	L	●	●	●	6.35	2.38	0.2	2.8
DCGT070204M-LS-P	L	●	●	●	6.35	2.38	0.4	2.8
DCGT11T301M-LS-P	L	●	●	●	9.525	3.97	0.1	4.4
DCGT11T302M-LS-P	L	●	●	●	9.525	3.97	0.2	4.4
DCGT11T304M-LS-P	L	●	●	●	9.525	3.97	0.4	4.4

1/2

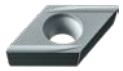
* Nominal value (Max.)

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

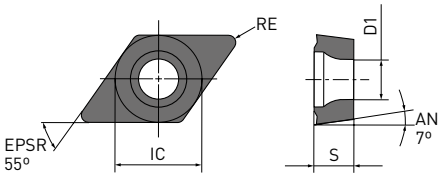
DCGT – 7° POSITIVE INSERTS (WITH HOLE)

P M S

R/L-SS



G Class



Order number	F	L	MS6015	MS7025	MS9025	IC	S	RE*	D1
DCGT070201MR-SS		L	●			6.35	2.38	0.1	2.8
DCGT070201ML-SS		L	●			6.35	2.38	0.1	2.8
DCGT070202MR-SS		L	●			6.35	2.38	0.2	2.8
DCGT070202ML-SS		L	●			6.35	2.38	0.2	2.8
DCGT11T301MR-SS		L	●			9.525	3.97	0.1	4.4
DCGT11T301ML-SS		L	●			9.525	3.97	0.1	4.4
DCGT11T302MR-SS		L	●			9.525	3.97	0.2	4.4
DCGT11T302ML-SS		L	●			9.525	3.97	0.2	4.4
DCGT11T304MR-SS		L	●			9.525	3.97	0.4	4.4
DCGT11T304ML-SS		L	●			9.525	3.97	0.4	4.4

* Nominal value (Max.)

163 Vc

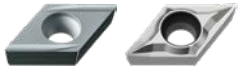
DCGT

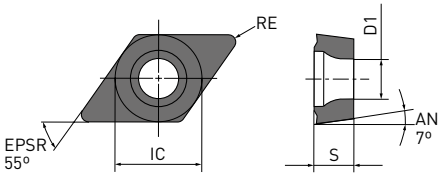
7° POSITIVE INSERTS (WITH HOLE)

P M S

G Class

R/L-SN SMG





Order number		MS6015	MS7025	MS9025	IC	S	RE*	D1
DCGT070201MR-SN	M	●	●	●	6.35	2.38	0.1	2.8
DCGT070201ML-SN	M	●	★	★	6.35	2.38	0.1	2.8
DCGT070202MR-SN	M	●	●	●	6.35	2.38	0.2	2.8
DCGT070202ML-SN	M	●	★	★	6.35	2.38	0.2	2.8
DCGT070204MR-SN	M		●	●	6.35	2.38	0.4	2.8
DCGT11T301MR-SN	M	●	●	●	9.525	3.97	0.1	4.4
DCGT11T301ML-SN	M	●	★	★	9.525	3.97	0.1	4.4
DCGT11T302MR-SN	M	●	●	●	9.525	3.97	0.2	4.4
DCGT11T302ML-SN	M	●	★	★	9.525	3.97	0.2	4.4
DCGT11T304MR-SN	M	●	●	●	9.525	3.97	0.4	4.4
DCGT11T304ML-SN	M	●	★	★	9.525	3.97	0.4	4.4
DCGT070201M-SMG	M	●			6.35	2.38	0.1	2.8
DCGT070202M-SMG	M	●			6.35	2.38	0.2	2.8
DCGT070204M-SMG	M	●			6.35	2.38	0.4	2.8
DCGT11T301M-SMG	M	●			9.525	3.97	0.1	4.4
DCGT11T302M-SMG	M	●			9.525	3.97	0.2	4.4
DCGT11T304M-SMG	M	●			9.525	3.97	0.4	4.4

1/1

* Nominal value (Max.)

163 Vc

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

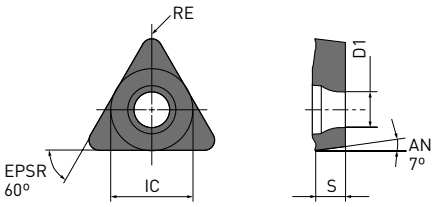
TCGT/VCET/VCGT

7° POSITIVE INSERTS (WITH HOLE)

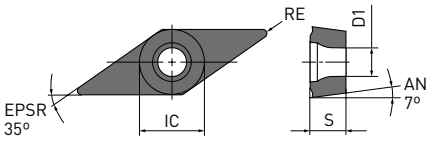
P M S

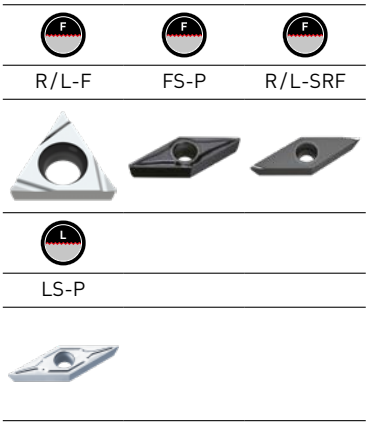
E, G Class

TCGT



VCET/VCGT





Order number		MS6015	MS7025	MS9025	IC	S	RE*	D1
TCGT060101MR-F	F	●			3.97	1.59	0.1	2.3
TCGT060101ML-F	F	●			3.97	1.59	0.1	2.3
TCGT060102MR-F	F	●			3.97	1.59	0.2	2.3
TCGT060102ML-F	F	●			3.97	1.59	0.2	2.3
TCGT060104MR-F	F	●			3.97	1.59	0.4	2.3
TCGT060104ML-F	F	●			3.97	1.59	0.4	2.3
VCGT110301M-FS-P	F		●	●	6.35	3.18	0.1	2.8
VCGT110302M-FS-P	F		●	●	6.35	3.18	0.2	2.8
VCGT110304M-FS-P	F			●	6.35	3.18	0.4	2.8
NEW VCET080202MR-SRF	F			●	4.76	2.38	0.2	2.4
NEW VCET080202ML-SRF	F			●	4.76	2.38	0.2	2.4
NEW VCET080204MR-SRF	F			●	4.76	2.38	0.4	2.4
NEW VCET080204ML-SRF	F			●	4.76	2.38	0.4	2.4
NEW VCET110301MR-SRF	F			●	6.35	3.18	0.1	2.8
NEW VCET110301ML-SRF	F			●	6.35	3.18	0.1	2.8
NEW VCET110302MR-SRF	F			●	6.35	3.18	0.2	2.8
NEW VCET110302ML-SRF	F			●	6.35	3.18	0.2	2.8
NEW VCET110304MR-SRF	F			●	6.35	3.18	0.4	2.8
NEW VCET110304ML-SRF	F			●	6.35	3.18	0.4	2.8
VCGT110301M-LS-P	L		●	●	6.35	3.18	0.1	2.8
VCGT110302M-LS-P	L		●	●	6.35	3.18	0.2	2.8
VCGT110304M-LS-P	L		●	●	6.35	3.18	0.4	2.8
VCGT130301M-LS-P	L			●	7.94	3.18	0.1	3.4
VCGT130302M-LS-P	L			●	7.94	3.18	0.2	3.4
VCGT130304M-LS-P	L			●	7.94	3.18	0.4	3.4

* Nominal value (Max.)

● = Expansion

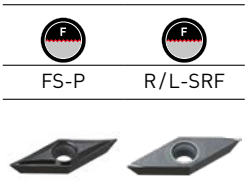
● : Inventory maintained. ★ : Inventory maintained in Japan.

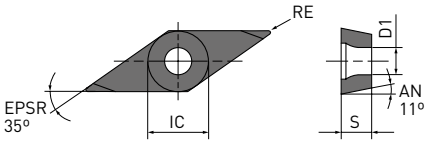
VPET/VPGT

11° POSITIVE INSERTS (WITH HOLE)

P M S

E, G Class





	Order number		MS6015	MS7025	MS9025	IC	S	RE	D1
	VPGT080201M-FS-P	F			●	4.76	2.38	0.1*1	2.42
	VPGT080202M-FS-P	F			●	4.76	2.38	0.2*1	2.42
	VPGT110301M-FS-P	F			●	6.35	3.18	0.1*1	2.85
	VPGT110302M-FS-P	F			●	6.35	3.18	0.2*1	2.85
NEW	VPET1103V3R-SRF	F			●	6.35	3.18	0.03*2	2.85
NEW	VPET1103V3L-SRF	F			●	6.35	3.18	0.03*2	2.85
NEW	VPET080201MR-SRF	F			●	4.76	2.38	0.1*1	2.42
NEW	VPET080201ML-SRF	F			●	4.76	2.38	0.1*1	2.42
NEW	VPET080202MR-SRF	F			●	4.76	2.38	0.2*1	2.42
NEW	VPET080202ML-SRF	F			●	4.76	2.38	0.2*1	2.42
NEW	VPET110301MR-SRF	F			●	6.35	3.18	0.1*1	2.85
NEW	VPET110301ML-SRF	F			●	6.35	3.18	0.1*1	2.85
NEW	VPET110302MR-SRF	F			●	6.35	3.18	0.2*1	2.85
NEW	VPET110302ML-SRF	F			●	6.35	3.18	0.2*1	2.85

1/1

*1 Nominal value (Max.)
*2 Nominal value (Med.)

163 Vc

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

MS6015 / MS7025 / MS9025

RECOMMENDED CUTTING CONDITIONS

	Material	Properties	Conditions	F L M	Grade		Vc	f	ap
P	Pure iron Free cutting steel	—	●	F	MS6015	R/L-FS	150 (50 – 200)	0.01 – 0.15	0.1 – 0.5
			●	F	MS6015	R/L-F	150 (50 – 200)	0.01 – 0.15	0.1 – 0.5
			◐	L	MS6015	LS-P	150 (50 – 200)	0.01 – 0.15	0.3 – 3.0
			◐	L	MS6015	R/L-SS	150 (50 – 200)	0.01 – 0.15	0.2 – 1.0
			◐	M	MS6015	R/L-SN	150 (50 – 200)	0.01 – 0.15	0.1 – 0.5
			◐	M	MS6015	SMG	150 (50 – 200)	0.01 – 0.15	0.1 – 2.0
	Soft magnetic iron	—	●	F	MS6015	R/L-FS	200 (150 – 250)	0.01 – 0.15	0.1 – 0.5
			●	F	MS7025	FS-P	200 (100 – 300)	0.01 – 0.06	0.2 – 0.7
			●	F	MS6015	R/L-F	200 (150 – 250)	0.01 – 0.15	0.1 – 0.5
			◐	F	MS7025	R-SRF	200 (100 – 300)	0.01 – 0.06	0.1 – 0.5
			◐	L	MS6015	LS-P	200 (150 – 250)	0.01 – 0.15	0.1 – 0.5
			◐	L	MS7025	LS-P	200 (100 – 300)	0.01 – 0.06	0.1 – 0.5
			◐	L	MS6015	R/L-SS	200 (150 – 250)	0.01 – 0.15	0.2 – 1.0
			◐	M	MS6015	R/L-SN	200 (150 – 250)	0.01 – 0.15	0.1 – 0.5
			◐	M	MS7025	R/L-SN	200 (100 – 300)	0.01 – 0.06	0.1 – 0.5
			◐	M	MS6015	SMG	200 (150 – 250)	0.01 – 0.15	0.1 – 2.0
	Carbon and alloy steel	180 – 280 HB	●	F	MS6015	R/L-FS	100 (50 – 150)	0.01 – 0.15	0.1 – 0.5
			●	F	MS7025	FS-P	90 (40 – 130)	0.01 – 0.06	0.2 – 0.7
			●	F	MS6015	R/L-F	100 (50 – 150)	0.01 – 0.15	0.1 – 0.5
			◐	L	MS6015	LS-P	100 (50 – 150)	0.01 – 0.15	0.3 – 3.0
			◐	L	MS7025	LS-P	90 (40 – 130)	0.01 – 0.06	0.3 – 3.0
			◐	L	MS6015	R/L-SS	100 (50 – 150)	0.01 – 0.15	0.2 – 1.0
			◐	M	MS6015	R/L-SN	100 (50 – 150)	0.01 – 0.15	0.1 – 0.5
			◐	M	MS7025	R/L-SN	90 (40 – 130)	0.01 – 0.06	0.1 – 0.5
			◐	M	MS6015	SMG	100 (50 – 150)	0.01 – 0.15	0.1 – 2.0
M	Austenitic stainless steel	—	●	F	MS7025	FS-P	60 (40 – 100)	0.01 – 0.08	0.2 – 0.7
			●	F	MS9025	FS-P	100 (60 – 150)	0.04 – 0.15	0.2 – 0.7
			●	F	MS7025	R-SRF	60 (40 – 100)	0.01 – 0.08	0.1 – 0.5
			◐	F	MS9025	R/L-SRF	100 (60 – 150)	0.04 – 0.15	0.1 – 0.5
			◐	L	MS7025	LS-P	60 (40 – 100)	0.01 – 0.08	0.3 – 3.0
			◐	L	MS9025	LS-P	100 (60 – 150)	0.05 – 0.15	0.3 – 3.0
			◐	M	MS7025	R-SN	60 (40 – 100)	0.01 – 0.08	0.1 – 5.0
			◐	M	MS9025	R-SN	100 (60 – 150)	0.05 – 0.15	0.1 – 5.0
	Ferritic and martensitic stainless steel	—	●	F	MS7025	FS-P	60 (40 – 100)	0.01 – 0.08	0.2 – 0.7
			◐	F	MS7025	R-SRF	60 (40 – 100)	0.01 – 0.08	0.1 – 0.5
			◐	L	MS7025	LS-P	60 (40 – 100)	0.01 – 0.08	0.3 – 3.0
			◐	M	MS7025	R/L-SN	60 (40 – 100)	0.01 – 0.08	0.1 – 5.0
	Electromagnetic stainless steel (DIN X105CrMo17, DIN X30Cr13 etc.)	Hardness 230 HBW	●	F	MS9025	FS-P	100 (50 – 180)	0.04 – 0.12	0.2 – 1.8
			●	F	MS7025	FS-P	80 (40 – 160)	0.02 – 0.08	0.2 – 1.8
			◐	F	MS9025	R/L-SRF	100 (50 – 180)	0.04 – 0.12	0.1 – 0.5
			◐	F	MS7025	R-SRF	80 (40 – 160)	0.03 – 0.08	0.1 – 0.5
			◐	L	MS9025	LS-P	100 (50 – 180)	0.04 – 0.15	0.3 – 3.0
			◐	L	MS7025	LS-P	80 (40 – 160)	0.02 – 0.10	0.3 – 3.0
			◐	M	MS9025	R-SN	100 (50 – 180)	0.01 – 0.10	0.1 – 5.0
			◐	M	MS7025	R-SN	80 (40 – 160)	0.01 – 0.10	0.1 – 5.0

Cutting conditions: ● : Stable cutting ◐ : General cutting ✿ : Unstable cutting

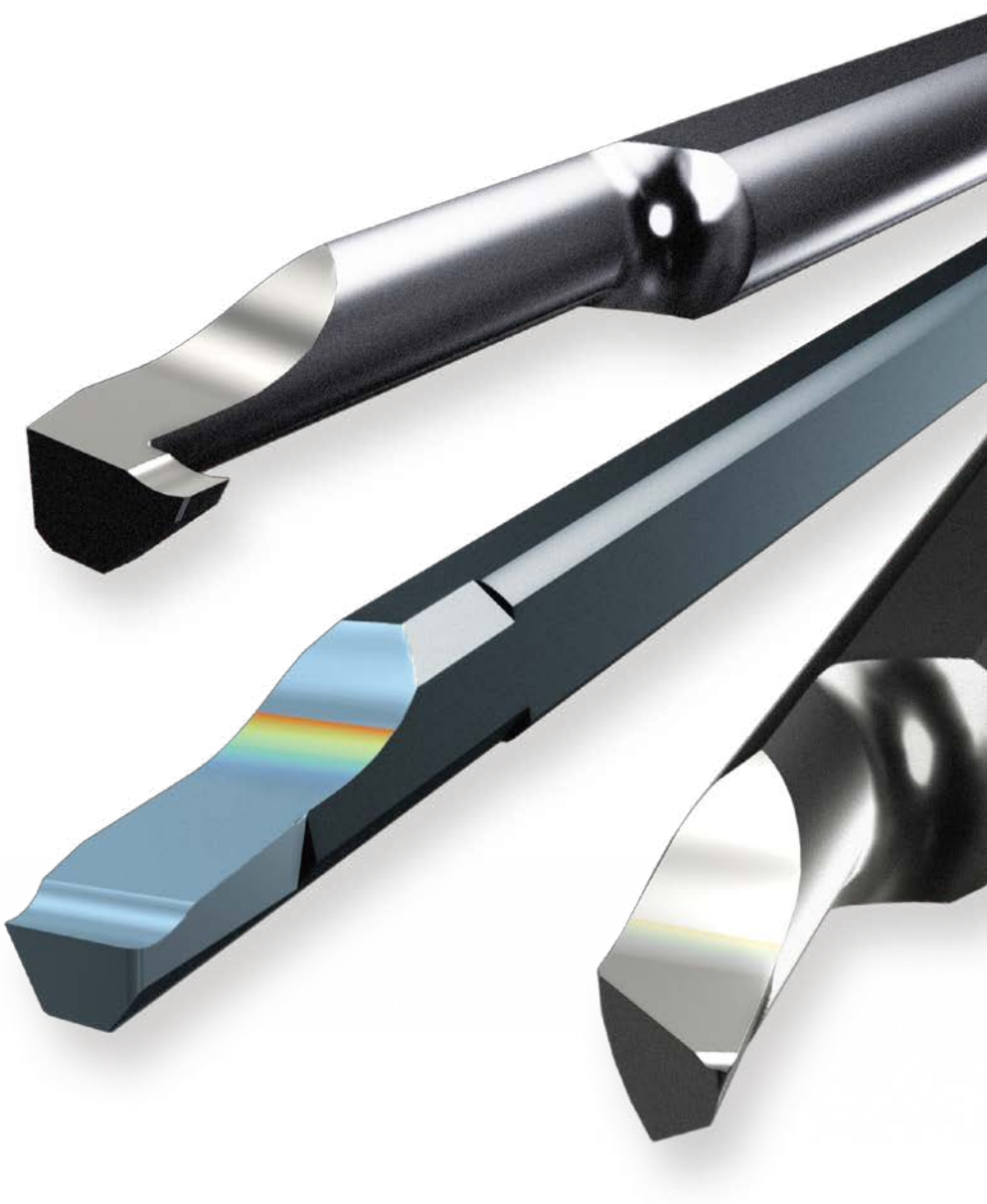
MS6015/MS7025/MS9025

	Material	Properties	Conditions	F L M	Grade		Vc	f	ap
M	Precipitation hardening stainless steel (DIN X5CrNiCuNb16-4, DIN X7CrNiAl17-7 etc.)	<450 HB	●	F	MS7025	FS-P	60 (40 – 80)	0.01 – 0.10	0.1 – 1.4
			●	F	MS9025	FS-P	70 (50 – 100)	0.03 – 0.15	0.1 – 1.4
			◐	F	MS7025	R-SRF	60 (40 – 80)	0.01 – 0.10	0.1 – 0.5
			◐	F	MS9025	R/L-SRF	70 (50 – 100)	0.03 – 0.15	0.1 – 0.5
			◐	L	MS7025	LS-P	60 (40 – 80)	0.04 – 0.10	0.2 – 3.0
			◐	L	MS9025	LS-P	70 (50 – 100)	0.04 – 0.15	0.2 – 3.0
			◐	M	MS7025	R-SN	60 (40 – 80)	0.03 – 0.10	0.3 – 3.0
			◐	M	MS9025	R-SN	70 (50 – 100)	0.04 – 0.15	0.3 – 3.0
S	Heat resistant alloy (SUH etc.)	—	●	F	MS9025	FS-P	80 (40 – 140)	0.04 – 0.12	0.2 – 1.4
			◐	F	MS9025	R/L-SRF	80 (40 – 140)	0.05 – 0.12	0.1 – 0.5
			◐	L	MS9025	LS-P	80 (40 – 140)	0.04 – 0.15	0.3 – 3.0
			◐	M	MS9025	R-SN	80 (40 – 140)	0.01 – 0.10	0.1 – 5.0

Cutting conditions: ● : Stable cutting ◐ : General cutting ✿ : Unstable cutting

MICRO-MINI TWIN

BORING BAR FOR HIGH PRECISION AND SMALL PARTS MACHINING



Interested in more...

B042-G

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DIA EDGE

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.

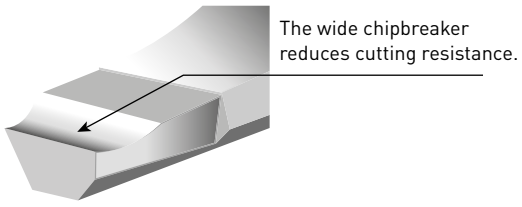
MULTI PURPOSE BORING BAR
The multi-functionality of the MICRO-MINI TWIN enables a wide application range that covers boring, grooving and threading and is available with or without a chipbreaker.

MINIMUM CUTTING DIAMETER:

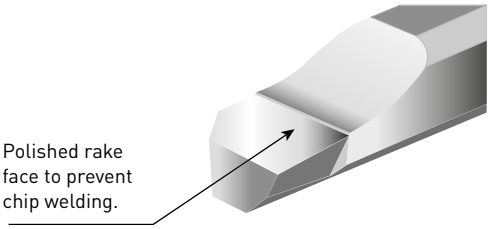
Boring:	Ø 2.2 mm ~
	RE: 0.05, 0.1, 0.15, 0.2
Copying:	Ø 3.5 mm ~
Grooving:	Ø 3 mm ~
Threading:	Ø 3 mm ~

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

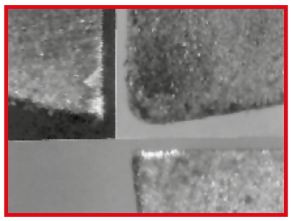
MACHINING OF STAINLESS STEEL

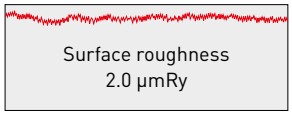
Insert	CB05RS, VP15TF
Material	1.4301 (X5CrNi18-9)
Vc (m/min)	100
fr (mm/rev)	0.02
ap (mm)	0.1
Coolant	Wet cutting

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

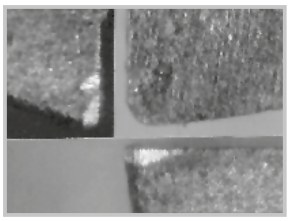
CUTTING EDGE WEAR

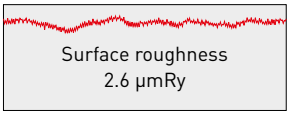
MICRO-MINI TWIN
(Polished rake face)



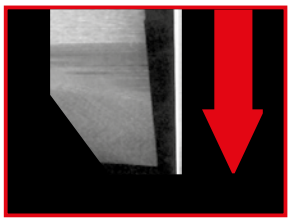


Conventional

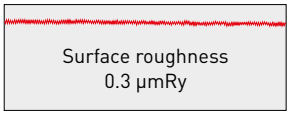




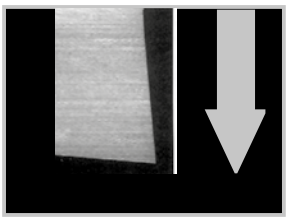
MICRO-MINI TWIN
(Polished rake face)



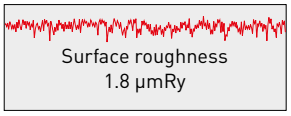
Direction of
measurement



Conventional



Direction of
measurement



NEW

SLEEVE

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

Sleeve inner diameter: 2.5 – 4.5 mm
Functional length : 67 mm, 85 mm, 110 mm, 135 mm

MS9025

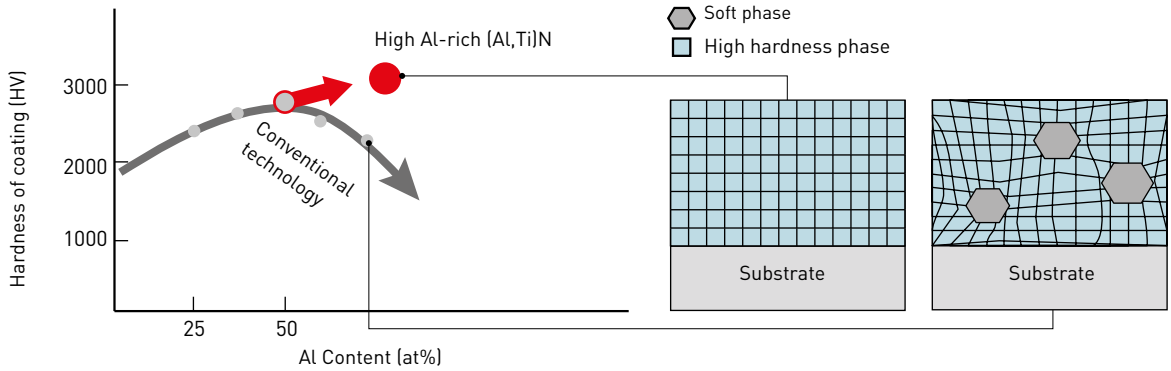
PVD COATED GRADES FOR HIGH PRECISION AND SMALL PARTS MACHINING

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.

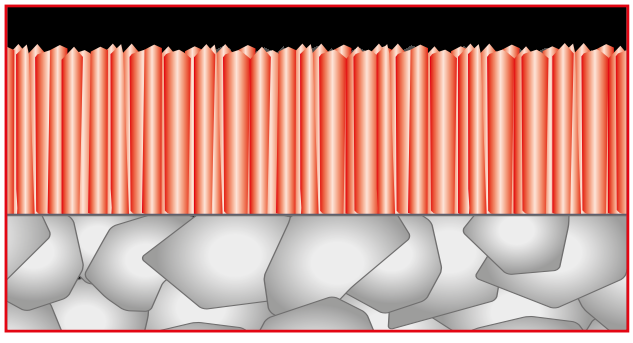


SMOOTH SURFACE OF THE COATING

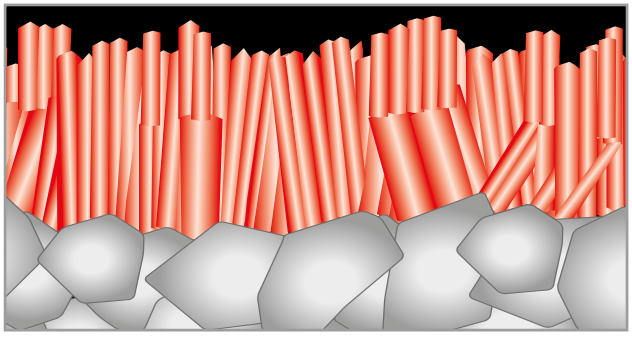
The even surface of the coating has been achieved by first making the carbide substrate smooth then by promoting straight growth of the coating crystals. This leads to excellent welding resistance.

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

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



MS9025



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

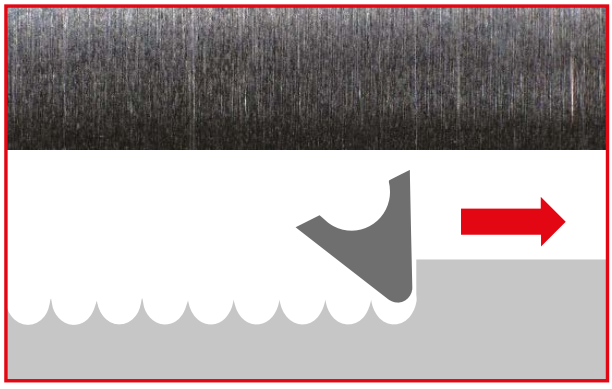
By combining the high lubrication layer with excellent welding resistance, and the high hardness layer with a greater wear resistance that suppresses the progress of wear at the nano-level, damage when machining is significantly reduced. Additionally, machining marks on the component surface are reduced.

IMPROVED QUALITY OF THE MACHINED SURFACE

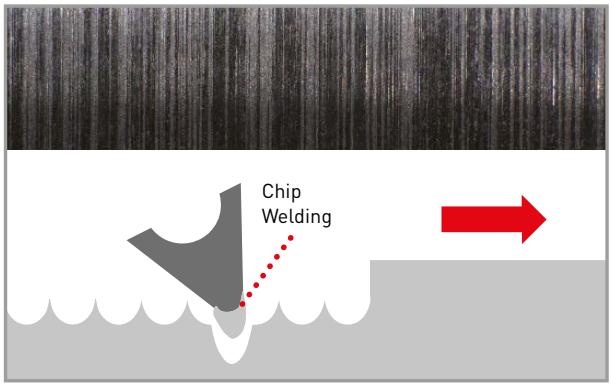
The nano-level, high lubrication layer suppresses built-up edge caused by chip welding which tends to occur in low feed machining and in addition reduces machining marks on the component surface.

SURFACE FINISH

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

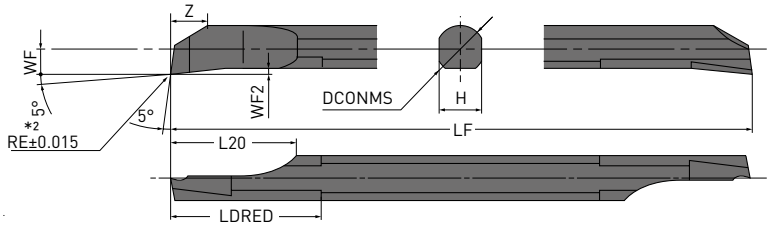
Enlarged photo of the cutting edge

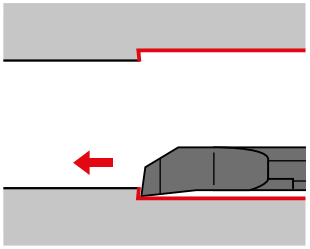
Conventional

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	NEW MS7025	NEW MS9025	VP15TF	TF15	Chipbreaker	DMIN*1 l/d ≤ 3	DMIN*1 l/d ≥ 3	RE*2	DCONMS	LF	L20	LDRED	WF	WF2	H	Z
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
NEW 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
NEW CB025RS-B	●	●			with	2.7	4.7	0.05	2.5	50	6.25	7.5	1.25	0.30	2.25	1.8
NEW CB025RS-01B	●	●			with	2.7	4.7	0.1	2.5	50	6.25	7.5	1.25	0.30	2.25	1.8
NEW CB025RS-015B	●	●			with	2.7	4.7	0.15	2.5	50	6.25	7.5	1.25	0.30	2.25	1.8
NEW 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
NEW 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
NEW CB035RS-B	●	●			with	3.7	5.2	0.05	3.5	60	8.75	10.5	1.75	0.40	3.15	2.6
NEW CB035RS-01B	●	●			with	3.7	5.2	0.1	3.5	60	8.75	10.5	1.75	0.40	3.15	2.6
NEW CB035RS-015B	●	●			with	3.7	5.2	0.15	3.5	60	8.75	10.5	1.75	0.40	3.15	2.6
NEW 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
NEW 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
NEW CB045RS-B	●	●			with	4.7	6.0	0.05	4.5	70	11.25	13.5	2.25	0.50	4.05	3.4
NEW CB045RS-01B	●	●			with	4.7	6.0	0.1	4.5	70	11.25	13.5	2.25	0.50	4.05	3.4
NEW CB045RS-015B	●	●			with	4.7	6.0	0.15	4.5	70	11.25	13.5	2.25	0.50	4.05	3.4
NEW 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.)

172 Vc

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

CB, MICRO-MINI TWIN FOR INTERNAL MACHINING

Order number	NEW MS7025	NEW MS9025	VP15TF	TF15	Chipbreaker	DMIN*1 l/d ≤ 3	DMIN*1 l/d ≥ 3	RE*2	DCONMS	LF	L20	LDRED	WF	WF2	H	Z
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
NEW 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

*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.)

172 Vc

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
P	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 Steel

M Stainless steel

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

MS9025

S Heat resistant alloy

M Stainless steel

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

VP15TF

P Steel

M Stainless steel

K Gray cast iron

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

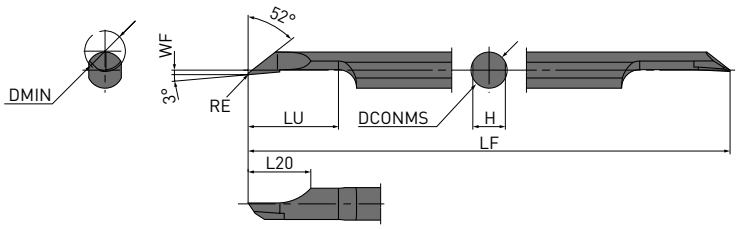
TF15

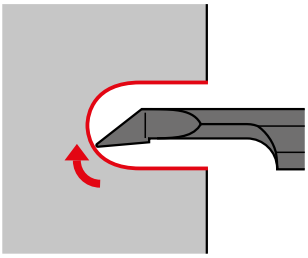
N Non-ferrous metal

- For machining non-ferrous metals.

CR-TYPE

MICRO-MINI TWIN FOR INTERNAL COPYING





Right hand tool only.

	Order number	NEW MS7025	NEW MS9025	VP15TF	TF15	Chipbreaker	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
NEW	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
NEW	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

173 Vc

RECOMMENDED CUTTING CONDITIONS

	Material	Properties	Grade	Vc	f		ap
					0.3RS-045RS	05RS	
P	Pure iron, Free cutting steel	—	MS7025	80 (40 – 120)	0.02 (0.01 – 0.03)	0.03 (0.01 – 0.05)	0.05
P	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.

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

PRECAUTIONS WHEN USING THE MICRO-MINI TWIN

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

1 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.

2 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.

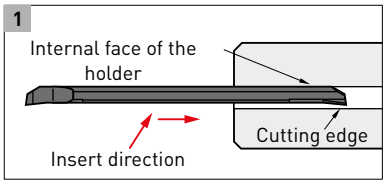
When using a square type holder:

1 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.

2 Make sure that the clamping screws are tightened to the recommended values.

3 Do not tighten the clamp screw without a bar in place, otherwise the bridge will be deformed.

1



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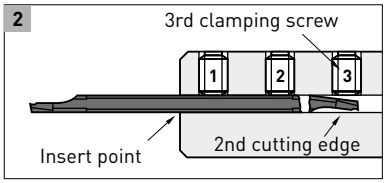

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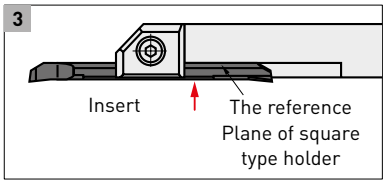


Tighten the clamping screw ensuring the MICRO-MINI TWIN boring bars is in contact with the reference plane of square type holder.

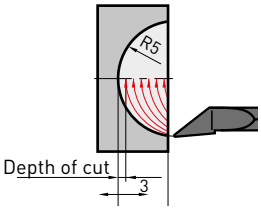
MACHINING METHODS OF THE CR TYPE

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

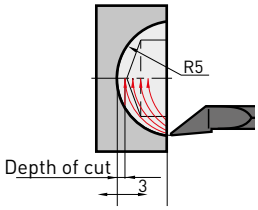
Insert	CR05RS-01B
Workpiece material	C20
Vc (m/min)	80
f (mm/rev)	0.05
ap (mm)	0.05
Coolant	Wet cutting

PROFILE TURNING

Machining a workpiece without a pre-prepared hole

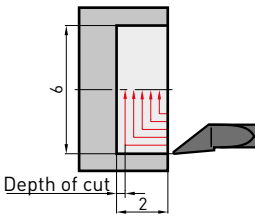


Machining a workpiece with a pre-prepared hole

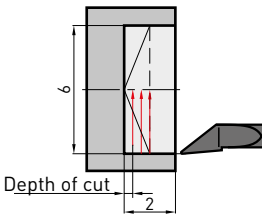


INNER END FACING

Machining a workpiece without a pre-prepared hole

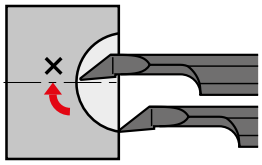


Machining a workpiece with a pre-prepared hole



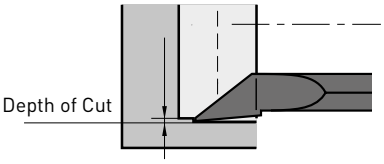
NOTES FOR USE

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.

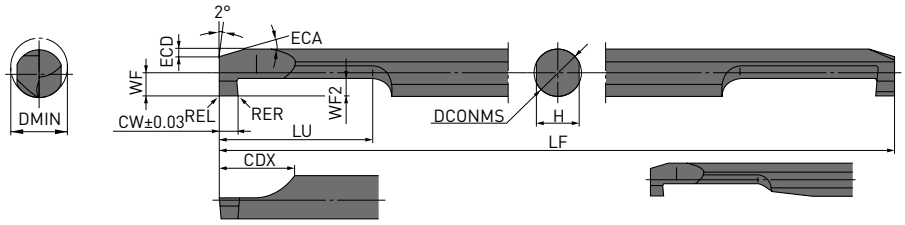
COPYING



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



* CG03○○RS-○○B (VP15TF, TF15) *only.*

Order number	NEW MS7025	NEW MS9025	VP15TF	TF15	Chipbreaker	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. The maximum groove depth is WF2 dimension - 0.1 mm.
2. (MICRO-MINI TWIN is available in 1 piece in one pack.)

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

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
P	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:

[1] 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.

[2] 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.

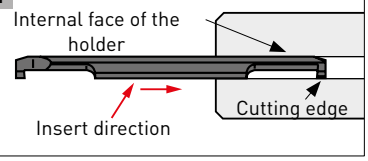
When using a square type holder:

[1] 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.

[2] Make sure that the clamping screws are tightened to the recommended values.

[3] Do not tighten the clamp screw without a bar in place, otherwise the bridge will be deformed.

1



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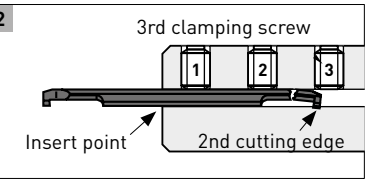

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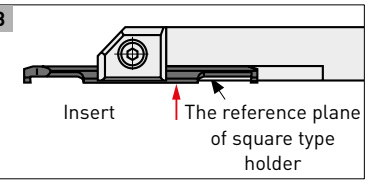
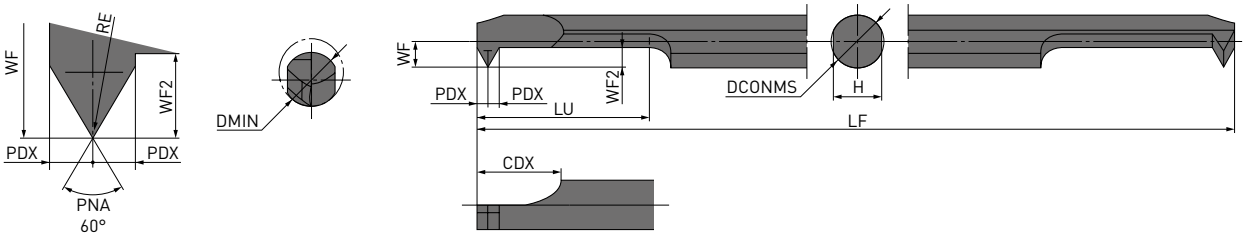


Tighten the clamping screw ensuring making the micro-mini twin boring bars in contact with the reference plane of square type holder.

CT-TYPE

MICRO-MINI TWIN



Order number	NEW MS7025	NEW MS9025	VP15TF	TF15	Chipbreaker	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
NEW 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
NEW 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

1/1

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

178 Vc

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

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

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
P	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.

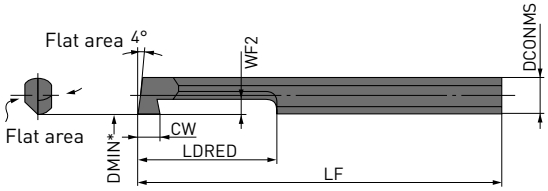
METRIC

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 Ø 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).



Right hand tool only.

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.)

180 Vc

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

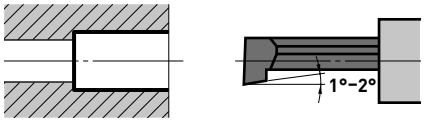
* Cutting edge is not honed. Please hone according to the workpiece before machining.

GRINDING THE CUTTING EDGE OF MICRO-MINI BORING BAR

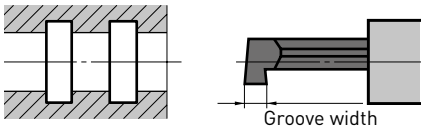
- MICRO-MINI boring bars can be used for boring and grooving without any modifications. It can also be reground as shown below.
- For shaping and regrinding, use a diamond whetstone approximately #250 – #400.
- Please grind according to the application using the figure below as a reference.

APPLICATION

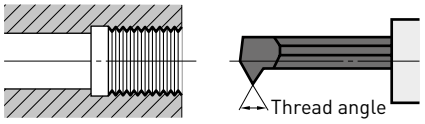
BORING



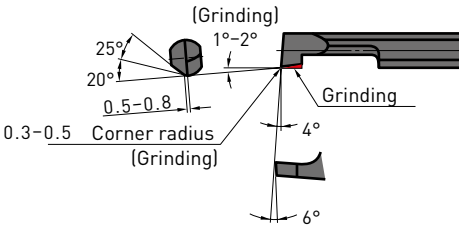
GROOVING

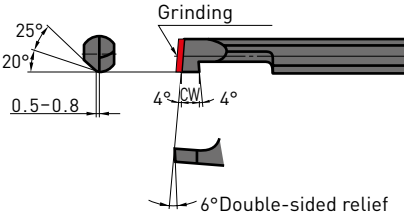


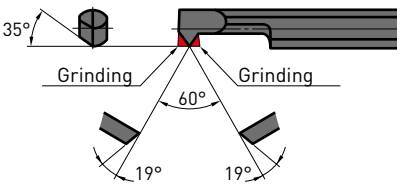
THREADING



GRINDING EXAMPLES

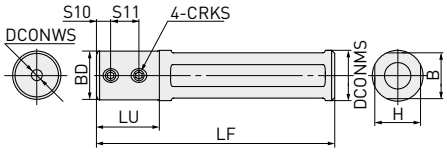






NEW

ROUND TYPE HOLDER



Order number	Stock	DCONMS	DCONWS	BD	LF	LU	H	B	S10	S11
SLV190085025N	●	19.05	2.5	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
SLV190085045N	●	19.05	4.5	18.5	85	20	17.8	17.8	4.5	9
SLV190110025N	●	19.05	2.5	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
SLV190110045N	●	19.05	4.5	18.5	110	20	17.8	17.8	4.5	9
SLV200085025N	●	20.0	2.5	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
SLV200085045N	●	20.0	4.5	19.0	85	20	18.8	18.8	4.5	9
SLV220135025N	●	22.0	2.5	20.0	135	20	20.8	20.8	4.5	9
SLV220135035N	●	22.0	3.5	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
SLV250067025N	●	25.0	2.5	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
SLV250067045N	●	25.0	4.5	20.0	67	20	23.9	23.9	4.5	9
SLV250110025N	●	25.0	2.5	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
SLV250110045N	●	25.0	4.5	20.0	110	20	23.9	23.9	4.5	9
SLV254085025N	●	25.4	2.5	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
SLV254085045N	●	25.4	4.5	20.0	85	20	24.4	24.4	4.5	9
SLV254110025N	●	25.4	2.5	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
SLV254110045N	●	25.4	4.5	20.0	110	20	24.4	24.4	4.5	9

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

ROUND TYPE HOLDER

MOUNTING CHART

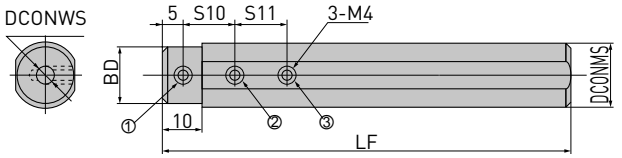
Series			Boring bar type	Holder type
MICRO-MINI TWIN	Boring	CB	025RS(-B)	SLV□□□□□□025N
MICRO-MINI TWIN	Boring	CB	035RS(-B)	SLV□□□□□□035N
MICRO-MINI TWIN	Boring	CB	045RS(-B)	SLV□□□□□□045N
MICRO-MINI TWIN	Boring	CR	035RS(-B)	SLV□□□□□□035N
MICRO-MINI TWIN	Boring	CR	045RS(-B)	SLV□□□□□□045N
MICRO-MINI TWIN	Threading	CT	035RS(-B)	SLV□□□□□□035N
MICRO-MINI TWIN	Threading	CT	045RS(-B)	SLV□□□□□□045N

SPARE PARTS

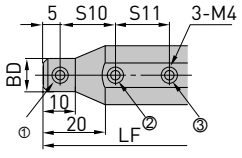
Holder type	Clamp screw	Wrench	Clamp torque (Nm)
SLV□□□□□□025N	HSS04005	HKY20R	2.0
SLV□□□□□□035N	HSS04005	HKY20R	2.0
SLV□□□□□□045N	HSS04005	HKY20R	2.0

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

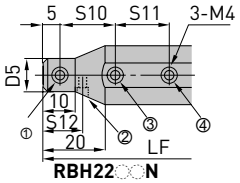
ROUND TYPE HOLDER



RBH158○○N, RBH16○○N, RBH190○○N



RBH20○○N, RBH25○○N, RBH254○○N



RBH22○○N

Order number	Stock	DCONMS	DCONWS	BD	LF	S10	S11	S12
RBH15820N	★	15.875	2	15	100	10	—	—
RBH15830N	★	15.875	3	15	100	10	10	—
RBH15840N	★	15.875	4	15	100	15	15	—
RBH15850N	★	15.875	5	15	100	15	15	—
RBH15860N	★	15.875	6	15	100	15	15	—
RBH15870N	★	15.875	7	15	100	20	20	—
RBH15880N	★	15.875	8	15	100	20	20	—
RBH1620N	●	16	2	15	100	10	—	—
RBH1630N	●	16	3	15	100	10	10	—
RBH1640N	●	16	4	15	100	15	15	—
RBH1650N	●	16	5	15	100	15	15	—
RBH1660N	●	16	6	15	100	15	15	—
RBH1670N	●	16	7	15	100	20	20	—
RBH1680N	★	16	8	15	100	20	20	—
RBH19020N	★	19.05	2	18	125	10	—	—
RBH19030N	★	19.05	3	18	125	10	10	—
RBH19040N	★	19.05	4	18	125	15	15	—
RBH19050N	★	19.05	5	18	125	15	15	—
RBH19060N	★	19.05	6	18	125	15	15	—
RBH19070N	★	19.05	7	18	125	20	20	—
RBH19080N	★	19.05	8	18	125	20	20	—
RBH2020N	★	20	2	11	125	10	—	—
RBH2030N	★	20	3	12	125	10	10	—
RBH2040N	★	20	4	13	125	15	15	—
RBH2050N	★	20	5	14	125	15	15	—
RBH2060N	★	20	6	15	125	15	15	—
RBH2070N	★	20	7	16	125	20	20	—
RBH2080N	★	20	8	17	125	20	20	—
RBH2220N	★	22	2	11	125	10	—	10
RBH2230N	★	22	3	12	125	10	10	10
RBH2240N	★	22	4	13	125	15	15	12.5
RBH2250N	★	22	5	14	125	15	15	12.5
RBH2260N	★	22	6	15	125	15	15	15
RBH2270N	★	22	7	16	125	20	20	15
RBH2280N	★	22	8	17	125	20	20	15
RBH2520N	★	25	2	11	150	10	—	—
RBH2530N	★	25	3	12	150	10	10	—
RBH2540N	★	25	4	13	150	15	15	—
RBH2550N	★	25	5	14	150	15	15	—
RBH2560N	★	25	6	15	150	15	15	—
RBH2570N	★	25	7	16	150	20	20	—
RBH2580N	★	25	8	17	150	20	20	—
RBH25420N	★	25.4	2	11	150	10	—	—
RBH25430N	★	25.4	3	12	150	10	10	—
RBH25440N	★	25.4	4	13	150	15	15	—
RBH25450N	★	25.4	5	14	150	15	15	—
RBH25460N	★	25.4	6	15	150	15	15	—
RBH25470N	★	25.4	7	16	150	20	20	—
RBH25480N	★	25.4	8	17	150	20	20	—

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

ROUND TYPE HOLDER

MOUNTING CHART

Series			Boring bar type		Holder type	
MICRO-DEX	Boring	C	04GS□□□R□□	—	RBH□□40N	RBH□□□40N
MICRO-DEX	Boring	C	05HS□□□R□□	—	RBH□□50N	RBH□□□50N
MICRO-DEX	Boring	C	06JS□□□R□□	—	RBH□□60N	RBH□□□60N
MICRO-DEX	Boring	C	07KS□□□R□□	—	RBH□□70N	RBH□□□70N
MICRO-MINI TWIN	Boring	CB	02RS(-B)	02RS-0□(B)	RBH□□20N	RBH□□□20N
MICRO-MINI TWIN	Boring	CB	03RS(-B)	03RS-0□(B)	RBH□□30N	RBH□□□30N
MICRO-MINI TWIN	Boring	CB	04RS(-B)	04RS-0□(B)	RBH□□40N	RBH□□□40N
MICRO-MINI TWIN	Boring	CB	05RS(-B)	05RS-0□(B)	RBH□□50N	RBH□□□50N
MICRO-MINI TWIN	Boring	CB	06RS(-B)	06RS-0□(B)	RBH□□60N	RBH□□□60N
MICRO-MINI TWIN	Boring	CB	07RS(-B)	07RS-0□(B)	RBH□□70N	RBH□□□70N
MICRO-MINI TWIN	Boring	CB	08RS(-B)	08RS-0□(B)	RBH□□80N	RBH□□□80N
MICRO-MINI TWIN	Boring	CR	03RS-01(-B)	—	RBH□□30N	RBH□□□30N
MICRO-MINI TWIN	Boring	CR	04RS-01(-B)	—	RBH□□40N	RBH□□□40N
MICRO-MINI TWIN	Boring	CR	05RS-01(-B)	—	RBH□□50N	RBH□□□50N
MICRO-MINI TWIN	Grooving	CG	03RS-□□(B)	—	RBH□□30N	RBH□□□30N
MICRO-MINI TWIN	Grooving	CG	04RS-□□(B)	—	RBH□□40N	RBH□□□40N
MICRO-MINI TWIN	Grooving	CG	05RS-□□(B)	—	RBH□□50N	RBH□□□50N
MICRO-MINI TWIN	Grooving	CG	06RS-□□(B)	—	RBH□□60N	RBH□□□60N
MICRO-MINI TWIN	Grooving	CG	07RS-□□(B)	—	RBH□□70N	RBH□□□70N
MICRO-MINI TWIN	Threading	CT	0305RS-M4	03RS-M4(B)	RBH□□30N	RBH□□□30N
MICRO-MINI TWIN	Threading	CT	0407RS-M6	04RS-M6(B)	RBH□□40N	RBH□□□40N
MICRO-MINI TWIN	Threading	CT	0511RS-M8	05RS-M8(B)	RBH□□50N	RBH□□□50N
MICRO-MINI TWIN	Threading	CT	0611RS-M10	06RS-M10(B)	RBH□□60N	RBH□□□60N
MICRO-MINI	General purpose	C	03FR-BLS	—	RBH□□30N	RBH□□□30N
MICRO-MINI	General purpose	C	04FR-BLS	—	RBH□□40N	RBH□□□40N
MICRO-MINI	General purpose	C	05FR-BLS	—	RBH□□50N	RBH□□□50N

ROUND TYPE HOLDER

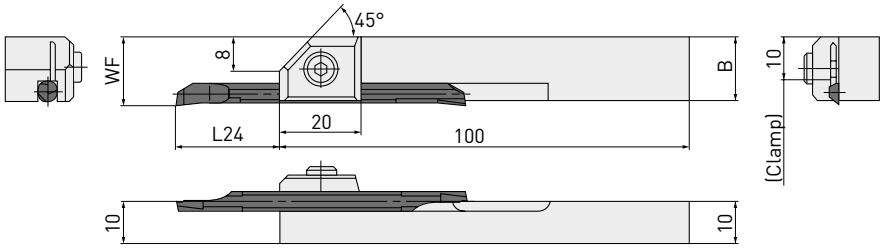
SPARE PARTS

Holder type	Clamp screw ①	Clamp screw ②	Clamp screw ③	Clamp screw ④	Wrench	Clamp torque (Nm)
RBH15820N	HSS04006	HSS04006	—	—	HKY20F	2.0
RBH158□□N	HSS04004	HSS04004	HSS04004	—	HKY20F	2.0
RBH15880N	HSS04003	HSS04003	HSS04003	—	HKY20F	2.0
RBH1620N	HSS04006	HSS04006	—	—	HKY20F	2.0
RBH16□□N	HSS04004	HSS04004	HSS04004	—	HKY20F	2.0
RBH1680N	HSS04003	HSS04003	HSS04003	—	HKY20F	2.0
RBH19020N	HSS04008	HSS04008	—	—	HKY20F	2.0
RBH190□□N	HSS04006	HSS04006	HSS04006	—	HKY20F	2.0
RBH19080N	HSS04004	HSS04004	HSS04004	—	HKY20F	2.0
RBH2020N	HSS04004	HSS04004	—	—	HKY20F	2.0
RBH2030N	HSS04004	HSS04004	HSS04006	—	HKY20F	2.0
RBH20□□N	HSS04004	HSS04006	HSS04006	—	HKY20F	2.0
RBH2080N	HSS04004	HSS04004	HSS04004	—	HKY20F	2.0
RBH2220N	HSS04004	HSS04006	—	HSS04004	HKY20F	2.0
RBH2230N	HSS04004	HSS04006	HSS04008	HSS04004	HKY20F	2.0
RBH22□□N	HSS04004	HSS04006	HSS04006	HSS04004	HKY20F	2.0
RBH2520N	HSS04004	HSS04006	—	—	HKY20F	2.0
RBH2530N	HSS04004	HSS04006	HSS04008	—	HKY20F	2.0
RBH25□N	HSS04004	HSS04008	HSS04008	—	HKY20F	2.0
RBH2580N	HSS04004	HSS04006	HSS04006	—	HKY20F	2.0
RBH25420N	HSS04004	HSS04006	—	—	HKY20F	2.0
RBH25430N	HSS04004	HSS04006	HSS04008	—	HKY20F	2.0
RBH254□N	HSS04004	HSS04008	HSS04008	—	HKY20F	2.0
RBH25480N	HSS04004	HSS04006	HSS04006	—	HKY20F	2.0

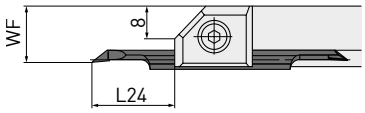
SQUARE TYPE HOLDER

MICRO-MINI TWIN

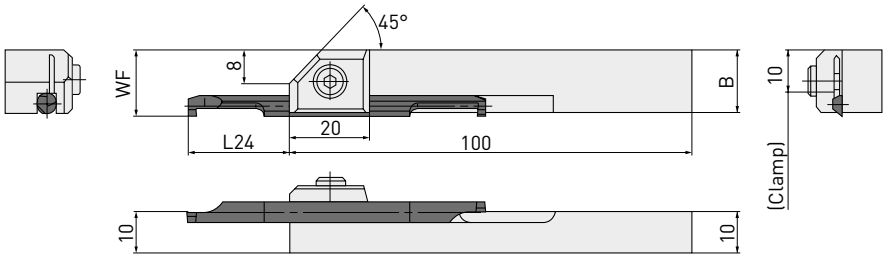
CB type (Boring bar fits to a holder)



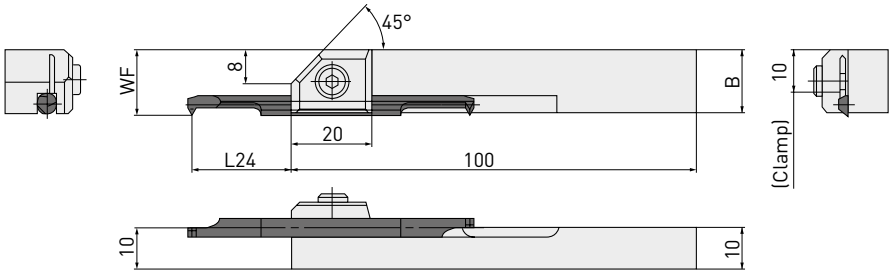
CR type (Boring bar fits to a holder)



CG type (Boring bar fits to a holder)



CT type (Boring bar fits to a holder)



Order number	Stock	WF				B
		CB	CR	CG	CT	
SBH1020R	★	13	—	—	—	12.9
SBH1030R	★	14	12.65	13.8	13.8	13.8
SBH1040R	★	15	13.15	14.8	14.8	14.7
SBH1050R	★	16	13.65	15.8	15.8	15.6
SBH1060R	★	17	—	16.8	16.8	16.5
SBH1070R	★	18	—	17.8	—	17.4

1/1

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

TOOL OVERHANG LENGTH FOR SUFFICIENT CLAMPING

Machining method		MICRO-MINI TWIN type		Holder type	Tool overhang L24		Recommended for steel
					Min.	Max.	Tool overhang
Boring	CB	02RS(B)	02RS-0(B)	SBH1020R	6	24	6 – 10
Boring	CB	03RS(B)	03RS-0(B)	SBH1030R	8.5	22	9 – 15
Boring	CB	04RS(B)	04RS-0(B)	SBH1040R	11	29.5	12 – 20
Boring	CB	05RS(B)	05RS-0(B)	SBH1050R	13.5	37	15 – 25
Boring	CB	06RS(B)	06RS-0(B)	SBH1060R	13.5	42	18 – 30
Boring	CB	07RS(B)	07RS-0(B)	SBH1070R	13.5	52	21 – 35
Boring	CR	03RS-01(B)	—	SBH1030R	11	19.5	12
Boring	CR	04RS-01(B)	—	SBH1040R	13	27.5	14
Boring	CR	05RS-01(B)	—	SBH1050R	15	35.5	16
Groove Width 1mm	CG	03RS-10(B)	—	SBH1030R	13	17.5	14
Groove Width 2mm	CG	03RS-20(B)	—	SBH1030R	14	16.5	15
Groove Width 1mm	CG	04RS-10(B)	—	SBH1040R	18	22.5	19
Groove Width 2mm	CG	04RS-20(B)	—	SBH1040R	19	21.5	20
Groove Width 1mm	CG	05RS-10(B)	—	SBH1050R	23	27.5	24
Groove Width 2mm	CG	05RS-20(B)	—	SBH1050R	24	26.5	25
Groove Width 1mm	CG	06RS-10(B)	—	SBH1060R	23	32.5	24
Groove Width 2mm	CG	06RS-20(B)	—	SBH1060R	24	31.5	25
Groove Width 1mm	CG	07RS-10(B)	—	SBH1070R	28	38	29
Groove Width 2mm	CG	07RS-20(B)	—	SBH1070R	29	37	30
Threading	CT	0305RS-M4	03RS-M4(B)	SBH1030R	13	17.5	14
Threading	CT	0407RS-M6	04RS-M6(B)	SBH1040R	18.5	22	19.5
Threading	CT	0511RS-M8	05RS-M8(B)	SBH1050R	24	26.5	25
Threading	CT	0611RS-M10	06RS-M10(B)	SBH1060R	24	31.5	25

SPARE PARTS

Holder type	Clamp screw	Wrench	Clamp torque
SBH1020R	HSC04010	HKY30R	4.8
SBH1030R	HSC05012	HKY40R	9.5
SBH1040R	HSC05012	HKY40R	9.5
SBH1050R	HSC05012	HKY40R	9.5
SBH1060R	HSC05012	HKY40R	9.5
SBH1070R	HSC05012	HKY40R	9.5

GTAH / GTBH / GTCH

SPECIAL SCREW DESIGNED FOR CLAMPING FROM THE FRONT OR THE BACK

Interested in more...

B282

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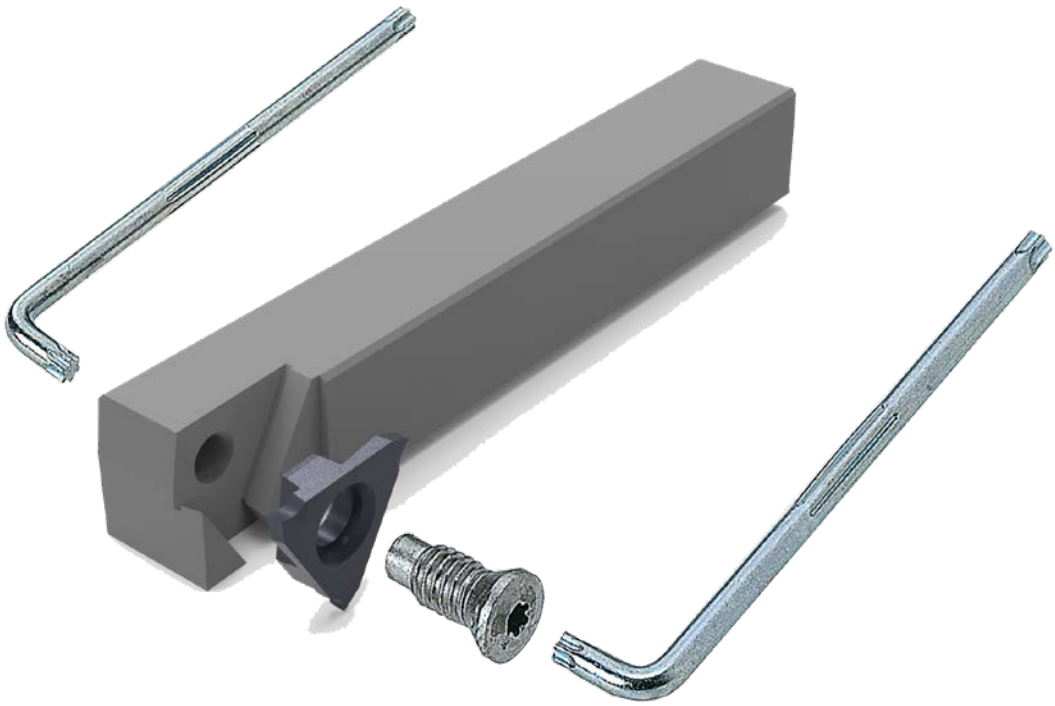
DIA EDGE

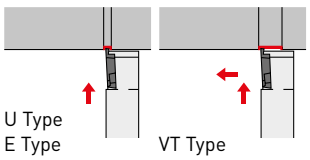
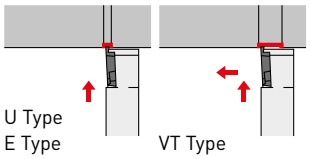
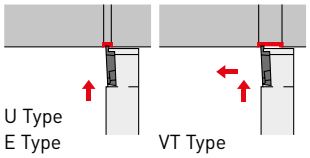
GTAH / GTBH / GTCH

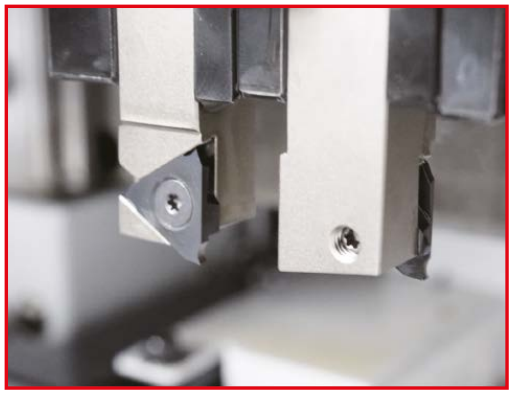
BACK CLAMPING MECHANISM

Even with gang type tool posts on Swiss automatic lathes, inserts can be changed quickly and accurately using the same wrench on both sides, improving machine operating efficiency.



GROOVING

Holder type	Shank size (mm) H x W x L	Geometry
GTAH (Groove width 0.3 – 3.0 mm)	8 x 8 x 80 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	 U Type E Type VT Type
GTBH (Groove width 1.45 – 3.0 mm)	10 x 10 x 80 10 x 10 x 120 12 x 12 x 120 16 x 16 x 120	 U Type E Type VT Type
GTCH (Groove width 2.5 – 3.0 mm)	10 x 10 x 80 10 x 10 x 120	 U Type E Type VT Type



NEW MT2015

CARBIDE GRADE (NON COATED)

Has the usual 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.

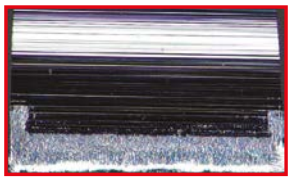
CUTTING PERFORMANCE

COMPARISON OF CUTTING EDGE DAMAGE : A6061

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

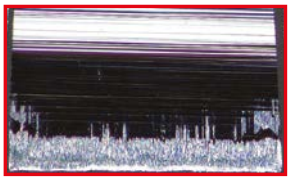
Material	A6061 Ø18 mm
Vc (m/min)	150
f (mm/rev)	0.04
Radial depth of cut (mm)	2.5
Cutting mode	Wet cutting

After 1 machining pass



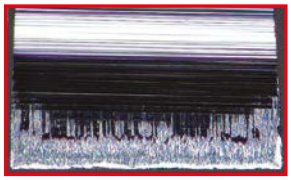
GTBT – MT2015

After 50 machining passes



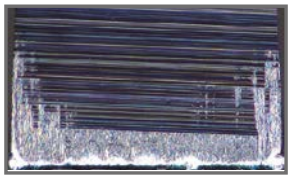
GTBT – MT2015

After 100 machining passes



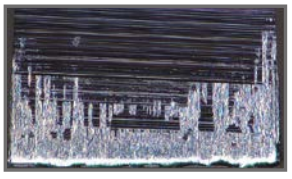
GTBT – MT2015

After 1 machining pass



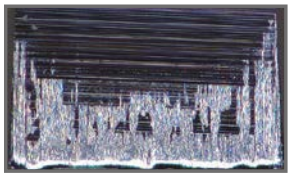
Conventional

After 50 machining passes



Conventional

After 100 machining passes



Conventional

VP15TF / VP15KZ

PVD COATED GRADES

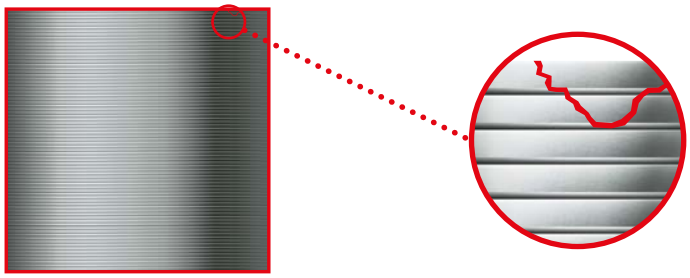
(Al,Ti)N coated grade with excellent heat resistance and adhesion strength.
Highly versatile and can be used in a variety of machining processes.

MS7025

DRAMATICALLY IMPROVED WELDING AND WEAR RESISTANCE IN LOW FEED MACHINING ENABLED BY A MORE PRECISE NANO-MULTILAYER COATING

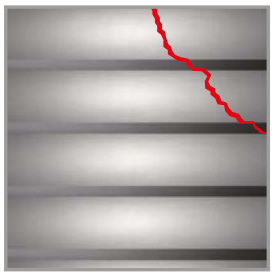
NANO-MULTILAYER COATING

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

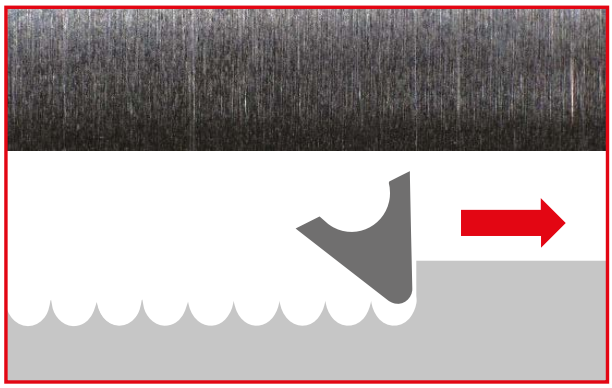


Conventional multilayer coating

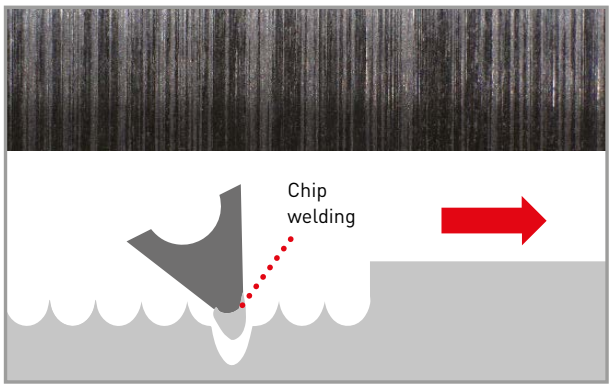
EFFECTS OF THE HIGH LUBRICATION LAYER

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

Surface Finish



MS7025



Conventional

MS7025 grade for stainless steel added to the series GTAH / GTBH / GTCH.

MS7025

CUTTING PERFORMANCE

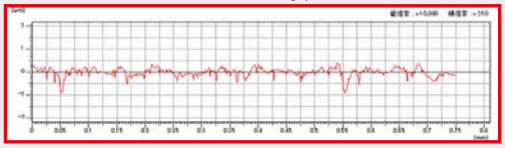
COMPARISON OF SURFACE ROUGHNESS AND CUTTING EDGE DAMAGE :
PURE IRON-BASED SOFT MAGNETIC MATERIALS

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

SURFACE ROUGHNESS WITH FINISHING GROOVE BOTTOM DIAMETER 11 MM

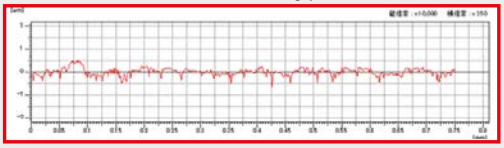
MS7025 achieves a good surface finish from the start of machining and maintains excellent consistency even after 100 passes.

After 50 machining passes



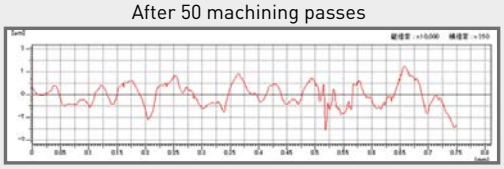
GTBT - MS7025

After 100 machining passes



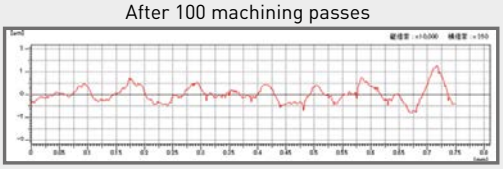
GTBT - MS7025

After 50 machining passes

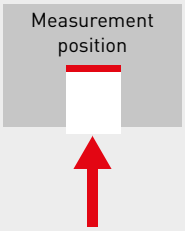


Conventional

After 100 machining passes



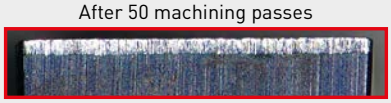
Conventional



CUTTING EDGE DAMAGE

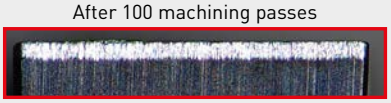
Material	Pure iron-based soft magnetic material Ø16 mm
Vc (m/min)	150
f (mm/rev)	0.04
Radial depth of cut (mm)	2.5
Cutting mode	Wet cutting

After 50 machining passes



GTBT - MS7025

After 100 machining passes

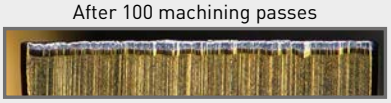


GTBT - MS7025

After 50 machining passes

Conventional
Chipping occurred due to welding.

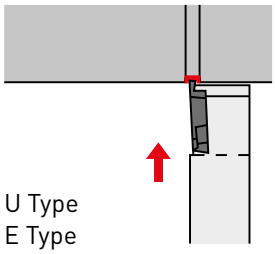
After 100 machining passes



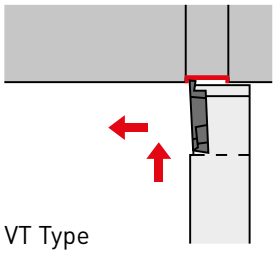
Conventional

GTAH / GTBH / GTCH

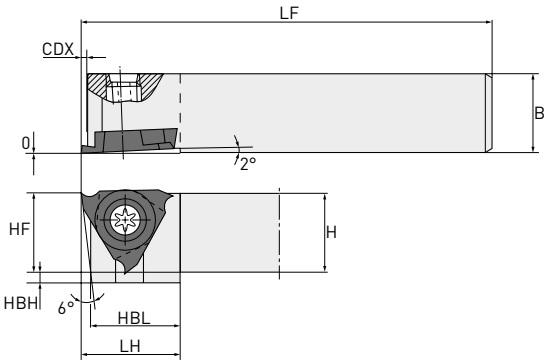
EXTERNAL GROOVING



U Type
E Type



VT Type



Right hand tool holder shown.

Order number	Stock		H	B	HF	LF	CDX*	LH	HBH	HBL	Cutting width		Insert
	R	L									min.	max.	
GTAHR/L0808-20S	●	●	8	8	8	80	2	15	5	12.9	0.3	3.0	GTAT GTBT* GTCT*
GTAHR/L0808-20	●	●	8	8	8	120	2	15	5	12.9	0.3	3.0	
GTAHR/L1010-20S	●	●	10	10	10	80	2	15	3	12.9	0.3	3.0	
GTAHR/L1010-20	●	●	10	10	10	120	2	15	3	12.9	0.3	3.0	
GTAHR/L1212-20S	●	●	12	12	12	80	2	15	1	12.9	0.3	3.0	
GTAHR/L1212-20	●	●	12	12	12	120	2	15	1	12.9	0.3	3.0	
GTAHR/L1616-20	●	●	16	16	16	120	2	15	—	12.9	0.3	3.0	
GTBHR/L1010-30S	●	●	10	10	10	80	3	15	3	13.4	1.45	3.0	GTBT GTCT
GTBHR/L1010-30	●	●	10	10	10	120	3	15	3	13.4	1.45	3.0	
GTBHR/L1212-30	●	●	12	12	12	120	3	15	1	13.4	1.45	3.0	
GTBHR/L1616-30	●	●	16	16	16	120	3	15	—	13.4	1.45	3.0	
GTCHR/L1010-30S	●	●	10	10	10	80	3	15	3	13.4	2.5	3.0	GTCT
GTCHR/L1010-30	●	●	10	10	10	120	3	15	3	13.4	2.5	3.0	

1/1

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

196 Vc

* 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.

SPARE PARTS

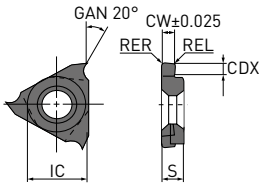
Clamp screw	Clamp torque (Nm)	Wrench
NS404W	1.0	NKY15S

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

GTAH / GTBH / GTCH

INSERTS

Order number	Hand	NEW MS7025	VP15TF	VP15KZ	NEW MT2015	TF15	CW	CDX*	RER/L	IC	S	Geometry *Right hand insert shown.*
GTAT03306V3R-E	R		●				0.33	0.27	0.03	9.525	3.18	
GTAT03306V3L-E	L		★				0.33	0.27	0.03	9.525	3.18	E Type (Ring processing grooving)
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	
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	
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	
GTAT12020V5R-E	R		●				1.20	1.8	0.05	9.525	3.18	
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	
GTAT14020V5R-E	R		●				1.40	1.8	0.05	9.525	3.18	
GTAT14020V5L-E	L		★				1.40	1.8	0.05	9.525	3.18	
NEW GTBT14530V5R-E	R	●			●		1.45	2.8	0.05	9.525	3.18	
NEW 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	
GTBT1503001L-E	L		★				1.50	2.8	0.1	9.525	3.18	
NEW GTBT17030V5R-E	R	●			●		1.70	2.8	0.05	9.525	3.18	
NEW GTBT17030V5L-E	L	●			●		1.70	2.8	0.05	9.525	3.18	
NEW GTBT17530V5R-E	R	●			●		1.75	2.8	0.05	9.525	3.18	
NEW GTBT17530V5L-E	L	●			●		1.75	2.8	0.05	9.525	3.18	
GTBT18030V5R-E	R	●	●		●		1.80	2.8	0.05	9.525	3.18	
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	



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

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

GTAH / GTBH / GTCH – INSERTS

	Order number	Hand	NEW MS7025	VP15TF	VP15KZ	NEW MT2015	TF15	CW	CDX*	RER/L	IC	S	Geometry *Right hand insert shown.*
NEW	GTBT2253001R-E	R	●					2.25	2.8	0.1	9.525	3.18	
NEW	GTBT2253001L-E	L	●					2.25	2.8	0.1	9.525	3.18	E Type (Ring processing grooving)
	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	
NEW	GTCT2503001R-E	R	●					2.50	2.8	0.1	9.525	3.18	
NEW	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	
NEW	GTCT3003001R-E	R	●					3.00	2.8	0.1	9.525	3.18	
NEW	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	
	GTAT03006V3L-U	L		★				0.30	0.27	0.03	9.525	3.18	U Type (General purpose grooving)
	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	

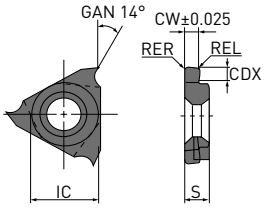
* CDX is a value that assumes the machining diameter of Ø42 or less.
Please note that the maximum machining depth is limited by the holder used.

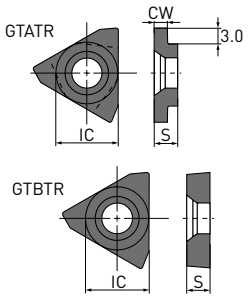
196 Vc

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

GTAH / GTBH / GTCH – INSERTS

Order number	Hand	NEW MS7025	VP15TF	VP15KZ	NEW MT2015	TF15	CW	CDX*	RER/L	IC	S	Geometry
GTAT0330600R-VT	R			●			0.33	0.25	0	9.525	3.18	
GTAT0431200R-VT	R			●			0.43	0.9	0	9.525	3.18	VT Type (Grooving, Side turning)
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

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

196 Vc

GTAH / GTBH / GTCH

RECOMMENDED CUTTING CONDITIONS

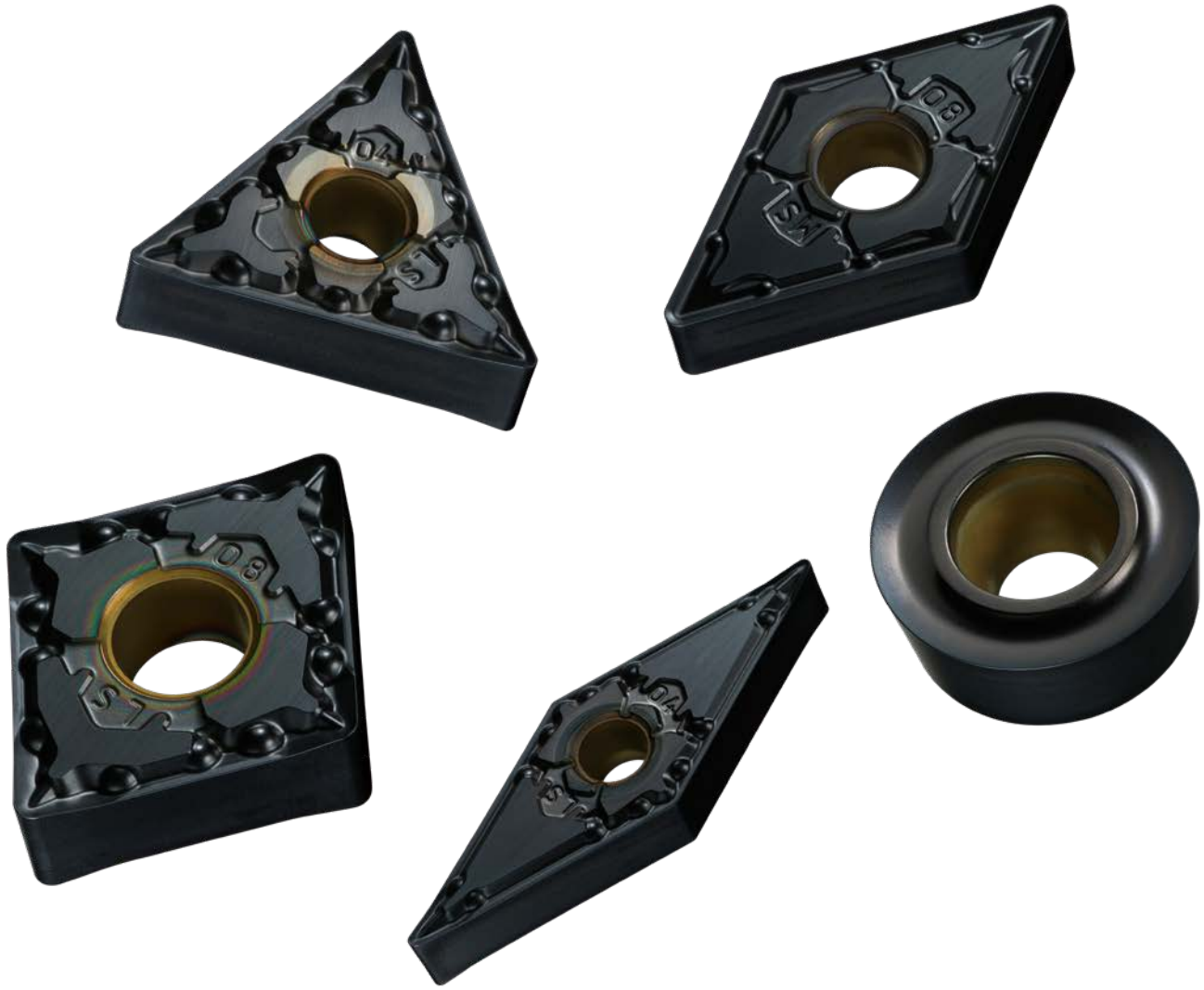
	Material	Hardness	Grade	Vc	f
P	Pure iron, Free cutting steel	—	MS7025, VP15TF	110 (30 – 180)	0.05 (0.01 – 0.09)
	Carbon steel , Alloy steel	180HB – 280HB	MS7025, VP15TF	100 (50 – 150)	0.05 (0.02 – 0.09)
M	Stainless steel	≤200HB	MS7025	80 (50 – 120)	0.03 (0.02 – 0.05)
N	Non-Ferrous metal	—	MT2015	150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

1/1

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

MV9005

CVD-COATED GRADES EXCEED ALL CURRENT STANDARDS WHEN MACHINING HEAT RESISTANT SUPER ALLOYS



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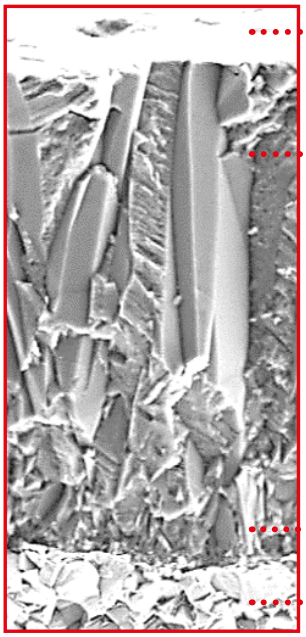
MV9005

CVD-COATED GRADES EXCEED ALL CURRENT STANDARDS WHEN MACHINING HEAT RESISTANT SUPER ALLOYS

ADVANCED WEAR RESISTANCE

By adopting a newly developed Al-Rich coating technology, an (Al,Ti)N coating with a high Al content ratio for extreme hardness means that oxidation resistance is greatly improved, resulting in excellent wear resistance.



Graphical representation

EXCELLENT WELDING RESISTANCE

Smooth surface

OUTSTANDING WEAR RESISTANCE

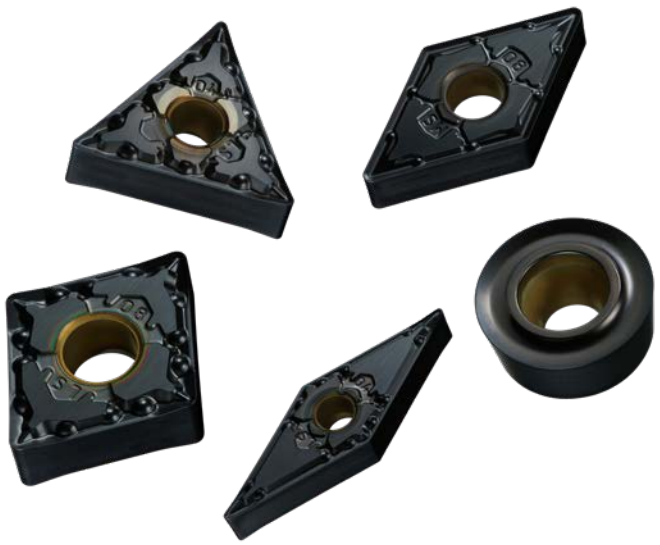
Newly developed Al-Rich coating

EXCELLENT CHIPPING RESISTANCE FOR STABLE MACHINING

Newly developed bonding layer

EXCELLENT RESISTANCE TO PLASTIC DEFORMATION

Extremely hard dedicated cemented carbide substrate



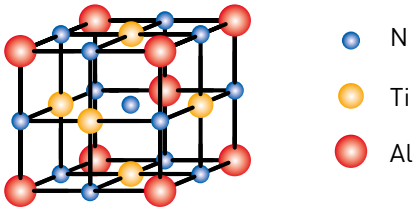
MV9005

CVD-COATED GRADES EXCEED ALL CURRENT STANDARDS WHEN MACHINING HEAT RESISTANT SUPER ALLOYS

COMPLETE COATING TECHNOLOGY THAT TOPPLES CURRENT TOOL LIFE STANDARDS

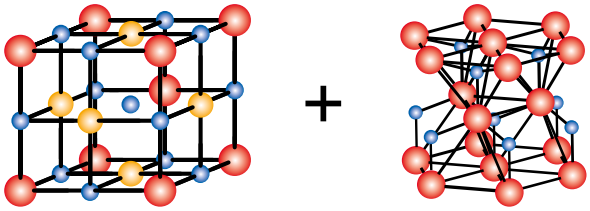
Due to the newly developed Al-Rich coating.

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.



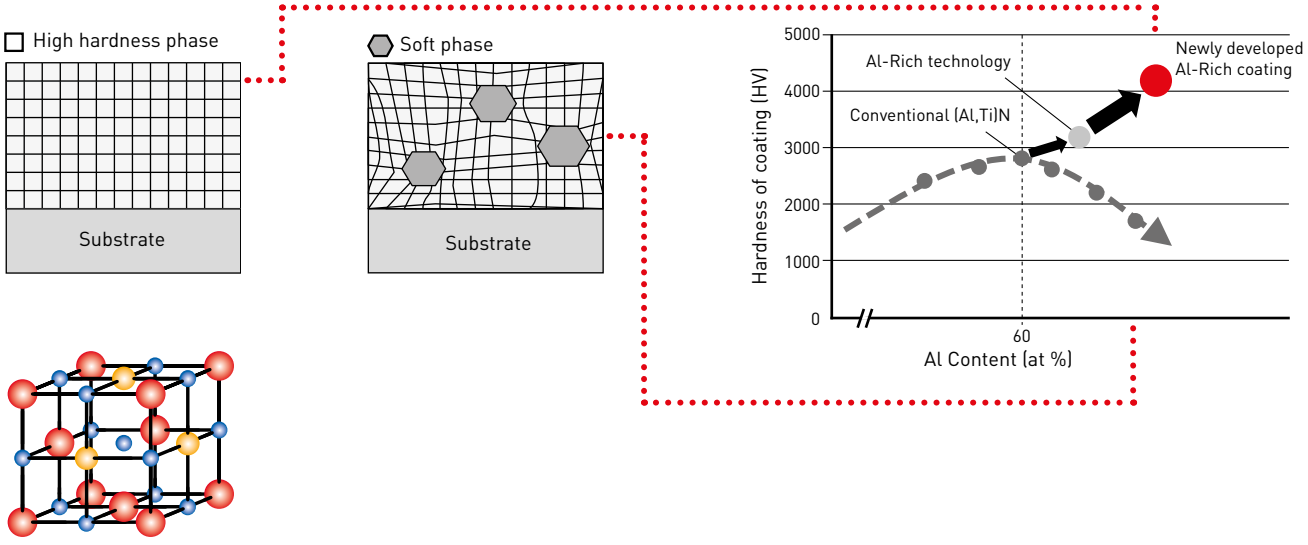
The combination of atoms with different sizes creates an exceptionally hard crystal structure.

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, a way in which an Al-Rich coating does not change its crystal structure even when the Al content is increased was developed. This also achieves a higher Al content and a higher hardness of (Al,Ti)N.

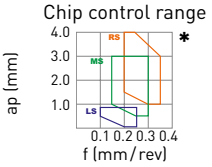
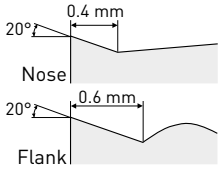
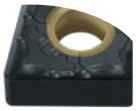
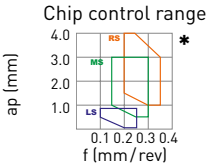
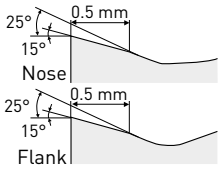
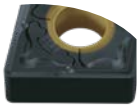
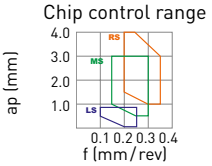
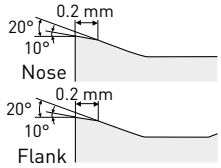
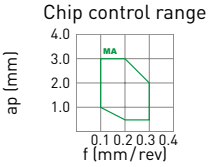
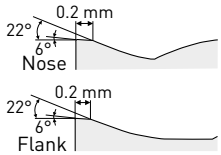


Crystal image of MV9005

MV9005

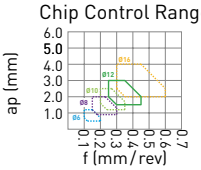
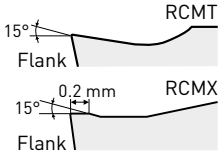
CHIPBREAKER SYSTEM

NEGATIVE INSERTS

Tolerance	Features	Cross section geometry
M	**LIGHT CUTTING**  LS Enhanced chip disposal for depths of cut smaller than the corner R. 	
	MEDIUM CUTTING  MS The large 2-step rake angle generates chips smoothly and without tangling during low feed cutting. 	
	ROUGH CUTTING  RS During low speed cutting the positive land controls chip welding and abrasion at the depth of cut line. 	
	MULTI-ASSIST CHIPBREAKER  MA Suitable for a medium cutting range. 	

* The chipbreaker control range was tested for optimum chip evacuation when cutting Inconel®718 with a CNMG120408 insert.

POSITIVE INSERTS

Tolerance	Features	Cross section geometry
M	**MEDIUM CUTTING** Balance of strength and sharpness due to a combination of a flat land and rake angle. 	

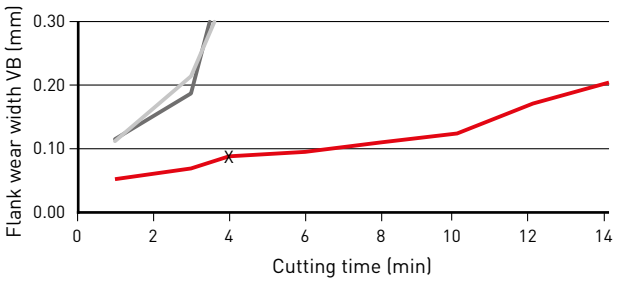
MV9005

CUTTING PERFORMANCE

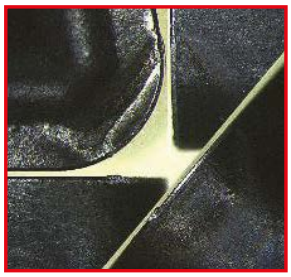
COMPARISON OF WEAR RESISTANCE WHEN MACHINING INCONEL®718

Exhibits excellent wear resistance and extended tool life.

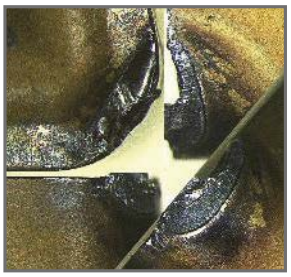
Material	Inconel®718
Insert	CNMG120412-○○
Vc (m/min)	100
f (mm/rev)	0.3
ap (mm)	0.75
Cutting mode	Wet cutting



TAKEN AFTER MACHINING 4 MINUTES



MV9005
MS Breaker

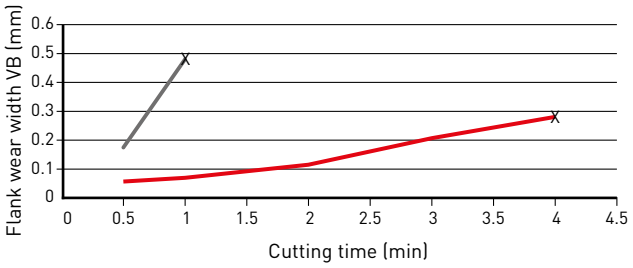


Conventional A

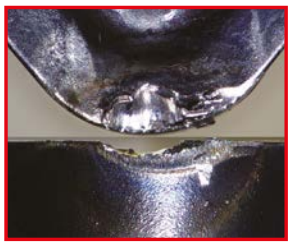
COMPARISON OF WEAR RESISTANCE WHEN MACHINING INCONEL®718

Demonstrates excellent wear resistance even during high-speed cutting of heat resistant alloys, thus improving machining efficiency.

Material	Inconel®718
Insert	CNMG120412-○○
Vc (m/min)	150
f (mm/rev)	0.3
ap (mm)	0.75
Cutting mode	Wet cutting



4 MIN. MACHINING



MV9005
MS Breaker

1 MIN. MACHINING

Conventional A

■ : MV9005 ■ A ■ B : Conventional tool

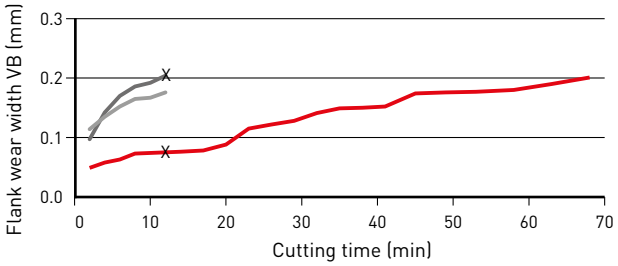
MV9005

CUTTING PERFORMANCE

COMPARISON OF WEAR RESISTANCE WHEN MACHINING RENE 41

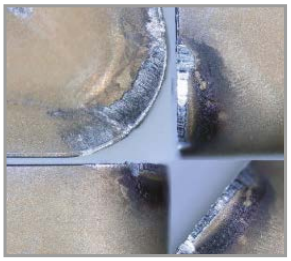
Exhibits excellent wear resistance even when machining heat resistant alloy components that are used in high temperature environments of 800 °C or higher.

Material	Rene 41 (Ni based heat resistant alloys)
Insert	CNMG120412-○○
Vc (m/min)	30
f (mm/rev)	0.1
ap (mm)	0.5
Cutting mode	Wet cutting



TAKEN AFTER 12 MINUTES MACHINING

MV9005
MS Breaker

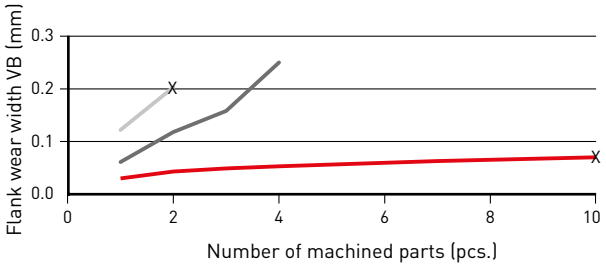


Conventional A

COMPARISON WHEN MACHINING A NICKEL-BASED SUPER ALLOY CONTAINING COBALT

Exhibits excellent wear resistance across a wide range of nickel-based heat resistant alloys.

Material	Nickel-base super alloy containing cobalt
Insert	CNMG120412-○○
Vc (m/min)	40
f (mm/rev)	0.15
ap (mm)	1.5
Cutting mode	Wet cutting



10 PARTS

MV9005
MS Breaker

1 PART

Conventional B

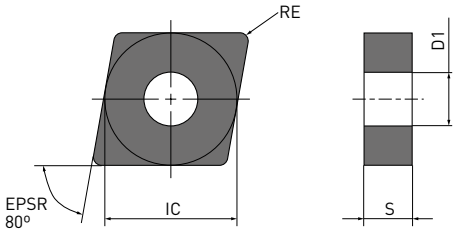
■ : MV9005 ■ A ■ B : Conventional tool

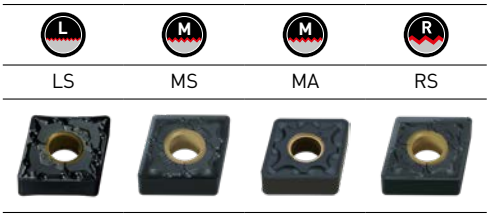
CNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

CNMG





Order number	L M R	MV9005	IC	S	RE	D1
CNMG120402-LS	L	●	12.7	4.76	0.2	5.16
CNMG120404-LS	L	●	12.7	4.76	0.4	5.16
CNMG120408-LS	L	●	12.7	4.76	0.8	5.16
CNMG120404-MS	M	●	12.7	4.76	0.4	5.16
CNMG120408-MS	M	●	12.7	4.76	0.8	5.16
CNMG120412-MS	M	●	12.7	4.76	1.2	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
CNMG120408-RS	R	●	12.7	4.76	0.8	5.16
CNMG120412-RS	R	●	12.7	4.76	1.2	5.16
CNMG120416-RS	R	●	12.7	4.76	1.6	5.16
CNMG190616-RS	R	●	19.05	6.35	1.6	7.93

1/1

209 Vc

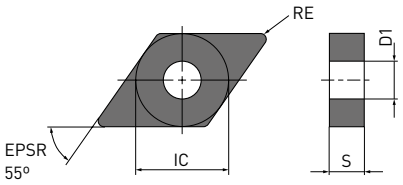
● : Inventory maintained. ★ : Inventory maintained in Japan.

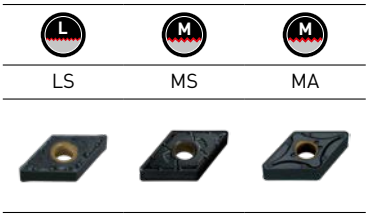
DNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

DNMG





Order number	L M R	MV9005	IC	S	RE	D1
DNMG150402-LS	L	●	12.7	4.76	0.2	5.16
DNMG150404-LS	L	●	12.7	4.76	0.4	5.16
DNMG150408-LS	L	●	12.7	4.76	0.8	5.16
DNMG150404-MS	M	●	12.7	4.76	0.4	5.16
DNMG150408-MS	M	●	12.7	4.76	0.8	5.16
DNMG150412-MS	M	●	12.7	4.76	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

1/1

209 Vc

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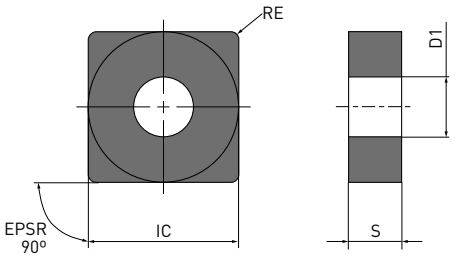
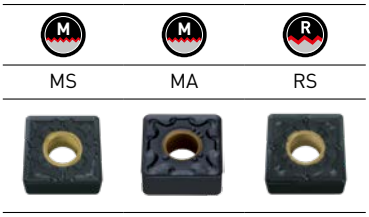
SNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

SNMG





Order number	L M R	MV9005	IC	S	RE	D1
SNMG120404-MS	M	●	12.7	4.76	0.4	5.16
SNMG120408-MS	M	●	12.7	4.76	0.8	5.16
SNMG120412-MS	M	●	12.7	4.76	1.2	5.16
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
SNMG120408-RS	R	●	12.7	4.76	0.8	5.16
SNMG120412-RS	R	●	12.7	4.76	1.2	5.16
SNMG120416-RS	R	●	12.7	4.76	1.6	5.16

1/1

209 Vc

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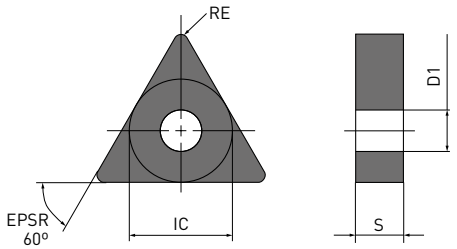
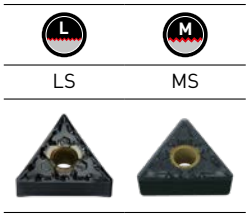
TNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

TNMG





Order number	L	M	R	MV9005	IC	S	RE	D1
TNMG160402-LS	L			●	9.525	4.76	0.2	3.81
TNMG160404-LS	L			●	9.525	4.76	0.4	3.81
TNMG160408-LS	L			●	9.525	4.76	0.8	3.81
TNMG160404-MS		M		●	9.525	4.76	0.4	3.81
TNMG160408-MS		M		●	9.525	4.76	0.8	3.81
TNMG160412-MS		M		●	9.525	4.76	1.2	3.81

1/1

209 Vc

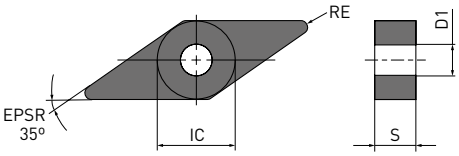
● : Inventory maintained. ★ : Inventory maintained in Japan.

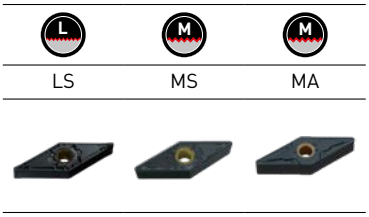
VNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

VNMG





Order number	L M R	MV9005	IC	S	RE	D1
VNMG160402-LS	L	●	9.525	4.76	0.2	3.81
VNMG160404-LS	L	●	9.525	4.76	0.4	3.81
VNMG160408-LS	L	●	9.525	4.76	0.8	3.81
VNMG160404-MS	M	●	9.525	4.76	0.4	3.81
VNMG160408-MS	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

1/1

209 Vc

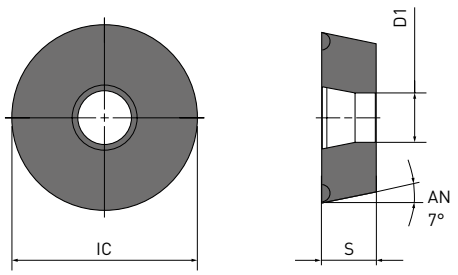
● : Inventory maintained. ★ : Inventory maintained in Japan.

RCMT/ RCMX

7° POSITIVE INSERTS (WITH HOLE)

M Class

RCMT / RCMX



Standard

Standard

Order number	L M R	MV9005	IC	S	RE	D1
RCMT0602M0	M	●	6.0	2.38	—	2.8
RCMT0803M0	M	●	8.0	3.18	—	3.4
RCMT10T3M0	M	●	10.0	3.97	—	4.4
RCMT1204M0	M	●	12.0	4.76	—	4.4
RCMT1606M0	M	●	16.0	6.35	—	5.5
RCMX1003M0	M	●	10.0	3.18	—	3.6
RCMX1204M0	M	●	12.0	4.76	—	4.2
RCMX1606M0	M	●	16.0	6.35	—	5.2

1/1

209 Vc

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

MV9005

RECOMMENDED CUTTING CONDITIONS

NEGATIVE INSERTS

	Material	Conditions		Grade		Vc	f	ap
S	Ni based heat resistant alloys (Inconel®718, Hastelloy®, WASPALOY®)	●	L	MV9005	LS	50 – 110	0.10 – 0.25	0.2 – 0.8
		●	M	MV9005	MS	50 – 100	0.15 – 0.30	0.5 – 3.0

1/1

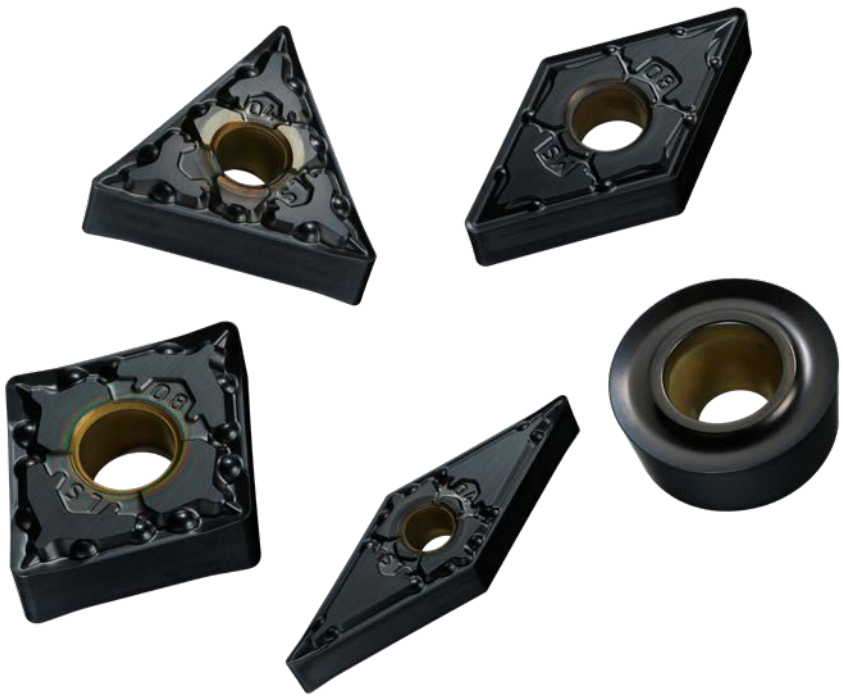
1. Verify the recommended conditions for each boring bar as cutting conditions for internal machining can differ.

POSITIVE INSERTS

	Material	Conditions		Grade	Vc	f	ap
S	Ni based heat resistant alloys (Inconel®718, Hastelloy®, WASPALOY®)	●	M	MV9005	40 – 80	0.25 – 0.45	1.5 – 3.0

1/1

1. Verify the recommended conditions for each boring bar as cutting conditions for internal machining can differ.

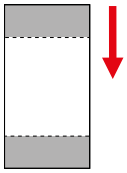


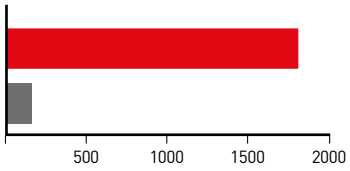
Cutting conditions: ●: Stable cutting

MV9005

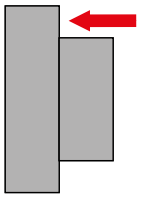
EXAMPLE OF USAGE

Insert	CNMG120412-MS
Material	Nickel-base super alloy containing cobalt
Component	Aerospace component
Application	Face
Vc (m/min)	40
f (mm/rev)	0.15
ap (mm)	1.5
Cutting mode	Wet cutting
Results	Notch wear is suppressed, and it is possible to significantly extend the tool life.

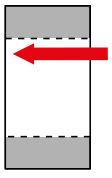




Insert	CNMG120412-MS
Material	Inconel®718
Component	Aerospace component
Application	Turning
Vc (m/min)	MV9005 = 100 Conventional = 80
f (mm/rev)	MV9005 = 0.30 Conventional = 0.25
ap (mm)	0.15 – 0.35
Cutting mode	Wet cutting
Results	Cutting conditions improve machining efficiency by 50 % compared to conventional products. Premature wear is also suppressed and stable machining is achieved.



Insert	CNMG120412-MS
Material	Inconel®718
Component	Aerospace component
Application	Internal
Vc (m/min)	MV9005 = 100 Conventional = 80
f (mm/rev)	MV9005 = 0.18 Conventional = 0.15
ap (mm)	0.15 – 0.35
Cutting mode	Wet cutting
Results	Machining efficiency is 50 % higher than conventional products. Premature wear is suppressed even under increased cutting conditions, enabling stable machining.

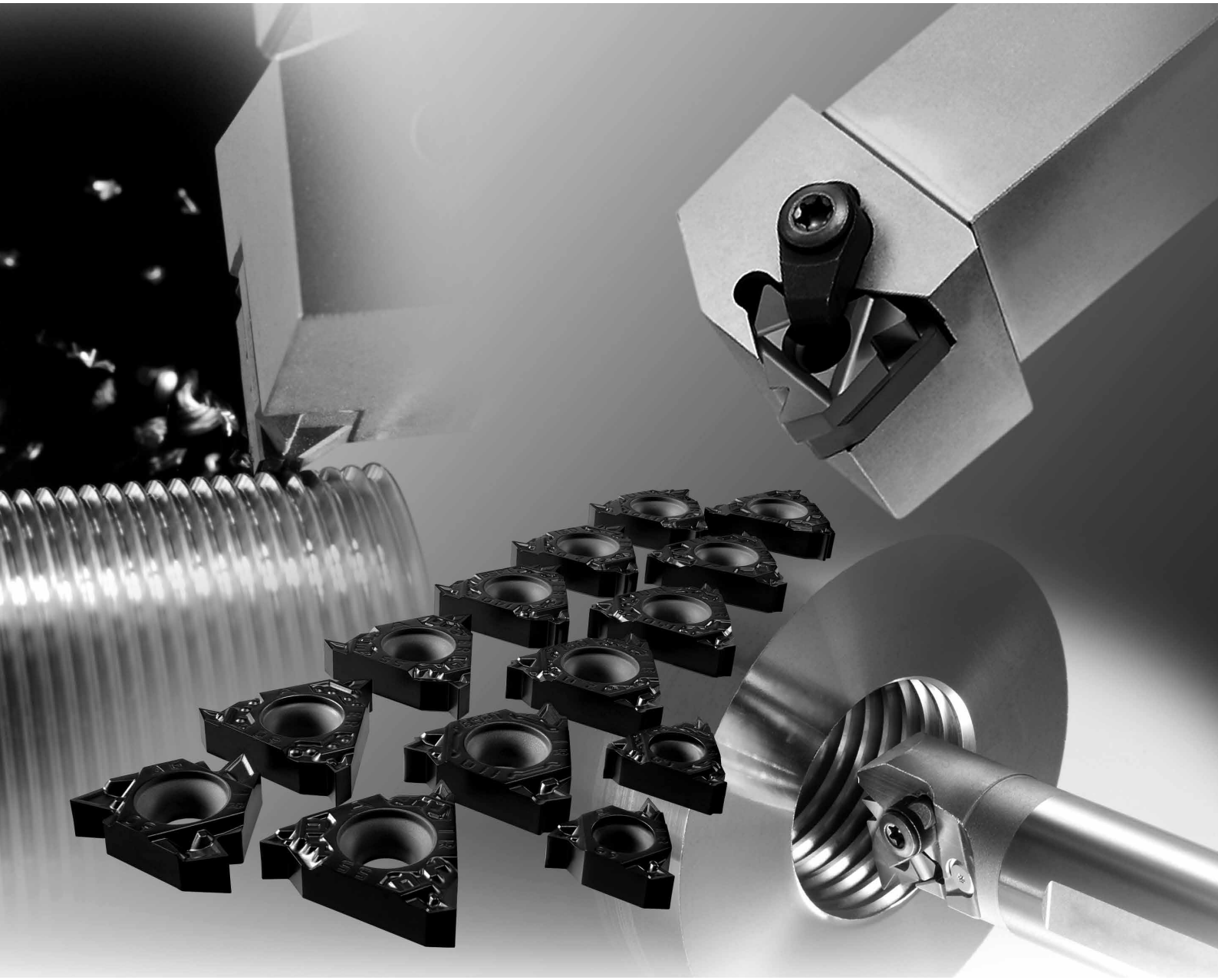


The examples shown are customer's applications, therefore can differ from the recommended conditions.

■ : MV9005 ■ A : Conventional tool

MMT THREADING SERIES

FOR HIGHLY EFFICIENT AND PRECISION MACHINING OVER A WIDE RANGE OF THREADING APPLICATIONS



Interested in more...

B053

www.mhg-mediastore.net

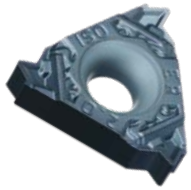
DIA EDGE

FEATURES OF MMT SERIES

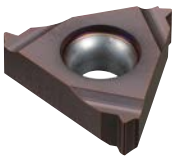
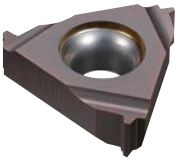
A WIDE VARIETY OF PRODUCTS

M-CLASS INSERTS WITH 3-D CHIPBREAKERS

M, UNC, UNF, W, G, Rp, R, Rc



G-CLASS GROUND INSERTS

M, UNC, UNF, W, G, Rp, R, Rc, NPTF, NPT	Rd, CSG, LCSG	Tr, ACME, BCSG
		

IDEAL CHIP CONTROL EVEN DURING THE LATTER HALF OF PASSES WHEN CONTINUOUS CHIPS ARE USUALLY PRODUCED (M-CLASS INSERTS WITH 3-D CHIPBREAKERS)

Workpiece	DIN 41CrMo4
Insert	MMT16ER150ISO-S
Grade	VP15TF
Vc (m/min)	120
Cutting method	Radial infeed
Depth of cut	Fixed cut area
Pass (times)	6
Coolant	Wet

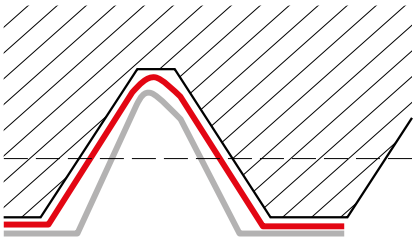
ISO metric external thread pitch 1.5 mm
Final pass (6th pass)

MMT

Conventional

A HIGHER LEVEL OF PRECISION THAN CONVENTIONAL INSERTS (G-CLASS GROUND INSERTS)

Thread type	Threading tolerance
ISO Metric	6g / 6H
American UN	2A / 2B
Whitworth for BSW, BSP	Medium class A
BSPT	Standard BSPT
Round DIN 405	7h / 7H
ISO Trapezoidal 30°	7e / 7H
American ACME	3G
UNJ	3A
API Buttress Casing	Standard API
API Rounded Casing & Tubing	Standard API RD
American NPT	Standard NPT
American NPTF	Class 2



High precision threading can be achieved by using MMT inserts that feature ground rake faces and peripheral cutting edges.

MMT series
Theoretical thread profile
Conventional insert

FEATURES OF MMT SERIES

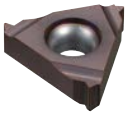
AG TYPE IS ADDED TO THE ACCURATE M-CLASS TYPE 3-D CHIPBREAKER

For general purpose 60° and 55° inner/outer diameter threading, the AG type has been added to the precision M-class 3-D chipbreaker range, which is applicable to 48 – 8 threads and a pitch of 0.5 – 3.0 mm to meet a wide range of needs.
The M-class precision 3-D chipbreaker improves chip control and contributes to tool cost reduction.

CHOOSING M-CLASS INSERTS WITH 3-D CHIPBREAKERS OR G-CLASS INSERTS

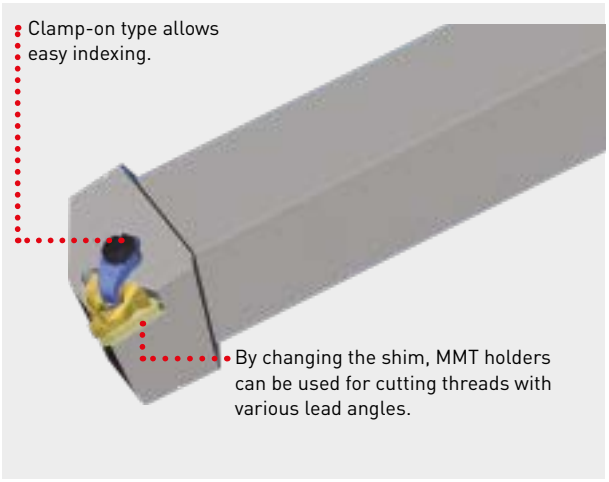
- For ideal chip control and a high cost performance ratio, M-class inserts with 3-D chipbreakers are recommended.
- G-class inserts are recommended where higher precision is required.

Insert	Chip control	Precision of thread
M-class inserts with 3-D chipbreakers 	◎	○

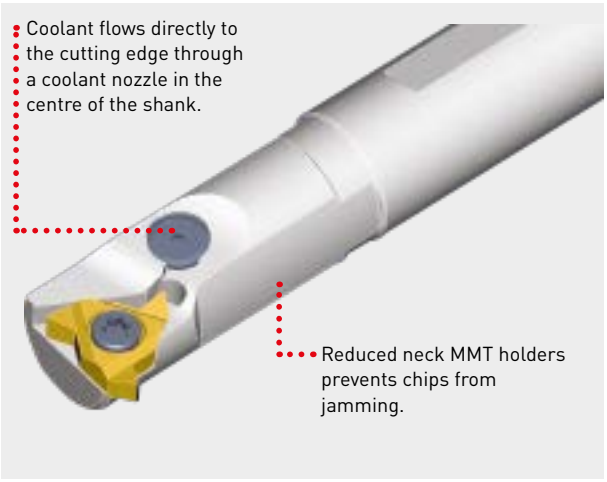
Insert	Chip control	Precision of thread
G-class inserts 	○	◎

HOLDER (USE OF SPECIAL SURFACE TREATMENT)

EXTERNAL



INTERNAL

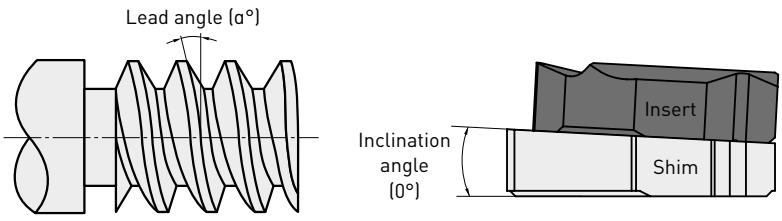


Order number of coolant guide screw: TFS03006
(Except MMTIR1316/MMTIR1516)

SUITABLE FOR THREADING WITH A LARGE LEAD ANGLE

Lead angle (α°)	Inclination angle (0°)
-1.5°	-3°
-0.5°	-2°
0.5°	-1°
1.5°	0°
2.5°	1°
3.5°	2°
4.5°	3°

Standard shim delivered with the holder.



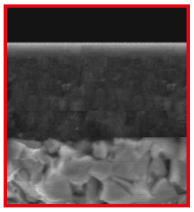
By changing only the shim, MMT holders can be used for turning of threads with various lead angles as well as the turning of left hand threads.

PVD COATED CARBIDE GRADE FOR STABLE THREADING

MP9025

Tough grade with an emphasis on cutting edge stability.

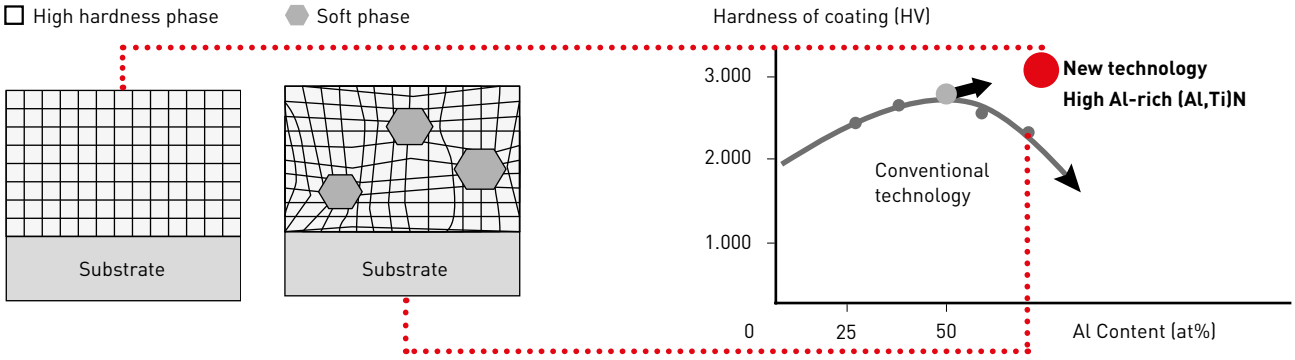
Demonstrates excellent fracture resistance when machining at low cutting speeds, internal machining, and even on small corner R sizes.
With excellent adhesion resistance, it is effective when machining heat resistant alloys and precipitation hardening stainless steel.



- High Al-rich (Al,Ti)N single layer coating technology
- Special cemented carbide substrate

HIGH AL AND CONVENTIONAL COATING COMPARISON

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



VP10MF

High wear and plastic deformation resistance for threading when maintaining the thread form is important.
Suitable for continuous high precision machining with extensive tool life.
Effective in combination with G-class inserts for high precision threading.

VP15TF

High fracture resistance during low rigidity applications such as bar feed machining. Able to withstand harsh conditions for long periods where conventional inserts would be liable to breakage.
Effective combination of high cost performance M-class inserts with 3-D chipbreakers.

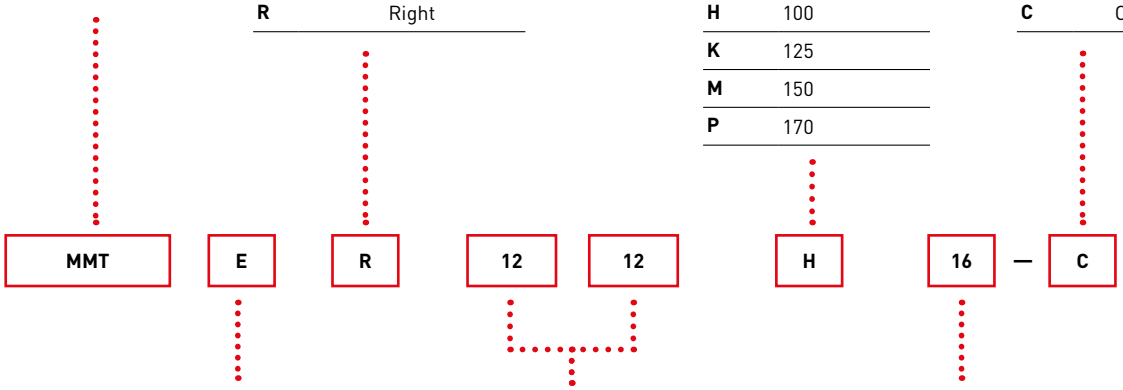
VP20RT

Suitable for stainless steel boring and unstable machining where inserts are vulnerable to fracturing.
Effective combination of high cost performance M-class inserts with 3-D chipbreakers.

MMT SERIES ORDER NUMBER

HOLDERS

EXTERNAL



Designation

Hand of tool	
R	Right

Tool length (mm)	
H	100
K	125
M	150
P	170

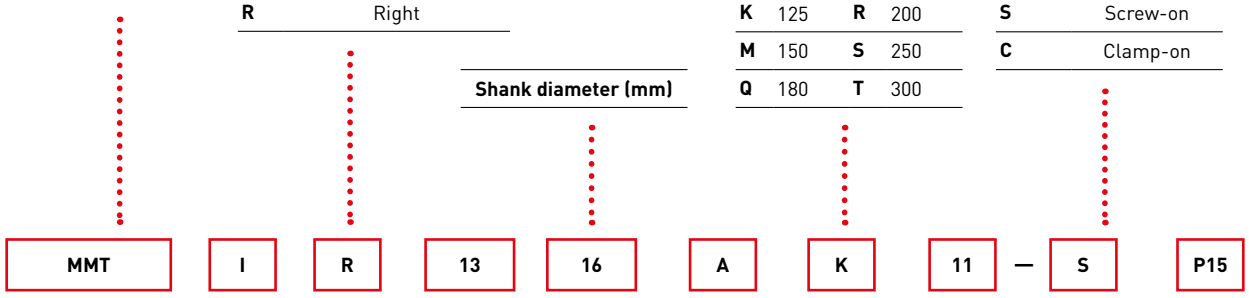
Method of holding	
C	Clamp-on

Application	
E	External

Tool size (mm) (Height and width)	
12	12
16	16
20	20
25	25
32	32

Insert size (mm)	
16	9.525
22	12.7

INTERNAL



Designation

Hand of tool	
R	Right

Tool length (mm)			
K	125	R	200
M	150	S	250
Q	180	T	300

Method of holding	
S	Screw-on
C	Clamp-on

Application	
I	Internal

Min.Cutting diameter (mm)

Shank diameter (mm)

Shank material	
A	Steel shank with coolant hole

Insert size (mm)	
11	6.35
16	9.525
22	12.7

Lead angle	
P15	1.5°
P25	2.5°
P35	3.5°

MMT SERIES ORDER NUMBER

INSERTS

M-CLASS

Designation	Hand of tool		Threading type		
	R	Right	60	Partial Profile 60°	
			55	Partial Profile 55°	
			ISO	ISO Metric	
			W	Whitworth for BSW, BSP	
			BSPT	BSPT	
			UN	American UN	

MMT	16	E	R	100	ISO	—	S

Diameter of inscribed circle (mm)	
11	6.35
16	9.525

Application	
E	External
I	Internal

Pitch		
100	1.0 mm	A: 0.5 – 1.5 mm or 48 – 16 thread/inch
125	1.25 mm	
150	1.5 mm	G: 1.75 – 3.0 mm or 14 – 8 thread/inch
175	1.75 mm	
200	2.0 mm	
250	2.5 mm	AG: 0.5 – 3.0 mm or 48 – 8 thread/inch
300	3.0 mm	

S
M-class inserts with 3-D chipbreakers

G-CLASS

Designation	Hand of tool	
	R	Right

MMT	16	E	R	050	ISO

Diameter of inscribed circle (mm)	
11	6.35
16	9.525
22	12.7

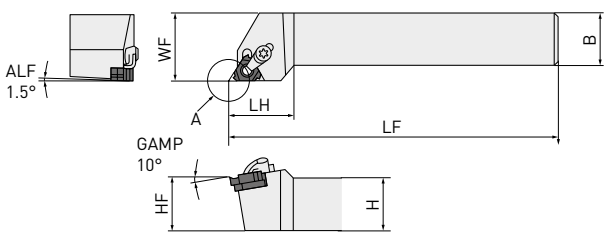
Application	
E	External
I	Internal

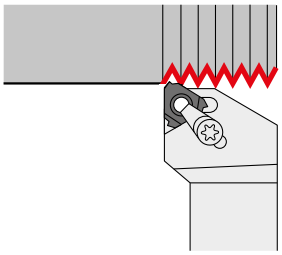
Pitch		
050	0.5 mm	A: 0.5 – 1.5 mm or 48 – 16 thread/inch
075	0.75 mm	
100	1.0 mm	
125	1.25 mm	G: 1.75 – 3.0 mm or 14 – 8 thread/inch
150	1.5 mm	
175	1.75 mm	
200	2.0 mm	AG: 0.5 – 3.0 mm or 48 – 8 thread/inch
250	2.5 mm	
300	3.0 mm	
350	3.5 mm	N: 3.5 – 5.0 mm or 7 – 5 thread/inch
400	4.0 mm	
450	4.5 mm	
500	5.0 mm	

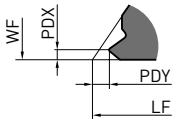
Threading type	
60	Partial Profile 60°
55	Partial Profile 55°
ISO	ISO Metric
W	Whitworth for BSW, BSP
BSPT	BSPT
UN	American UN
RD	Round DIN 405
TR	ISO Trapezoidal 30°
ACME	American ACME
UNJ	UNJ
APBU	API Buttress Casing
APRD	API Round Casing&Tubing
NPT	NPT
NPTF	NPTF

MMTE HOLDER

EXTERNAL THREADING







Details of position A
Refer to the insert standards for dimensions PDX and PDY.

Right hand tool holder only.

Order number	Stock R	H	B	LF	LH	HF	WF	Insert number
MMTER1212H16-C	●	12	12	100	25	12	16	MMT16ER ○○○○○
MMTER1616H16-C	●	16	16	100	25	16	20	
MMTER2020K16-C	●	20	20	125	26	20	25	
MMTER2525M16-C	●	25	25	150	28	25	32	
MMTER3232P16-C	●	32	32	170	32	32	40	
MMTER2525M22-C	●	25	25	150	32	25	32	MMT22ER ○○○○○
MMTER3232P22-C	●	32	32	170	32	32	40	

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(5 inserts per case)

220 Vc

SPARE PARTS

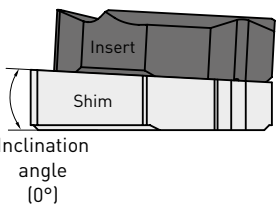
Order number	Clamp bridge	Clamp screw *	Stop ring	Shim screw *	Shim	Wrench 1. 2.
MMTER1212H16-C	SETK51	SETS51	CR4	HFC03008	CTE32TP15	1.TKY15F 2.HKY20R
MMTER1616H16-C						
MMTER2020K16-C						
MMTER2525M16-C						
MMTER3232P16-C						
MMTER2525M22-C	SETK61	SETS61	CR5	HFC04010	CTE43TP15	1.TKY20F 2.HKY25R
MMTER3232P22-C						

1. Select and use a shim as shown below (sold separately), dependant on the lead angle.
* Clamp Torque (N • m): SETS51 = 3.5, SETS61 = 5.0, HFC03008 = 1.5, HFC04010 = 2.2

SHIM

Lead angle (α°)	Order number	Stock R	Inclination angle (0°)	Applicable holder
-1.5°	CTE32TN15	●	-3°	MMTER ○○○○○ 16-C
-0.5°	CTE32TN05	●	-2°	
0.5°	CTE32TP05	●	-1°	
1.5°	CTE32TP15	●	0°	
2.5°	CTE32TP25	●	1°	
3.5°	CTE32TP35	●	2°	
4.5°	CTE32TP45	●	3°	

Lead angle (α°)	Order number	Stock R	Inclination angle (0°)	Applicable holder
-1.5°	CTE43TN15	●	-3°	MMTER ○○○○○ 22-C
-0.5°	CTE43TN05	●	-2°	
0.5°	CTE43TP05	●	-1°	
1.5°	CTE43TP15	●	0°	
2.5°	CTE43TP25	●	1°	
3.5°	CTE43TP35	●	2°	
4.5°	CTE43TP45	●	3°	



Standard shim delivered with the holder.

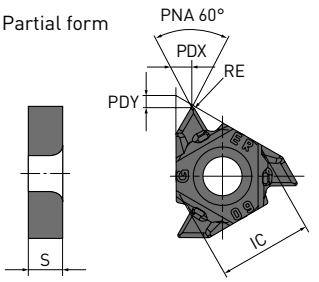
● : Inventory maintained. ★ : Inventory maintained in Japan.

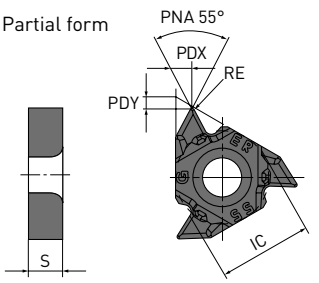
MMT

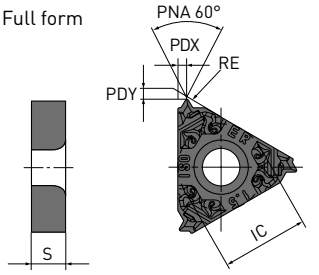
M-CLASS INSERTS WITH 3-D CHIPBREAKERS

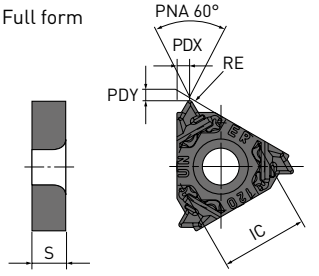
INSERTS

Order number	MP9025	VP15TF	VP20RT	Pitch mm	Thread / inch	IC	S	PDY	PDX	RE	Total cutting depth	Geometry
PARTIAL PROFILE 60°												
MMT16ERAG60-S	●	●	●	0.5 – 3.0	48 – 8	9.525	3.44	1.2	1.7	0.08	—	Partial form
MMT16ERA60-S	●		●	0.5 – 1.5	48 – 16	9.525	3.44	0.8	0.9	0.06	—	
MMT16ERG60-S	●		●	1.75 – 3.0	14 – 8	9.525	3.44	1.2	1.7	0.23	—	
PARTIAL PROFILE 55°												
MMT16ERAG55-S	●	●	●		48 – 8	9.525	3.44	1.2	1.7	0.07	—	Partial form
MMT16ERA55-S	●		●		48 – 16	9.525	3.44	0.8	0.9	0.07	—	
MMT16ERG55-S	●		●		14 – 8	9.525	3.44	1.2	1.7	0.23	—	
ISO METRIC												
MMT16ER100ISO-S	●			1.0		9.525	3.44	0.7	0.7	0.13	0.61	Full form
MMT16ER125ISO-S	●			1.25		9.525	3.44	0.8	0.9	0.16	0.77	
MMT16ER150ISO-S	●			1.5		9.525	3.44	0.8	1.0	0.20	0.92	
MMT16ER175ISO-S	●			1.75		9.525	3.44	0.9	1.2	0.22	1.07	
MMT16ER200ISO-S	●			2.0		9.525	3.44	1.0	1.3	0.26	1.23	
MMT16ER250ISO-S	●			2.5		9.525	3.44	1.1	1.5	0.33	1.53	
MMT16ER300ISO-S	●			3.0		9.525	3.44	1.2	1.6	0.40	1.84	
AMERICAN UN												
MMT16ER160UN-S	★		★		16	9.525	3.44	0.9	1.1	0.23	0.97	Full form
MMT16ER140UN-S	★		★		14	9.525	3.44	1.0	1.2	0.26	1.11	
MMT16ER120UN-S	★		★		12	9.525	3.44	1.1	1.4	0.30	1.30	









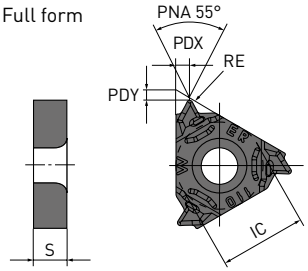
1/2

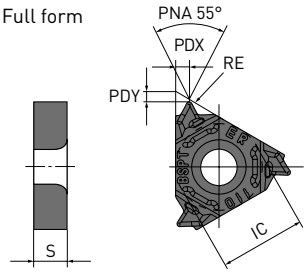
(5 inserts per case)

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

MMT – M-CLASS INSERTS WITH 3-D CHIPBREAKERS

Order number	MP9025	VP15TF	VP20RT	Pitch mm	Thread / inch	IC	S	PDY	PDX	RE	Total cutting depth	Geometry
WHITWORTH FOR BSW, BSP												
MMT16ER190W-S	●		●		19	9.525	3.44	0.8	1.0	0.18	0.86	Full form
MMT16ER140W-S	●		●		14	9.525	3.44	1.0	1.2	0.25	1.16	
MMT16ER110W-S	●		●		11	9.525	3.44	1.1	1.5	0.32	1.48	
BSPT												
MMT16ER190BSPT-S	★		★		19	9.525	3.44	0.8	0.9	0.18	0.86	Full form
MMT16ER140BSPT-S	★		★		14	9.525	3.44	1.0	1.2	0.25	1.16	
MMT16ER110BSPT-S	★		★		11	9.525	3.44	1.1	1.5	0.32	1.48	





2/2

(5 inserts per case)

220 Vc

1. Identification: Please see page 216 (M-Class).

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

MMTE HOLDER

RECOMMENDED CUTTING CONDITIONS

EXTERNAL THREADING

	Material	Hardness	Grade	Vc
P	Mild steel	≤180HB	MP9025	80 (60–100)
			VP10MF	150 (70–230)
			VP15TF	100 (60–140)
			VP20RT	80 (60–100)
	Carbon steel Alloy steel	180 – 280HB	MP9025	80 (60–100)
			VP10MF	140 (80–200)
			VP15TF	100 (60–140)
			VP20RT	80 (60–100)
M	Stainless steel	≤200HB	MP9025	80 (40–120)
			VP15TF	80 (40–120)
			VP20RT	80 (40–120)
K	Gray cast iron	Tensile Strength ≤350MPa	VP10MF	140 (80–200)
			VP15TF	90 (60–120)
S	Heat-resistant alloy	—	MP9025	30 (20– 40)
			VP10MF	45 (15– 70)
			VP15TF	30 (20– 40)
			VP20RT	30 (20– 40)
	Titanium alloy	—	MP9025	45 (25– 65)
			VP10MF	60 (40– 80)
			VP15TF	45 (25– 65)
			VP20RT	45 (25– 65)
H	Heat-treated alloy	45 – 55HRC	VP10MF	50 (30– 70)
			VP15TF	40 (20– 60)

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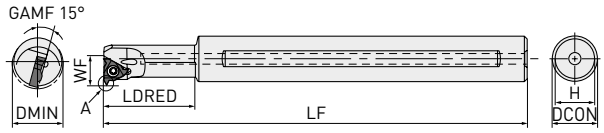
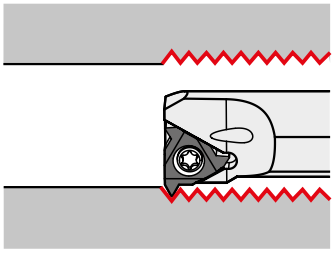
MMTI BORING BARS

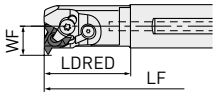
INTERNAL THREADING

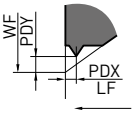
1 Screw-on type





2 Clamp-on type

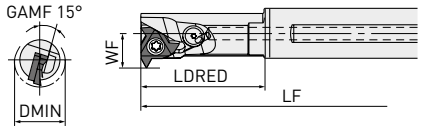




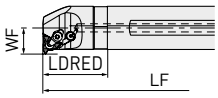
Details of position A.
Refer to the insert standards for dimensions PDX and PDY.

Right hand tool holder only.

3 Screw-on type



4 Clamp-on type



Order number	Stock R	Lead angle	DCON	LF	LDRED	WF	H	DMIN	Insert number	Type
MMTIR1316AK11-SP15	●	1.5°	16	125	25	8.7	15	13		1
MMTIR1316AK11-SP25	●	2.5°	16	125	25	8.7	15	13		1
MMTIR1316AK11-SP35	●	3.5°	16	125	25	8.7	15	13	MMT11IR	1
MMTIR1516AM11-SP15	●	1.5°	16	150	32	9.7	15	15		1
MMTIR1516AM11-SP25	●	2.5°	16	150	32	9.7	15	15		1
MMTIR1516AM11-SP35	●	3.5°	16	150	32	9.7	15	15		1
MMTIR1916AM16-SP15	●	1.5°	16	150	40	12.2	15	19		2
MMTIR1916AM16-SP25	●	2.5°	16	150	40	12.2	15	19		2
MMTIR1916AM16-SP35	●	3.5°	16	150	40	12.2	15	19	MMT16IR	2
MMTIR2420AQ16-C	●	1.5°	20	180	40	14.2	19	24		3
MMTIR2925AS16-C	●	1.5°	25	250	60	16.7	23.4	29		3
MMTIR3732AS16-C	●	1.5°	32	250	48	20.5	30.4	37		4
MMTIR2420AQ22-SP15	●	1.5°	20	180	50	15.5	19	24		2
MMTIR2420AQ22-SP25	●	2.5°	20	180	50	15.5	19	24		2
MMTIR2420AQ22-SP35	●	3.5°	20	180	50	15.5	19	24	MMT22IR	2
MMTIR3025AR22-C	●	1.5°	25	200	38	17.8	23.4	30		4
MMTIR3832AS22-C	●	1.5°	32	250	48	21.8	30.4	38		4
MMTIR4640AT22-C	●	1.5°	40	300	60	26.2	38	46		4

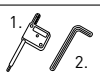
1/1

225 Vc

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

MMTI – INTERNAL THREADING

SPARE PARTS

Order number		 *		 1. * 2.		 1. 2.	
	Clamp bridge	Clamp screw	Stop ring	1. Shim screw 2. Embedded shim screw	Shim	Wrench	Type
MMTIR1316AK11-SP15	—	TS25	—	—	—	1.TKY08F	1
MMTIR1316AK11-SP25	—	TS25	—	—	—	1.TKY08F	1
MMTIR1316AK11-SP35	—	TS25	—	—	—	1.TKY08F	1
MMTIR1516AM11-SP15	—	TS25	—	—	—	1.TKY08F	1
MMTIR1516AM11-SP25	—	TS25	—	—	—	1.TKY08F	1
MMTIR1516AM11-SP35	—	TS25	—	—	—	1.TKY08F	1
MMTIR1916AM16-SP15	—	CS350860T	—	—	—	1.TKY15F	2
MMTIR1916AM16-SP25	—	CS350860T	—	—	—	1.TKY15F	2
MMTIR1916AM16-SP35	—	CS350860T	—	—	—	1.TKY15F	2
MMTIR2420AQ16-C	SETK51	SETS51	CR4	1.HFC03006 / 2.TFS03006	CTI32TP15	1.TKY15F / 2.HKY20R	3
MMTIR2925AS16-C	SETK51	SETS51	CR4	1.HFC03006 / 2.TFS03006	CTI32TP15	1.TKY15F / 2.HKY20R	3
MMTIR3732AS16-C	SETK51	SETS51	CR4	1.HFC03006 / 2.TFS03006	CTI32TP15	1.TKY15F / 2.HKY20R	4
MMTIR2420AQ22-SP15	—	TS43	—	—	—	1.TKY15F	2
MMTIR2420AQ22-SP25	—	TS43	—	—	—	1.TKY15F	2
MMTIR2420AQ22-SP35	—	TS43	—	—	—	1.TKY15F	2
MMTIR3025AR22-C	SETK61	SETS61	CR5	1.HFC04008 / 2.TFS03006	CTI43TP15	1.TKY20F / 2.HKY25R	4
MMTIR3832AS22-C	SETK61	SETS61	CR5	1.HFC04008 / 2.TFS03006	CTI43TP15	1.TKY20F / 2.HKY25R	4
MMTIR4640AT22-C	SETK61	SETS61	CR5	1.HFC04008 / 2.TFS03006	CTI43TP15	1.TKY20F / 2.HKY25R	4

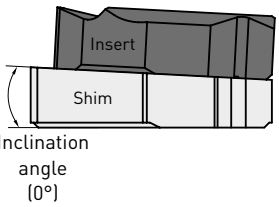
1. Select and use a shim as shown below (sold separately), dependant on the lead angle.
   • A screw-on tool holder uses no shim. (The holder body has a lead angle.) Use a tool holder with the appropriate lead angle.
   • Min. cutting diameter (DMIN) shows the internal hole diameter, not the thread diameter.

* Clamp Torque (N • m): TS25 = 1.0, CS350860T = 3.5, SETS51 = 3.5, TS43 = 3.5, SETS61 = 5.0, HFC03006 = 1.5, HFC04008 = 2.2

SHIM

Lead angle (α°)	Order number	Stock R	Inclination angle (0°)	Applicable holder
-1.5°	CTI32TN15	●	-3°	MMTIR ○○○○ ○○16-C
-0.5°	CTI32TN05	●	-2°	
0.5°	CTI32TP05	●	-1°	
1.5°	CTI32TP15	●	0°	
2.5°	CTI32TP25	●	1°	
3.5°	CTI32TP35	●	2°	
4.5°	CTI32TP45	●	3°	

Lead angle (α°)	Order number	Stock R	Inclination angle (0°)	Applicable holder
-1.5°	CTI43TN15	●	-3°	MMTIR ○○○○ ○○22-C
-0.5°	CTI43TN05	●	-2°	
0.5°	CTI43TP05	●	-1°	
1.5°	CTI43TP15	●	0°	
2.5°	CTI43TP25	●	1°	
3.5°	CTI43TP35	●	2°	
4.5°	CTI43TP45	●	3°	



Standard shim delivered with the holder.

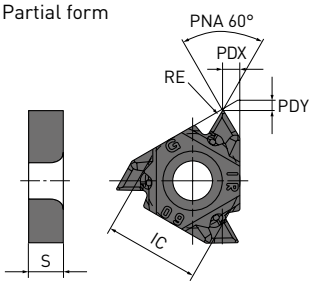
● : Inventory maintained. ★ : Inventory maintained in Japan.

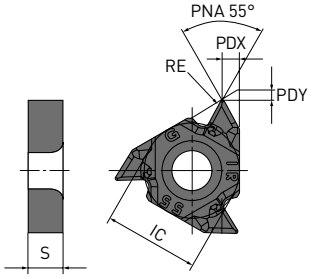
MMT

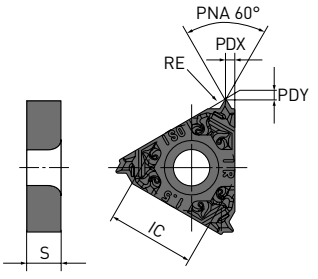
M-CLASS INSERTS WITH 3-D CHIPBREAKERS

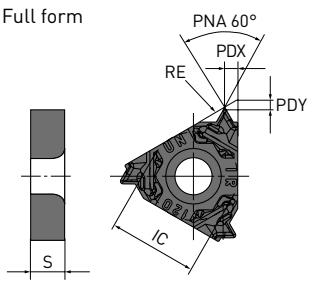
INSERTS

Order number	MP9025	VP15TF	VP20RT	Pitch mm	Thread / inch	IC	S	PDY	PDX	RE	Total cutting depth	Geometry
PARTIAL PROFILE 60°												
MMT11IRA60-S	●		●	0.5 – 1.5	48 – 16	6.35	3.04	0.8	0.9	0.03	—	Partial form
MMT16IRAG60-S	●	●	●	0.5 – 3.0	48 – 8	9.525	3.44	1.2	1.7	0.05	—	
MMT16IRA60-S	●		●	0.5 – 1.5	48 – 16	9.525	3.44	0.8	0.9	0.03	—	
MMT16IRG60-S	●		●	1.75 – 3.0	14 – 8	9.525	3.44	1.2	1.7	0.11	—	
PARTIAL PROFILE 55°												
MMT11IRA55-S	●		●		48 – 16	6.35	3.04	0.8	0.9	0.07	—	Partial form
MMT16IRAG55-S	●	●	●		48 – 8	9.525	3.44	1.2	1.7	0.07	—	
MMT16IRA55-S	●		●		48 – 16	9.525	3.44	0.8	0.9	0.07	—	
MMT16IRG55-S	●		●		14 – 8	9.525	3.44	1.2	1.7	0.21	—	
ISO METRIC												
MMT11IR100ISO-S	★		★	1.0		6.35	3.04	0.6	0.7	0.06	0.58	Full form
MMT11IR125ISO-S	★		★	1.25		6.35	3.04	0.8	0.9	0.08	0.72	
MMT11IR150ISO-S	★		★	1.5		6.35	3.04	0.8	1.0	0.10	0.87	
MMT16IR100ISO-S	●			1.0		9.525	3.44	0.6	0.7	0.06	0.58	
MMT16IR125ISO-S	●			1.25		9.525	3.44	0.8	0.9	0.08	0.72	
MMT16IR150ISO-S	●			1.5		9.525	3.44	0.8	1.0	0.10	0.87	
MMT16IR175ISO-S	●			1.75		9.525	3.44	0.9	1.2	0.11	1.01	
MMT16IR200ISO-S	●			2.0		9.525	3.44	1.0	1.3	0.13	1.15	
MMT16IR250ISO-S	●			2.5		9.525	3.44	1.1	1.5	0.17	1.44	
MMT16IR300ISO-S	●			3.0		9.525	3.44	1.1	1.5	0.20	1.73	
AMERICAN UN												
MMT16IR160UN-S	★		★		16	9.525	3.44	0.9	1.1	0.11	0.92	Full form
MMT16IR140UN-S	★		★		14	9.525	3.44	0.9	1.2	0.12	1.05	
MMT16IR120UN-S	★		★		12	9.525	3.44	1.1	1.4	0.14	1.22	









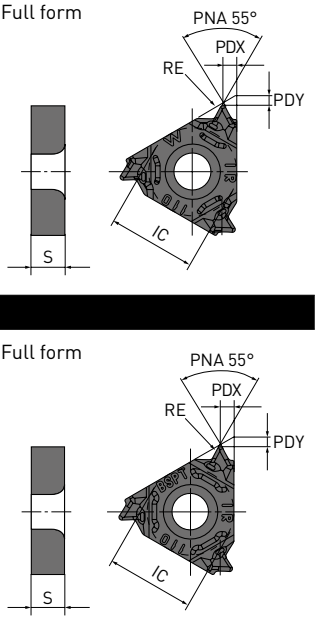
1/2

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

MMT – M-CLASS INSERTS WITH 3-D CHIPBREAKERS

INSERTS

Order number	MP9025	VP15TF	VP20RT	Pitch mm	Thread / inch	IC	S	PDY	PDX	RE	Total cutting depth	Geometry
WHITWORTH FOR BSW, BSP												
MMT16IR190W-S	●		●		19	9.525	3.44	0.8	1.0	0.18	0.86	Full form
MMT16IR140W-S	●		●		14	9.525	3.44	1.0	1.2	0.25	1.16	
MMT16IR110W-S	●		●		11	9.525	3.44	1.1	1.5	0.32	1.48	
BSPT												
MMT16IR190BSPT-S	★		★		19	9.525	3.44	0.8	0.9	0.18	0.86	Full form
MMT16IR140BSPT-S	★		★		14	9.525	3.44	1.0	1.2	0.25	1.16	
MMT16IR110BSPT-S	★		★		11	9.525	3.44	1.1	1.5	0.32	1.48	



(5 inserts per case)

225 Vc

1. Identification: Please see page 216 (M-Class).

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

MMTI BORING BARS

RECOMMENDED CUTTING CONDITIONS

INTERNAL THREADING

	Material	Hardness	Grade	Vc
P	Mild steel	≤180HB	MP9025	80 (60–100)
			VP10MF	150 (70–230)
			VP15TF	100 (60–140)
			VP20RT	80 (60–100)
	Carbon steel Alloy steel	180 – 280HB	MP9025	80 (60–100)
			VP10MF	140 (80–200)
			VP15TF	100 (60–140)
			VP20RT	80 (60–100)
M	Stainless steel	≤200HB	MP9025	80 (40–120)
			VP15TF	80 (40–120)
			VP20RT	80 (40–120)
K	Gray cast iron	Tensile Strength ≤350MPa	VP10MF	140 (80–200)
			VP15TF	90 (60–120)
S	Heat-resistant alloy	—	MP9025	30 (20– 40)
			VP10MF	45 (15– 70)
			VP15TF	30 (20– 40)
			VP20RT	30 (20– 40)
	Titanium alloy	—	MP9025	45 (25– 65)
			VP10MF	60 (40– 80)
			VP15TF	45 (25– 65)
			VP20RT	45 (25– 65)
H	Heat-treated alloy	45 – 55HRC	VP10MF	50 (30– 70)
			VP15TF	40 (20– 60)

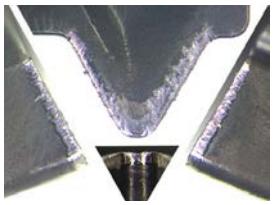
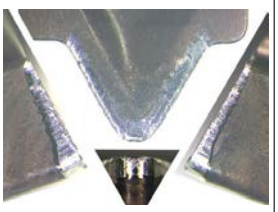
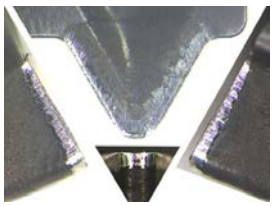
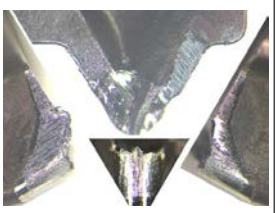
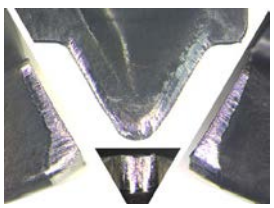
1/1

CUTTING PERFORMANCE

INCONEL®718 – COMPARISON OF WEAR BY MACHINING LENGTH

When threading heat resistant alloys, compound damage such as wear and plastic deformation was reduced and achieved excellent wear resistance.

Workpiece	Inconel®718
Insert	ISO Metric 60°
Vc (m/min)	30
Pitch (mm)	1.5
Depth of cut	Total 12 passes, total depth of cut 0.92 mm, ap = 0.1 mm x 3 passes, 0.08 mm x 4 passes, 0.06 mm x 5 passes
Cutting mode	Wet cutting

Cutting length (m)	MP9025	Conventional A	Conventional B	Conventional C
20				
25				Not machinable
35				

ALIMASTER

HIGH EFFICIENCY MACHINING OF ALUMINIUM ALLOYS

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B118

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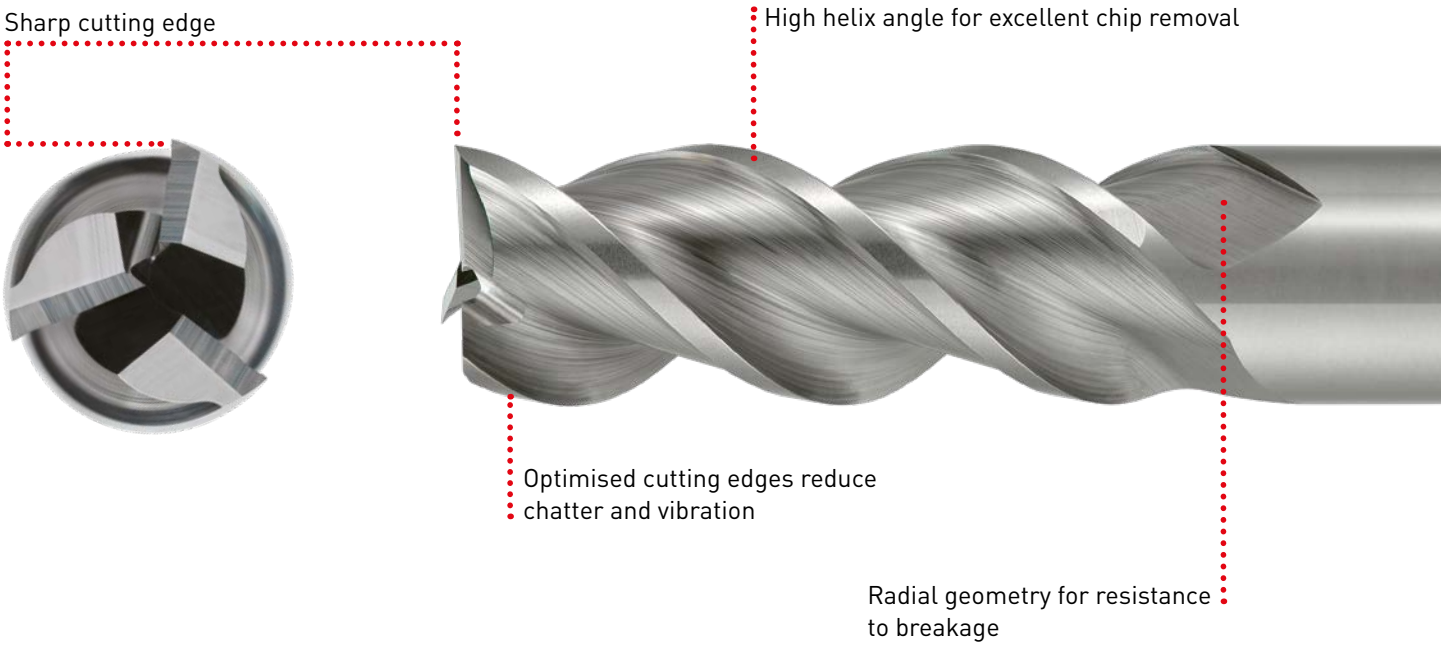
DIA EDGE

NEW

C - AL / DLC - AL

EXCELLENT SHARPNESS FOR STABLE MACHINING

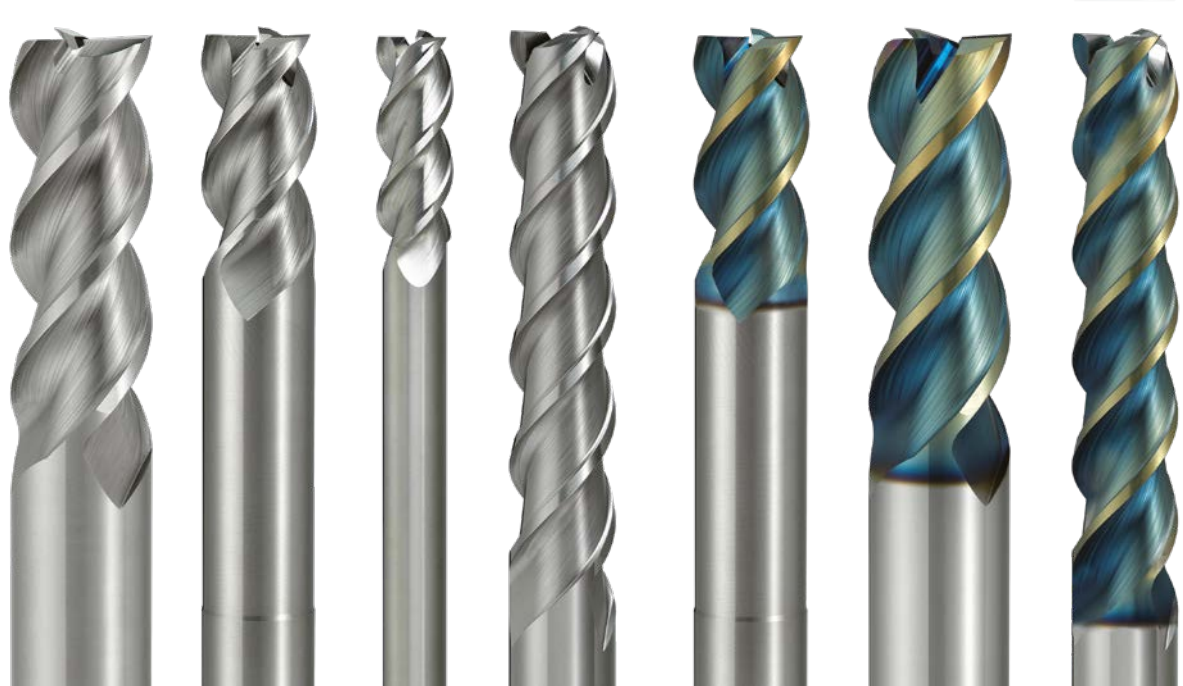
Superior cutting edge quality and excellent chip evacuation suppresses vibrations and chatter to enable stable machining of non-ferrous materials.



A WIDE VARIETY OF SIZES

A versatile choice of end mills:

- 2 and 3 flutes
- Standard length and long flutes
- Slim shank type
- DLC coated and uncoated carbide grades



NEW

C2MAL / C3MAL

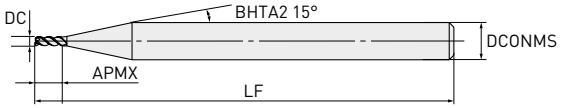
END MILL, MEDIUM CUT LENGTH, 2 AND 3 FLUTE, FOR ALUMINIUM ALLOYS

N

Slim shank type

1

2



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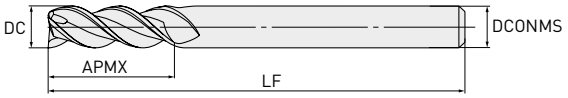

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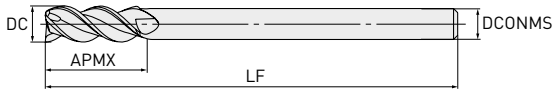


	DC		
	0 -0.02		
h6	DCONMS 4, 6	DCONMS 8, 10	DCONMS 12
	0 -0.008	0 -0.009	0 -0.011

- Flute length is DC x 2.5.
- The cutting edge suppresses chatter and vibration resulting in superior component surface finishes.

Order number	Stock	DC	APMX	LF	DCONMS	ZEFP	Type
C2MALD0100	●	1	2.5	45	4	2	1
C2MALD0150	●	1.5	3.7	45	4	2	1
C2MALD0200	●	2	5	45	4	2	1
C2MALD0250	●	2.5	6.3	45	4	2	1
C3MALD0100	●	1	2.5	45	4	3	2
C3MALD0150	●	1.5	3.7	45	4	3	2
C3MALD0200	●	2	5	45	4	3	2
C3MALD0250	●	2.5	6.3	45	4	3	2
C3MALD0300	●	3	7.5	50	6	3	2
C3MALD0400	●	4	10	50	6	3	2
C3MALD0500	●	5	12.5	55	6	3	2
C3MALD0600	●	6	15	55	6	3	3
C3MALD0800	●	8	20	70	8	3	3
C3MALD1000	●	10	25	75	10	3	3
C3MALD1200	●	12	30	80	12	3	3

1/2

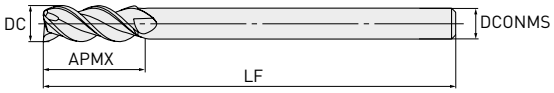
232 / 233

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

NEW

C2MAL / C3MAL – END MILL, MEDIUM CUT LENGTH, 2 AND 3 FLUTE, FOR ALUMINIUM ALLOYS

4



SLIM SHANK TYPE

Order number	Stock	DC	APMX	LF	DCONMS	ZEFP	Type
C3MALD0700S06	●	7	17.5	80	6	3	4
C3MALD0800S06	●	8	20	110	6	3	4
C3MALD0900S08	●	9	22.5	110	8	3	4
C3MALD1000S08	●	10	25	130	8	3	4
C3MALD1100S10	●	11	28	130	10	3	4
C3MALD1200S10	●	12	30	150	10	3	4

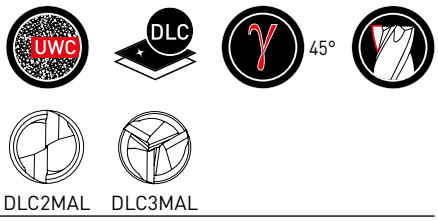
2/2

239 Vc

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

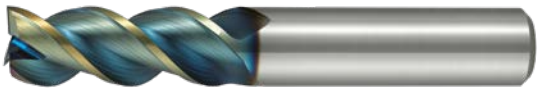
NEW

DLC2MAL/ DLC3MAL



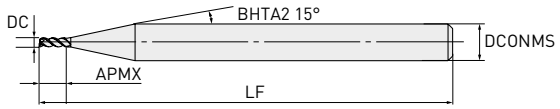
END MILL, MEDIUM CUT LENGTH, 2 AND 3 FLUTE, FOR ALUMINIUM ALLOYS

N



1

2



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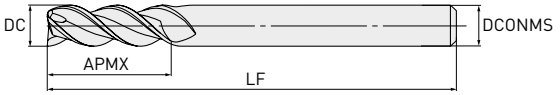


DC		
0 -0.02		
DCONMS 4, 6	DCONMS 8, 10	DCONMS 12
0 -0.008	0 -0.009	0 -0.011

- The cutting edge suppresses chatter and vibration, resulting in superior component surface finishes.
- DLC coating provides extreme resistance to welding.

Order number	Stock	DC	APMX	LF	DCONMS	ZEFP	Type
DLC2MALD0100	●	1	2.5	45	4	2	1
DLC2MALD0150	●	1.5	3.7	45	4	2	1
DLC2MALD0200	●	2	5	45	4	2	1
DLC2MALD0250	●	2.5	6.3	45	4	2	1
DLC3MALD0100	●	1	2.5	45	4	3	2
DLC3MALD0150	●	1.5	3.7	45	4	3	2
DLC3MALD0200	●	2	5	45	4	3	2
DLC3MALD0250	●	2.5	6.3	45	4	3	2
DLC3MALD0300	●	3	7.5	50	6	3	2
DLC3MALD0400	●	4	10	50	6	3	2
DLC3MALD0500	●	5	12.5	55	6	3	2
DLC3MALD0600	●	6	15	55	6	3	3
DLC3MALD0800	●	8	20	70	8	3	3
DLC3MALD1000	●	10	25	75	10	3	3
DLC3MALD1200	●	12	30	80	12	3	3

1/1

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

NEW

C2MAL / DLC2MAL

RECOMMENDED CUTTING CONDITIONS

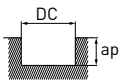
SIDE MILLING

	Material	DC	Vc	n	f	ap	ae
N	Aluminium alloy A1000 Series, A2000 – A7000 Series	1	60	20000	440	1.5	0.2
		1.5	90	20000	550	2.3	0.3
		2	130	20000	660	3	0.4
		2.5	160	20000	770	3.8	0.5
	Aluminium alloy castings	1	60	20000	440	1.5	0.2
		1.5	90	20000	550	2.3	0.3
		2	130	20000	660	3	0.4
		2.5	160	20000	770	3.8	0.5
	Copper, Copper alloy, Resin material	1	50	17000	320	2	0.2
		1.5	60	13300	400	3	0.3
		2	60	9900	320	4	0.4
		2.5	50	6600	440	5	0.5

1/1

SLOT MILLING

	Material	DC	Vc	n	f	ap
N	Aluminium alloy A1000 Series, A2000 – A7000 Series	1	60	20000	330	1
		1.5	90	20000	440	1.5
		2	130	20000	440	2
		2.5	160	20000	550	2.5
	Aluminium alloy castings	1	60	20000	330	1
		1.5	90	20000	440	1.5
		2	130	20000	440	2
		2.5	160	20000	550	2.5
	Copper, Copper alloy, Resin material	1	50	17000	420	1
		1.5	60	13300	480	1.5
		2	60	9900	420	2
		2.5	50	6600	480	2.5



1/1

1. If the rigidity of the machine or the workpiece materials installation is very low, or chattering and noise are generated, adjust the speed and feed rate proportionally.
2. For side milling, down (climb) milling is recommended.
3. Water-soluble cutting fluid is recommended.
4. DLC coating is the first recommendation for resin materials. If the surface quality or tool life is reduced, use a non-coated product.

NEW

C3MAL / DLC3MAL

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

	Material	DC	Vc	n	f	ap	ae
N	Aluminium alloy A1000 Series	1	60	20000	1320	2.5	0.3
		1.5	90	20000	1650	3.8	0.5
		2	130	20000	1980	5	0.6
		2.5	160	20000	2100	6.3	0.8
		3	190	20000	2200	7.5	0.9
		4	250	20000	2420	10	1.2
		5	300	19000	2420	12.5	1.5
		6	300	16000	2420	15	1.8
		8	300	12000	2420	20	2.4
		9	300	10600	2420	22.5	2.7
		10	300	9500	2420	25	3
		12	300	8000	2640	30	3.6
	Aluminium alloy A2000 – A7000 Series	1	60	20000	1320	2.5	0.3
		1.5	90	20000	1650	3.8	0.5
		2	130	20000	1980	5	0.6
		2.5	160	20000	2100	6.3	0.8
		3	190	20000	2200	7.5	0.9
		4	250	20000	2420	10	1.2
		5	310	20000	2970	12.5	1.5
		6	330	17500	3300	15	1.8
		8	330	13000	3300	20	2.4
		9	330	11700	3450	22.5	2.7
		10	330	10500	3580	25	3
		12	330	9000	3580	30	3.6

1. If the rigidity of the machine or the workpiece materials installation is very low, or chattering and noise are generated, adjust the speed and feed rate proportionally.
2. For side milling, down (climb) milling is recommended.
3. Water-soluble cutting fluid is recommended.
4. DLC coating is the first recommendation for resin materials. If the surface quality or tool life is reduced, use a non-coated product.

NEW

C3MAL / DLC3MAL

SIDE MILLING

	Material	DC	Vc	n	f	ap	ae
N	Aluminium alloy castings	1	60	20000	1320	2.5	0.3
		1.5	90	20000	1650	3.8	0.5
		2	130	20000	1980	5	0.6
		2.5	160	20000	2100	6.3	0.8
		3	190	20000	2200	7.5	0.9
		4	250	20000	2420	10	1.2
		5	250	16000	2420	12.5	1.5
		6	250	13500	2420	15	1.8
		8	250	10000	2530	20	2.4
		9	250	8900	2640	22.5	2.7
		10	250	8000	2750	25	3
		12	250	6500	2860	30	3.6
	Copper, Copper alloy, Resin material	1	60	20000	960	2.5	0.3
		1.5	90	20000	1200	3.8	0.5
		2	120	19100	960	5	0.6
		2.5	120	15300	1200	6.3	0.8
		3	120	12800	960	7.5	0.9
		4	120	9600	1020	10	1.2
		5	120	7700	1080	12.5	1.5
		6	120	6400	1160	15	1.8
		8	120	4800	1300	20	2.4
		9	120	4250	1300	22.5	2.7
		10	120	3840	1420	25	3
		12	120	3200	1550	30	3.6

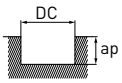
1. If the rigidity of the machine or the workpiece materials installation is very low, or chattering and noise are generated, adjust the speed and feed rate proportionally.
2. For side milling, down (climb) milling is recommended.
3. Water-soluble cutting fluid is recommended.
4. DLC coating is the first recommendation for resin materials. If the surface quality or tool life is reduced, use a non-coated product.

NEW

C3MAL / DLC3MAL

SLOT MILLING

	Material	DC	Vc	n	f	ap
N	Aluminium alloy A1000 Series	1	60	20000	550	1
		1.5	90	20000	660	1.5
		2	130	20000	770	2
		2.5	160	20000	930	2.5
		3	190	20000	1100	3
		4	220	17500	1210	4
		5	220	14000	1210	5
		6	220	11500	1210	6
		8	220	9000	1320	8
		9	220	7800	1370	9
		10	220	7000	1430	10
		12	220	6000	1540	12
	Aluminium alloy A2000 – A7000 Series	1	60	20000	550	1
		1.5	90	20000	660	1.5
		2	130	20000	770	2
		2.5	160	20000	930	2.5
		3	190	20000	1100	3
		4	240	19000	1210	4
		5	240	15500	1320	5
		6	240	12500	1430	6
		8	240	9500	1540	8
		9	240	8500	1600	9
		10	240	7500	1650	10
		12	240	6500	1760	12



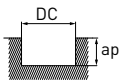
1. If the rigidity of the machine or the workpiece materials installation is very low, or chattering and noise are generated, adjust the speed and feed rate proportionally.
2. Water-soluble cutting fluid is recommended.
3. DLC coating is the first recommendation for resin materials. If the surface quality or tool life is reduced, use a non-coated product.

NEW

C3MAL / DLC3MAL

SLOT MILLING

Material	DC	Vc	n	f	ap
Aluminium alloy castings	1	60	20000	550	1
	1.5	90	20000	660	1.5
	2	130	20000	770	2
	2.5	160	20000	860	2.5
	3	160	17000	940	3
	4	160	13000	940	4
	5	160	10000	940	5
	6	160	8500	940	6
	8	160	6500	940	8
	9	160	5700	940	9
	10	160	5000	990	10
	12	160	4000	1100	12
Copper, Copper alloy, Resin material	1	60	20000	700	1
	1.5	90	20000	720	1.5
	2	120	19100	730	2
	2.5	120	15300	750	2.5
	3	120	12800	770	3
	4	120	9600	820	4
	5	120	7700	870	5
	6	120	6400	930	6
	8	120	4800	1040	8
	9	120	4200	1100	9
	10	120	3800	1140	10
	12	120	3200	1250	12



1. If the rigidity of the machine or the workpiece materials installation is very low, or chattering and noise are generated, adjust the speed and feed rate proportionally.
2. Water-soluble cutting fluid is recommended.
3. DLC coating is the first recommendation for resin materials. If the surface quality or tool life is reduced, use a non-coated product.

NEW

C3MAL / DLC3MAL

PLUNGING

	Material	DC	Vc	n	f
N	Aluminium alloy A1000 Series	1	60	20000	110
		1.5	90	20000	140
		2	130	20000	170
		2.5	160	20000	170
		3	190	20000	170
		4	220	17500	170
		5	220	14000	170
		6	220	11500	170
		8	220	9000	110
		9	220	7800	110
		10	220	7000	80
		12	220	6000	80
	Aluminium alloy A2000 – A7000 Series	1	60	20000	110
		1.5	90	20000	140
		2	130	20000	170
		2.5	160	20000	170
		3	190	20000	170
		4	240	19000	220
		5	240	15500	220
		6	240	12500	220
		8	240	9500	220
		9	240	8500	220
		10	240	7500	170
		12	240	6500	170

1. If the rigidity of the machine or the workpiece materials installation is very low, or chattering and noise are generated, adjust the speed and feed rate proportionally.
2. Water-soluble cutting fluid is recommended.
3. DLC coating is the first recommendation for resin materials. If the surface quality or tool life is reduced, use a non-coated product.

NEW

C3MAL / DLC3MAL

PLUNGING

	Material	DC	Vc	n	f
N	Aluminium alloy castings	1	60	20000	90
		1.5	90	20000	120
		2	130	20000	140
		2.5	160	20000	140
		3	160	17000	140
		4	160	13000	110
		5	160	10000	90
		6	160	8500	90
		8	160	6500	70
		9	160	5700	70
		10	160	5000	60
		12	160	4000	60
	Copper, Copper alloy, Resin material	1	50	15900	80
		1.5	50	10600	80
		2	50	8000	80
		2.5	50	6400	90
		3	50	5300	100
		4	50	4000	100
		5	50	3200	100
		6	50	2700	110
		8	50	2000	120
		9	50	1800	120
		10	50	1600	120
		12	50	1300	120

1. If the rigidity of the machine or the workpiece materials installation is very low, or chattering and noise are generated, adjust the speed and feed rate proportionally.
2. Water-soluble cutting fluid is recommended.
3. DLC coating is the first recommendation for resin materials. If the surface quality or tool life is reduced, use a non-coated product.

NEW

C3MAL - SLIM SHANK TYPE

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

	Material	DC	Vc	n	f	ap	ae
N	Aluminium alloy A1000 Series	7	250	11400	1550	7	0.7
		8	250	10000	1980	8	0.8
		9	250	8800	1980	9	0.9
		10	250	8000	2090	10	1
		11	250	7200	2090	11	1.1
		12	250	6600	1870	12	1.2
	Aluminium alloy A2000 – A7000 Series	7	300	13600	2090	7	0.7
		8	300	12000	2750	8	0.8
		9	300	10600	2750	9	0.9
		10	300	9500	2750	10	1
		11	300	8700	2750	11	1.1
		12	300	7900	3080	12	1.2
	Aluminium alloy castings	7	200	9100	1210	7	0.7
		8	200	8000	1650	8	0.8
		9	200	7100	1650	9	0.9
		10	200	6300	1870	10	1
		11	200	5800	1870	11	1.1
		12	200	5300	1760	12	1.2
	Copper, Copper alloy, Resin material	7	150	6800	1000	7	0.7
		8	150	6000	1070	8	0.8
		9	150	5300	1070	9	0.9
		10	150	4800	1000	10	1
		11	150	4300	870	11	1.1
		12	150	4000	960	12	1.2

1/1

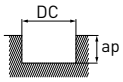
1. If the rigidity of the machine or the workpiece materials installation is very low, or chattering and noise are generated, adjust the speed and feed rate proportionally.
2. These recommended conditions are calculated based on a tool overhang of 4 x DC. If a longer overhang is required, please adjust the cutting conditions by referring to the values on page 240.
3. For side milling, down (climb) milling is recommended.
4. Water-soluble cutting fluid is recommended.

NEW

C3MAL – SLIM SHANK TYPE

SLOT MILLING

	Material	DC	Vc	n	f	ap
N	Aluminium alloy A1000 Series	7	250	11400	1100	0.7
		8	250	10000	1490	1.6
		9	250	8800	1490	1.8
		10	250	8000	1600	3
		11	250	7200	1600	3.3
		12	250	6600	1540	3.6
	Aluminium alloy A2000 – A7000 Series	7	300	13600	1540	0.7
		8	300	12000	2200	1.6
		9	300	10600	2200	1.8
		10	300	9500	2040	3
		11	300	8700	2040	3.3
		12	300	7900	1930	3.6
	Aluminium alloy castings	7	200	9100	990	0.7
		8	200	8000	1320	1.6
		9	200	7100	1320	1.8
		10	200	6300	1320	3
		11	200	5800	1320	3.3
		12	200	5300	1320	3.6
	Copper, Copper alloy, Resin material	7	80	3600	430	0.7
		8	80	3200	480	1.6
		9	80	2800	430	1.8
		10	100	3200	760	3
		11	100	2900	700	3.3
		12	100	2700	640	3.6



1/1

1. If the rigidity of the machine or the workpiece materials installation is very low, or chattering and noise are generated, adjust the speed and feed rate proportionally.
2. These recommended conditions are calculated based on a tool overhang of 4 x DC. If a longer overhang is required, please adjust the cutting conditions by referring to the values in the following table.
3. Water-soluble cutting fluid is recommended.

Overhang	Revolutions	f		ap	
		Side milling	Slot milling	Side milling	Slot milling
5D	70 %	70 %	70 %	ap 1D x ae 0.05D	60 %
6D	50 %	50 %	50 %	ap 1D x ae 0.03D	40 %
7D	30 %	30 %	30 %	ap 1D x ae 0.015D	20 %

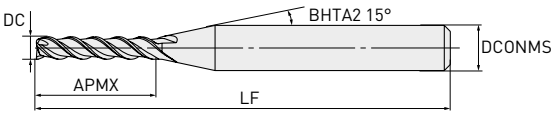
NEW

C3SXAL

END MILL, LONG CUT LENGTH, 3 FLUTE, FOR ALUMINIUM ALLOYS

N

1



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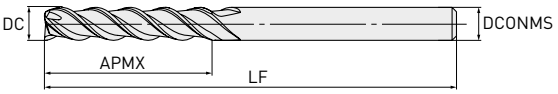


DC
0 -0.02

DCONMS 6	DCONMS 8, 10	DCONMS 12
0 -0.008	0 -0.009	0 -0.011

- The cutting edge suppresses chatter and vibration, resulting in superior component surface finishes.
- The flute length is DC x 5.

Order number	Stock	DC	APMX	LF	DCONMS	ZEFP	Type
C3SXALD0300	●	3	15	55	6	3	1
C3SXALD0400	●	4	20	60	6	3	1
C3SXALD0500	●	5	25	65	6	3	1
C3SXALD0600	●	6	30	75	6	3	2
C3SXALD0800	●	8	40	90	8	3	2
C3SXALD1000	●	10	50	100	10	3	2
C3SXALD1200	●	12	60	110	12	3	2

1/1

243 Vc

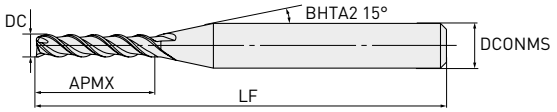
NEW

DLC3SXAL

END MILL, LONG CUT LENGTH, 3 FLUTE, FOR ALUMINIUM ALLOYS

N

1



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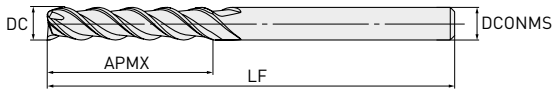


DC
0 -0.02

DCONMS 6	DCONMS 8, 10	DCONMS 12
0 -0.008	0 -0.009	0 -0.011

- With a long neck geometry DC x 3 and DC x 5.
- DLC coating provides extreme resistance to welding.

Order number	Stock	DC	APMX	LF	DCONMS	ZEFP	Type
DLC3SXALD0300	●	3	15	55	6	3	1
DLC3SXALD0400	●	4	20	60	6	3	1
DLC3SXALD0500	●	5	25	65	6	3	1
DLC3SXALD0600	●	6	30	75	6	3	2
DLC3SXALD0800	●	8	40	90	8	3	2
DLC3SXALD1000	●	10	50	100	10	3	2
DLC3SXALD1200	●	12	60	110	12	3	2

1/1

243 Vc

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

NEW

C3SXAL / DLC3SXAL

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

	Material	DC	Vc	n	f	ap	ae
N	Aluminium alloy A1000 Series	3	160	17000	680	15	0.3
		4	160	12700	750	20	0.4
		5	160	10000	980	25	0.5
		6	160	8500	980	30	0.6
		8	160	6400	980	40	0.8
		10	160	5100	1050	50	1
		12	160	4300	1300	60	1.2
	Aluminium alloy A2000 – A7000 Series	3	190	20000	680	15	0.3
		4	230	18000	1050	20	0.4
		5	230	14600	1050	25	0.5
		6	230	12000	1200	30	0.6
		8	230	9100	1350	40	0.8
		10	230	7300	1500	50	1
		12	230	6100	1650	60	1.2
	Aluminium alloy castings	3	120	12700	600	15	0.3
		4	120	9600	600	20	0.4
		5	120	7600	600	25	0.5
		6	120	6400	600	30	0.6
		8	120	4800	750	40	0.8
		10	120	3800	830	50	1
		12	120	3200	900	60	1.2
	Copper, Copper alloy, Resin material	3	50	5300	100	15	0.3
		4	50	4000	100	20	0.4
		5	50	3200	100	25	0.5
		6	50	2600	110	30	0.6
		8	50	2000	120	40	0.8
		10	50	1600	120	50	1
		12	50	1300	120	60	1.2

1/1

1. If the rigidity of the machine or the workpiece materials installation is very low, or chattering and noise are generated, adjust the speed and feed rate proportionally.
2. For side milling, down (climb) milling is recommended.
3. Water-soluble cutting fluid is recommended.
4. DLC coating is the first recommendation for resin materials. If the surface quality or tool life is reduced, use a non-coated product.

NEW

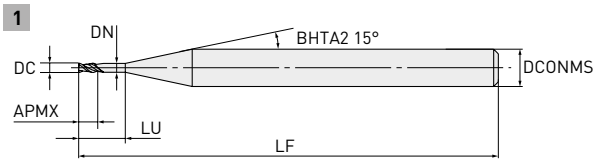
C2XLAL / C3XLAL

UWC · 45° · C2XLAL · C3XLAL

END MILL, LONG NECK, 2 AND 3 FLUTE, FOR ALUMINIUM ALLOYS

N

1



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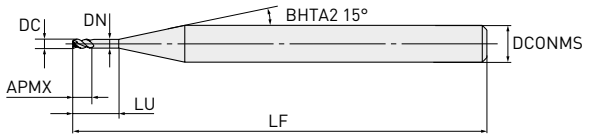

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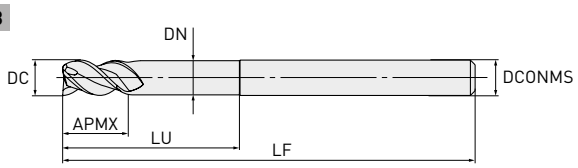


DC
0 -0.02

h6

DCONMS 4, 6	DCONMS 8, 10	DCONMS 12
0 -0.008	0 -0.009	0 -0.011

- The cutting edge suppresses chatter and vibration resulting in superior component surface finishes.
- With a long neck geometry DC x 3 and DC x 5.

Order number	Stock	DC	APMX	LU	DN	LF	DCONMS	ZEFP	Type
C2XLALD0100N030	●	1	1.5	3	0.95	45	4	2	1
C2XLALD0100N050	●	1	1.5	5	0.95	45	4	2	1
C2XLALD0150N045	●	1.5	2.3	4.5	1.45	45	4	2	1
C2XLALD0150N080	●	1.5	2.3	8	1.45	45	4	2	1
C2XLALD0200N060	●	2	3	6	1.94	45	4	2	1
C2XLALD0200N100	●	2	3	10	1.94	45	4	2	1
C2XLALD0250N075	●	2.5	3.8	7.5	2.4	45	4	2	1
C2XLALD0250N125	●	2.5	3.8	12.5	2.4	45	4	2	1
C3XLALD0100N030	●	1	1.5	3	0.95	45	4	3	2
C3XLALD0100N050	●	1	1.5	5	0.95	45	4	3	2
C3XLALD0150N045	●	1.5	2.3	4.5	1.45	45	4	3	2
C3XLALD0150N080	●	1.5	2.3	8	1.45	45	4	3	2
C3XLALD0200N060	●	2	3	6	1.94	45	4	3	2
C3XLALD0200N100	●	2	3	10	1.94	45	4	3	2
C3XLALD0250N075	●	2.5	3.8	7.5	2.4	45	4	3	2
C3XLALD0250N125	●	2.5	3.8	12.5	2.4	45	4	3	2
C3XLALD0300N090	●	3	4.5	9	2.85	55	6	3	2

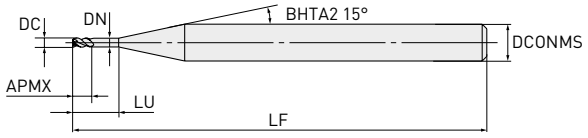
1/2

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

NEW

C2XLAL / C3XLAL – END MILL, LONG NECK, 2 AND 3 FLUTE, FOR ALUMINIUM ALLOYS

2



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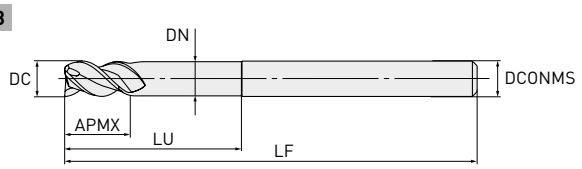


Order number	Stock	DC	APMX	LU	DN	LF	DCONMS	ZEFP	Type
C3XLALD0300N150	●	3	4.5	15	2.85	55	6	3	2
C3XLALD0400N120	●	4	6	12	3.8	60	6	3	2
C3XLALD0400N200	●	4	6	20	3.8	60	6	3	2
C3XLALD0500N150	●	5	7.5	15	4.8	65	6	3	2
C3XLALD0500N250	●	5	7.5	25	4.8	65	6	3	2
C3XLALD0600N180	●	6	9	18	5.8	70	6	3	3
C3XLALD0600N300	●	6	9	30	5.8	70	6	3	3
C3XLALD0700N210	●	7	10.5	21	6.8	75	8	3	2
C3XLALD0700N350	●	7	10.5	35	6.8	75	8	3	2
C3XLALD0800N240	●	8	12	24	7.8	80	8	3	3
C3XLALD0800N400	●	8	12	40	7.8	80	8	3	3
C3XLALD0900N270	●	9	13.5	27	8.8	85	10	3	2
C3XLALD0900N450	●	9	13.5	45	8.8	85	10	3	2
C3XLALD1000N300	●	10	15	30	9.8	90	10	3	3
C3XLALD1000N500	●	10	15	50	9.8	90	10	3	3
C3XLALD1100N330	●	11	16.5	33	10.8	95	12	3	2
C3XLALD1100N550	●	11	16.5	55	10.8	95	12	3	2
C3XLALD1200N360	●	12	18	36	11.8	100	12	3	3
C3XLALD1200N600	●	12	18	60	11.8	100	12	3	3

248 Vc

NEW

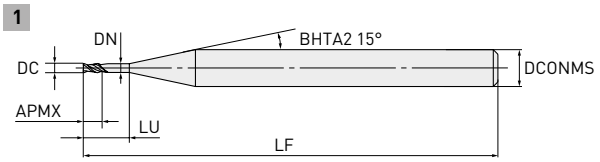
DLC2XLAL / DLC3XLAL

DLC2XLAL DLC3XLAL

END MILL, LONG NECK, 2 AND 3 FLUTE, FOR ALUMINIUM ALLOYS

N

1



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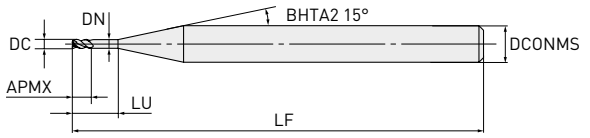

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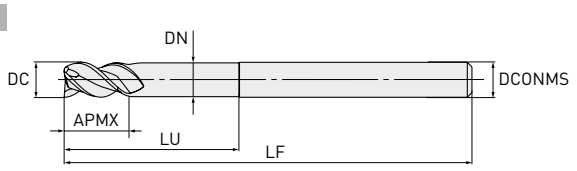


DC
0 -0.02

DCONMS 4, 6	DCONMS 8, 10	DCONMS 12
0 -0.008	0 -0.009	0 -0.011

- With a long neck geometry DC x 3 and DC x 5.
- DLC coating provides extreme resistance to welding.

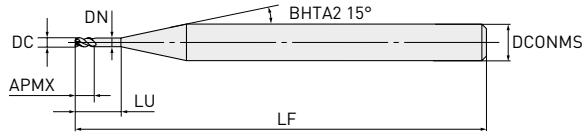
Order number	Stock	DC	APMX	LU	DN	LF	DCONMS	ZEFP	Type
DLC2XLALD0100N030	●	1	1.5	3	0.95	45	4	2	1
DLC2XLALD0100N050	●	1	1.5	5	0.95	45	4	2	1
DLC2XLALD0150N045	●	1.5	2.3	4.5	1.45	45	4	2	1
DLC2XLALD0150N080	●	1.5	2.3	8	1.45	45	4	2	1
DLC2XLALD0200N060	●	2	3	6	1.94	45	4	2	1
DLC2XLALD0200N100	●	2	3	10	1.94	45	4	2	1
DLC2XLALD0250N075	●	2.5	3.8	7.5	2.4	45	4	2	1
DLC2XLALD0250N125	●	2.5	3.8	12.5	2.4	45	4	2	1
DLC3XLALD0100N030	●	1	1.5	3	0.95	45	4	3	2
DLC3XLALD0100N050	●	1	1.5	5	0.95	45	4	3	2
DLC3XLALD0150N045	●	1.5	2.3	4.5	1.45	45	4	3	2
DLC3XLALD0150N080	●	1.5	2.3	8	1.45	45	4	3	2
DLC3XLALD0200N060	●	2	3	6	1.94	45	4	3	2
DLC3XLALD0200N100	●	2	3	10	1.94	45	4	3	2

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

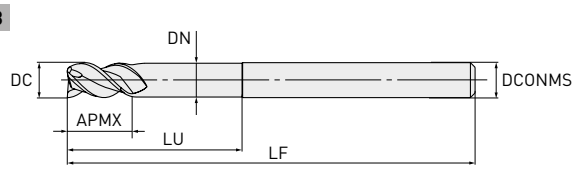
NEW

DLC2XLAL / DLC3XLAL – END MILL, LONG NECK, 2 AND 3 FLUTE, FOR ALUMINIUM ALLOYS

2



3



Order number	Stock	DC	APMX	LU	DN	LF	DCONMS	ZEFP	Type
DLC3XLALD0250N075	●	2.5	3.8	7.5	2.4	45	4	3	2
DLC3XLALD0250N125	●	2.5	3.8	12.5	2.4	45	4	3	2
DLC3XLALD0300N090	●	3	4.5	9	2.85	55	6	3	2
DLC3XLALD0300N150	●	3	4.5	15	2.85	55	6	3	2
DLC3XLALD0400N120	●	4	6	12	3.8	60	6	3	2
DLC3XLALD0400N200	●	4	6	20	3.8	60	6	3	2
DLC3XLALD0500N150	●	5	7.5	15	4.8	65	6	3	2
DLC3XLALD0500N250	●	5	7.5	25	4.8	65	6	3	2
DLC3XLALD0600N180	●	6	9	18	5.8	70	6	3	3
DLC3XLALD0600N300	●	6	9	30	5.8	70	6	3	3
DLC3XLALD0800N240	●	8	12	24	7.8	80	8	3	3
DLC3XLALD0800N400	●	8	12	40	7.8	80	8	3	3
DLC3XLALD0900N270	●	9	13.5	27	8.8	85	10	3	2
DLC3XLALD0900N450	●	9	13.5	45	8.8	85	10	3	2
DLC3XLALD1000N300	●	10	15	30	9.8	90	10	3	3
DLC3XLALD1000N500	●	10	15	50	9.8	90	10	3	3
DLC3XLALD1100N330	●	11	16.5	33	10.8	95	12	3	2
DLC3XLALD1100N550	●	11	16.5	55	10.8	95	12	3	2
DLC3XLALD1200N360	●	12	18	36	11.8	100	12	3	3
DLC3XLALD1200N600	●	12	18	60	11.8	100	12	3	3

251 Vc

NEW

C2XLAL / DLC2XLAL

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

	Material	DC	LU	Vc	n	f	ap	ae
N	Aluminium alloy A1000 Series, A2000 – A7000 Series	1	3	60	20000	800	1	0.3
		1	5	50	16000	660	1	0.3
		1.5	4.5	90	20000	800	1.5	0.45
		1.5	8	80	16000	660	1.5	0.45
		2	6	130	20000	1100	2	0.6
		2	10	100	16000	880	2	0.6
		2.5	7.5	160	20000	1100	2.5	0.75
		2.5	12.5	130	16000	880	2.5	0.75
N	Aluminium alloy castings	1	3	60	20000	800	1	0.3
		1	5	50	16000	660	1	0.3
		1.5	4.5	90	20000	800	1.5	0.45
		1.5	8	80	16000	660	1.5	0.45
		2	6	130	20000	1100	2	0.6
		2	10	100	16000	880	2	0.6
		2.5	7.5	160	20000	1100	2.5	0.75
		2.5	12.5	130	16000	880	2.5	0.75
N	Copper, Copper alloy, Resin material	1	3	60	20000	800	1	0.3
		1	5	50	16000	660	1	0.3
		1.5	4.5	90	20000	800	1.5	0.45
		1.5	8	80	16000	660	1.5	0.45
		2	6	130	20000	1100	2	0.6
		2	10	100	16000	880	2	0.6
		2.5	7.5	160	20000	1100	2.5	0.75
		2.5	12.5	130	16000	880	2.5	0.75

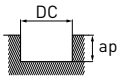
1. If the rigidity of the machine or the workpiece materials installation is very low, or chattering and noise are generated, adjust the speed and feed rate proportionally.
2. For side milling, down (climb) milling is recommended.
3. Water-soluble cutting fluid is recommended.
4. DLC coating is the first recommendation for resin materials. If the surface quality or tool life is reduced, use a non-coated product.

NEW

C2XLAL / DLC2XLAL

SLOT MILLING

	Material	DC	LU	Vc	n	f	ap
N	Aluminium alloy A1000 Series, A2000 – A7000 Series	1	3	60	20000	440	1
		1	5	50	16000	360	1
		1.5	4.5	90	20000	440	1.5
		1.5	8	80	16000	360	1.5
		2	6	130	20000	660	2
		2	10	100	16000	580	2
		2.5	7.5	160	20000	660	2.5
		2.5	12.5	130	16000	580	2.5
	Aluminium alloy castings	1	3	60	20000	440	1
		1	5	50	16000	360	1
		1.5	4.5	90	20000	440	1.5
		1.5	8	80	16000	360	1.5
		2	6	130	20000	660	2
		2	10	100	16000	580	2
		2.5	7.5	160	20000	660	2.5
		2.5	12.5	130	16000	580	2.5
	Copper, Copper alloy, Resin material	1	3	60	20000	440	1
		1	5	50	16000	360	1
		1.5	4.5	90	20000	440	1.5
		1.5	8	80	16000	360	1.5
		2	6	130	20000	660	2
		2	10	100	16000	580	2
		2.5	7.5	160	20000	660	2.5
		2.5	12.5	130	16000	580	2.5



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2. Water-soluble cutting fluid is recommended.
3. DLC coating is the first recommendation for resin materials. If the surface quality or tool life is reduced, use a non-coated product.

NEW

C2XLAL / DLC2XLAL

PLUNGING

	Material	DC	LU	Vc	n	f
N	Aluminium alloy A1000 Series, A2000 – A7000 Series	1	3	60	20000	140
		1	5	50	16000	120
		1.5	4.5	90	20000	140
		1.5	8	80	16000	120
		2	6	130	20000	220
		2	10	100	16000	180
		2.5	7.5	160	20000	220
		2.5	12.5	130	16000	180
	Aluminium alloy castings	1	3	60	20000	110
		1	5	50	16000	90
		1.5	4.5	90	20000	110
		1.5	8	80	16000	90
		2	6	130	20000	190
		2	10	100	16000	140
		2.5	7.5	160	20000	190
		2.5	12.5	130	16000	140
	Copper, Copper alloy, Resin material	1	3	60	20000	110
		1	5	50	16000	90
		1.5	4.5	90	20000	110
		1.5	8	80	16000	90
		2	6	130	20000	190
		2	10	100	16000	140
		2.5	7.5	160	20000	190
		2.5	12.5	130	16000	140

1/1

1. If the rigidity of the machine or the workpiece materials installation is very low, or chattering and noise are generated, adjust the speed and feed rate proportionally.
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3. DLC coating is the first recommendation for resin materials. If the surface quality or tool life is reduced, use a non-coated product.

NEW

C3XLAL / DLC3XLAL

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

	Material	DC	LU	Vc	n	f	ap	ae
N	Aluminium alloy A1000 Series	1	3	60	20000	1210	1	0.3
		1	5	50	16000	990	1	0.3
		1.5	4.5	90	20000	1210	1.5	0.45
		1.5	8	80	16000	990	1.5	0.45
		2	6	130	20000	1650	2	0.6
		2	10	100	16000	1320	2	0.6
		2.5	7.5	160	20000	1650	2.5	0.75
		2.5	12.5	130	16000	1320	2.5	0.75
		3	9	190	20000	2200	3	0.9
		3	15	150	16000	1760	3	0.9
		4	12	250	20000	2420	4	1.2
		4	20	200	16000	1980	4	1.2
		5	15	310	19700	2750	5	1.5
		5	25	250	15700	2200	5	1.5
		6	18	310	16500	2750	6	1.8
		6	30	250	13200	2200	6	1.8
		7	21	310	14100	2750	7	2.1
		7	35	250	11400	2200	7	2.1
		8	24	310	12300	2750	8	2.4
		8	40	250	9800	2200	8	2.4
		9	27	310	11000	2750	9	2.7
		9	45	250	8800	2000	9	2.7
		10	30	310	9900	2750	10	3
		10	50	250	7900	2200	10	3
		11	33	310	9000	2860	11	3.3
		11	55	250	7200	2100	11	3.3
		12	36	310	8200	2970	12	3.6
		12	60	250	6500	2200	12	3.6

1. If the rigidity of the machine or the workpiece materials installation is very low, or chattering and noise are generated, adjust the speed and feed rate proportionally.
2. For side milling, down (climb) milling is recommended.
3. Water-soluble cutting fluid is recommended.
4. DLC coating is the first recommendation for resin materials. If the surface quality or tool life is reduced, use a non-coated product.

NEW

C3XLAL / DLC3XLAL

SIDE MILLING

	Material	DC	LU	Vc	n	f	ap	ae
N	Aluminium alloy A2000 – A7000 Series	1	3	60	20000	1210	1	0.3
		1	5	50	16000	990	1	0.3
		1.5	4.5	90	20000	1210	1.5	0.45
		1.5	8	80	16000	990	1.5	0.45
		2	6	130	20000	1650	2	0.6
		2	10	100	16000	1320	2	0.6
		2.5	7.5	160	20000	1650	2.5	0.75
		2.5	12.5	130	16000	1320	2.5	0.75
		3	9	190	20000	2420	3	0.9
		3	15	150	16000	1980	3	0.9
		4	12	250	20000	2750	4	1.2
		4	20	200	16000	2200	4	1.2
		5	15	310	20000	3410	5	1.5
		5	25	250	16000	2750	5	1.5
		6	18	350	18600	3850	6	1.8
		6	30	280	14800	3080	6	1.8
		7	21	350	15900	3850	7	2.1
		7	35	280	12700	3080	7	2.1
		8	24	350	13900	3850	8	2.4
		8	40	280	11100	3080	8	2.4
		9	27	350	12400	3850	9	2.7
		9	45	280	9900	3080	9	2.7
		10	30	350	11100	4180	10	3
		10	50	280	8800	3300	10	3
		11	33	350	10100	4510	11	3.3
		11	55	280	8100	3520	11	3.3
		12	36	350	9300	4510	12	3.6
		12	60	280	7400	3520	12	3.6

1. If the rigidity of the machine or the workpiece materials installation is very low, or chattering and noise are generated, adjust the speed and feed rate proportionally.
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NEW

C3XLAL / DLC3XLAL

SIDE MILLING

	Material	DC	LU	Vc	n	f	ap	ae
N	Aluminium alloy castings, Copper, Copper alloy, Resin material	1	3	60	20000	1210	1	0.3
		1	5	50	16000	990	1	0.3
		1.5	4.5	90	20000	1210	1.5	0.45
		1.5	8	80	16000	990	1.5	0.45
		2	6	130	20000	1650	2	0.6
		2	10	100	16000	1320	2	0.6
		2.5	7.5	160	20000	1650	2.5	0.75
		2.5	12.5	130	16000	1320	2.5	0.75
		3	9	190	20000	2420	3	0.9
		3	15	150	16000	1980	3	0.9
		4	12	230	18300	2530	4	1.2
		4	20	180	14600	2090	4	1.2
		5	15	230	14600	2310	5	1.5
		5	25	180	11700	1870	5	1.5
		6	18	230	12200	2310	6	1.8
		6	30	180	9700	1870	6	1.8
		7	21	230	10500	2310	7	2.1
		7	35	180	8200	1870	7	2.1
		8	24	230	9200	2420	8	2.4
		8	40	180	7300	1980	8	2.4
		9	27	230	8100	2420	9	2.7
		9	45	180	6400	1980	9	2.7
		10	30	230	7300	2420	10	3
		10	50	180	5800	1980	10	3
		11	33	230	6700	2420	11	3.3
		11	55	180	5200	1980	11	3.3
		12	36	230	6100	2420	12	3.6
		12	60	180	4800	1980	12	3.6

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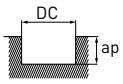
NEW

C3XLAL / DLC3XLAL

SLOT MILLING

	Material	DC	LU	Vc	n	f	ap
N	Aluminium alloy A1000 Series	1	3	60	20000	660	1
		1	5	50	16000	550	1
		1.5	4.5	90	20000	660	1.5
		1.5	8	80	16000	550	1.5
		2	6	130	20000	990	2
		2	10	100	16000	880	2
		2.5	7.5	160	20000	990	2.5
		2.5	12.5	130	16000	880	2.5
		3	9	190	20000	1320	3
		3	15	150	16000	1100	3
		4	12	250	20000	1540	4
		4	20	200	16000	1320	4
		5	15	310	19700	1650	5
		5	25	250	15700	1320	5
		6	18	310	16500	1760	6
		6	30	250	13200	1430	6
		7	21	310	14100	1760	7
		7	35	250	11400	1430	7
		8	24	310	12300	1870	8
		8	40	250	9800	1540	8
		9	27	310	11000	1870	9
		9	45	250	8800	1540	9
		10	30	310	9900	1870	10
		10	50	250	7900	1540	10
		11	33	310	9000	1980	11
		11	55	250	7200	1540	11
		12	36	310	8200	2090	12
		12	60	250	6500	1650	12



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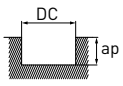
NEW

C3XLAL / DLC3XLAL

SLOT MILLING

Material	DC	LU	Vc	n	f	ap
N Aluminium alloy A2000 – A7000 Series	1	3	60	20000	660	1
	1	5	50	16000	550	1
	1.5	4.5	90	20000	660	1.5
	1.5	8	80	16000	550	1.5
	2	6	130	20000	990	2
	2	10	100	16000	880	2
	2.5	7.5	160	20000	990	2.5
	2.5	12.5	130	16000	880	2.5
	3	9	190	20000	1540	3
	3	15	150	16000	1320	3
	4	12	250	20000	1980	4
	4	20	200	16000	1650	4
	5	15	310	20000	2420	5
	5	25	250	16000	1980	5
	6	18	350	18600	2750	6
	6	30	280	14800	2200	6
	7	21	350	15900	2750	7
	7	35	280	12700	2200	7
	8	24	350	13900	2860	8
	8	40	280	11100	2310	8
	9	27	350	12400	2860	9
	9	45	280	9900	2310	9
	10	30	350	11100	2860	10
	10	50	280	8800	2310	10
	11	33	350	10100	2860	11
	11	55	280	8100	2310	11
	12	36	350	9300	2860	12
	12	60	280	7400	2310	12



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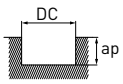
NEW

C3XLAL / DLC3XLAL

SLOT MILLING

	Material	DC	LU	Vc	n	f	ap
N	Aluminium alloy castings, Copper, Copper alloy, Resin material	1	3	60	20000	660	1
		1	5	50	16000	550	1
		1.5	4.5	90	20000	660	1.5
		1.5	8	80	16000	550	1.5
		2	6	130	20000	990	2
		2	10	100	16000	880	2
		2.5	7.5	160	20000	990	2.5
		2.5	12.5	130	16000	880	2.5
		3	9	190	20000	1320	3
		3	15	150	16000	1100	3
		4	12	230	18300	1540	4
		4	20	180	14600	1320	4
		5	15	230	14600	1540	5
		5	25	180	11700	1320	5
		6	18	230	12200	1540	6
		6	30	180	9700	1320	6
		7	21	230	10500	1540	7
		7	35	180	8200	1320	7
		8	24	230	9200	1540	8
		8	40	180	7300	1320	8
		9	27	230	8100	1540	9
		9	45	180	6400	1320	9
		10	30	230	7300	1540	10
		10	50	180	5800	1320	10
		11	33	230	6700	1540	11
		11	55	180	5200	1320	11
		12	36	230	6100	1650	12
		12	60	180	4800	1320	12



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NEW

C3XLAL / DLC3XLAL

PLUNGING

	Material	DC	LU	Vc	n	f
N	Aluminium alloy A1000 Series	1	3	60	20000	220
		1	5	50	16000	180
		1.5	4.5	90	20000	220
		1.5	8	80	16000	180
		2	6	130	20000	330
		2	10	100	16000	260
		2.5	7.5	160	20000	330
		2.5	12.5	130	16000	260
		3	9	190	20000	330
		3	15	150	16000	260
		4	12	250	20000	330
		4	20	200	16000	260
		5	15	310	19700	330
		5	25	250	15700	260
		6	18	310	16500	330
		6	30	250	13200	260
		7	21	310	14100	220
		7	35	250	11400	180
		8	24	310	12300	220
		8	40	250	9800	180
		9	27	310	11000	220
		9	45	250	8800	180
		10	30	310	9900	110
		10	50	250	7900	90
		11	33	310	9000	110
		11	55	250	7200	90
		12	36	310	8200	110
		12	60	250	6500	90

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NEW

C3XLAL / DLC3XLAL

PLUNGING

	Material	DC	LU	Vc	n	f
N	Aluminium alloy A2000 – A7000 Series	1	3	60	20000	220
		1	5	50	16000	180
		1.5	4.5	90	20000	220
		1.5	8	80	16000	180
		2	6	130	20000	330
		2	10	100	16000	260
		2.5	7.5	160	20000	330
		2.5	12.5	130	16000	260
		3	9	190	20000	330
		3	15	150	16000	260
		4	12	250	20000	440
		4	20	200	16000	350
		5	15	310	20000	440
		5	25	250	16000	350
		6	18	350	18600	440
		6	30	280	14800	350
		7	21	350	15900	440
		7	35	280	12700	350
		8	24	350	13900	440
		8	40	280	11100	350
		9	27	350	12400	330
		9	45	280	9900	260
		10	30	350	11100	330
		10	50	280	8800	260
		11	33	350	10100	330
		11	55	280	8100	260
		12	36	350	9300	330
		12	60	280	7400	260

1. If the rigidity of the machine or the workpiece materials installation is very low, or chattering and noise are generated, adjust the speed and feed rate proportionally.
2. Water-soluble cutting fluid is recommended.
3. DLC coating is the first recommendation for resin materials. If the surface quality or tool life is reduced, use a non-coated product.

NEW

C3XLAL / DLC3XLAL

PLUNGING

Material	DC	LU	Vc	n	f
N Aluminium alloy castings, Copper, Copper alloy, Resin material	1	3	60	20000	170
	1	5	50	16000	130
	1.5	4.5	90	20000	170
	1.5	8	80	16000	130
	2	6	130	20000	280
	2	10	100	16000	220
	2.5	7.5	160	20000	280
	2.5	12.5	130	16000	220
	3	9	190	20000	280
	3	15	150	16000	220
	4	12	230	18300	220
	4	20	180	14600	180
	5	15	230	14600	170
	5	25	180	11700	130
	6	18	230	12200	170
	6	30	180	9700	130
	7	21	230	10500	150
	7	35	180	8200	110
	8	24	230	9200	130
	8	40	180	7300	110
	9	27	230	8100	130
	9	45	180	6400	110
	10	30	230	7300	90
	10	50	180	5800	80
	11	33	230	6700	90
	11	55	180	5200	80
	12	36	230	6100	70
	12	60	180	4800	60

1. If the rigidity of the machine or the workpiece materials installation is very low, or chattering and noise are generated, adjust the speed and feed rate proportionally.
2. Water-soluble cutting fluid is recommended.
3. DLC coating is the first recommendation for resin materials. If the surface quality or tool life is reduced, use a non-coated product.

iMX

EXCHANGEABLE HEAD END MILLS

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B200

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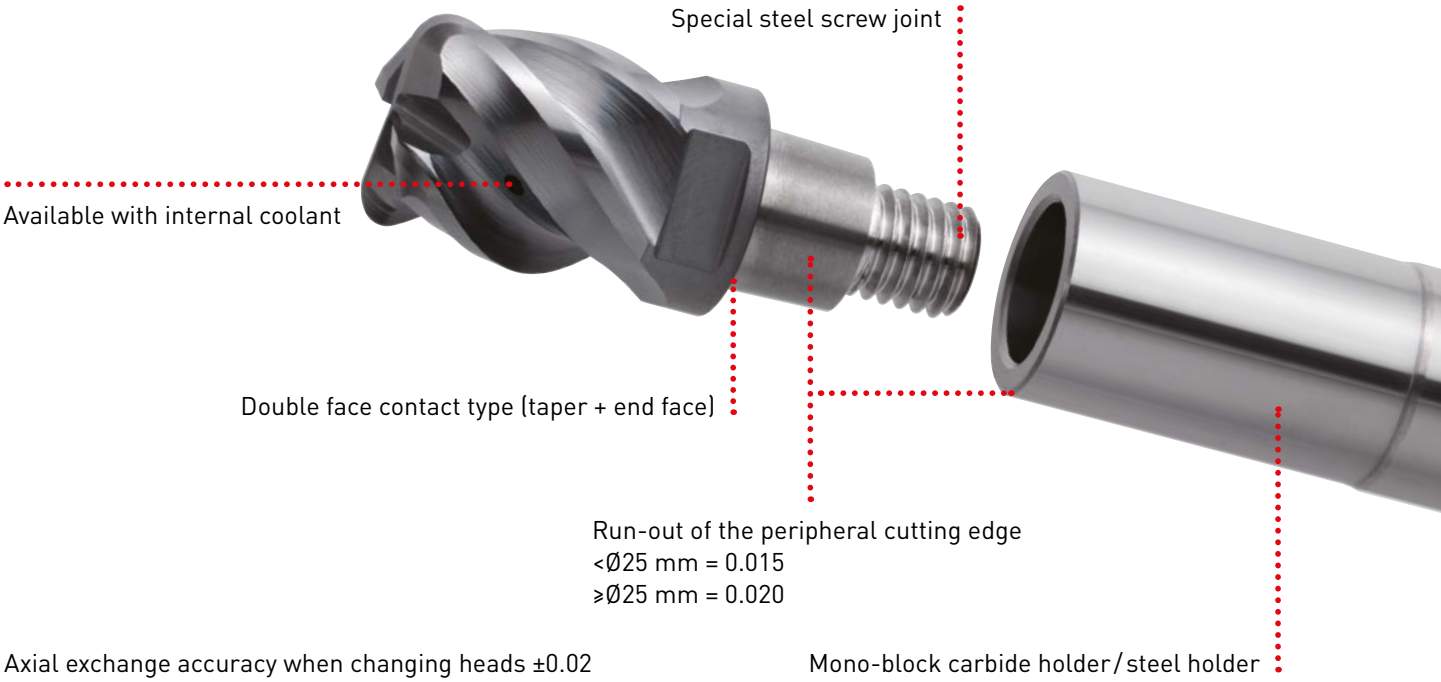
DIA EDGE

iMX

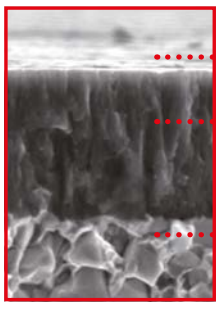
EXCHANGEABLE HEAD END MILLS



FEATURES

The iMX series is a revolutionary end mill system that enables efficiency, high accuracy and rigidity by combining the advantages of both solid carbide and indexable end mills.
Security and rigidity is close to that of a solid carbide end mill because all clamping faces are solid carbide.
Suitable for a variety of applications due to the exchangeable head, therefore excellent for reducing inventory.

HIGHLY VERSATILE GRADES



- Smooth "ZERO-μ surface"
- Newly developed (Al, Cr)N group coating
- Super-fine particle, super-hard base material

ET2020 (Uncoated)
Suitable for milling aluminium.

EP7020
Suitable for difficult-to-cut materials.

EP6120
Suitable for high feed milling of steel.

- High lubricity
- High oxidation temperature
- Better wear resistance
- High adhesion

EP8110 / EP8120
The newly developed (Al,Cr,Si)N coating that has a high oxidation temperature and high lubricity. Together with the (Al,Ti,Si)N coating, for better wear resistance and higher adhesion, allows hardened steel machining with longer tool life to be maintained.

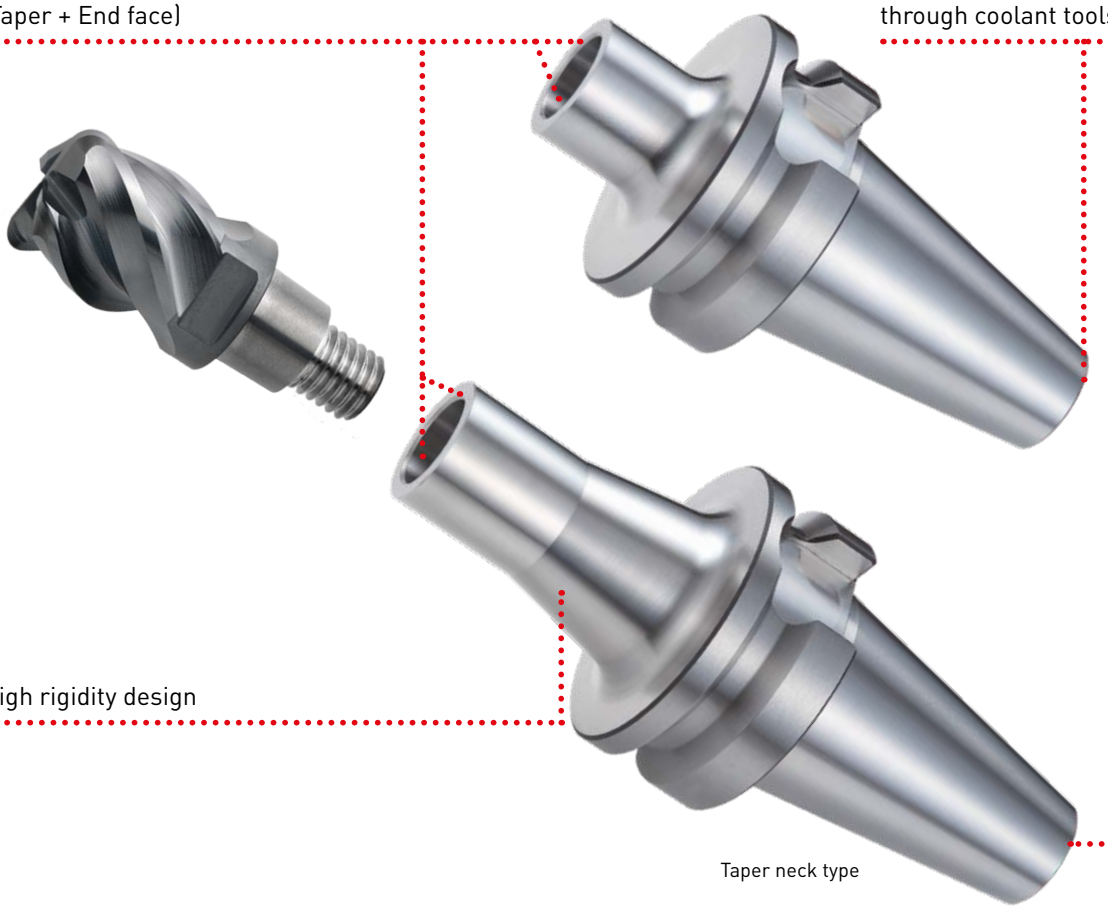
NEW

BT30 MONO-BLOCK TYPE - STEEL TOOL HOLDER

New tool holders for the iMX series. High rigidity realises high efficiency machining.

Double face contact type
(Taper + End face)

Compatible with internal,
through coolant tools

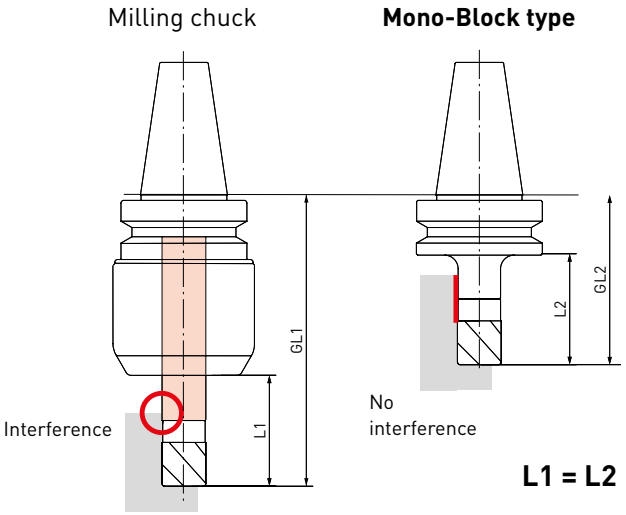


High rigidity design

Taper neck type

BENEFITS OF MONO-BLOCK TYPE HOLDERS

The mono-block type holder greatly reduces tool overhang, allowing stable machining even with larger diameter tools, and thereby achieving high efficiency machining. When a standard milling chuck is used, a screw-in type shank also required. This is negated when using a mono-block type holder, therefore a reduction in costs can be realised. Undercutting the bottom of the neck, makes it suitable for vertical wall machining.



NEW

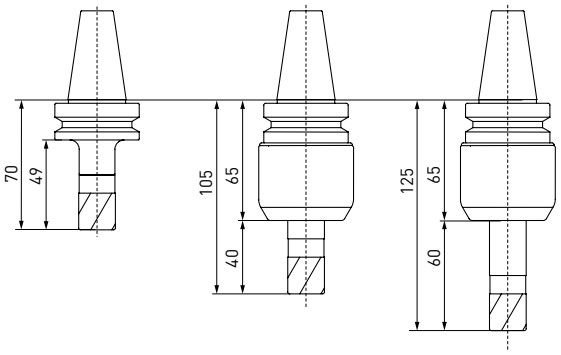
BT30 MONO-BLOCK TYPE STEEL TOOL HOLDER

SHOULDER MILLING COMPARISON WHEN MACHINING 1.4542

Stable machining can be achieved when combined with high-output machine tools.
Carbide holders and milling chucks are no longer required, enabling a reduction in costs.

OVERHANG LENGTH COMPARISON

Material	1.4542
Tool	iMX20C4HV200R10020S
Vc (m/min)	100
fz (mm/t.)	0.2
Machine	Machining Centre Max. 10000 min^{-1} Spindle Motor 14.2 kw Torque 80 Nm



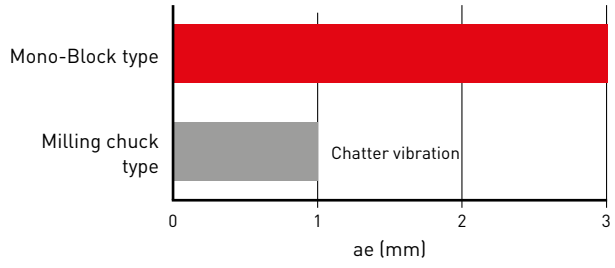
Mono-Block type | Milling chuck and a shortened carbide holder | Milling chuck and carbide holder

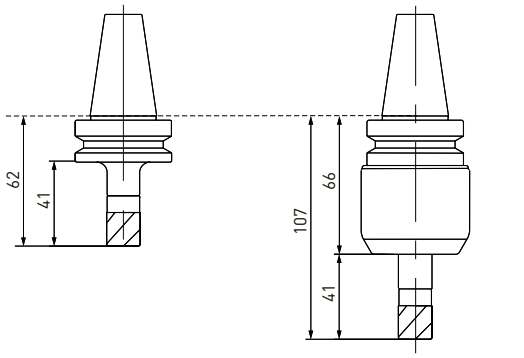
Holder	ae	Vf (mm/min)		
		380	510	640
		ap = 10 mm		
Mono-Block holder	3	✓	✓	✓
	6	✓	✓	✓
Milling chuck with a short carbide holder	3	✓	✓	✓
	6	✓	✓	✓
Milling chuck with a standard length carbide holder	3	✓	✓	
	6			✗

SIDE MILLING COMPARISON WHEN MACHINING 1.4301

Achieves high efficiency machining with a depth of cut (ae) that is three times that of a standard milling chuck holder.

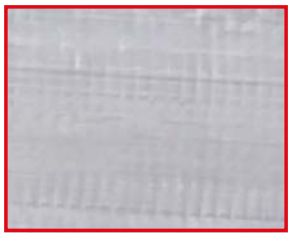
OVERHANG LENGTH COMPARISON





Mono-Block type | Milling chuck and a shortened carbide holder

Machined Surface Comparison: ae = 1 mm, fz = 0.1 mm/t.



Mono-Block type

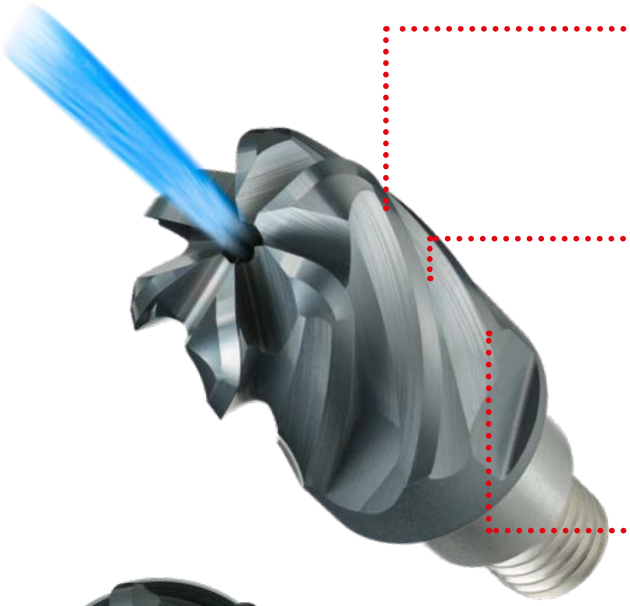
Milling chuck type

Material	1.4301
Tool	iMX16C4HV160R10016
Vc (m/min)	100
Vf (mm/min)	796
ap (mm)	16
Machine	Machining Centre Max. 10000 min^{-1} Spindle Motor 14.2 kw Torque 80 Nm

iMX-C6HV-C

High efficiency machining enables process consolidation.

CORNER RADIUS HEAD WITH COOLANT HOLE, 6 FLUTE, IRREGULAR HELIX



IRREGULAR HELIX ANGLE

Irregularity between each flute provides stability due to reduced vibration.

FLUTE GEOMETRY

Good chip evacuation in the corners of pockets by adopting an ideal flute geometry.

Cross section of the flute geometry

SMALL RELIEF

Provides a margin effect whilst maintaining edge sharpness. Also achieves less burr creation and enables vibration damping.

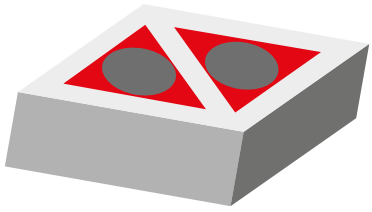
CENTRE COOLANT HOLE

Effective when machining the corner of a pocket when external coolant isn't sufficient.

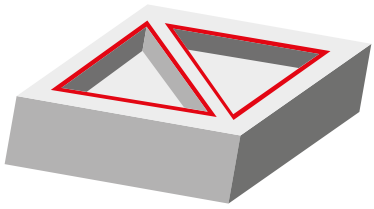
TOOL INTEGRATION ACHIEVED

Multi functionality brings efficiency to the entire machining process.

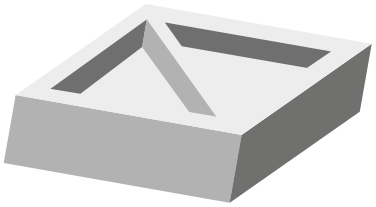
Pocket milling



Semi-finish machining



Finish machining



COMPARISON OF ANTI-VIBRATION WHEN MACHINING CORNERS

Excellent vibration damping that prevents the usual problems even when machining corner radii.

Vc = 200 m/min, R15, Photographed after machining

iMX-C6HV-C

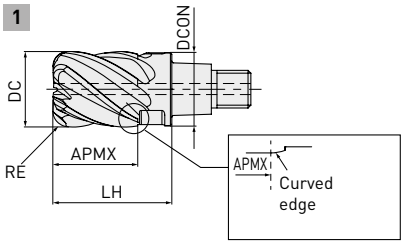
Conventional

iMX-C6HV-C

36°
40°

CORNER RADIUS HEAD, 6 FLUTE, IRREGULAR HELIX, WITH COOLANT HOLE

P M S



RE
±0.020

DC<12	12<DC<12	20<DC<25
0 - 0.030	0 - 0.040	0 - 0.050

Order number	EP7020	DC	RE	APMX	LH	DCON	ZEFP	Type
IMX10C6HV100R05010C	●	10	0.5	10	16	9.7	6	1
IMX10C6HV100R10010C	●	10	1	10	16	9.7	6	
IMX12C6HV120R05012C	●	12	0.5	12	19	11.7	6	
IMX12C6HV120R10012C	●	12	1	12	19	11.7	6	
IMX16C6HV160R10016C	●	16	1	16	24	15.5	6	
IMX16C6HV160R30016C	●	16	3	16	24	15.5	6	
IMX20C6HV200R10020C	●	20	1	20	30	19.5	6	
IMX20C6HV200R30020C	●	20	3	20	30	19.5	6	
IMX25C6HV250R10025C	●	25	1	25	37.5	24.5	6	
IMX25C6HV250R30025C	●	25	3	25	37.5	24.5	6	

1/1

266 Vc

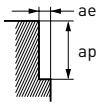
● : Inventory maintained. ★ : Inventory maintained in Japan.

iMX-C6HV-C

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

	Material	DC	Vc	n	fz	Vf	ap	ae
P	Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel	10	200	6400	0.07	2700	10	1.0
		12	200	5300	0.085	2700	12	1.2
		16	200	4000	0.088	2100	16	1.6
		20	200	3200	0.1	1900	20	2.0
		25	200	2500	0.1	1500	25	2.5
M	Austenitic and Ferritic stainless steel	10	150	4800	0.07	2000	10	1.0
		12	150	4000	0.085	2000	12	1.2
		16	150	3000	0.088	1600	16	1.6
		20	150	2400	0.1	1400	20	2.0
		25	150	1900	0.1	1100	25	2.5
S	Heat resistant alloy	10	40	1300	0.033	260	10	0.5
		12	40	1100	0.035	230	12	0.6
		16	40	800	0.038	180	16	0.8
		20	40	640	0.04	150	20	1.0
		25	40	510	0.04	120	25	1.3
M	Precipitation hardening stainless steel, Cobalt chromium alloy	10	100	3200	0.07	1300	10	1.0
		12	100	2700	0.085	1400	12	1.2
		16	100	2000	0.088	1100	16	1.6
S	Titanium alloy	20	100	1600	0.1	1000	20	2.0
		25	100	1300	0.1	800	25	2.5



1/1

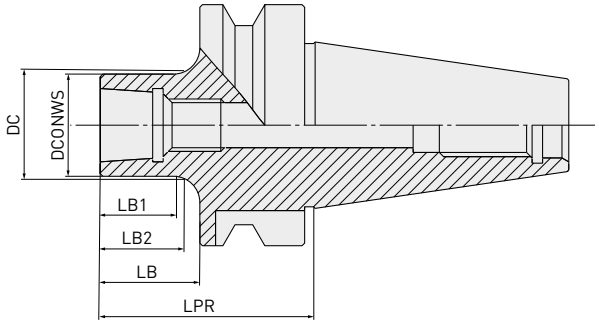
1. For stainless steel, titanium alloy and heat resistant alloy, the use of water-soluble coolant is effective.
2. If the depth of cut is shallow, the revolution and feed rate can be increased.
3. Irregular helix flute end mills have a large effect on controlling vibration when compared to standard end mills.
   However, if the rigidity of the machine or the workpiece installation is poor, vibration or abnormal sound can occur.
   In this case, please reduce the revolution and feed rate proportionately, or set a lower depth of cut.

NEW

iMX

BT30 MONO-BLOCK TYPE STEEL HOLDER

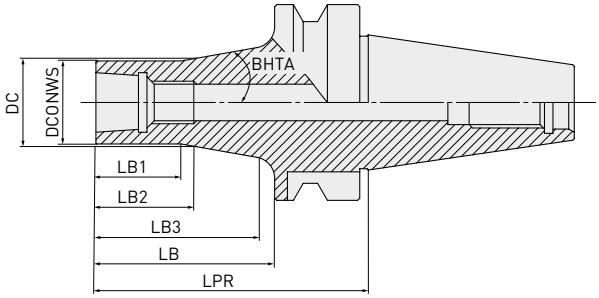
STRAIGHT TYPE



Order number	Stock	DC	DCONWS	LPR	LB	LB1	LB2	WT	Suitable head
IMX16-S16GL38-BT30	●	16	15.5	38	16	11	12.5	0.39	IMX16
IMX16-S28GL50-BT30	●	16	15.5	50	28	23	24.5	0.41	IMX16
IMX20-S19GL41-BT30	●	20	19.5	41	19	14	15.5	0.41	IMX20
IMX20-S33GL55-BT30	●	20	19.5	55	33	28	29.5	0.42	IMX20
IMX25-S25GL47-BT30	●	25	24.5	47	25	20	21.5	0.45	IMX25
IMX25-S43GL65-BT30	●	25	24.5	65	43	38	39.5	0.50	IMX25

1/1

TAPER NECK TYPE



Order number	Stock	DC	DCONWS	LPR	LB	LB1	LB2	LB3	BHTA	WT	Suitable head
IMX16-A33GL55-BT30	●	16	15.5	55	33	16	16.7	29.2	15°	0.43	IMX16
IMX20-A42GL64-BT30	●	20	19.5	64	42	20	21.4	37.8	10°	0.48	IMX20
IMX25-A53GL75-BT30	●	25	24.5	75	53	25	26.7	48.7	8°	0.57	IMX25

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. Recommended for use with machining centres equipped with high-output spindle motors.
4. The depth of cut should be 50 – 60% of the recommended conditions for each head.
5. The connection part with the machine tool is not a two-sided shank.

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

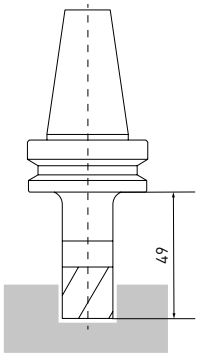
NEW

iMX

VERTICAL MACHINING CENTRE: BROTHER INDUSTRIES, LTD. S700XD1

Achieved high efficiency machining with a metal removal rate of 600 mm^3/min.

Material	Aluminium Alloy
Tool	iMX20S3A20016 ET2020 Square, 3 flute
Holder	iMX20-S19GL41-BT30
n (min^{-1})	5971
Vc (m/min)	375
Vf (mm/min)	2389
ap (mm)	13
Metal removal rate (mm^3/min)	621
Cutting mode	External coolant (Emulsion)



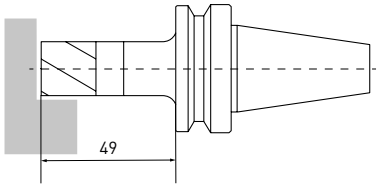
Spindle speed max. 10000 min^{-1}, Spindle motor 26.2 kw, Torque 92 Nm

HORIZONTAL MACHINING CENTRE: ENSHU, LTD. SH350

The volume of metal removed was six times higher than the standard recommended conditions.

Material	S50C
Tool	iMX20R4F20021 EP7020 Roughing, 4 flute
Holder	iMX20-S19GL41-BT30
n (min^{-1})	**3997** (2400)
Vc (m/min)	**251** (150)
Vf (mm/min)	**1599** (480)
ap (mm)	12
ae (mm)	20
Metal removal rate (mm^3/min)	384
Cutting mode	Down Cut. Air blow

( ) Recommended cutting conditions



Spindle speed max. 12000 min^{-1}, Spindle motor 31 kw, Torque 31.04 Nm

VQ

LATEST TECHNOLOGY, HIGH PERFORMANCE END MILLS FOR STAINLESS AND DIFFICULT-TO-CUT MATERIALS

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B197

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DIA EDGE

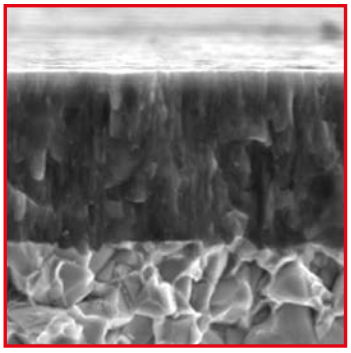
VQ

REVOLUTIONARY PERFORMANCE FOR DIFFICULT-TO-CUT-MATERIALS

INNOVATIVE TECHNOLOGY

VQ end mills have been treated with a newly developed (Al, Cr)N group coating that delivers substantially better wear resistance. The surface of the coating has been given a smoothening treatment resulting in better machined surfaces, reduced cutting resistance and improved chip discharge. This is the next generation of coated end mills that deliver long tool life when machining stainless steels and other difficult-to-cut materials.

VQ coating

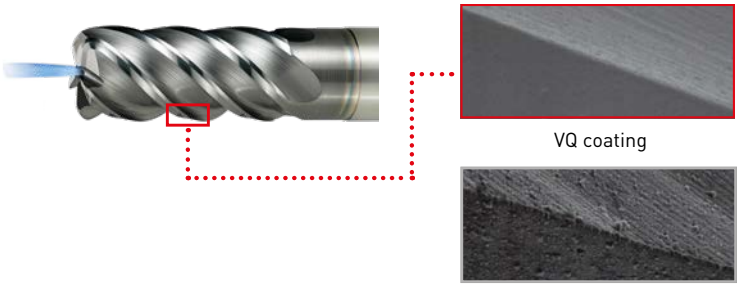


- Smoothened "ZERO-μ Surface".
- Newly developed (Al, Cr)N PVD coating.
- Super-fine-particle, super-hard base material.

Conventional coating

ZERO-μ SURFACE

With the unique ZERO-μ Surface, the cutting edge retains its sharpness. While previous technologies often resulted in diminshed sharpness, the ZERO-μ Surface achieves both smoothness and sharpness, as well as longer tool life.

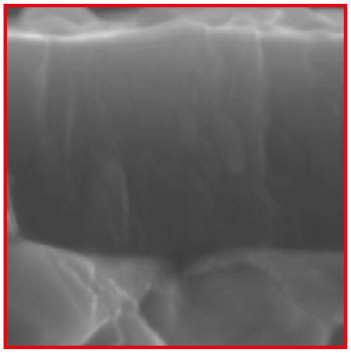


VQ coating

Conventional coating

(Al, Ti, Si) BASED COATING

The (Al, Ti, Si) based coatings maintain their film hardness and heat resistant properties under the harshest of conditions making it highly suitable for applying to end mills for machining Ni-based super alloys.



- New (Al, Ti, Si) based coating
- High quality grade focusing on wear resistance

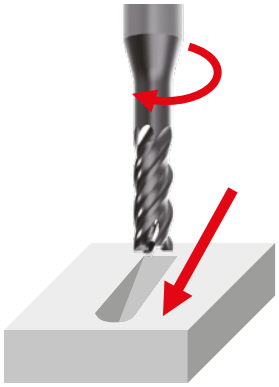
VQN coating

VQ4MVM

MULTIFUNCTIONAL END MILL CAPABLE OF STRONG RAMPING CAPABILITY ON A WIDE RANGE OF MATERIALS

RAMPING IS A METHOD OF SINKING GRADUALLY AS THE TOOL TRAVERSES

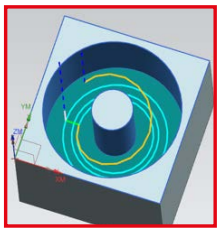
This eliminates the need for a pilot hole when machining pockets, thereby reducing costs through tool consolidation. Compared to direct plunge cutting, ramping enables simultaneous multi-axis feed at high speeds to lower machining times. This method is ideal for machining wide and shallow pockets.



Steep ramping capability

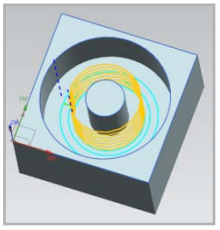
VQ4MVM provides high-performance and multi-functionality. It can perform shoulder milling, grooving and helical machining as well as ramping angles of up to 30° in carbon and alloy steels.

14 sec

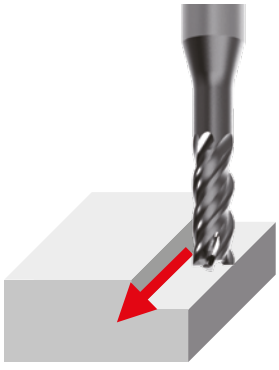


VQ4MVM
Helical and ramping
Only 1 pass needed

27 sec

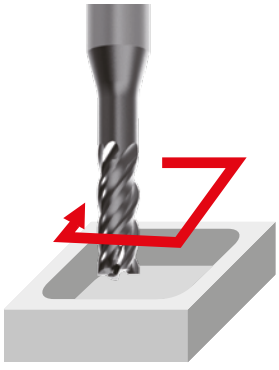


Conventional
Helical milling
7 passes needed

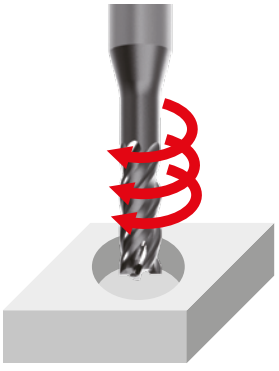


Shoulder milling

Slot milling



Pocket milling



Helical milling

VQ4MVM

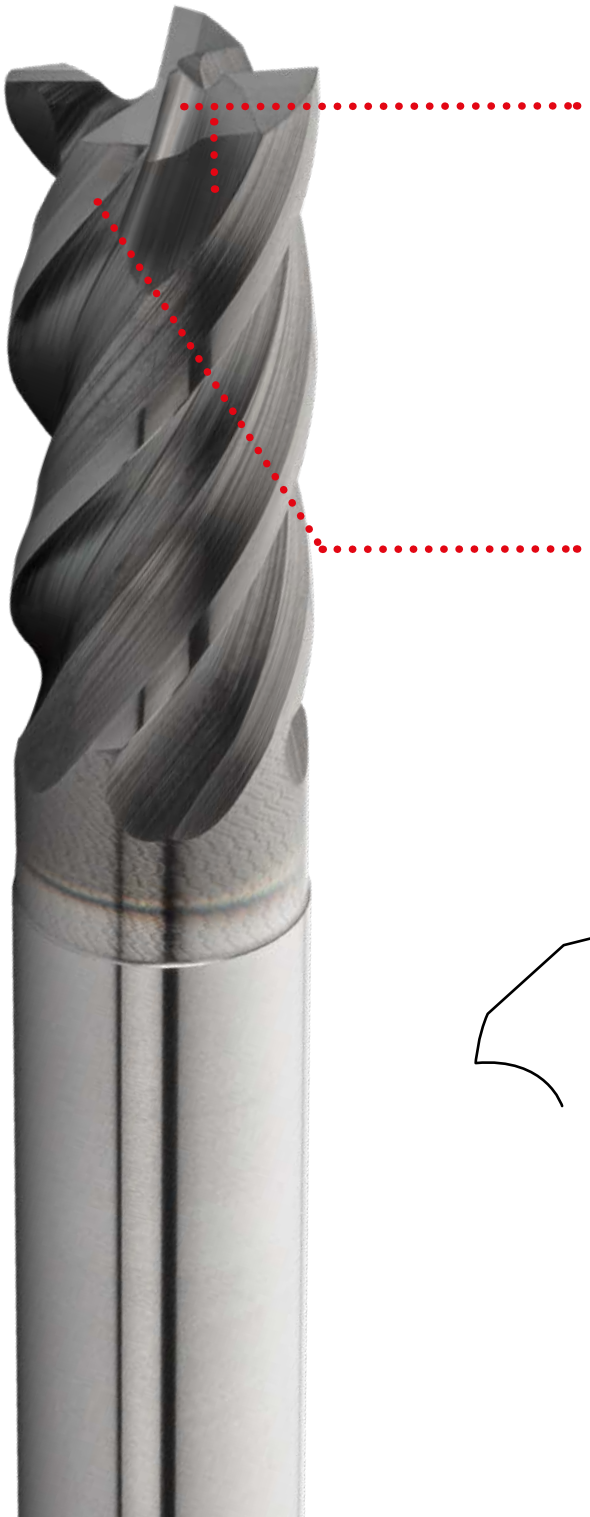
HIGH PERFORMANCE END MILL

NEWLY-DEVELOPED COATING WITH IMPROVED WEAR RESISTANCE

The smoothening treatment of the coating layer reduces cutting resistance and significantly improves chip discharge.

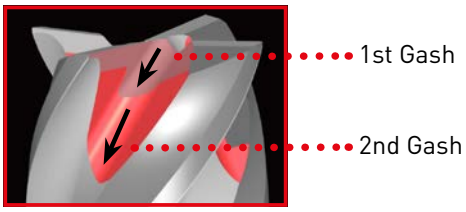
SMART MIRACLE Coating
(Al,Cr)N coating is the most suitable coating for higher efficiency machining.

ZERO-μ Surface
The original surface treatment technology provides smooth coating layer.



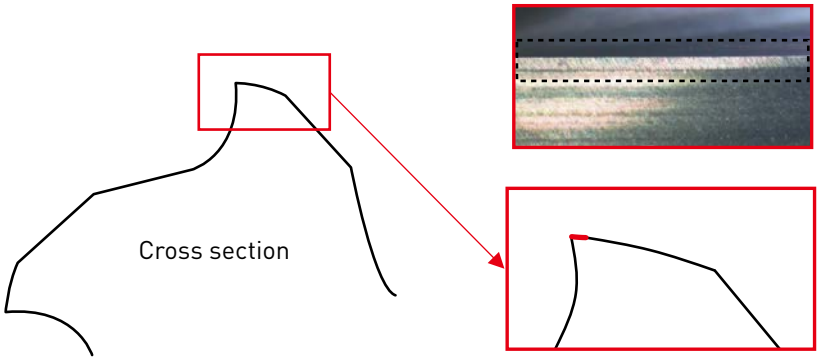
SECONDARY GASH

A first and secondary gash provides high chip evacuation that far exceeds conventional designs when ramping.



MICRO RELIEF ANGLE

It exerts a margin effect that plays the role of a guide during machining.
Combined with irregular helix flutes, it improves vibration damping and suppresses burrs.



Irregular helix flutes and the micro relief angle improve vibration damping and provides excellent surface finishes.

X5CrNi18–10 Vc = 100 m/min, fz = 0.05 mm/t., ap = 5 mm, ae = 3 mm

VQ4MVM

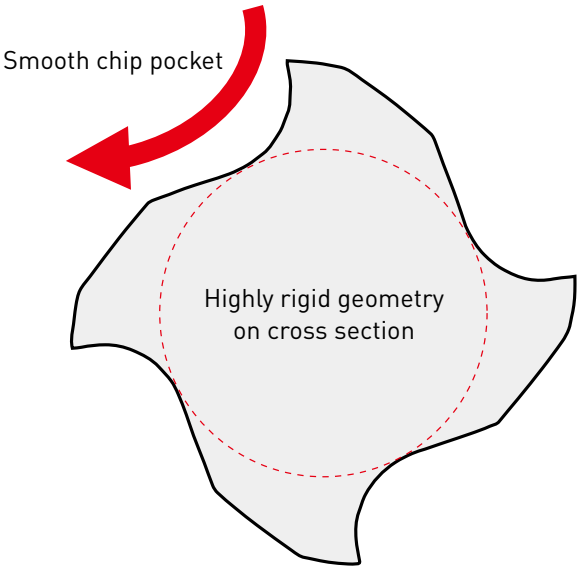
Conventional

VQ4MVM

HIGH PERFORMANCE END MILL

CHIP POCKET AND HIGHLY RIGID GEOMETRY

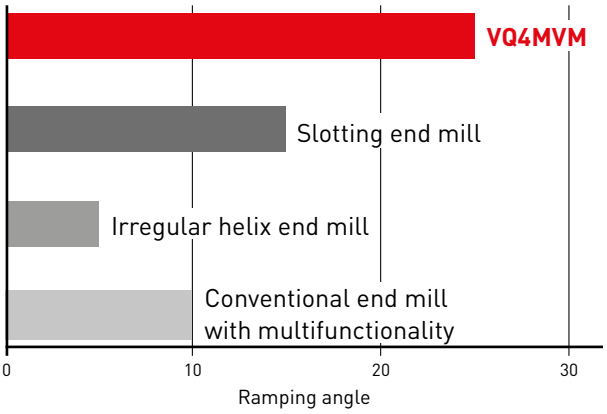
VQ4MVM is suitable for strong ramping machining and chip evacuation performance due to the highly rigid geometry.



COMPARISON OF RAMPING ANGLES WHEN MACHINING X5CrNi18-10

Provided a good machined surface when machining with a ramping angle of 25°.

Material	X5CrNi18-10
Tool	Ø 10
Vc (m/min)	50
fz (mm)	0.025
ap (mm)	10
ae (mm)	10
Overhang length (mm)	35
Cutting mode	External coolant (Emulsion)
Machine	Vertical M/C (BT50)

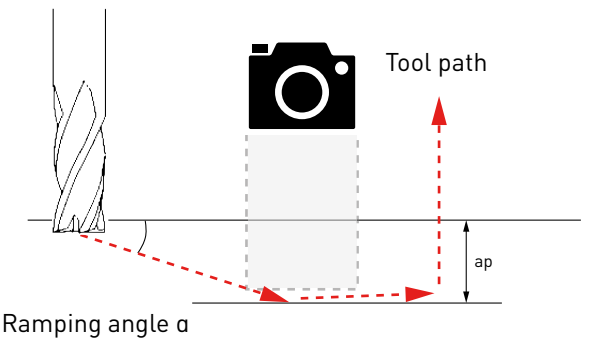


MACHINING SURFACE

VQ4MVM

Conventional end mill

SHOOTING POINT



Ramping angle α

VQJCS / VQLCS

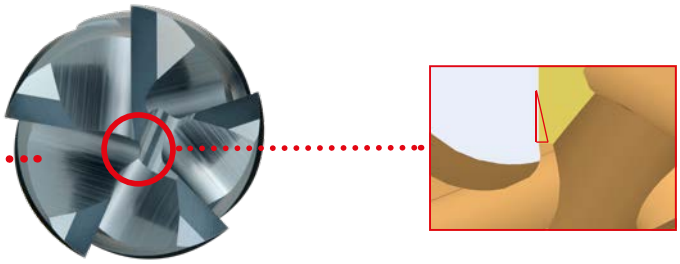
END MILL WITH IRREGULAR PITCH FLUTES AND CHIPBREAKER GEOMETRY

VQLCS (4XDC)

VQJCS (3XDC)

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

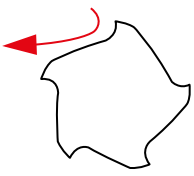
Due to its excellent vibration damping properties, chatter and vibration are suppressed making stable machining possible.

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.



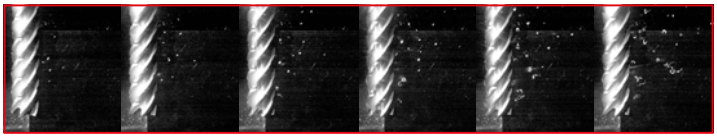
Ideal chip pocket geometry

VQJCS / VQLCS

CHIPBREAKER FUNCTION: HIGH-SPEED CAMERA COMPARISON

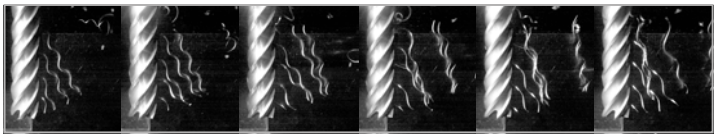
The excellent chip breaking properties reduces chip clogging and removes chips efficiently while also reducing chips collecting together on the machine.

VQLCS



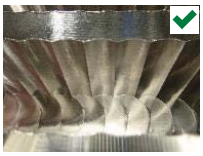
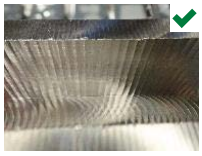
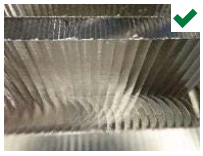
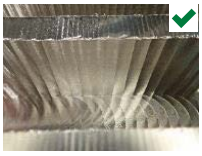
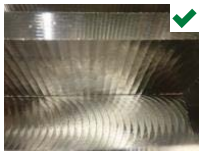
After Machining with VQLCS

Without breaker



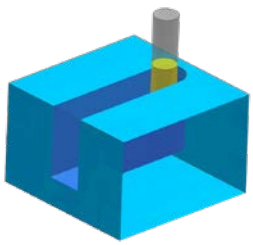
After Machining with conventional

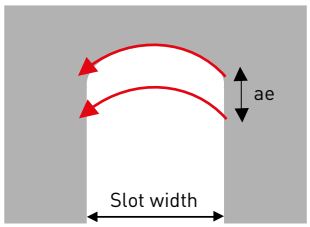
EVALUATION OF TROCHOIDAL MILLING

	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	DC = Ø 12 VQJCSD1200
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)





VQN4/6MVRB

SMART MIRACLE END MILL SERIES FOR DIFFICULT-TO-CUT MATERIALS

Featuring the new (Al, Ti, Si)N based coating that has excellent wear resistance. Additionally, the optimum number of irregular helix flutes greatly dampens vibration to enable stable, efficient machining.

VQN6MVRB VQN4MVRB

CORNER R-GEOMETRY WITH IMPROVED FRACTURE RESISTANCE

The negative shape of the rake angle for the corner radius cutting edge allows the smooth flow of chips, there by improving chip resistance.

OPTIMISED NUMBER OF FLUTES

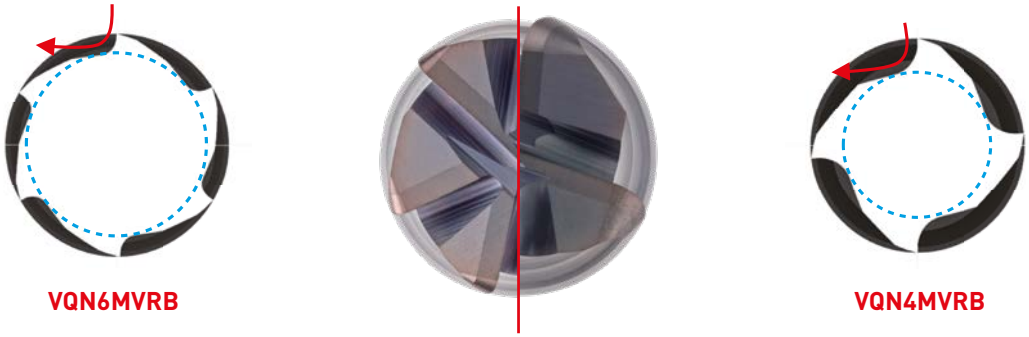
The number of flutes has been optimised in relation to the outer diameter to achieve excellent chip evacuation and increased tool rigidity.

IRREGULAR HELIX FLUTES

Helix angles vary from flute to flute by up to 4° to prevent vibration.

SPECIAL FLUTE SHAPE

The flute shape is specially designed for machining super heat resistant alloys by utilising the excellent chip evacuation and wear resistance properties.



VQN6MVRB VQN4MVRB

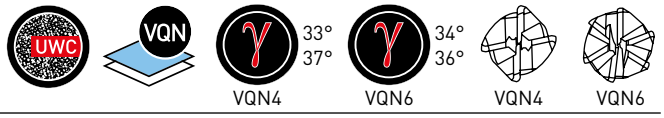
VQN4/6MVRB

Conventional

Defection due to high load

Defection due to lack of strength

VQN4 / 6MVRB



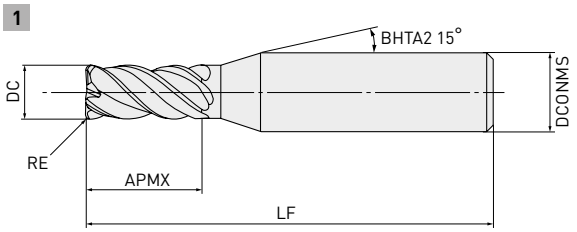
CORNER RADIUS, MEDIUM CUT LENGTH, 4 / 6 FLUTE

S

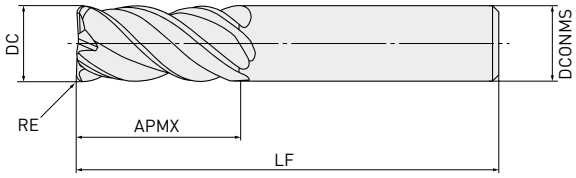
VQN4MVRB

VQN6MVRB

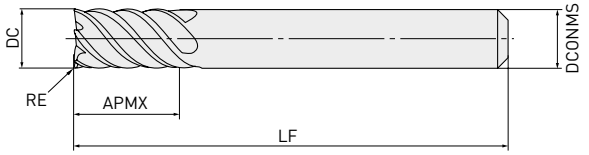
1



2



3



VQN4	VQN6
±0.015	±0.02

DC≤12
0 - 0.02

DCONMS = 6	DCONMS = 8, 12	DCONMS = 12
0 -0.008	0 - 0.009	0 - 0.012

- (Al, Ti, Si) N-based coating exhibits excellent wear and chipping resistance when machining heat resistant super alloys.
- Optimised number of flutes for efficient and stable machining.

Order number	Stock	DC	RE	APMX	LF	DCONMS	ZEFP	Type
VQN4MVRBD0300R030	●	3	0.3	7	45	6	4	1
VQN4MVRBD0300R050	●	3	0.5	7	45	6	4	1
VQN4MVRBD0400R030	●	4	0.3	10	45	6	4	1
VQN4MVRBD0400R050	●	4	0.5	10	45	6	4	1
VQN4MVRBD0500R050	●	5	0.5	12	50	6	4	1
VQN4MVRBD0600R050	●	6	0.5	13	50	6	4	2
VQN4MVRBD0600R100	●	6	1	13	50	6	4	2
VQN6MVRBD0800R050	●	8	0.5	19	60	8	6	3
VQN6MVRBD0800R100	●	8	1	19	60	8	6	3
VQN6MVRBD1000R050	●	10	0.5	22	70	10	6	3
VQN6MVRBD1000R100	●	10	1	22	70	10	6	3
VQN6MVRBD1200R050	●	12	0.5	26	75	12	6	3
VQN6MVRBD1200R100	●	12	1	26	75	12	6	3

1/1

278 Vc

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

VQN4 / 6MVRB

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

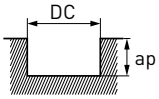
	Material	DC	ZEFP	n	Vf	ap	ae
S	Nickel-based heat resistant super alloy	3	4	4200	340	4.5	0.3
		4	4	3200	260	6	0.4
		5	4	2500	300	7.5	0.5
		6	4	2100	250	9	0.6
		8	6	1600	290	12	0.8
		10	6	1300	310	15	1
		12	6	1100	260	18	1.2

1/1

SLOT MILLING

	Material	DC	ZEFP	n	Vf	ap
S	Nickel-based heat resistant super alloy	3	4	3200	260	1.5
		4	4	2400	190	2
		5	4	1900	230	2.5
		6	4	1600	190	3
		8	6	1200	140	4
		10	6	1000	120	5
		12	6	800	140	6

1/1

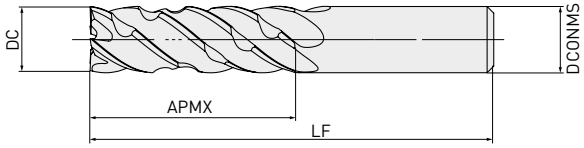


1. For machining heat resistant super alloys, the use of water-solble coolant is effective.
2. Chattering can still occur if the machine rigidity and clamping method are insufficient. In these cases the feed and speed should be reduced proportionately.
3. If the depth of cut is shallow, the revolution and feed rate can be increased.

VQJCS

END MILL, SEMI LONG CUT LENGTH (3 x DC), 5 FLUTE, IRREGULAR PITCH FLUTES, CHIPBREAKER

P M N S



DC≤12	DC>12		
0 -0.030	0 -0.040		
DCONMS=6	8≤DCONMS≤10	12≤DCONMS≤16	DCONMS=20
0 -0.008	0 -0.009	0 -0.011	0 -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
VQJCSD0600	●	6	18	70	6	5
VQJCSD0800	●	8	24	80	8	
VQJCSD1000	●	10	30	90	10	
VQJCSD1200	●	12	36	100	12	
VQJCSD1600	●	16	48	110	16	
VQJCSD2000	●	20	60	125	20	

1/1

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

280 Vc

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

VQJCS

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
	Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel	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
		16	180	3600	1200	48	2.4	0.018	0.035
		20	180	2900	1000	60	3.0	0.021	0.039
M	Austenitic, Ferritic and martensitic stainless steel,	6	120	6400	1000	18	0.45	0.006	0.012
		8	120	4800	1000	24	0.6	0.008	0.016
		10	120	3800	900	30	0.75	0.010	0.019
S	Titanium alloy	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
M	Hardened stainless steel, Cobaly chromium alloy	6	100	5300	800	18	0.45	0.006	0.012
		8	100	4000	800	24	0.6	0.008	0.016
		10	100	3200	800	30	0.75	0.01	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
N	Copper, Copper alloy	6	220	11700	2100	18	0.9	0.010	0.019
		8	220	8800	2100	24	1.2	0.014	0.026
		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
S	Heat resistant alloy	6	40	2100	200	18	0.18	0.002	0.004
		8	40	1600	200	24	0.24	0.003	0.006
		10	40	1300	200	30	0.3	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	0.6	0.004	0.007

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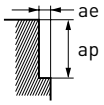
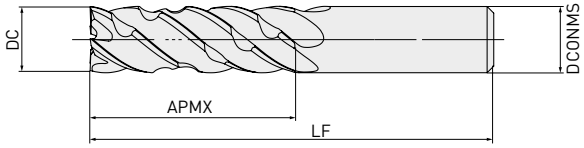


1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work. When measuring the tool length, please use a mechanical contact type or a laser tool setter.
2. The irregular pitch flute end mill has a larger effect on controlling vibration 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 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

P M N S



DC≤12		
0 -0.030		
DCONMS=6	8≤DCONMS≤10	DCONMS=12
0 -0.008	0 -0.009	0 -0.011

- 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	

1/1

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

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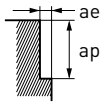
VQLCS

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
	Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel	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	Austenitic, Ferritic and martensitic stainless steel,	6	100	5300	800	24	0.3	0.005	0.010
		8	100	4000	800	32	0.4	0.006	0.013
S	Titanium alloy	10	100	3200	700	40	0.5	0.008	0.015
		12	100	2700	700	48	0.6	0.008	0.017
M	Hardened stainless steel, Cobaly 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
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
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	0.2	0.003	0.005
		12	30	800	100	48	0.24	0.003	0.005

1/1



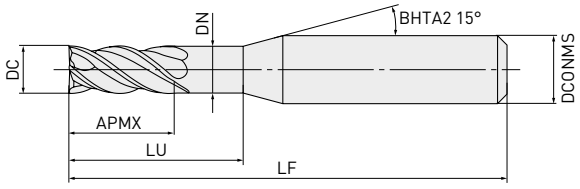
1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work. When measuring the tool length, please use a mechanical contact type or a laser tool setter.
2. The irregular pitch flute end mill has a larger effect on controlling vibration 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.

VQ4MVM

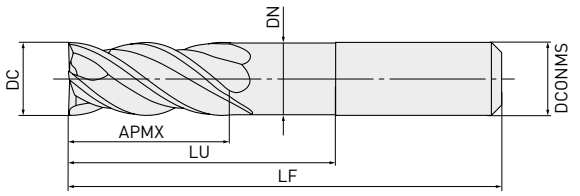
END MILL, MEDIUM CUT LENGTH, 4 FLUTE, FOR MULTIFUNCTIONAL MACHINING

P M S

1



2



DC ≤ 12
0 -0.020

DCONMS = 6
0 -0.008

DCONMS 8, 10	DCONMS = 12
0 -0.009	0 -0.011

- Multifunctional end mill that enables a strong ramping capability.
- Chip evacuation is improved by increasing the capacity of the radial cutting edge pocket.

Order number	Stock	DC	APMX	LF	DCONMS	LU	DN	ZEFP	Type
VQ4MVMD0400N180	●	4	11	50	6	18	3.85	4	1
VQ4MVMD0500N180	●	5	13	50	6	18	4.85	4	1
VQ4MVMD0600N200	●	6	13	60	6	20	5.85	4	2
VQ4MVMD0800N240	●	8	19	60	8	24	7.85	4	2
VQ4MVMD1000N300	●	10	22	70	10	30	9.70	4	2
VQ4MVMD1200N360	●	12	26	75	12	36	11.70	4	2

1/1

284 Vc

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

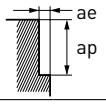
VQ4MVM

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

	Material	DC	n	Vc	f	ap	ae
P	Mild steel, Carbon steel, Alloy steel (180 – 280HB),	4	9500	120	1400	6	1.2
		5	7600	120	1400	7.5	1.5
		6	6400	120	1400	9	1.8
		8	4800	120	1300	12	2.4
		10	3800	120	1200	15	3
		12	3200	120	1000	18	3.6
P	Pre-hardened steel (≤45HRC), Alloy tool steel	4	5600	70	490	4	0.4
		5	4500	70	500	5	0.5
		6	3700	70	500	6	0.6
		8	2800	70	520	8	0.8
		10	2200	70	460	10	1
		12	1900	70	450	12	1
M	Austenitic stainless steel, Ferritic and martensitic stainless steel,	4	6400	80	470	4	0.6
		5	5100	80	470	5	0.9
		6	4200	80	580	6	1.2
S	Titanium alloy	8	3200	80	630	8	1.5
		10	2500	80	660	10	1.8
		12	2100	80	610	12	2.4
M	Precipitation hardening stainless steel, Cobalt chromium alloy	4	5600	70	490	4	0.8
		5	4500	70	500	5	1
		6	3700	70	500	6	1.2
		8	2800	70	520	8	1.6
		10	2200	70	460	10	2
		12	1900	70	450	12	2.4
S	Heat resistant alloy	4	2400	30	120	4	0.4
		5	1900	30	120	5	0.5
		6	1600	30	130	6	0.6
		8	1200	30	130	8	0.8
		10	950	30	140	10	1
		12	800	30	140	12	1.2

1/1



1. SMART MIRACLE coating has very low electrical conductivity; therefore, an external contact type of tool setter (electrically transmitted) may not work.
   When measuring the tool length, please use an internal contact type (non-electrical type) or a laser tool setter.
2. When cutting austenitic stainless steels and titanium alloys, the use of water-soluble cutting fluid is effective.
3. If the depth of cut is shallow, the revolution and feed rate can be increased.
4. If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

VQ4MVM

SLOT MILLING AND RAMPING

	Material	DC	n	Vc	f	ap	ae
P	Mild steel, Carbon steel, Alloy steel (180 – 280HB)	4	8000	100	840	4	4
		5	6400	100	840	5	5
		6	5300	100	840	6	6
		8	4000	100	740	8	8
		10	3200	100	680	10	10
		12	2700	100	570	12	12
P	Pre-hardened steel (≤45HRC), Alloy tool steel	4	4800	60	210	2	4
		5	3800	60	210	2.5	5
		6	3200	60	230	3	6
		8	2400	60	240	4	8
		10	1900	60	270	5	10
		12	1600	60	260	6	12
M S	Austenitic stainless steel, Ferritic and martensitic stainless steel, Titanium alloy	4	4800	60	280	4	4
		5	3800	60	280	5	5
		6	3200	60	300	6	6
		8	2400	60	320	8	8
		10	1900	60	350	10	10
		12	1600	60	340	12	12
M	Precipitation hardening stainless steel, Cobalt chromium alloy	4	4000	50	250	2	4
		5	3200	50	250	2.5	5
		6	2700	50	290	3	6
		8	2000	50	260	4	8
		10	1600	50	230	5	10
		12	1300	50	210	6	12
S	Heat resistant alloy	4	2000	25	93	1.2	4
		5	1600	25	95	1.5	5
		6	1300	25	96	1.8	6
		8	990	25	100	2.4	8
		10	800	25	120	3	10
		12	660	25	110	3.6	12

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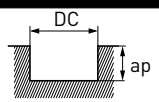

1. SMART MIRACLE coating has very low electrical conductivity; therefore, an external contact type of tool setter (electric transmitted) may not work.
   When measuring the tool length, please use an internal contact type (non-electricity type) or a laser tool setter.
2. When cutting austenitic stainless steels and titanium alloys, the use of water-soluble cutting fluid is effective.
3. When performing machining with a strong ramping angle, a high clamping force tool holder is recommended.
4. When performing ramping deeper than the recommended depth of cut, please divide the process into multiple steps within the recommended depth of cut.
5. If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

VQ4MVM

FEED RATE FACTOR FOR RAMPING

	Material	DC	Slot milling feed %						
			1°	5°	10°	15°	20°	25°	30°
P	Mild steel, Carbon steel, Alloy steel (180 – 280HB),	4	100	90	80	80	60	60	60
		5	100	90	80	80	60	60	60
		6	100	90	80	80	60	60	60
		8	100	95	90	90	90	75	75
		10	100	95	95	95	90	80	80
		12	100	95	95	95	90	80	80
P	Pre-hardened steel (≤45HRC), Alloy tool steel	4	80	70	60				
		5	80	70	60				
		6	80	70	60				
		8	70	60	50				
		10	70	60	50				
		12	70	60	50				
M	Austenitic stainless steel, Ferritic and martensitic stainless steel, Titanium alloy	4	90	80	70	50			
		5	90	80	70	50			
		6	90	80	70	60			
		8	90	80	70	60			
S		10	80	70	60	50			
		12	80	70	60	50			
M	Precipitation hardening stainless steel, Cobalt chromium alloy	4	90	80	70	60	60		
		5	90	80	70	60	60		
		6	90	80	70	60	60		
		8	90	80	70	60	60		
		10	80	80	70	60	60		
		12	80	80	70	60	60		
S	Heat resistant alloy	4	90	80					
		5	90	80					
		6	90	80					
		8	90	80					
		10	80	70					
		12	80	70					

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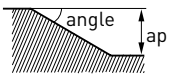
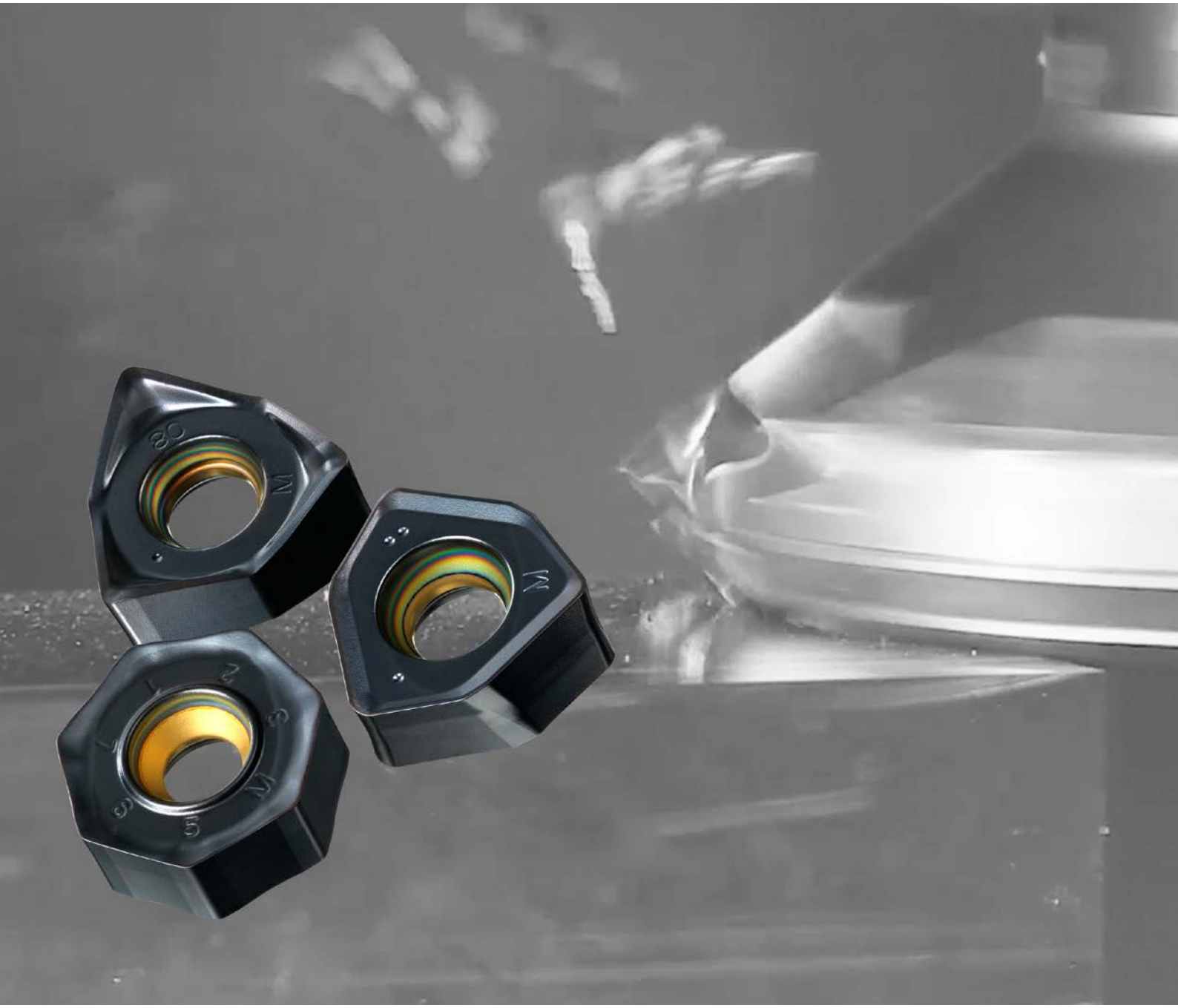


1. SMART MIRACLE coating has very low electrical conductivity; therefore, an external contact type of tool setter (electric transmitted) may not work.
   When measuring the tool length, please use an internal contact type (non-electrical type) or a laser tool setter.
2. When performing ramping, please use the feed rate shown on the previous page multiplied by the coefficient.
3. When cutting austenitic stainless steels and titanium alloys, the use of water-soluble cutting fluid is effective.
4. When performing machining with large ramping angles, a high clamping force tool holder is recommended. Also, if the machine or workpiece material lacks rigidity, or if chipping occurs on the cutting edge, adjust the ramping angle and feed rate.
5. When performing ramping deeper than the recommended depth of cut, please divide the process into multiple steps within the recommended depth of cut.

MV1000 SERIES

SETTING A NEW STANDARD FOR TOOL LIFE



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DIA EDGE

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

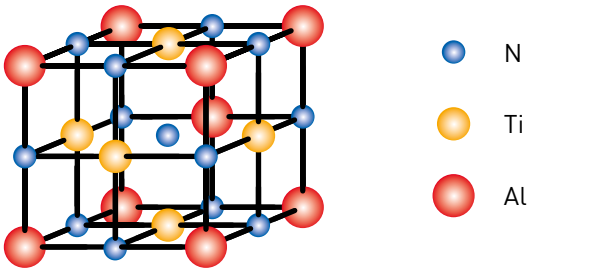
Exclusive cemented carbide substrate.

MV1000 SERIES

COMPLETE COATING TECHNOLOGY THAT REWRITES CURRENT TOOL LIFE STANDARDS

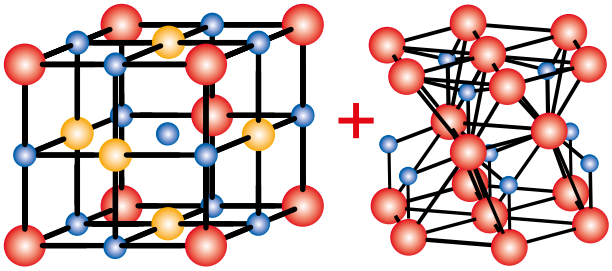
DUE TO THE NEWLY DEVELOPED AL-RICH COATING

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.



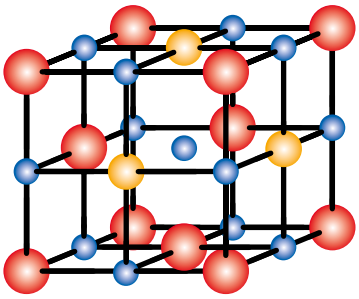
The combination of atoms with different sizes creates an exceptionally hard crystal structure.

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.

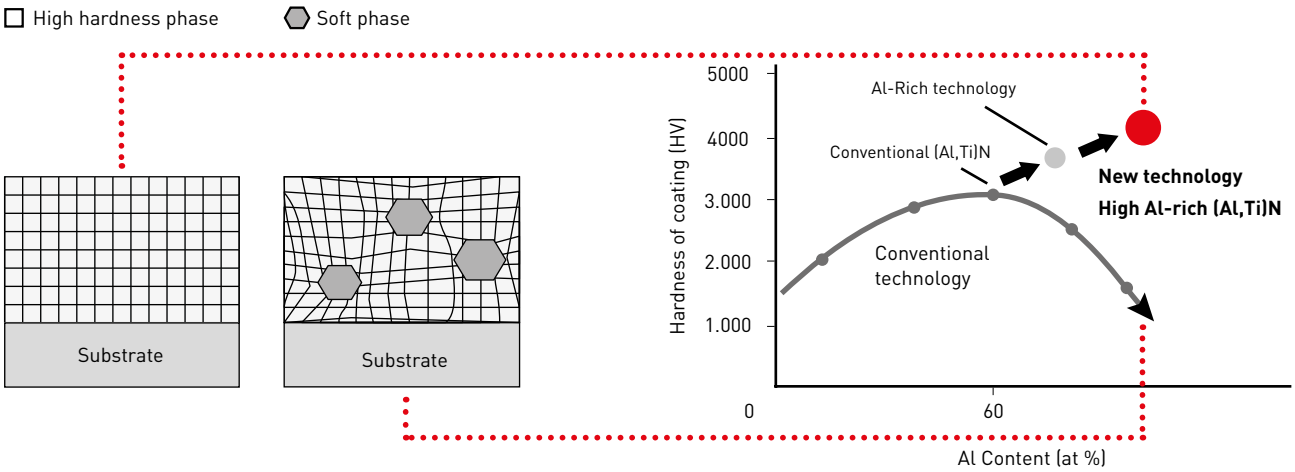


When the Al ratio is over 60 %, a softer crystal phase is formed.

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

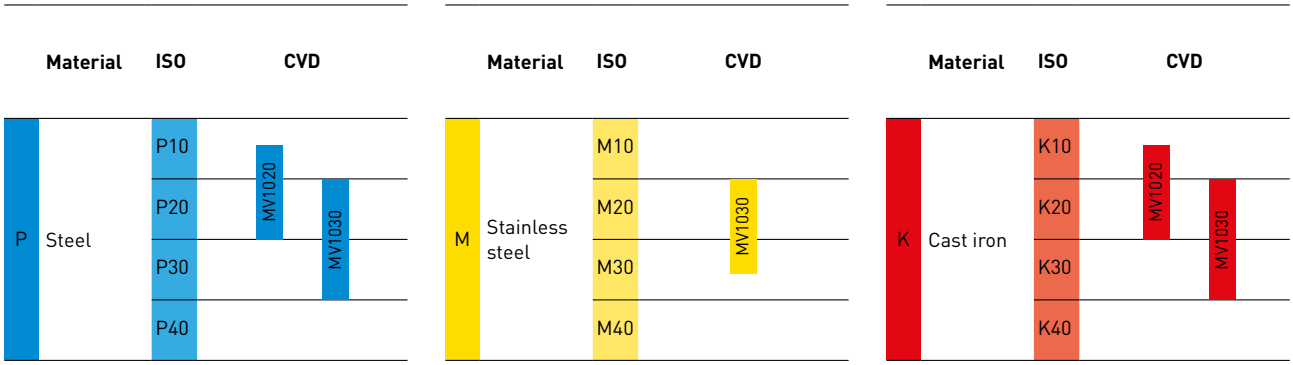
COATED CARBIDE GRADE FOR MILLING

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.



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

MV1000 SERIES

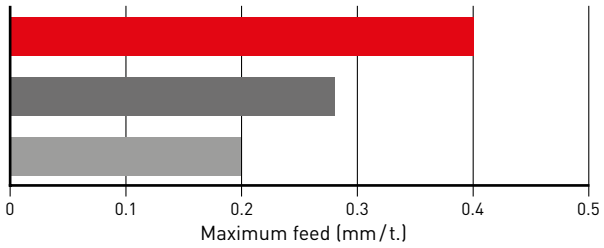
CUTTING PERFORMANCE

MV1030

COMPARISON OF FRACTURE RESISTANCE FOR INTERMITTENT CUTTING OF ALLOY STEEL

MV1030 is capable of high feed machining due to its excellent fracture resistance even during interrupted cutting.

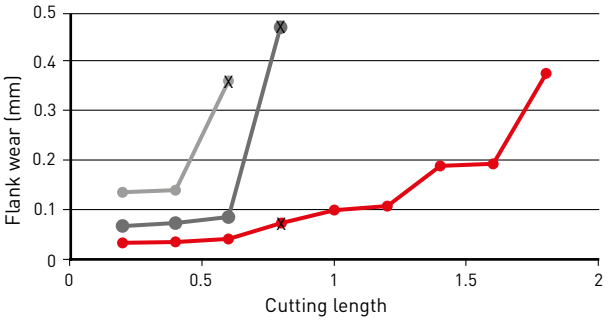
Material	DIN 41CrMo4
Tool	ASX445
Insert	SEMT13T3AGSN-JM
Vc (m/min)	200
ap (mm)	3.0
ae (mm)	100
Cutting mode	Dry cutting



COMPARISON OF WEAR RESISTANCE WHEN MACHINING STAINLESS STEEL

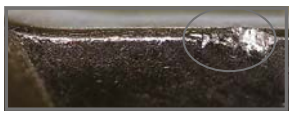
MV1030 suppresses damage at the cut border and can be expected to significantly improve tool life.

Material	DIN X5CrNi189
Tool	ASX445
Insert	SEMT13T3AGSN-JM
Vc (m/min)	180
fz (mm/t)	0.2
ap (mm)	2.0
ae (mm)	100
Cutting mode	Dry cutting Single insert



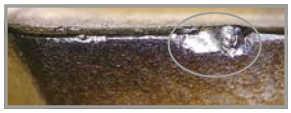
AFTER MACHINING 0.8 M

MV1030



Conventional A

AFTER MACHINING 0.6 M



Conventional B

■ : MV1030 ■ A ■ B : Conventional tool

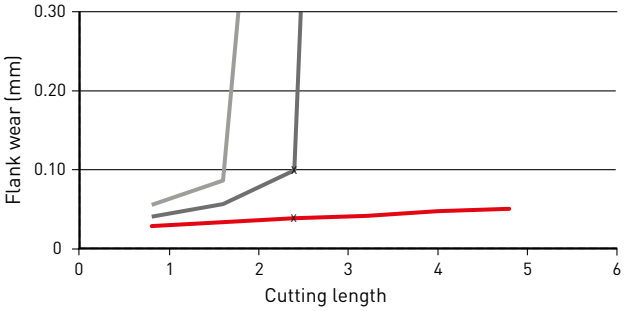
MV1000 SERIES

CUTTING PERFORMANCE

MV1020

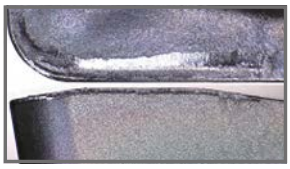
COMPARISON OF WEAR RESISTANCE WHEN MACHINING ALLOY STEEL

Material	DIN 41CrMo4
Tool	WWX400
Insert	6NMU1409080PNER-M
Vc (m/min)	300
fz (mm/t)	0.15
ap (mm)	3.0
ae (mm)	52
Cutting mode	Dry cutting Single insert



TAKEN AFTER CUTTING LENGTH OF 2.4 M

MV1020

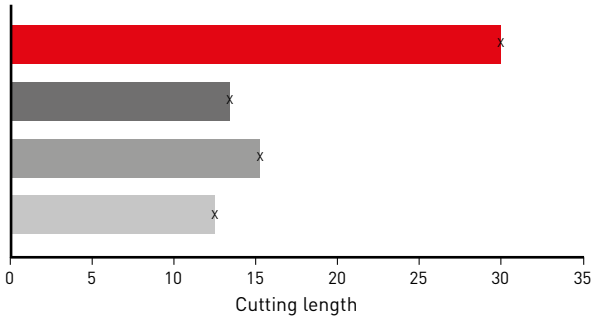


Conventional A

Conventional B

COMPARISON OF WEAR RESISTANCE WHEN MACHINING DUCTILE CAST IRON

Material	DIN GGG70
Tool	WJX14
Insert	JOMU140715ZZER-M
Vc (m/min)	220
fz (mm/t)	1.0
ap (mm)	1.0
ae (mm)	45
Cutting mode	Dry cutting Single insert



30.4 M

MV1020

13.6 M

Conventional A

15.2 M

Conventional B

12.8 M

Conventional C

■ : MV1020 ■ A ■ B ■ C : Conventional tool

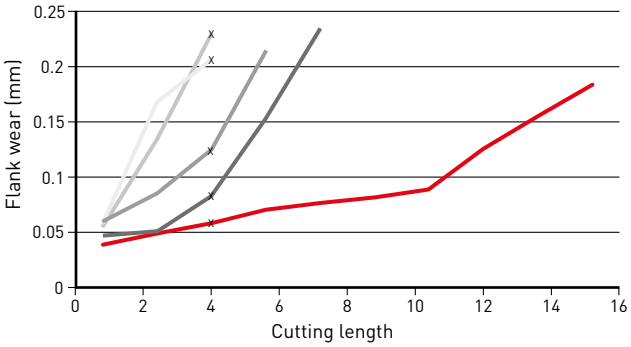
MV1000 SERIES

CUTTING PERFORMANCE

MV1020

COMPARISON OF WEAR RESISTANCE WHEN MACHINING DUCTILE CAST IRON

Material	DIN GGG70
Tool	AHX440
Insert	NNMU130508ZEN-M
Vc (m/min)	300
fz (mm/t)	0.1
ap (mm)	2.0
ae (mm)	52
Cutting mode	Dry cutting Single insert



TAKEN AFTER CUTTING LENGTH OF 4.0 M

MV1020

Conventional A

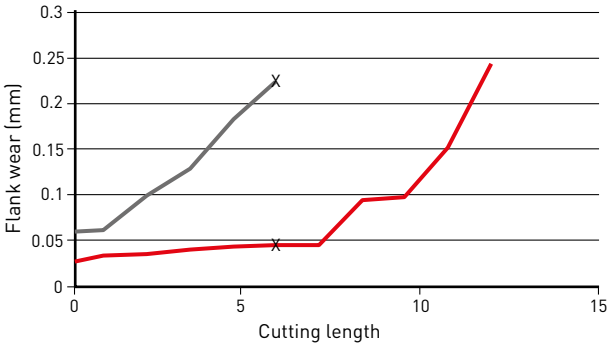
Conventional B

Conventional C

Conventional D

COMPARISON OF WEAR RESISTANCE WHEN MACHINING ALLOY STEEL

Material	DIN 41CrMo4
Tool	WSX445
Insert	SNMU140812ANER-M
Vc (m/min)	300
fz (mm/t)	0.2
ap (mm)	2.0
ae (mm)	100
Cutting mode	Dry cutting



TAKEN AFTER CUTTING LENGTH OF 6.0 M

12 M CUTTING LENGTH ACHIEVED

MV1020

CHIPPING OCCURS AT CUTTING LENGTH OF 6 M

Conventional A

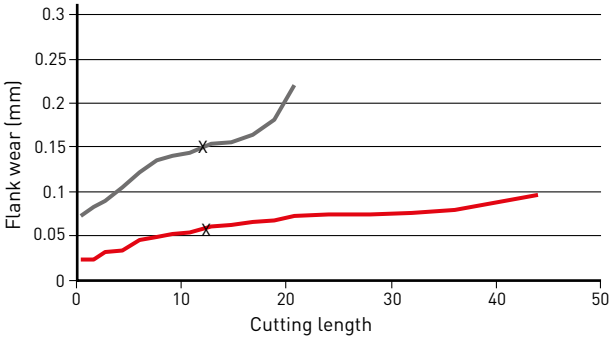
MV1000 SERIES

CUTTING PERFORMANCE

MV1020

COMPARISON OF WEAR RESISTANCE FOR ROLLED STEEL

Material	DIN St 44-2
Tool	ASX445
Insert	SEMT13T3AGSN-JM
Vc (m/min)	300
fz (mm/t)	0.2
ap (mm)	2.0
ae (mm)	100
Cutting mode	Dry cutting

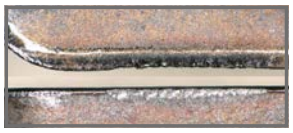


TAKEN AFTER CUTTING LENGTH OF 12.8 M

40 M CUTTING LENGTH ACHIEVED

MV1020

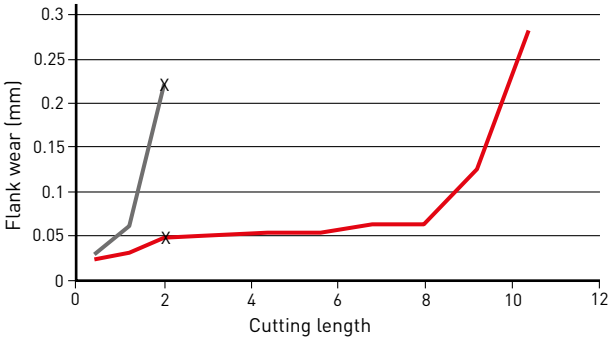
WEAR PROGRESSED AND THE SUBSTRATE WAS EXPOSED



Conventional

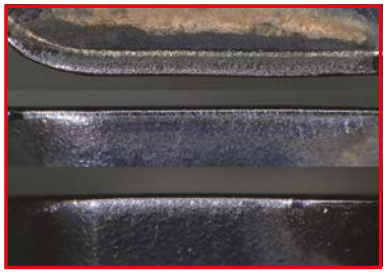
COMPARISON OF WEAR RESISTANCE WHEN MACHINING CARBON STEEL

Material	DIN Ck55
Tool	ASX445
Insert	SEMT13T3AGSN-JM
Vc (m/min)	200
fz (mm/t)	0.2
ap (mm)	2.0
ae (mm)	100
Cutting mode	Wet cutting



TAKEN AFTER CUTTING LENGTH OF 2.0 M

10 M CUTTING LENGTH ACHIEVED



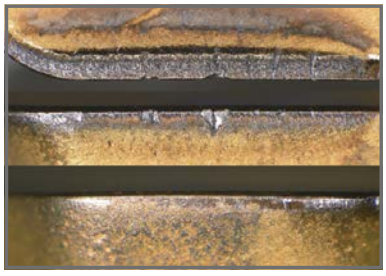
MV1020

Rake face

Main cutting edge

Wiper

CHIPPING OCCURRED DUE TO THERMAL CRACKS AT A CUTTING LENGTH OF 2 M



Conventional

■ : MV1020 ■ : Conventional tool

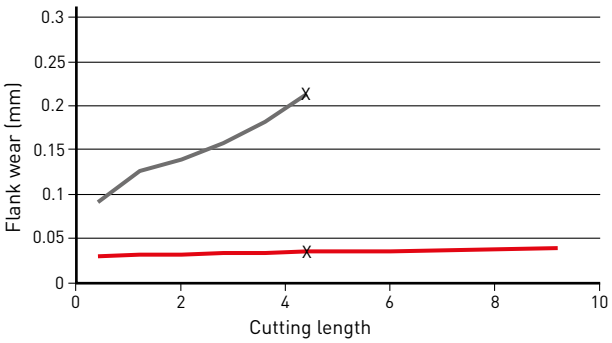
MV1000 SERIES

CUTTING PERFORMANCE

MV1020

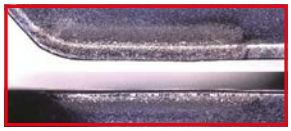
COMPARISON OF WEAR RESISTANCE WHEN MACHINING DUCTILE CAST IRON

Material	DIN GGG40.5
Tool	ASX445
Insert	SEMT13T3AGSN-JM
Vc (m/min)	250
fz (mm/t)	0.2
ap (mm)	2.0
ae (mm)	100
Cutting mode	Dry cutting



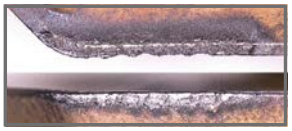
TAKEN AFTER CUTTING LENGTH OF 4.4 M

ACHIEVES A CUTTING LENGTH OF 9 M OR MORE



MV1020

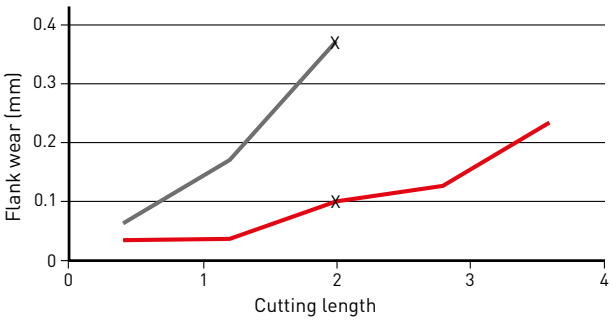
UNABLE TO CONTINUE MACHINING AFTER A CUT LENGTH OF 4.4 M



Conventional

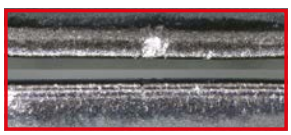
COMPARISON OF WEAR RESISTANCE WHEN MACHINING DUCTILE CAST IRON WET CUTTING

Material	DIN GGG70
Tool	ASX445
Insert	SEMT13T3AGSN-JM
Vc (m/min)	200
fz (mm/t)	0.2
ap (mm)	2.0
ae (mm)	100
Cutting mode	Wet cutting



TAKEN AFTER CUTTING LENGTH OF 2.0 M

3.5 M CUTTING LENGTH ACHIEVED



MV1020

UNABLE TO CONTINUE PROCESSING WITH A CUT LENGTH OF 2.0 M

Conventional

MV1000 SERIES

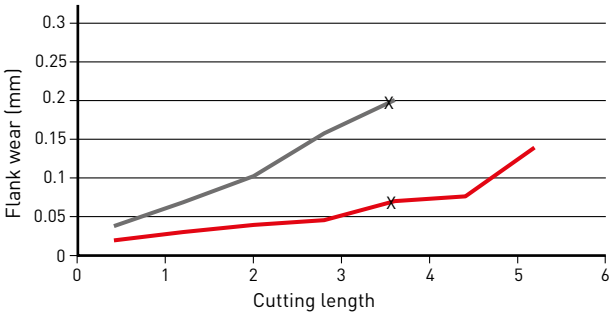
CUTTING PERFORMANCE

MV1020

COMPARISON OF WEAR RESISTANCE WHEN MACHINING DUCTILE CAST IRON

DRY CUTTING

Material	DIN GGG70
Tool	ASX445
Insert	SEMT13T3AGSN-JM
Vc (m/min)	200
fz (mm/t)	0.2
ap (mm)	2.0
ae (mm)	100
Cutting mode	Dry cutting



TAKEN AFTER CUTTING LENGTH OF 3.6 M

5.0 M CUTTING LENGTH ACHIEVED

MV1020

CHIPPING OCCURRED DUE TO PEELING OF THE COATING

Conventional

■ : MV1020 ■ : Conventional tool

MV1000 SERIES

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.

Honing:
E: Round

Order number	Application	Class	Honing	MV1020	MV1030	IC	S	S1	BS	RE/ BCH	Geometry
6NMU0906040PNER-M	General purpose cutting	M	E	●		9.0	5.3	6.1	1.6	0.4	**WWX200**
6NMU0906080PNER-M	General purpose cutting	M	E	●		9.0	5.3	6.1	1.2	0.8	
6NMU0906080PNER-R	Cutting edge strength	M	E	●		9.0	5.3	6.1	1.2	0.8	
6NGU1409040PNER-L	Low cutting resistance	G	E	●	●	14.0	7.0	9.0	1.7	0.4	**WWX400**
6NGU1409080PNER-L	Low cutting resistance	G	E	●	●	14.0	7.0	9.0	1.3	0.8	
6NGU1409040PNER-M	General purpose cutting	G	E	●	●	14.0	7.0	9.0	1.7	0.4	
6NGU1409080PNER-M	General purpose cutting	G	E	●	●	14.0	7.0	9.0	1.3	0.8	
6NMU1409040PNER-M	General purpose cutting	M	E	●	●	14.0	7.0	9.0	1.7	0.4	
6NMU1409080PNER-M	General purpose cutting	M	E	●	●	14.0	7.0	9.0	1.3	0.8	
6NMU1409160PNER-M	General purpose cutting	M	E	●	●	14.0	7.0	9.0	0.5	1.6	
6NMU1409200PNER-M	General purpose cutting	M	E	●	●	14.0	7.0	9.0	0.5	2.0	
6NMU1409080PNER-R	Cutting edge strength	M	E	●	●	14.0	7.0	9.0	1.3	0.8	
6NMU1409160PNER-R	Cutting edge strength	M	E	●	●	14.0	7.0	9.0	0.5	1.6	
6NMU1409200PNER-R	Cutting edge strength	M	E	●	●	14.0	7.0	9.0	0.5	2.0	
SNGU140812ANER-L	Low cutting resistance	G	E	●	●	14.0	8.4	—	1.5	1.2	**WSX445**
SNGU140812ANER-M	General purpose cutting	G	E	●	●	14.0	8.4	—	1.5	1.2	
SNMU140812ANER-M	General purpose cutting	M	E	●	●	14.0	8.4	—	1.5	1.2	
SNMU140812ANER-R	Cutting edge strength	M	E	●	●	14.0	8.4	—	1.5	1.2	
SNMU140812ANER-H	Cutting edge strength	M	E	●	●	14.0	8.4	—	1.5	1.2	
JOMU090512ZZER-L	Low cutting resistance	M	E	●	●	9.525	4.73	—	0.88	1.2	**WJX**
JOMU140715ZZER-L	Low cutting resistance	M	E	●	●	14.0	6.58	—	1.3	1.5	
JOMU090512ZZER-M	General purpose cutting	M	E	●	●	9.525	4.75	—	0.88	1.2	
JOMU140715ZZER-M	General purpose cutting	M	E	●	●	14.0	6.63	—	1.3	1.5	
JOMU090512ZZER-R	Cutting edge strength	M	E	●	●	9.525	4.83	—	0.88	1.2	
JOMU140715ZZER-R	Cutting edge strength	M	E	●	●	14.0	6.75	—	1.3	1.5	
SNMU1206C05ZNER-M	Cast iron milling	M	E	●	●	12.7	6.2	—	1.6	0.5	**WSF406W**

(10 inserts in one case)

300 Vc

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

MV1000 SERIES – 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.

Honing:
E: Round

Order number	Application	Class	Honing	MV1020	MV1030	L	S	LE	BS	RE	Geometry
LOGU0904020PNER-L	Low cutting resistance	G	E	●	●	8.7	4.3	7.6	1.7	0.2	VPX200
LOGU0904040PNER-L		G	E	●	●	8.7	4.3	7.6	1.5	0.4	
LOGU0904080PNER-L		G	E	●	●	8.7	4.3	7.6	1.2	0.8	
LOGU0904100PNER-L		G	E	●	●	8.7	4.3	7.6	1.0	1.0	
LOGU0904120PNER-L		G	E	●	●	8.7	4.3	7.6	0.8	1.2	
LOGU0904160PNER-L		G	E	●	●	8.7	4.3	7.6	0.5	1.6	
LOGU0904020PNER-M	General purpose cutting	G	E	●	●	8.7	4.3	7.6	1.7	0.2	
LOGU0904040PNER-M		G	E	●	●	8.7	4.3	7.6	1.6	0.4	
LOGU0904080PNER-M		G	E	●	●	8.7	4.3	7.6	1.2	0.8	
LOGU0904100PNER-M		G	E	●	●	8.7	4.3	7.6	1.0	1.0	
LOGU0904120PNER-M		G	E	●	●	8.7	4.3	7.6	0.9	1.2	
LOGU0904160PNER-M		G	E	●	●	8.7	4.3	7.6	0.5	1.6	
LOGU1207020PNER-L	Low cutting resistance	G	E	●	●	12.4	7.0	11.3	3.0	0.2	VPX300
LOGU1207040PNER-L		G	E	●	●	12.4	7.0	11.3	2.8	0.4	
LOGU1207080PNER-L		G	E	●	●	12.4	7.0	11.3	2.6	0.8	
LOGU1207100PNER-L		G	E	●	●	12.4	7.0	11.3	2.5	1.0	
LOGU1207120PNER-L		G	E	●	●	12.4	7.0	11.3	2.4	1.2	
LOGU1207160PNER-L		G	E	●	●	12.4	7.0	11.3	1.8	1.6	
LOGU1207200PNER-L		G	E	●	●	12.4	7.0	11.3	1.4	2.0	
LOGU1207240PNER-L		G	E	●	●	12.4	7.0	11.3	1.2	2.4	
LOGU1207300PNER-L		G	E	●	●	12.4	7.0	11.3	0.6	3.0	
LOGU1207320PNER-L		G	E	●	●	12.4	7.0	11.3	0.4	3.2	
LOGU1207020PNER-M	General purpose cutting	G	E	●	●	12.4	7.0	11.3	3.0	0.2	
LOGU1207040PNER-M		G	E	●	●	12.4	7.0	11.3	2.8	0.4	
LOGU1207080PNER-M		G	E	●	●	12.4	7.0	11.3	2.4	0.8	
LOGU1207100PNER-M		G	E	●	●	12.4	7.0	11.3	2.3	1.0	
LOGU1207120PNER-M		G	E	●	●	12.4	7.0	11.3	2.1	1.2	
LOGU1207160PNER-M		G	E	●	●	12.4	7.0	11.3	1.7	1.6	
LOGU1207200PNER-M		G	E	●	●	12.4	7.0	11.3	1.4	2.0	
LOGU1207240PNER-M		G	E	●	●	12.4	7.0	11.3	1.0	2.4	
LOGU1207300PNER-M		G	E	●	●	12.4	7.0	11.3	0.5	3.0	
LOGU1207320PNER-M		G	E	●	●	12.4	7.0	11.3	0.3	3.2	

(10 inserts in one case)

300 Vc

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

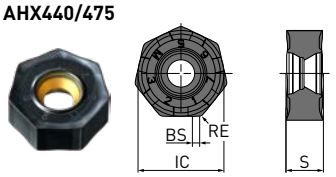
MV1000 SERIES – INSERTS

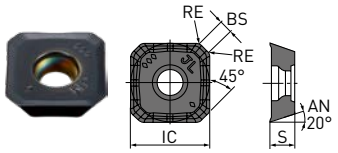
P	Steel	◆	◆
M	Stainless steel		◆
K	Cast iron	◆	◆

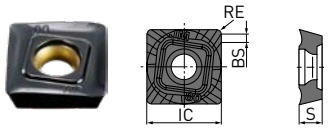
Please note that the cutting conditions differ depending on multiple factors, for more details refer to the recommended cutting conditions.

Honing:
E: Round S: Chamfer + round

Order number	Application	Class	Honing	MV1020	MV1030	IC	S	S1	BS	RE	Geometry
NNMU130508ZER-L	Low cutting resistance	M	E	●	●	13.4	5.77	—	1.0	0.8	**AHX440/475**
NNMU130508ZEN-M	General purpose cutting	M	E	●	●	13.4	5.57	—	1.0	0.8	
NNMU130532ZEN-M	General purpose cutting	M	E	●	●	13.4	5.57	—	—	3.2	
NNMU130532ZEN-R	Cutting edge strength	M	E	●	●	13.4	5.47	—	—	3.2	
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	







3/3

(10 inserts in one case)

300 Vc

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

MV1000 SERIES

COATED CARBIDE GRADE FOR MILLING

COVERS A WIDE RANGE OF CUTTING SPEEDS (DRY CUTTING WITH WWX400)

	Material	Properties	Grade	Vc
P	Mild steel	≤180HB	MV1020	305 (250 – 360)
			MV1030	235 (190 – 280)
			MP6120	245 (200 – 290)
			MP6130	235 (190 – 280)
	Carbon steel Alloy steel	180–280HB	MV1020	260 (210 – 310)
			MV1030	200 (155 – 245)
			MP6120	205 (160 – 250)
			MP6130	200 (155 – 245)
		280–350HB	MV1020	260 (210 – 310)
			MV1030	200 (155 – 245)
			MP6120	200 (155 – 245)
			MP6130	195 (150 – 240)
M	Stainless steel	>200HB	MV1030	180 (155 – 200)
			MP7130	175 (150 – 200)
			VP15TF	175 (150 – 200)
K	Ductile cast iron	Tensile strength ≤450MPa	MV1020	255 (200 – 310)
			MV1030	205 (160 – 250)
			MP6120	205 (160 – 250)
			MP6130	205 (160 – 250)
		Tensile strength >450MPa	MV1020	225 (160 – 290)
			MV1030	170 (130 – 210)
			MP6120	170 (130 – 210)
			MP6130	170 (130 – 210)

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MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

WWX200/400

CUTTING SPEED (DRY CUTTING)

	Material	Properties	Conditions	MV1020			MV1030		
				ae			ae		
				≥0.5 DC	≥0.8 DC	DC (Slot)	≥0.5 DC	≥0.8 DC	DC (Slot)
				Vc			Vc		
P	Mild steel	≤180HB	●	300 (250–350)	280 (230–330)	250 (200–300)	230 (190–270)	210 (170–250)	190 (150–230)
			◐	290 (240–340)	260 (210–320)	240 (190–290)	230 (190–270)	210 (170–250)	190 (150–230)
	Carbon steel Alloy steel	180–350HB	●	260 (210–310)	240 (190–280)	210 (160–260)	200 (160–240)	180 (140–220)	160 (120–200)
			◐	250 (200–300)	230 (180–270)	200 (150–250)	200 (160–240)	180 (140–220)	160 (120–200)
M	Stainless steel	—	●	—	—	—	180 (160–200)	160 (140–180)	—
			◐	—	—	—	170 (150–190)	150 (130–170)	—
K	Ductile cast iron	Tensile strength ≤450MPa	●	240 (200–310)	220 (170–280)	200 (150–260)	210 (170–250)	190 (150–230)	170 (130–210)
			◐	230 (190–300)	210 (160–270)	190 (140–250)	210 (170–250)	190 (150–230)	170 (130–210)
		Tensile strength ≤800MPa	●	210 (160–280)	190 (140–250)	160 (120–210)	170 (130–210)	150 (110–190)	130 (90–170)
			◐	200 (150–270)	180 (130–240)	150 (110–200)	170 (130–210)	150 (110–190)	130 (90–170)

1/1

WWX200/400

CUTTING SPEED (WET CUTTING)

	Material	Properties	Conditions	MV1020			MV1030		
				ae			ae		
				≥0.5 DC	≥0.8 DC	DC (Slot)	≥0.5 DC	≥0.8 DC	DC (Slot)
				Vc			Vc		
P	Mild steel	≤180HB	●	220 (210–230)	190 (180–210)	180 (160–190)	140 (130–150)	120 (110–130)	110 (100–120)
			◐	210 (200–220)	180 (170–200)	170 (150–180)	140 (130–150)	120 (110–130)	110 (100–120)
	Carbon steel Alloy steel	180–350HB	●	200 (190–210)	170 (160–190)	160 (150–170)	140 (130–150)	120 (110–130)	110 (100–120)
			◐	190 (180–200)	160 (150–180)	150 (140–160)	140 (130–150)	120 (110–130)	110 (100–120)
K	Ductile cast iron	Tensile strength ≤450MPa	●	200 (180–240)	180 (150–220)	150 (130–200)	160 (140–180)	140 (120–160)	120 (100–140)
			◐	190 (170–230)	170 (140–210)	140 (120–190)	160 (140–180)	140 (120–160)	120 (100–140)
		Tensile strength ≤800MPa	●	180 (170–210)	160 (150–190)	140 (120–160)	150 (140–160)	130 (120–140)	110 (100–120)
			◐	170 (160–200)	150 (140–180)	120 (110–150)	150 (140–160)	130 (120–140)	110 (100–120)

1/1

1. The recommended cutting speed has been calculated for a depth of cut 2 mm. Please reduce the cutting speed by an appropriate amount corresponding to the increase in cutting depth.

Cutting conditions: ●: Stable cutting ◐: General cutting ✱: Unstable cutting

MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

WWX200

DEPTH OF CUT / FEED PER TOOTH

DRY AND WET CUTTING

	Material	Properties	Conditions	ae								
				≥0.5 DC			≥0.8 DC			DC (Slot)		
					ap	fz		ap	fz		ap	fz
P	Mild steel	≤180HB	●●	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)
			●	M,R	≤3.0	0.16 (0.10–0.20)	M,R	≤3.0	0.16 (0.10–0.20)	—	—	—
	Carbon steel Alloy steel	180–350HB	●●	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)
			●	M,R	≤3.0	0.16 (0.10–0.20)	M,R	≤3.0	0.16 (0.10–0.20)	—	—	—
K	Ductile cast iron	Tensile strength ≤450MPa	●●	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)
			●	M,R	≤3.0	0.16 (0.10–0.20)	M,R	≤3.0	0.16 (0.10–0.20)	—	—	—
		Tensile strength ≤800MPa	●●	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)
			●	M,R	≤3.0	0.16 (0.10–0.20)	M,R	≤3.0	0.16 (0.10–0.20)	—	—	—

1/1

1. Refer to the above table and set up cutting conditions according to the application.

WWX400

DEPTH OF CUT / FEED PER TOOTH

DRY AND WET CUTTING

	Material	Properties	Conditions	ae								
				≥0.5 DC			≥0.8 DC			DC (Slot)		
					ap	fz		ap	fz		ap	fz
P	Mild steel	≤180HB	●●	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)
			●	M,R	≤4.0	0.16 (0.10–0.20)	M,R	≤3.0	0.16 (0.10–0.20)	—	—	—
	Carbon steel Alloy steel	180–350HB	●●	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)
			●	M,R	≤4.0	0.16 (0.10–0.20)	M,R	≤3.0	0.16 (0.10–0.20)	—	—	—
M	Stainless steel	—	●●	L,M	≤2.0	0.13 (0.10–0.15)	L, M	≤2.0	0.13 (0.10–0.15)	—	—	—
K	Ductile cast iron	Tensile strength ≤450MPa	●●	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)
			●	M,R	≤4.0	0.16 (0.10–0.20)	M,R	≤3.0	0.16 (0.10–0.20)	—	—	—
		Tensile strength ≤800MPa	●●	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)
			●	M,R	≤4.0	0.16 (0.10–0.20)	M,R	≤3.0	0.16 (0.10–0.20)	—	—	—

1/1

1. Refer to the above table and set up cutting conditions according to the application.

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

MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

WSX445

CUTTING SPEED

DRY AND WET CUTTING

	Material	Properties	MV1020 Vc		MV1030 Vc	
			Dry cutting	Wet cutting	Dry cutting	Wet cutting
P	Mild steel	≤180HB	300 (200 – 400)	220 (120 – 320)	250 (200 – 300)	150 (100 – 200)
P	Carbon steel Alloy steel	180–350HB	260 (170 – 350)	200 (100 – 300)	220 (170 – 270)	120 (80 – 160)
P		280–350HB	180 (100 – 250)	150 (100 – 200)	180 (100 – 250)	120 (80 – 160)
M	Stainless steel	—	—	—	200 (150 – 250)	—
K	Ductile cast iron	Tensile strength ≤450MPa	240 (130 – 350)	200 (130 – 250)	160 (110 – 240)	150 (100 – 200)
K		Tensile strength ≤800MPa	220 (80 – 350)	180 (80 – 230)	180 (110 – 250)	140 (80 – 200)

1/1

WSX445

DEPTH OF CUT / FEED PER TOOTH

DRY AND WET CUTTING

	Material	Properties	LF L		L L, M		M M		R M, R		H R, H	
			fz	ap	fz	ap	fz	ap	fz	ap	fz	ap
P	Mild steel	≤180HB	0.15 (0.1–0.2)	≤1.0	0.15 (0.1–0.2)	≤2.0	0.2 (0.15–0.25)	≤3.0	0.2 (0.15–0.25)	≤4.0	0.25 (0.2–0.3)	≤5.0
P	Carbon steel Alloy steel	180–350HB	0.15 (0.1–0.2)	≤1.0	0.15 (0.1–0.2)	≤2.0	0.2 (0.15–0.25)	≤3.0	0.2 (0.15–0.25)	≤4.0	0.25 (0.2–0.3)	≤5.0
P		280–350HB	0.15 (0.1–0.2)	≤1.0	0.15 (0.1–0.2)	≤2.0	0.2 (0.15–0.25)	≤3.0	0.2 (0.15–0.25)	≤4.0	0.25 (0.2–0.3)	≤5.0
M	Stainless steel	—	0.15 (0.1–0.2)	≤1.0	0.15 (0.1–0.2)	≤2.0	0.2 (0.15–0.25)	≤3.0	—	—	—	—
K	Ductile cast iron	Tensile strength ≤450MPa	0.15 (0.1–0.2)	≤1.0	0.15 (0.1–0.2)	≤2.0	0.2 (0.15–0.25)	≤3.0	0.2 (0.15–0.25)	≤4.0	0.25 (0.2–0.3)	≤5.0
K		Tensile strength ≤800MPa	0.15 (0.1–0.2)	≤1.0	0.15 (0.1–0.2)	≤2.0	0.2 (0.15–0.25)	≤3.0	0.2 (0.15–0.25)	≤4.0	0.25 (0.2–0.3)	≤5.0

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MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

CHIPBREAKER SELECTION TABLE

WJX09

	Material	Properties	L		M		R	
			Conditions	ap	Conditions	ap	Conditions	ap
P	Mild steel	≤180HB	● ◐	≤1.0	● ◐	≤1.5	◐ ✱	≤1.5
P	Carbon steel, Alloy steel	180–350HB	● ◐	≤1.0	● ◐	≤1.5	◐ ✱	≤1.5
M	Stainless steel	—	● ◐	≤1.0	● ◐	≤1.0	—	—
K	Ductile cast iron	Tensile strength ≤450MPa	● ◐	≤1.0	● ◐	≤1.5	◐ ✱	≤1.5
K		Tensile strength ≤800MPa	● ◐	≤1.0	● ◐	≤1.0	◐ ✱	≤1.0

1/1

WJX14

	Material	Properties	L		M		R	
			Conditions	ap	Conditions	ap	Conditions	ap
P	Mild steel	≤180HB	● ◐	≤2.0	● ◐	≤3.0	◐ ✱	≤3.0
P	Carbon steel, Alloy steel	180–350HB	● ◐	≤2.0	● ◐	≤3.0	◐ ✱	≤3.0
M	Stainless steel	—	● ◐	≤2.0	● ◐	≤1.5	—	—
K	Ductile cast iron	Tensile strength ≤450MPa	● ◐	≤2.0	● ◐	≤3.0	—	—
K		Tensile strength ≤800MPa	● ◐	≤2.0	● ◐	≤2.0	—	—

1/1

Cutting conditions: ●: Stable cutting ◐: General cutting ✱: Unstable cutting

MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

WJX09

CUTTING SPEED (DRY CUTTING)

	Material	Properties	MV1020	MV1030
			Vc	Vc
P	Mild steel	≤180HB	230 (180 – 280)	160 (100 – 220)
P	Carbon steel, Alloy steel	180–350HB	220 (170 – 270)	150 (80 – 220)
M	Stainless steel	≤200HB	—	160 (130 – 200)
M	Stainless steel	>200HB	—	140 (80 – 200)
K	Ductile cast iron	Tensile strength ≤450MPa	210 (160 – 260)	160 (120 – 210)
K	Ductile cast iron	Tensile strength ≤800MPa	190 (140 – 240)	130 (90 – 170)

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WJX09

DEPTH OF CUT / FEED PER TOOTH

DRY CUTTING

	Material	Properties		ap	DCX = 25, 28 (Z=2)	DCX = 25, 28 (Z=3)	DCX ≥ 32
					fz	fz	fz
P	Mild steel	≤180HB	M, R	≤0.5	1.3 (0.4 – 2.0)	1.3 (0.4 – 2.0)	1.5 (0.5 – 2.0)
P	Mild steel	≤180HB	M, R	≤1.0	1.0 (0.3 – 1.3)	0.8 (0.3 – 1.0)	1.2 (0.4 – 1.5)
P	Mild steel	≤180HB	M, R	≤1.5	0.6 (0.3 – 1.0)	—	0.8 (0.4 – 1.2)
P	Mild steel	≤180HB	L	≤0.5	1.2 (0.4 – 1.6)	1.2 (0.4 – 1.6)	1.2 (0.4 – 1.6)
P	Mild steel	≤180HB	L	≤1.0	0.8 (0.3 – 1.2)	0.8 (0.3 – 1.0)	1.0 (0.4 – 2.5)
P	Carbon steel Alloy steel	180–350HB	M, R	≤0.5	1.3 (0.4 – 1.7)	1.3 (0.4 – 1.7)	1.5 (0.4 – 2.0)
P	Carbon steel Alloy steel	180–350HB	M, R	≤1.0	0.8 (0.3 – 1.0)	0.7 (0.3 – 0.9)	1.0 (0.3 – 1.3)
P	Carbon steel Alloy steel	180–350HB	M, R	≤1.5	0.5 (0.3 – 0.7)	—	0.7 (0.3 – 1.0)
P	Carbon steel Alloy steel	180–350HB	L	≤0.5	1.2 (0.3 – 1.5)	1.2 (0.3 – 1.5)	1.2 (0.3 – 1.5)
P	Carbon steel Alloy steel	180–350HB	L	≤1.0	0.7 (0.2 – 1.0)	0.7 (0.2 – 0.9)	0.7 (0.2 – 1.0)
M	Stainless steel	—	L	≤0.5	0.8 (0.3 – 1.0)	0.8 (0.3 – 1.0)	0.8 (0.3 – 1.0)
M	Stainless steel	—	L	≤1.0	1.0 (0.4 – 1.2)	1.0 (0.4 – 1.2)	1.0 (0.4 – 1.2)
M	Stainless steel	—	M	≤0.5	0.6 (0.2 – 0.8)	0.6 (0.2 – 0.8)	0.6 (0.2 – 0.8)
M	Stainless steel	—	M	≤1.0	0.8 (0.3 – 1.0)	0.8 (0.3 – 1.0)	0.8 (0.3 – 1.0)
K	Ductile cast iron	Tensile strength ≤450MPa	M, R	≤0.5	1.3 (0.4 – 1.7)	1.3 (0.4 – 1.7)	1.5 (0.4 – 2.0)
K	Ductile cast iron	Tensile strength ≤450MPa	M, R	≤1.0	0.8 (0.3 – 1.0)	0.7 (0.3 – 0.9)	1.0 (0.3 – 1.3)
K	Ductile cast iron	Tensile strength ≤450MPa	M, R	≤1.5	0.5 (0.3 – 0.7)	—	0.7 (0.3 – 1.0)
K	Ductile cast iron	Tensile strength ≤450MPa	L	≤0.5	1.0 (0.3 – 1.3)	1.0 (0.3 – 1.3)	1.0 (0.3 – 1.3)
K	Ductile cast iron	Tensile strength ≤450MPa	L	≤1.0	0.8 (0.2 – 1.0)	0.7 (0.2 – 0.9)	0.8 (0.2 – 1.2)
K	Ductile cast iron	Tensile strength ≤800MPa	M, R	≤0.5	1.0 (0.2 – 1.5)	1.0 (0.2 – 1.5)	1.3 (0.3 – 1.7)
K	Ductile cast iron	Tensile strength ≤800MPa	M, R	≤1.0	0.8 (0.2 – 1.0)	0.6 (0.2 – 0.8)	1.0 (0.3 – 1.2)
K	Ductile cast iron	Tensile strength ≤800MPa	L	≤0.5	0.8 (0.3 – 1.2)	0.8 (0.3 – 1.2)	0.8 (0.3 – 1.2)
K	Ductile cast iron	Tensile strength ≤800MPa	L	≤1.0	0.5 (0.2 – 0.8)	0.5 (0.2 – 0.8)	0.5 (0.2 – 0.8)

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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 wet cutting, tool life may become shorter than dry cutting. When carrying out wet cutting for the applications recommended with dry cutting, reduce the cutting speed by 25 %.
3. When large vibration occurs, reduce the cutting conditions.
4. For interrupted cutting, reduce the cutting speed and feed rate by 20 %.

MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

WJX14

CUTTING SPEED (DRY CUTTING)

	Material	Properties	MV1020	MV1030
			Vc	Vc
P	Mild steel	≤180HB	220 (170 – 270)	130 (80 – 180)
P	Carbon steel, Alloy steel	180–350HB	200 (150 – 250)	120 (60 – 180)
M	Stainless steel	≤200HB	—	160 (130 – 200)
M	Stainless steel	>200HB	—	140 (100 – 200)
K	Ductile cast iron	Tensile strength ≤450MPa	200 (150 – 250)	150 (100 – 200)
K	Ductile cast iron	Tensile strength ≤800MPa	180 (130 – 230)	120 (80 – 160)

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MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

WJX14

DEPTH OF CUT / FEED PER TOOTH

DRY CUTTING

	Material	Properties		ap	DCX = 50, 52	DCX ≥ 63
					fz	fz
P	Mild steel	≤180HB	M, R	≤1.0	1.5 (0.6 – 2.5)	1.7 (0.6 – 2.8)
				≤1.5	1.3 (0.6 – 2.0)	1.5 (0.6 – 2.5)
				≤2.0	1.2 (0.6 – 2.0)	1.3 (0.6 – 2.5)
				≤2.5	0.8 (0.3 – 1.5)	1.0 (0.3 – 1.6)
				≤3.0	0.4 (0.2 – 1.0)	0.5 (0.2 – 1.2)
			L	≤1.0	1.2 (0.4 – 2.0)	1.2 (0.4 – 2.0)
				≤1.5	1.0 (0.4 – 1.8)	1.0 (0.4 – 2.5)
				≤2.0	0.8 (0.4 – 1.7)	0.8 (0.4 – 1.7)
	Carbon steel Alloy steel	180–350HB	M, R	≤1.0	1.5 (0.5 – 2.0)	1.7 (0.5 – 2.5)
				≤1.5	1.2 (0.5 – 1.7)	1.3 (0.5 – 2.2)
				≤2.0	1.0 (0.5 – 1.5)	1.2 (0.5 – 2.0)
				≤2.5	0.7 (0.3 – 1.2)	0.9 (0.3 – 1.5)
				≤3.0	0.3 (0.2 – 0.8)	0.4 (0.2 – 1.0)
			L	≤1.0	1.0 (0.3 – 1.7)	1.0 (0.3 – 1.7)
				≤1.5	0.8 (0.3 – 1.5)	0.8 (0.3 – 1.5)
				≤2.0	0.7 (0.3 – 1.2)	0.7 (0.3 – 1.2)
M	Stainless steel	≤200HB	M	≤1.0	1.0 (0.5 – 1.2)	1.0 (0.5 – 1.2)
				≤1.5	1.0 (0.5 – 1.0)	1.0 (0.5 – 1.0)
			L	≤1.0	0.8 (0.3 – 1.2)	0.8 (0.3 – 1.2)
				≤1.5	0.8 (0.3 – 1.0)	0.8 (0.3 – 1.0)
		>200HB	M	≤1.0	1.0 (0.5 – 1.2)	1.0 (0.5 – 1.2)
				≤1.5	1.0 (0.5 – 1.0)	1.0 (0.5 – 1.0)
			L	≤1.0	0.8 (0.3 – 1.2)	0.8 (0.3 – 1.2)
				≤1.5	0.8 (0.3 – 1.0)	0.8 (0.3 – 1.0)
K	Ductile cast iron	Tensile strength ≤450MPa	MR	≤1.0	1.5 (0.5 – 2.0)	1.7 (0.5 – 2.5)
				≤1.5	1.3 (0.5 – 1.8)	1.5 (0.5 – 2.0)
				≤2.0	1.2 (0.5 – 1.8)	1.3 (0.5 – 2.0)
				≤2.5	0.7 (0.3 – 1.2)	0.9 (0.3 – 1.5)
				≤3.0	0.3 (0.2 – 0.8)	0.4 (0.2 – 1.0)
			L	≤1.0	1.2 (0.3 – 2.0)	1.2 (0.3 – 2.0)
				≤1.5	1.0 (0.3 – 1.7)	1.0 (0.3 – 1.7)
				≤2.0	0.8 (0.3 – 1.5)	0.8 (0.3 – 1.5)
		Tensile strength ≤800MPa	M	≤1.0	1.3 (0.4 – 1.8)	1.5 (0.4 – 2.0)
				≤1.5	1.2 (0.4 – 1.5)	1.3 (0.4 – 1.8)
				≤2.0	1.0 (0.4 – 1.5)	1.2 (0.4 – 1.8)
			L	≤1.0	1.0 (0.3 – 1.7)	1.0 (0.3 – 1.7)
				≤1.5	0.8 (0.3 – 1.5)	0.8 (0.3 – 1.5)
				≤2.0	0.7 (0.3 – 1.2)	0.7 (0.3 – 1.2)

1/1

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 wet cutting, tool life may become shorter than dry cutting. When carrying out wet cutting for the applications recommended with dry cutting, reduce the cutting speed by 25 %.
3. When large vibration occurs, reduce the cutting conditions.
4. For interrupted cutting, reduce the cutting speed and feed rate by 20 %.

MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

VPX200 / 300

CUTTING SPEED (DRY CUTTING)

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

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WET CUTTING

	Material	Properties	Conditions	Recommendation 1st	Recommendation 2nd	ae ≤0.25 DC MV1020	ae ≤0.25 DC MV1030	ae 0.25 – 0.5 DC MV1020	ae 0.25 – 0.5 DC MV1030	ae 0.5 – 0.75 DC MV1020	ae 0.5 – 0.75 DC MV1030	ae DC (Slot) MV1020	ae DC (Slot) MV1030
P	Mild steel	≤180HB	●●	L	M	210 (150–290)	140 (100–190)	200 (140–270)	130 (90–180)	150 (110–180)	100 (70–120)	150 (110–180)	100 (70–120)
P	Carbon steel Alloy steel	180–280HB	●●	L	M	180 (140–210)	120 (90–140)	170 (120–200)	110 (80–130)	150 (110–180)	100 (70–120)	150 (110–180)	100 (70–120)
P	Carbon steel Alloy steel	280–350HB	●●	L	M	140 (110–160)	120 (90–140)	130 (90–150)	110 (80–130)	120 (80–140)	100 (70–120)	120 (80–140)	120 (80–140)
K	Ductile cast iron	Tensile strength ≤450MPa	●●	M	L	180 (150–240)	130 (80–180)	170 (140–230)	120 (70–170)	150 (130–200)	105 (60–150)	150 (130–200)	105 (60–150)
K	Ductile cast iron	Tensile strength ≤800MPa	●●	M	L	160 (130–210)	130 (80–180)	150 (120–200)	120 (70–170)	130 (110–170)	105 (60–150)	130 (110–170)	105 (60–150)

1/1

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

MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

VPX200

DEPTH OF CUT / FEED PER TOOTH

DRY AND WET CUTTING

	Material	Properties	ae	Conditions	DC					
					Ø 16 – Ø 18		Ø 20 – Ø 25		Ø 28 – Ø 63	
					ap	fz	ap	fz	ap	fz
P	Mild steel	≤180HB	≤0.25DC	● ◐	≤6	0.10–0.15	≤8	0.10–0.20	≤8	0.10–0.25
			0.25–0.5DC	● ◐	≤5	0.08–0.12	≤8	0.10–0.15	≤8	0.10–0.20
			0.5–0.75DC	● ◐	≤4	0.08–0.12	≤6	0.08–0.12	≤6	0.10–0.15
			DC (Slot)	● ◐	≤2	0.06–0.10	≤4	0.06–0.10	≤4	0.08–0.12
	Carbon steel Alloy steel	180–280HB	≤0.25DC	● ◐	≤6	0.10–0.15	≤8	0.10–0.20	≤8	0.10–0.25
			0.25–0.5DC	● ◐	≤5	0.08–0.12	≤8	0.10–0.15	≤8	0.10–0.20
			0.5–0.75DC	● ◐	≤4	0.08–0.12	≤6	0.08–0.12	≤6	0.10–0.15
			DC (Slot)	● ◐	≤2	0.06–0.10	≤4	0.06–0.10	≤4	0.08–0.12
		280–350HB	≤0.25DC	● ◐	≤6	0.10–0.15	≤8	0.10–0.15	≤8	0.10–0.20
			0.25–0.5DC	● ◐	≤5	0.08–0.12	≤8	0.08–0.12	≤8	0.10–0.15
			0.5–0.75DC	● ◐	≤4	0.08–0.12	≤6	0.06–0.10	≤6	0.08–0.12
			DC (Slot)	● ◐	≤2	0.06–0.10	≤4	0.06–0.10	≤4	0.06–0.10
M	Stainless steel	—	≤0.25DC	● ◐	≤6	0.10–0.15	≤8	0.10–0.20	≤8	0.10–0.20
			0.25–0.5DC	● ◐	≤5	0.08–0.12	≤8	0.08–0.15	≤8	0.08–0.15
			0.5–0.75DC	● ◐	≤4	0.06–0.10	≤6	0.08–0.12	≤6	0.08–0.12
			DC (Slot)	● ◐	≤2	0.06–0.10	≤4	0.06–0.10	≤4	0.06–0.10
K	Ductile cast iron	Tensile strength ≤800MPa	≤0.25DC	● ◐	≤6	0.10–0.15	≤8	0.10–0.20	≤8	0.10–0.20
			0.25–0.5DC	● ◐	≤5	0.08–0.12	≤8	0.10–0.15	≤8	0.10–0.15
			0.5–0.75DC	● ◐	≤4	0.08–0.12	≤6	0.08–0.12	≤6	0.08–0.12
			DC (Slot)	● ◐	≤2	0.06–0.10	≤4	0.06–0.10	≤4	0.06–0.10

1/1

1. These cutting conditions should be referenced for standard shank types (last letter in designation is S) and arbor shank types. If there is chatter, insert chipping, etc. during machining, alter conditions accordingly
2. Chattering vibration is more likely under the following circumstances. Use a cut and feed per tooth that are at minimum recommended conditions or below.
   - When tool overhang is long (using a long shank, screw-in type, etc.)
   - Rigidity of machine, workpiece material or attachment of workpiece material is low
   - Corner radius during pocket milling
3. A type with fewer teeth is recommended when the depth of cut in the radius direction (ae) is 0.5 DC or more.
4. Wet cutting is recommended, when focusing on the surface finish. (Service life is shorter than for dry cutting.)
5. When using under higher than recommended cutting conditions, or for long periods of time, the clamp screw may become fatigued and break during machining. Please use a new clamp screw periodically.

Cutting conditions: ●: Stable cutting ◐: General cutting ✱: Unstable cutting

MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

VPX300

DEPTH OF CUT / FEED PER TOOTH

DRY AND WET CUTTING

	Material	Properties	ae	Conditions	DC			
					Ø 25		Ø 28 – Ø 80	
					ap	fz	ap	fz
P	Mild steel	≤180HB	≤0.25DC	● ◐	≤11	0.10 – 0.20	≤11	0.10 – 0.30
			0.25–0.5DC	● ◐	≤11	0.10 – 0.15	≤11	0.10 – 0.25
			0.5–0.75DC	● ◐	≤8	0.08 – 0.12	≤8	0.10 – 0.20
			DC (Slot)	● ◐	≤5	0.06 – 0.10	≤5	0.08 – 0.15
	Carbon steel Alloy steel	180–280HB	≤0.25DC	● ◐	≤11	0.10 – 0.20	≤11	0.10 – 0.30
			0.25–0.5DC	● ◐	≤11	0.10 – 0.15	≤11	0.10 – 0.25
			0.5–0.75DC	● ◐	≤8	0.08 – 0.12	≤8	0.10 – 0.20
			DC (Slot)	● ◐	≤5	0.06 – 0.10	≤5	0.08 – 0.15
		280–350HB	≤0.25DC	● ◐	≤11	0.10 – 0.15	≤11	0.10 – 0.25
			0.25–0.5DC	● ◐	≤11	0.08 – 0.12	≤11	0.10 – 0.20
			0.5–0.75DC	● ◐	≤8	0.06 – 0.10	≤8	0.10 – 0.15
			DC (Slot)	● ◐	≤5	0.06 – 0.10	≤5	0.08 – 0.12
M	Stainless steel	—	≤0.25DC	● ◐	≤11	0.10 – 0.20	≤11	0.10 – 0.20
			0.25–0.5DC	● ◐	≤11	0.08 – 0.15	≤11	0.08 – 0.15
			0.5–0.75DC	● ◐	≤8	0.08 – 0.12	≤8	0.08 – 0.12
			DC (Slot)	● ◐	≤5	0.06 – 0.10	≤5	0.06 – 0.10
K	Ductile cast iron	Tensile strength ≤800MPa	≤0.25DC	● ◐	≤11	0.10 – 0.20	≤11	0.10 – 0.25
			0.25–0.5DC	● ◐	≤11	0.10 – 0.15	≤11	0.10 – 0.20
			0.5–0.75DC	● ◐	≤8	0.08 – 0.12	≤8	0.10 – 0.15
			DC (Slot)	● ◐	≤5	0.06 – 0.10	≤5	0.08 – 0.12

1/1

1. These cutting conditions should be referenced for standard shank types (last letter in designation is S) and arbor shank types. If there is chatter, insert chipping, etc. during machining, alter conditions accordingly.
2. Chattering vibration is more likely under the following circumstances. Use a cut and feed per tooth that are at minimum recommended conditions or below.
   - When tool overhang is long (using a long shank, screw-in type, etc.)
   - Rigidity of machine, workpiece material or attachment of workpiece material is low
   - Corner radius during pocket milling
3. A type with fewer teeth is recommended when the depth of cut in the radius direction (ae) is 0.5 DC or more.
4. Wet cutting is recommended, when focusing on the surface finish. (Service life is shorter than for dry cutting.)
5. When using under higher than recommended cutting conditions, or for long periods of time, the clamp screw may become fatigued and break during machining. Please renew the clamp screw periodically.

Cutting conditions: ●: Stable cutting ◐: General cutting ✱: Unstable cutting

MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

AHX440S

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
P	Carbon steel Alloy steel	180–280HB	260 (170 – 350)	210 (150 – 270)	0.3 (0.2 – 0.4)	≤3	≤0.8 DC
P	Carbon steel 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
M	Stainless steel	>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
K	Ductile cast iron	Tensile strength ≤800MPa	220 (80 – 350)	150 (100 – 200)	0.2 (0.1 – 0.3)	≤3	≤0.8 DC

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

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

MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

WSF406W

DRY CUTTING

	Material	Properties	Conditions	ap	Vc		fz	ae
					MV1020	MV1030		
K	Gray cast iron	Tensile strength ≤350MPa	●	ap ≤ 0.5 mm	300 (250 – 300)	150 (100 – 200)	0.13 (0.08 – 0.20)	≤0.8DC
				ap ≤ 2.0 mm	250 (210 – 300)	150 (100 – 200)	0.15 (0.10 – 0.25)	≤0.8DC
				2.0 mm < ap ≤ 4.0 mm	220 (190 – 260)	140 (80 – 200)	0.13 (0.10 – 0.20)	≤0.8DC
				4.0 mm < ap ≤ 7.5 mm	200 (180 – 230)	110 (60 – 160)	0.10 (0.08 – 0.15)	≤0.8DC
			◐	ap ≤ 0.5 mm	250 (210 – 300)	150 (100 – 200)	0.13 (0.08 – 0.20)	≤0.8DC
				ap ≤ 2.0 mm	220 (190 – 260)	150 (100 – 200)	0.15 (0.10 – 0.25)	≤0.8DC
				2.0 mm < ap ≤ 4.0 mm	200 (180 – 230)	140 (80 – 200)	0.13 (0.10 – 0.20)	≤0.8DC
				4.0 mm < ap ≤ 7.5 mm	180 (160 – 210)	110 (60 – 160)	0.10 (0.08 – 0.15)	≤0.8DC
			✣	ap ≤ 0.5 mm	220 (190 – 260)	140 (80 – 200)	0.13 (0.08 – 0.20)	≤0.8DC
				ap ≤ 2.0 mm	200 (180 – 230)	140 (80 – 200)	0.15 (0.10 – 0.25)	≤0.8DC
				2.0 mm < ap ≤ 4.0 mm	180 (160 – 210)	110 (60 – 160)	0.13 (0.10 – 0.20)	≤0.8DC
				4.0 mm < ap ≤ 7.5 mm	150 (100 – 180)	80 (40 – 120)	0.10 (0.08 – 0.15)	≤0.8DC
	Ductile cast iron	Tensile strength ≤450MPa	●	ap ≤ 0.5 mm	230 (200 – 250)	110 (60 – 160)	0.13 (0.08 – 0.20)	≤0.8DC
				ap ≤ 2.0 mm	200 (170 – 230)	110 (60 – 160)	0.15 (0.10 – 0.25)	≤0.8DC
				2.0 mm < ap ≤ 4.0 mm	180 (150 – 210)	90 (50 – 130)	0.13 (0.10 – 0.20)	≤0.8DC
				4.0 mm < ap ≤ 7.5 mm	160 (130 – 190)	70 (40 – 100)	0.10 (0.08 – 0.15)	≤0.8DC
			◐	ap ≤ 0.5 mm	200 (170 – 230)	110 (60 – 160)	0.13 (0.08 – 0.20)	≤0.8DC
				ap ≤ 2.0 mm	180 (150 – 210)	110 (60 – 160)	0.15 (0.10 – 0.25)	≤0.8DC
				2.0 mm < ap ≤ 4.0 mm	160 (130 – 190)	90 (50 – 130)	0.13 (0.10 – 0.20)	≤0.8DC
				4.0 mm < ap ≤ 7.5 mm	140 (110 – 170)	70 (40 – 100)	0.10 (0.08 – 0.15)	≤0.8DC
			✣	ap ≤ 0.5 mm	180 (150 – 200)	90 (50 – 130)	0.13 (0.08 – 0.20)	≤0.8DC
				ap ≤ 2.0 mm	160 (130 – 190)	90 (50 – 130)	0.15 (0.10 – 0.25)	≤0.8DC
				2.0 mm < ap ≤ 4.0 mm	140 (110 – 170)	70 (40 – 100)	0.13 (0.10 – 0.20)	≤0.8DC
				4.0 mm < ap ≤ 7.5 mm	120 (90 – 150)	60 (30 – 90)	0.10 (0.08 – 0.15)	≤0.8DC
	Ductile cast iron	Tensile strength ≤800MPa	●	ap ≤ 0.5 mm	230 (200 – 250)	110 (60 – 160)	0.13 (0.08 – 0.20)	≤0.8DC
				ap ≤ 2.0 mm	200 (170 – 230)	110 (60 – 160)	0.15 (0.10 – 0.25)	≤0.8DC
				2.0 mm < ap ≤ 4.0 mm	180 (150 – 210)	90 (50 – 130)	0.13 (0.10 – 0.20)	≤0.8DC
				4.0 mm < ap ≤ 7.5 mm	160 (130 – 190)	70 (40 – 100)	0.10 (0.08 – 0.15)	≤0.8DC
			◐	ap ≤ 0.5 mm	200 (170 – 230)	110 (60 – 160)	0.13 (0.08 – 0.20)	≤0.8DC
				ap ≤ 2.0 mm	180 (150 – 210)	110 (60 – 160)	0.15 (0.10 – 0.25)	≤0.8DC
				2.0 mm < ap ≤ 4.0 mm	160 (130 – 190)	90 (50 – 130)	0.13 (0.10 – 0.20)	≤0.8DC
				4.0 mm < ap ≤ 7.5 mm	140 (110 – 170)	70 (40 – 100)	0.10 (0.08 – 0.15)	≤0.8DC
			✣	ap ≤ 0.5 mm	180 (150 – 210)	90 (50 – 130)	0.13 (0.08 – 0.20)	≤0.8DC
				ap ≤ 2.0 mm	160 (130 – 190)	90 (50 – 130)	0.15 (0.10 – 0.25)	≤0.8DC
				2.0 mm < ap ≤ 4.0 mm	140 (110 – 170)	70 (40 – 100)	0.13 (0.10 – 0.20)	≤0.8DC
				4.0 mm < ap ≤ 7.5 mm	120 (90 – 150)	60 (30 – 90)	0.10 (0.08 – 0.15)	≤0.8DC

Cutting conditions: ●: Stable cutting ◐: General cutting ✣: Unstable cutting

MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

ASX445

DRY AND WET CUTTING

	Material	Properties	Vc		L		M		R	
			MV1020	MV1030	fz		fz		fz	
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)	JH
P	Carbon steel Alloy 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)	JH
P	Carbon steel 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)	JH
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)	JH
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)	JH, FT
K	Ductile cast iron	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)	JH, FT

1/1

ASX400

DRY AND WET CUTTING

	Material	Properties	Vc		L		M		R	
			MV1020	MV1030	fz		fz		fz	
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)	JH
P	Carbon steel Alloy 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)	JH
P	Carbon steel 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)	JH
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)	JH
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)	JH, FT
K	Ductile cast iron	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)	JH, FT

1/1

AHX SERIES

FEATURING ECONOMICAL, HEPTAGONAL DOUBLE SIDED INSERTS WITH 14 CUTTING EDGES

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AHX SERIES

MULTI CORNER INSERT FACE MILLING CUTTERS

AHX440S

P
M
K
H

IDEAL FOR ROUGHING AND FINISHING ON SMALL AND LOW POWER MACHINES

- Diameter range Ø 40 – 160 mm (3 – 16 teeth)
- Double sided insert with 14 cutting edges
- Maximum depth of cut 3 mm (APMX)
- With through coolant holes (Ø 40 – 125 mm)
- Insert corner radius 0.8 mm and 3.2 mm

AHX475S

P
K
H

EFFICIENT HIGH-FEED MILLING AND PROCESS RELIABILITY

- Diameter range Ø 50 – 160 mm (4 – 12 teeth)
- Double sided insert with 14 cutting edges
- Maximum depth of cut 1.6 mm (APMX)
- With through coolant holes (Ø 50 – 160 mm)
- Feed rate up to 2 mm/tooth

AHX640S

P
M
K
H

IDEAL FOR GENERAL ROUGHING ON MEDIUM AND LARGER MACHINES

- Diameter range Ø 63 – 200 mm (4 – 12 teeth)
- Double sided insert with 14 cutting edges
- Maximum depth of cut 6 mm (APMX)
- With through coolant holes (Ø 63 – 125 mm)

AHX640W

K

IDEAL FOR GENERAL ROUGHING OF CAST IRON ON MEDIUM AND LARGER MACHINES

- Diameter range Ø 80 – 315 mm (8 – 44 teeth)
- Double sided insert with 14 cutting edges
- Maximum depth of cut 6 mm (APMX)
- High rigidity Anti-Fly (AFI) wedge clamping system

DOUBLE SIDED INSERT WITH 14 CUTTING EDGES FOR MACHINING OF STEEL, STAINLESS STEEL AND CAST IRON

ECONOMICAL HEPTAGONAL DOUBLE SIDED INSERT

Double positive cutting edge geometry offers lower cutting resistance for improved machining efficiency.

CUTTING EDGE STABILITY

Thicker inserts ensure greater stability and enable reliable machining.

SIMPLE INDICATION OF THE CUTTING EDGE

For easy handling and to recognize used and unused corners.

GRADES FOR MACHINING A WIDE RANGE OF MATERIALS

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

MP6120
For general milling of steel

MP6130
For interrupted milling of steel

MP7030
For general milling of stainless steel

MP7130
For general milling of stainless steel

MP7140
For unstable 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

XC5010
The strength of ceramics allows for stable machining even when cutting at high-speeds

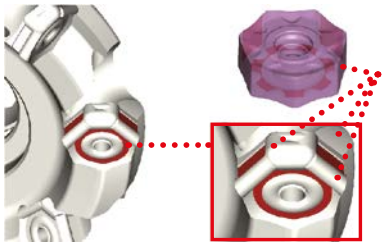
AHX440S / AHX475S / AHX640S

A UNIQUE FACE MILL FOR MACHINING OF STEEL, STAINLESS STEEL AND CAST IRON

AHX440S

DESIGNED TO CONTROL ABNORMAL INSERT BREAKAGE AND BODY DAMAGE

The unique conical insert shim and Anti Fly mechanism (A.F.I) hold the insert securely.
The outer edge of the insert is not in contact with the body, thereby preventing damage when sudden fracturing occurs.
The thick insert negates the need for a shim.



THROUGH COOLANT HOLES

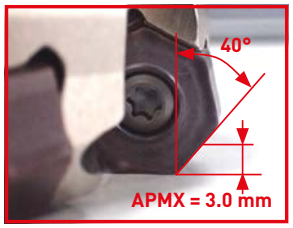
Improves chip discharge and prevents chip welding.

AHX475S

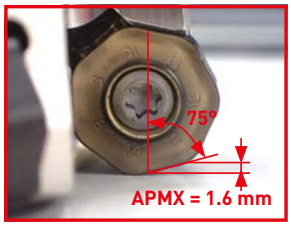
AHX475S

For high feed machining
High feed is possible with AHX475S by setting an RE = 3.2 mm insert to be used in a cutter body with a corner angle of 75° (KAPR 15°).
The maximum depths of cut (APMX) will be limited to 1.6 mm.

AHX640S



AHX440S
L Breaker



AHX475S

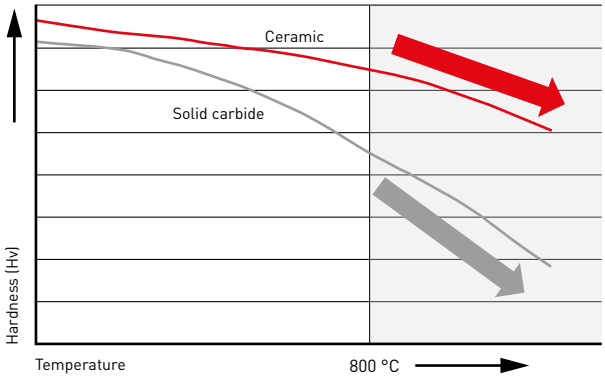
⚠ AHX475S is not compatible with stainless steel.

XC5010

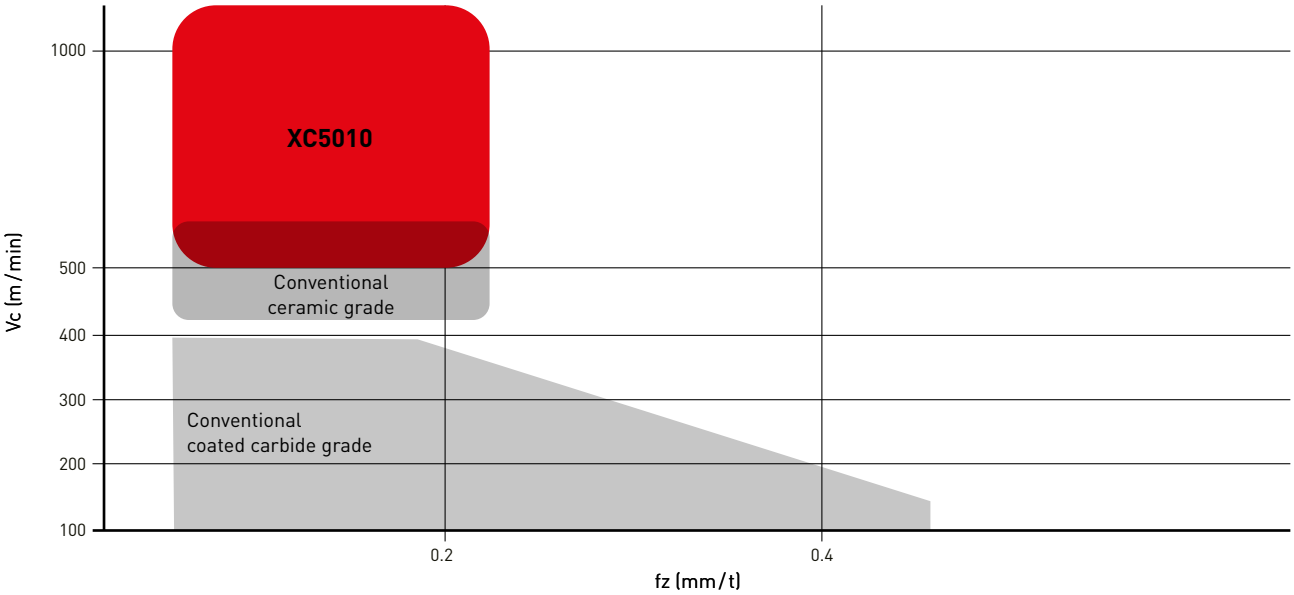
THE STRENGTH OF CERAMICS ALLOWS FOR STABLE MACHINING EVEN WHEN CUTTING AT HIGH-SPEEDS

HIGH TEMPERATURE HARDNESS OF CEMENTED CARBIDE AND CERAMIC

Cemented carbide inserts are significantly reduced in strength when temperatures exceed 800 degrees. However, the strength of ceramic inserts is not affected at these high temperatures, therefore can be used at the high-speeds and depths of cut required to generate sufficient heat to enable machining.



THE COMBINATION OF THE UNIQUE SHAPE AND THE COATED CERAMIC GRADE ACHIEVES STABLE MACHINING EVEN AT A CUTTING SPEEDS OF 1000 M/MIN

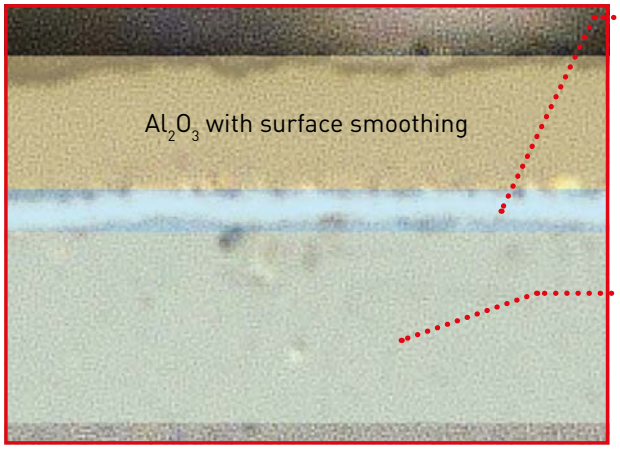


XC5010

THE STRENGTH OF CERAMICS ALLOWS FOR STABLE MACHINING EVEN WHEN CUTTING AT HIGH-SPEEDS

SURFACE-SMOOTHING AL_2O_3 COATING SUPPRESSES THE TRANSMISSION OF CUTTING HEAT

By applying an Al_2O_3 coating, which suppresses the transmission of cutting heat to the ceramic substrate, and together with a surface smoothing treatment, abnormal wear and adhesion of the workpiece material are suppressed.



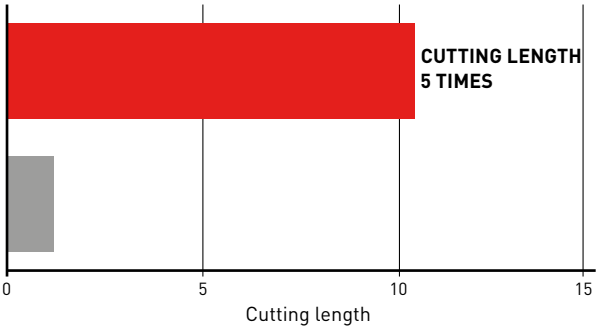
TECHNOLOGY IMPROVES ADHESION STRENGTH

Mitsubishi Materials' own adhesion technology has greatly improved the adhesion between the ceramic base material and the coating layer.

SILICON NITRIDE CERAMIC SUBSTRATE

By adopting a high toughness silicon nitride ceramic substrate as the base material, ultra-high-speed milling of ductile cast iron can be achieved even at high temperatures with minimal loss of strength.

Material	DIN GGG60
Tool	AHX640S
DC (mm)	80
Vc (m/min)	1000
fz (mm/t)	0.1
ap (mm)	2.0
ae (mm)	50
Cutting mode	Dry cutting



AFTER 1.2 M MACHINING

XC5010

Non-coated ceramic grade

Machining video
at Vc = 1200 m/min

■ : XC5010 ■ A : Non-coated ceramic grade

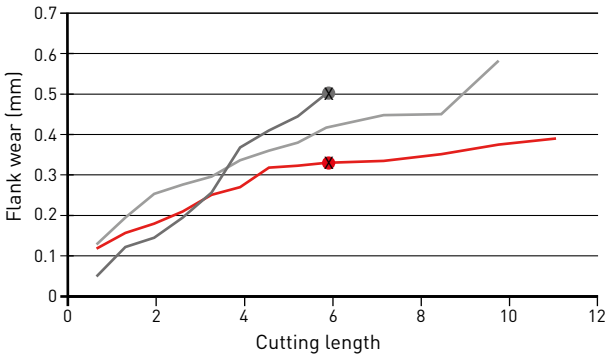
XC5010

CUTTING PERFORMANCE

COMPARISON OF WEAR WHEN MACHINING GGG70 Vc = 1000 M/MIN

Achieves a level of wear resistance that greatly surpasses carbide grades when high-speed roughing.

Material	DIN GGG70
Tool	AHX640S
DC (mm)	80
Vc (m/min)	1000
fz (mm/t)	0.1
ap (mm)	2.0
ae (mm)	40
Cutting mode	Dry cutting Single insert



AFTER MACHINING 6 M

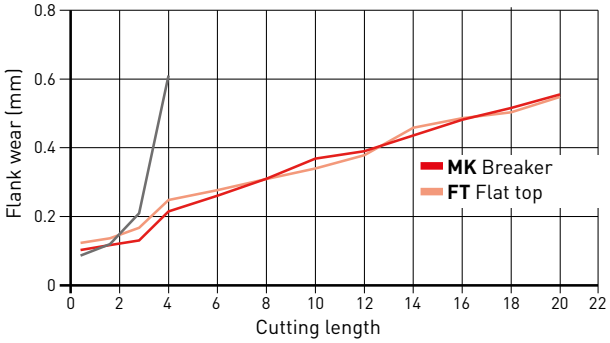
XC5010

Conventional A

COMPARISON OF FINISHED SURFACES WHEN MACHINING GGG70 AT Vc = 1000 M/MIN

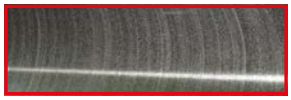
A high quality machined surface is maintained even after a cutting length of 20 m.

Material	DIN GGG70
Tool	AHX640S
DC (mm)	125
Vc (m/min)	1000
fz (mm/t)	0.1
ap (mm)	2.0
ae (mm)	100
Cutting mode	Dry cutting



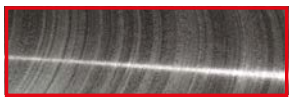
Cutting length 4 m

XC5010
MK Breaker



XC5010
FT Flat top

Cutting length 20 m



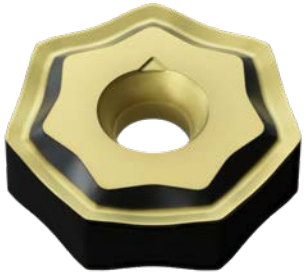
XC5010
MK Breaker

XC5010
FT Flat top

The conventional carbide grade chipped at a cutting length of 4 m.

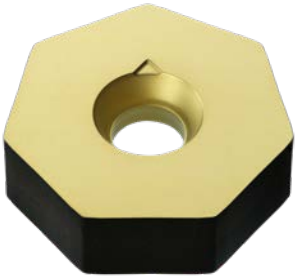
XC5010

CHIPBREAKER SYSTEM



MK BREAKER – GENERAL CUTTING

When compared to flat top inserts, the cutting resistance is lower when using the MK breaker. This reduces the load on the spindle thereby making it suitable for high speed cutting.



FT FLAT TOP – CUTTING EDGE STRENGTH

The high cutting edge strength of the flat top type enables stable cutting over long periods and helps to prevent sudden edge chipping.

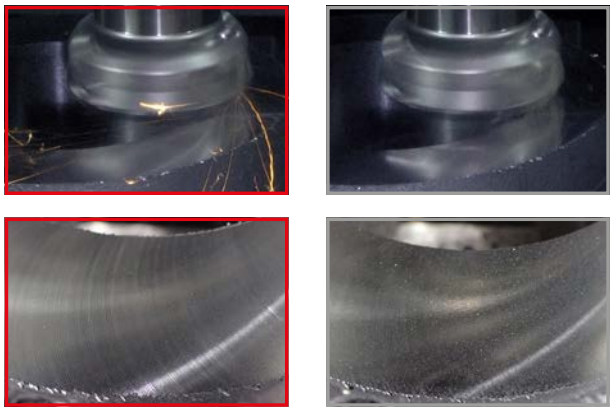
The height setting when using MK inserts is different than when using FT type inserts.

GGG60 FINISH SURFACE COMPARISON

A high quality machined surface is maintained even when high speed cutting conditions are used.

Material	DIN GGG60
Tool	AHX640S
DC (mm)	63
fz (mm/t)	0.1
ap (mm)	1.0
ae (mm)	32
Cutting mode	Dry cutting

Vc = 1000 m/min | **Vc = 250 m/min**



XC5010
MK Breaker

Conventional,
Coated carbide grade

AHX STEEL SERIES

SELECTION REFERENCE TABLE (CUTTING EDGE COUNT AND CUTTING CONDITIONS)

DC	Type	ZEFF	AHX440S General cutting			AHX475S High feed machining			AHX640S General cutting		
			Stock	fr	APMX	Stock	fr	APMX	Stock	fr	APMX
40	Fine pitch	3	●	0.6 – 1.2	3						
	Extra fine pitch	4	●	0.8 – 1.6	3						
50	Fine pitch	4	●	0.8 – 1.6	3	●	2.4 – 4.0	1.6			
	Extra fine pitch	5	●	1.0 – 2.0	3	●	3.0 – 5.0	1.6			
	Super extra fine pitch	6	●	1.2 – 2.4	3						
63	Coarse pitch	4							●	0.8 – 1.6	6
	Fine pitch	5	●	1.0 – 2.0	3	●	3.0 – 5.0	1.6	●	1.0 – 2.0	6
	Extra fine pitch	6	●	1.2 – 2.4	3	●	3.6 – 6.0	1.6			
	Super extra fine pitch	8	●	1.6 – 3.2	3						
80	Coarse pitch	4							●	0.8 – 1.6	6
	Fine pitch	6	●	1.2 – 2.4	3	●	3.6 – 6.0	1.6	●	1.2 – 2.4	6
	Extra fine pitch	8	●	1.6 – 3.2	3	●	4.8 – 8.0	1.6			
	Super extra fine pitch	10	●	2.0 – 4.0	3						
100	Coarse pitch	5							●	1.0 – 2.0	6
	Fine pitch	7	●	1.4 – 2.8	3	●	4.2 – 7.0	1.6	●	1.4 – 2.8	6
	Extra fine pitch	9				●	5.4 – 9.0	1.6			
	Extra fine pitch	10	●	2.0 – 4.0	3						
	Super extra fine pitch	12	●	2.4 – 4.8	3						
125	Coarse pitch	6							●	1.2 – 2.4	6
	Fine pitch	8	●	1.6 – 3.2	3	●	4.8 – 8.0	1.6	●	1.6 – 3.2	6
	Extra fine pitch	10				●	6.0 – 10.0	1.6			
	Extra fine pitch	12	●	2.4 – 4.8	3						
	Super extra fine pitch	14	●	2.8 – 5.6	3						
160	Coarse pitch	7							●	1.4 – 2.8	6
	Fine pitch	10	●	2.0 – 4.0	3	●	6.0 – 10.0	1.6	●	2.0 – 4.0	6
	Extra fine pitch	12				●	7.2 – 12.0	1.6			
	Extra fine pitch	14	●	2.8 – 5.6	3						
	Super extra fine pitch	16	●	3.2 – 6.4	3						
200	Coarse pitch	8							●	1.6 – 3.2	6
	Fine pitch	12							●	2.4 – 4.8	6

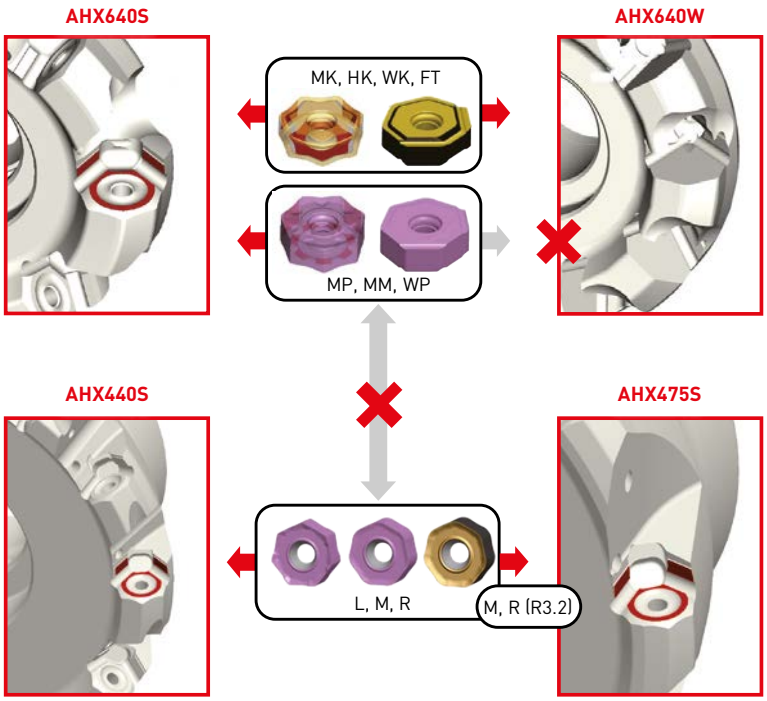
1. fr: Feed rate per revolution (AHX475S: the feed rate per cutter (fz) will be limited by the cutting width ae. Please refer to page 333 for details.)
2. APMX: Maximum depths of cut (AHX440S: the maximum depths of cut will vary depending on the type of chipbreaker.)
3. The depths of cut and feed rate are identical to the recommended conditions for carbon steel and alloy steel.

AHX STEEL SERIES

SELECTION REFERENCE TABLE (CUTTING EDGE COUNT AND CUTTING CONDITIONS)

COMPATIBILITY WITH INSERTS FOR AHX SERIES

The RE = 3.2 mm insert for use with AHX440S can be mounted on AHX475S type cutters.
All inserts for use with AHX640 can be mounted on AHX640S (note, however, that the height setting will differ).
The inserts for mounting on AHX640W are the MK, HK, WK and FT breaker types for casting.

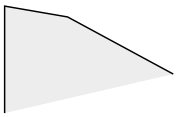


AHX STEEL SERIES

CHIPBREAKER SYSTEM

L Breaker

- Focus on cutting edge sharpness
- Low resistance type



M Breaker

- First Recommendation
- General use

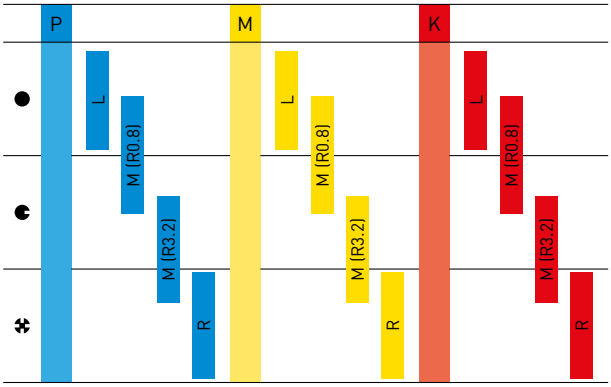
R Breaker

- Focus on fracture resistance
- Reinforced edge type

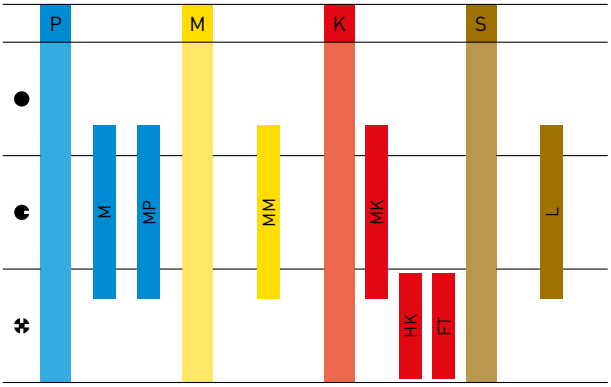
Cutting conditions:

●: Stable cutting ◔: General cutting ✠: Unstable cutting

AHX440S



AHX640S



WIPER INSERT OF AHX640S

Based on the number of inserts and the cutting conditions, use of wiper inserts can improve overall surface finishes.

P **WP** + combination with **MP**
Right-hand 2 corners,
left-hand 2 corners.

K **WK** + combination with **MK**
Right-hand 2 corners,
left-hand 2 corners.

AHX640W

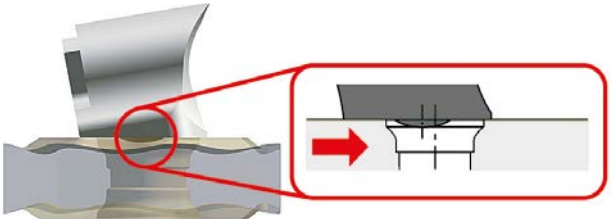
FACE MILLING CUTTER FOR HIGH EFFICIENCY MACHINING OF CAST IRON

HIGH RIGIDITY INSERTS SUITABLE FOR HIGH FEED MACHINING

Sloped cutting edge and large rake angle

INNOVATIVE CLAMP SYSTEM

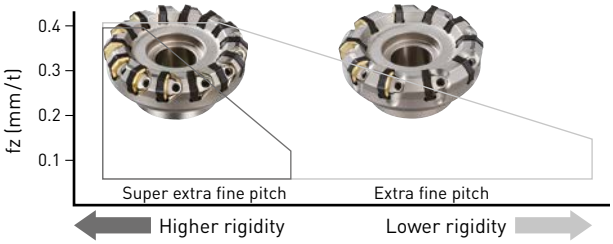
New type of wedge developed to increase the permissible number of teeth. Unique geometry uses a protruding section that fits inside the insert hole and acts as an Anti-Fly Insert (AFI) mechanism.



Prevents insert from flying out of the pocket.

2 VARIATIONS FOR DIFFERENT APPLICATIONS

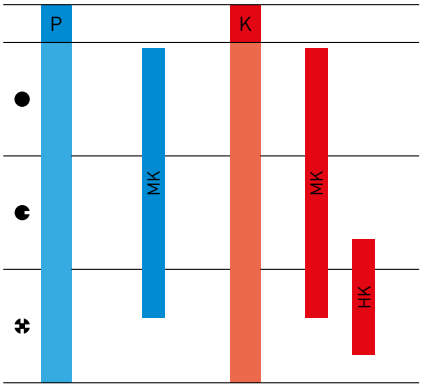
Extra fine pitch and super extra fine pitch types allow high efficiency milling under various machining conditions. Additionally, left hand types for use on special machines are also available as standard. Inserts can be used with both right and left hand type cutters.

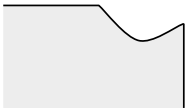


AHX640W

FACE MILLING CUTTER FOR HIGH EFFICIENCY MACHINING OF CAST IRON

INSERT APPLICATIONS



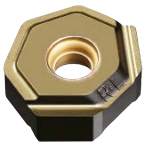


MK General purpose insert

- Accurate tolerance M-class insert.
- Neutral, double sided 14 corners.
- 20° rake angle for low cutting resistance.
  First recommendation for roughing and finishing.

HK Strong cutting edge insert

- Accurate tolerance M-class insert.
- Neutral, double sided 14 corners.
- High cutting edge strength to prevent fracturing of the cutting edge during unstable machining of non-uniform workpieces and high feed machining.



WK Wiper Insert

- Right-hand 2 corners, left-hand 2 corners.
- Based on the number of inserts and the cutting conditions, by using the wiper inserts it is possible to improve the overall surface finish.

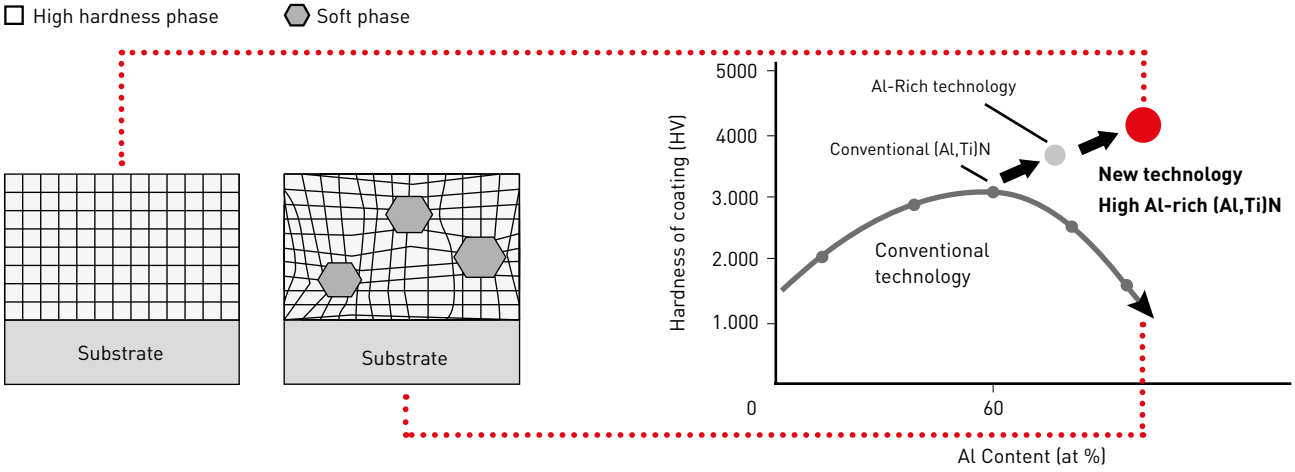
1. The insert for AHX640W is compatible with AHX640S.
2. Please refer to page 321 for the proper use of the XC5010 insert.

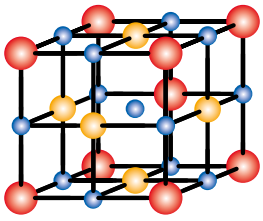
MV1020 / MV1030

NEWLY DEVELOPED Al-RICH COATING

ADVANCED WEAR AND THERMAL SHOCK RESISTANT

By adopting the newly developed Al-Rich coating technology, the (Al,Ti)N with a high Al content ratio displays a very high hardness. This greatly improves oxidation and wear resistance. The extreme heat resistance of this new series achieves amazing stability not only when dry cutting, but also during wet cutting where inserts are usually prone to thermal cracking. MV1020 offers overwhelmingly superior performance in high-speed cutting, and MV1030 achieves stable performance during interrupted and stainless steel machining.



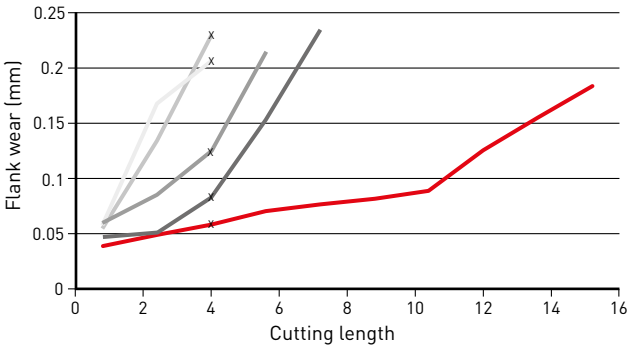


Crystal image of **MV1000** series

CUTTING PERFORMANCE

COMPARISON OF WEAR RESISTANCE WHEN MACHINING DUCTILE CAST IRON

Material	DIN GGG70
Tool	AHX440
Insert	NNMU130508ZEN-M
Vc (m/min)	300
fz (mm/t)	0.1
ap (mm)	2.0
ae (mm)	52
Cutting mode	Dry cutting Single insert



TAKEN AFTER CUTTING LENGTH OF 4.0 M

MV1020

Conventional A

Conventional B

Conventional C

Conventional D

■ : MV1020 ■ A ■ B ■ C ■ D : Conventional tool

MP6100 / MP7100 / MP9100

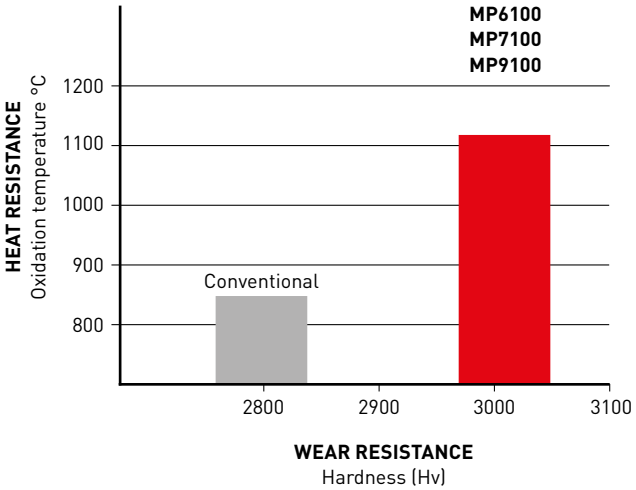
INSERT GRADES FOR A WIDE RANGE OF MATERIALS

ACCUMULATED Al-Ti-Cr-N BASED PVD COATING

Excellent welding resistance due to a low coefficient of friction.

PVD accumulated coating.

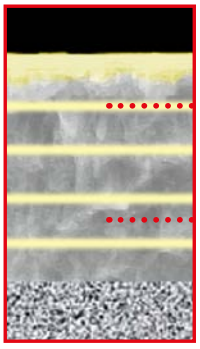
Special cemented carbide substrate.



COEFFICIENT OF FRICTION

	Material	Grade	Coefficient of friction (Measured at 600 °C)		
			C55	X10CrNi18-9	Ti6Al4V
P	Carbon steel, Alloy steel	MP61○○	0.4		
M	Stainless steel	MP71○○		0.5	
S	Titanium alloy, Heat resistant alloy	MP91○○		0.7	0.3
	Conventional		0.7		0.7

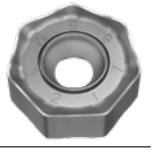
TOUGH-Σ



Graphical representation

Each grade has a layer suitable for each application area

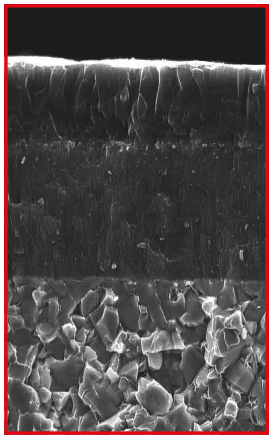
Base Layer High Al-(Al, Ti)N
The new technology Al-(Al, Ti)N coating provides stabilisation of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance.

P	**(Al,Cr)N** Tough against thermal cracks	
M	**TiN** Tough against notching	
S	**CrN** Tough resistant chipping	

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

MC5020

MC5020 has excellent wear, chipping and thermal crack resistance. These features prevent the problems usually associated with machining cast iron over prolonged periods.



Structure of
MC5020

IMPROVED WEAR RESISTANCE

The micro-grain wear resistant Al_2O_3 and fibrous TiCN layers deliver excellent wear resistance when milling a wide range of cast irons.

IMPROVED FRACTURE RESISTANCE

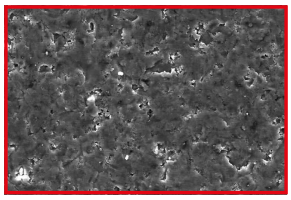
Use of a specially developed cemented carbide that provides superior resistance to fracture and thermal cracking prevents the cutting edge from sudden fracturing.

REDUCED ABNORMAL DAMAGE

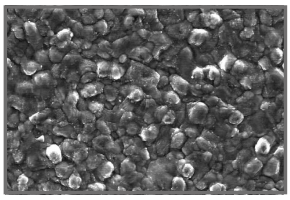
A black super smooth coating prevents abnormal damage such as weld chipping.

BLACK SUPER SMOOTH COATING

COMPARISON OF COATING SURFACE



MC5020



Conventional

CUTTING PERFORMANCE

WEAR RESISTANCE

MC5020

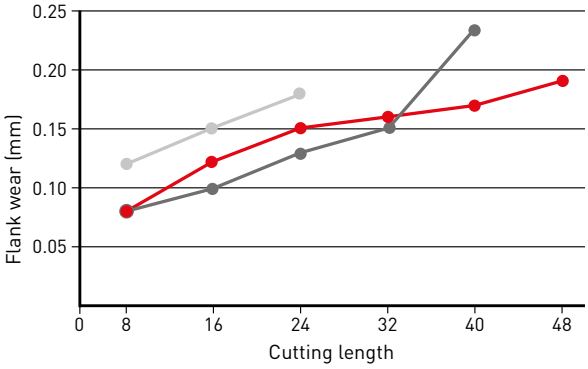
SURFACE FINISH

Surface finish condition

CUTTING PERFORMANCE

WEAR RESISTANCE

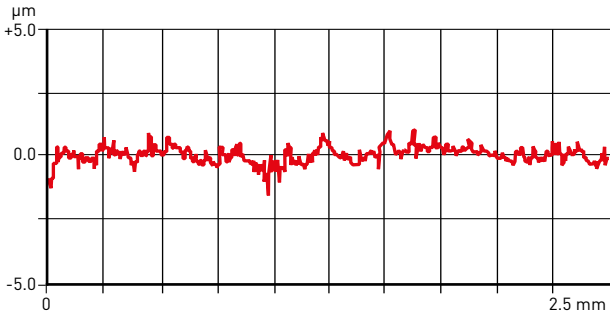
Material	DIN GG30
Tool	AHX640WR10010D
Insert	NNMU200608ZEN-MK
Vc (m/min)	300
fz (mm/t)	0.3
ap (mm)	5.0
ae (mm)	100
Cutting mode	Dry cutting Single insert



Wear comparison when machining with a single tooth.

SURFACE FINISH

Material	DIN GGG70
Tool	AHX640WR10014D
Insert	NNMU200608ZEN-MK
Wiper insert	WNEU2006ZEN7C-WK
Vc (m/min)	350
fz (mm/t)	0.1
ap (mm)	0.4
ae (mm)	80
Cutting mode	Air blow



■ : MC5020 ■ A ■ B : Conventional tool

AHX440S

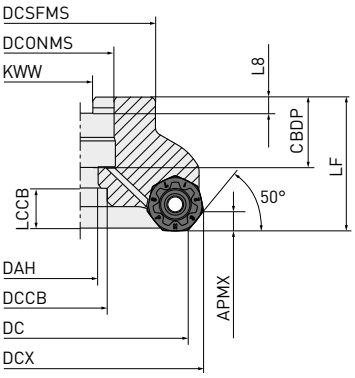
FACE MILL

P M K H

KAPR: 50°
GAMP: -10°
GAMF: -7°

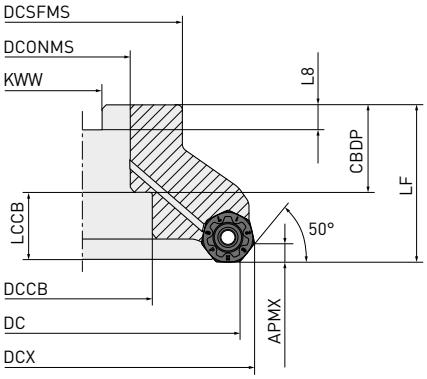
1

Ø 40
Ø 50
Ø 63
Ø 80



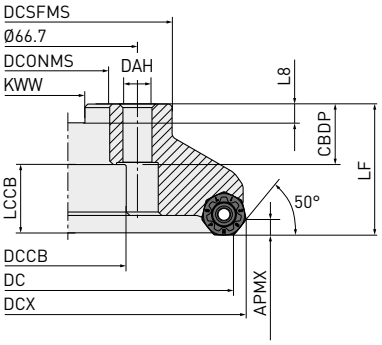
2

Ø 100
Ø 125
Ø 160

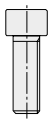
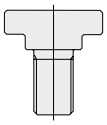


3

Ø 160



Right hand tool holder only.

Tool holder type	Set bolt order number		Geometry	
				
AHX440S-040A○○AR	HSC08025H	HSC08040	1	1 
AHX440S-050A○○AR	HSC10030H	HSC10035		
AHX440S-063A○○AR	HSC10030H	HSC10035		
AHX440S-080A○○AR	HSC12035H	HSC12035		
		HSC12045		
AHX440S-100B○○AR	MBA16033H	—	2	2 
AHX440S-125B○○AR	MBA20040H	—		

AHX440S – FACE MILL

ARBOR TYPE

Order number	Stock	APMX	DC	DCONMS	LF	WT	ZEFF		Type
AHX440S-040A03AR	●	3	40	16	40	0.3	3	○	1
AHX440S-040A04AR	●	3	40	16	40	0.2	4	○	1
AHX440S-050A04AR	●	3	50	22	40	0.4	4	○	1
AHX440S-050A05AR	●	3	50	22	40	0.4	5	○	1
AHX440S-050A06AR	●	3	50	22	40	0.4	6	○	1
AHX440S-063A05AR	●	3	63	22	40	0.6	5	○	1
AHX440S-063A06AR	●	3	63	22	40	0.6	6	○	1
AHX440S-063A08AR	●	3	63	22	40	0.5	8	○	1
AHX440S-080A06AR	●	3	80	27	50	1.1	6	○	1
AHX440S-080A08AR	●	3	80	27	50	1.1	8	○	1
AHX440S-080A10AR	●	3	80	27	50	1.1	10	○	1
AHX440S-100B07AR	●	3	100	32	50	1.6	7	○	2
AHX440S-100B10AR	●	3	100	32	50	1.6	10	○	2
AHX440S-100B12AR	●	3	100	32	50	1.6	12	○	2
AHX440S-125B08AR	●	3	125	40	63	3.0	8	○	2
AHX440S-125B12AR	●	3	125	40	63	3.0	12	○	2
AHX440S-125B14AR	●	3	125	40	63	2.9	14	○	2
AHX440S-160C10NR	●	3	160	40	63	4.8	10	—	3
AHX440S-160C14NR	●	3	160	40	63	4.6	14	—	3
AHX440S-160C16NR	●	3	160	40	63	4.7	16	—	3

1/1

1. The cutter body is not supplied with the set bolt for the arbor. Please order a set bolt seperately.
2. ○ = With through coolant holes

333 Vc

MOUNTING DIMENSIONS

Order number	CBDP	DAH	DCCB	DCONMS	DCSFMS	DCX	KWW	L8	Type
AHX440S-040A03AR	18	9	—	16	37	48.4	8.4	5.6	1
AHX440S-040A04AR	18	9	—	16	37	48.4	8.4	5.6	1
AHX440S-050A04AR	20	11	—	22	47	58.4	10.4	6.3	1
AHX440S-050A05AR	20	11	—	22	47	58.4	10.4	6.3	1
AHX440S-050A06AR	20	11	—	22	47	58.4	10.4	6.3	1
AHX440S-063A05AR	20	11	—	22	50	71.4	10.4	6.3	1
AHX440S-063A06AR	20	11	—	22	50	71.4	10.4	6.3	1
AHX440S-063A08AR	20	11	—	22	50	71.4	10.4	6.3	1
AHX440S-080A06AR	23	13	—	27	56	88.4	12.4	7	1
AHX440S-080A08AR	23	13	—	27	56	88.4	12.4	7	1
AHX440S-080A10AR	23	13	—	27	56	88.4	12.4	7	1
AHX440S-100B07AR	32	—	45	32	78	108.4	14.4	8	2
AHX440S-100B10AR	32	—	45	32	78	108.4	14.4	8	2
AHX440S-100B12AR	32	—	45	32	78	108.3	14.4	8	2
AHX440S-125B08AR	40	—	56	40	89	133.4	16.4	9	2
AHX440S-125B12AR	40	—	56	40	89	133.4	16.4	9	2
AHX440S-125B14AR	40	—	56	40	89	133.3	16.4	9	2
AHX440S-160C10NR	40	—	56	40	100	168.4	16.4	9	3
AHX440S-160C14NR	40	—	56	40	100	168.4	16.4	9	3
AHX440S-160C16NR	40	—	56	40	100	168.4	16.4	9	3

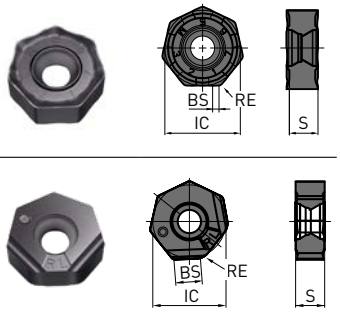
1/1

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

AHX440S – INSERTS

P	Steel	◐	✣				◐	◐	◐	**Cutting conditions :**	
M	Stainless steel			◐	✣			◐	◐	●: Stable cutting ◐: General cutting ✣: Unstable cutting	
K	Cast iron					◐	◐	◐	◐	**Honing:**	
H	Hardened steel								◐	E: Round	

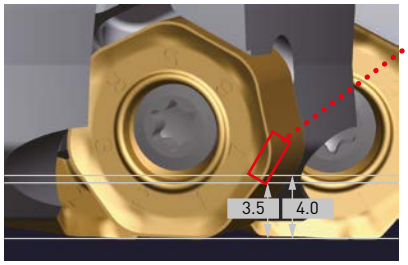
Order number	Class	Honing	MP6120	MP6130	MP7130	MP7140	MC5020	MV1020	MV1030	VP15TF	IC	S	BS	RE	APMX	Geometry
NNMU130508ZER-L	M	E	●	●	●	●	●	●	●	●	13.4	5.09	1	0.8	3	
NNMU130508ZEN-M	M	E	●	●	●	●	●	●	●	●	13.4	5.09	1	0.8	4*	
NNMU130532ZEN-M	M	E	●	●	●	●	●	●	●	●	13.4	5.09	—	3.2	4*	
NNMU130532ZEN-R	M	E	●	●	●	●	●	●	●	●	13.4	5.09	—	3.2	4*	
WNEU1305ZEN4C-M	E	E	●				●			●	13.4	5.09	4	2.7	0.5	



* Without using the wiper, APMX = 3.0 mm

GRADE SELECTION

P	PVD					M	PVD			K	PVD		CVD		H	PVD
P10	VP15TF	MP6120		MV1020		M10	VP15TF			K10	VP15TF				H10	
P20			MP6130		MV1030	M20		MP7130	MV1030	K20		XC5010	MC5020	MV1020	H20	VP15TF
P30						M30				MP7140	K30			MV1030	H30	
P40						M40					K40				H40	



NEXT CORNER RADIUS TO BE USED

When the next corner is not to be used, the APMX is 4.0 mm. When the next corner is to be used later (clockwise insert indexing), the APMX is 3.5 mm. This is to ensure that the next cutting edge isn't already worn from use at 4.0 mm depth of cut.

INSTRUCTIONS FOR USE OF WIPER INSERTS

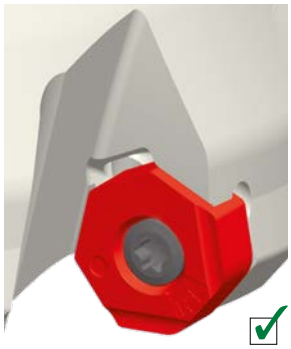


Fig. 1

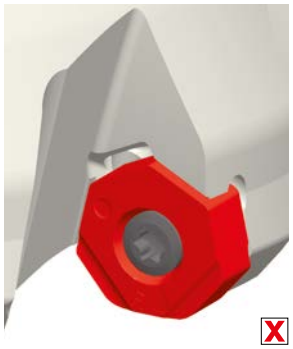


Fig. 2

1. These wiper inserts have 2 cutting edges for left hand use and 2 corners for right hand use. Position as shown in figure 1.
2. A satisfactory finished surface can be achieved with one wiper insert. However, if the feed rate per revolution will be equal to or greater than the width of the wiper edge, it is recommended to install the second and further wiper inserts spaced evenly within the cutting body.

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

AHX440S

RECOMMENDED CUTTING CONDITIONS

DRY CUTTING

	Material	Properties	Grade	Vc	fz	ap	ae
P	Mild steel	<180HB	MV1020	300 (200–400)	0.30 (0.20–0.40)	≤3	≤0.8DC
			MP6120	250 (200–300)	0.30 (0.20–0.40)	≤3	≤0.8DC
			VP15TF	250 (200–300)	0.30 (0.20–0.40)	≤3	≤0.8DC
			MV1030	245 (190–300)	0.30 (0.20–0.40)	≤3	≤0.8DC
			MP6130	240 (190–290)	0.30 (0.20–0.40)	≤3	≤0.8DC
	Carbon steel Alloy steel	180–280HB	MV1020	260 (170–350)	0.30 (0.20–0.40)	≤3	≤0.8DC
			MP6120	220 (170–270)	0.30 (0.20–0.40)	≤3	≤0.8DC
			VP15TF	220 (170–270)	0.30 (0.20–0.40)	≤3	≤0.8DC
			MV1030	210 (150–270)	0.30 (0.20–0.40)	≤3	≤0.8DC
			MP6130	200 (150–250)	0.30 (0.20–0.40)	≤3	≤0.8DC
		280–350HB	MV1020	180 (100–250)	0.30 (0.20–0.40)	≤3	≤0.8DC
			MP6120	140 (100–180)	0.30 (0.20–0.40)	≤3	≤0.8DC
			VP15TF	140 (100–180)	0.30 (0.20–0.40)	≤3	≤0.8DC
			MV1030	135 (90–180)	0.30 (0.20–0.40)	≤3	≤0.8DC
			MP6130	120 (90–150)	0.30 (0.20–0.40)	≤3	≤0.8DC
	Alloy tool steel	≤350HB	MP6120	140 (100–180)	0.15 (0.20–0.20)	≤ 1	≤0.8DC
			VP15TF	140 (100–180)	0.15 (0.20–0.20)	≤ 1	≤0.8DC
			MP6130	120 (90–150)	0.15 (0.20–0.20)	≤ 1	≤0.8DC
	Pre-hardened steel	35–45HRC	MP6120	140 (100–180)	0.15 (0.20–0.20)	≤ 1	≤0.8DC
			MP6130	120 (90–150)	0.15 (0.20–0.20)	≤ 1	≤0.8DC
M	Austenitic stainless steel	≤200HB	MP7130	200 (150–250)	0.20 (0.10–0.30)	≤3	≤0.8DC
			VP15TF	200 (150–250)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MV1030	185 (120–250)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MP7140	180 (120–230)	0.20 (0.10–0.30)	≤3	≤0.8DC
		≥200HB	MP7130	150 (100–200)	0.20 (0.10–0.30)	≤3	≤0.8DC
			VP15TF	150 (100–200)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MV1030	140 (80–200)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MP7140	130 (80–180)	0.20 (0.10–0.30)	≤3	≤0.8DC
	Ferritic and martensitic stainless steel	≤200HB	MP7130	200 (150–250)	0.20 (0.10–0.30)	≤3	≤0.8DC
			VP15TF	200 (150–250)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MV1030	185 (120–250)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MP7140	180 (120–230)	0.20 (0.10–0.30)	≤3	≤0.8DC
		≥200HB	MP7130	150 (100–200)	0.20 (0.10–0.30)	≤3	≤0.8DC
			VP15TF	150 (100–200)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MV1030	140 (80–200)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MP7140	130 (80–180)	0.20 (0.10–0.30)	≤3	≤0.8DC
	Two-phase stainless steel	≤280HB	MP7130	140 (100–180)	0.15 (0.20–0.20)	≤3	≤0.8DC
			VP15TF	140 (100–180)	0.15 (0.20–0.20)	≤3	≤0.8DC
			MP7140	120 (80–160)	0.15 (0.20–0.20)	≤3	≤0.8DC
	Hardened stainless steel	≤450HB	MP7130	130 (100–160)	0.15 (0.20–0.20)	≤3	≤0.8DC
			VP15TF	130 (100–160)	0.15 (0.20–0.20)	≤3	≤0.8DC
			MP7140	110 (80–140)	0.15 (0.20–0.20)	≤3	≤0.8DC

1. Reduce the cutting speed when using coolant.

AHX440S

RECOMMENDED CUTTING CONDITIONS

DRY CUTTING

	Material	Properties	Grade	Vc	fz	ap	ae
K	Grey cast iron	<350MPa	MC5020	220 (150–300)	0.30 (0.20–0.40)	≤3	≤0.8DC
			VP15TF	180 (130–230)	0.30 (0.20–0.40)	≤3	≤0.8DC
	Ductile cast iron	<450MPa	MV1020	240 (130–350)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MC5020	220 (150–300)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MV1030	185 (120–250)	0.20 (0.10–0.30)	≤3	≤0.8DC
			VP15TF	170 (120–220)	0.20 (0.10–0.30)	≤3	≤0.8DC
	Ductile cast iron	<800MPa	MV1020	220 (80–350)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MC5020	170 (150–200)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MV1030	150 (100–200)	0.20 (0.10–0.30)	≤3	≤0.8DC
			VP15TF	140 (100–180)	0.20 (0.10–0.30)	≤3	≤0.8DC
H	Hardened steel	40–55HRC	VP15TF	80 (60–100)	0.15 (0.10–0.20)	≤1	≤0.8DC

1. Reduce the cutting speed when using coolant.

AHX440S

RECOMMENDED CUTTING CONDITIONS

WET CUTTING

	Material	Properties	Grade	Vc	fz	ap	ae
M	Austenitic stainless steel	≤200HB	MP7130	125 (100–150)	0.15 (0.10–0.20)	≤3	≤0.8DC
			VP15TF	125 (100–150)	0.15 (0.10–0.20)	≤3	≤0.8DC
			MP7140	100 (80–140)	0.15 (0.10–0.20)	≤3	≤0.8DC
		≥200HB	MP7130	100 (75–125)	0.15 (0.10–0.20)	≤3	≤0.8DC
			VP15TF	100 (75–125)	0.15 (0.10–0.20)	≤3	≤0.8DC
			MP7140	80 (55–105)	0.15 (0.10–0.20)	≤3	≤0.8DC
	Ferritic and martensitic stainless steel	≤200HB	MP7130	125 (100–150)	0.15 (0.10–0.20)	≤3	≤0.8DC
			VP15TF	125 (100–150)	0.15 (0.10–0.20)	≤3	≤0.8DC
			MP7140	100 (80–140)	0.15 (0.10–0.20)	≤3	≤0.8DC
		≥200HB	MP7130	100 (75–125)	0.15 (0.10–0.20)	≤3	≤0.8DC
			VP15TF	100 (75–125)	0.15 (0.10–0.20)	≤3	≤0.8DC
			MP7140	80 (55–105)	0.15 (0.10–0.20)	≤3	≤0.8DC
	Two-phase stainless steel	≤280HB	MP7130	80 (60–100)	0.10 (0.05–0.15)	≤3	≤0.8DC
			VP15TF	80 (60–100)	0.10 (0.05–0.15)	≤3	≤0.8DC
			MP7140	60 (40– 80)	0.10 (0.05–0.15)	≤3	≤0.8DC
	Hardened stainless steel	≤450HB	MP7130	70 (50– 90)	0.10 (0.05–0.15)	≤3	≤0.8DC
			VP15TF	70 (50– 90)	0.10 (0.05–0.15)	≤3	≤0.8DC
			MP7140	50 (30– 70)	0.10 (0.05–0.15)	≤3	≤0.8DC

AHX440S

RECOMMENDED CUTTING CONDITIONS

CUTTING CONDITIONS FOR WIPER INSERT

	Material	Properties	Grade	Vc	fz	ap
P	Mild steel	<180HB	MP6120	250 (200–300)	0.30 (0.20–0.40)	≤0.5
			VP15TF	250 (200–300)	0.30 (0.20–0.40)	≤0.5
	Carbon steel Alloy steel	180–280HB	MP6120	220 (170–270)	0.30 (0.20–0.40)	≤0.5
			VP15TF	220 (170–270)	0.30 (0.20–0.40)	≤0.5
		280–350HB	MP6120	140 (100–180)	0.30 (0.20–0.40)	≤0.5
			VP15TF	140 (100–180)	0.30 (0.20–0.40)	≤0.5
	Alloy tool steel	≤350HB	MP6120	140 (100–180)	0.15 (0.10–0.20)	≤0.5
			VP15TF	140 (100–180)	0.15 (0.10–0.20)	≤0.5
	Pre-hardened steel	35–45HRC	MP6120	140 (100–180)	0.15 (0.10–0.20)	≤0.5
			VP15TF	140 (100–180)	0.15 (0.10–0.20)	≤0.5
M	Austenitic stainless steel	≤200HB	VP15TF	125 (100–150)	0.15 (0.10–0.20)	≤0.5
		≥200HB	VP15TF	100 (75–125)	0.15 (0.10–0.20)	≤0.5
	Ferritic and martensitic stainless steel	≤200HB	VP15TF	125 (100–150)	0.15 (0.10–0.20)	≤0.5
		≥200HB	VP15TF	100 (75–125)	0.15 (0.10–0.20)	≤0.5
	Two-phase stainless steel	≤280HB	VP15TF	80 (60–100)	0.10 (0.05–0.15)	≤0.5
	Hardened stainless steel	≤450HB	VP15TF	70 (50– 90)	0.10 (0.05–0.15)	≤0.5
K	Grey cast iron	<350MPa	MC5020	320 (250–400)	0.30 (0.20–0.40)	≤0.5
			VP15TF	220 (150–300)	0.30 (0.20–0.40)	≤0.5
	Ductile cast iron	<450MPa	MC5020	250(200–300)	0.20 (0.10–0.30)	≤0.5
			VP15TF	200 (150–250)	0.20 (0.10–0.30)	≤0.5
		<800MPa	MC5020	220 (200–250)	0.20 (0.10–0.30)	≤0.5
			VP15TF	170 (150–200)	0.20 (0.10–0.30)	≤0.5
H	Hardened steel	40–55HRC	VP15TF	80 (60–100)	0.15 (0.10–0.20)	≤0.5

1/1

1. Refer to the table above 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 when 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. Wet cutting is recommended when good surface finishes are needed on stainless steel.
   (Tool life is short wehn compared to dry cutting).

AHX475S

15° KAPR

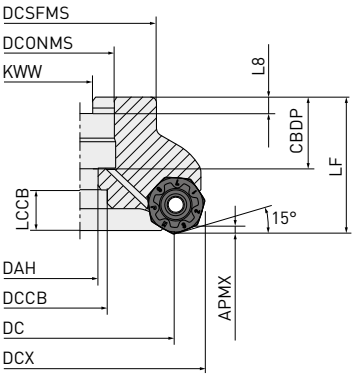
HIGH FEED MILLING CUTTER

P K H

KAPR: 15°
T: 16°
GAMP: -6°/9°
GAMF: -10°

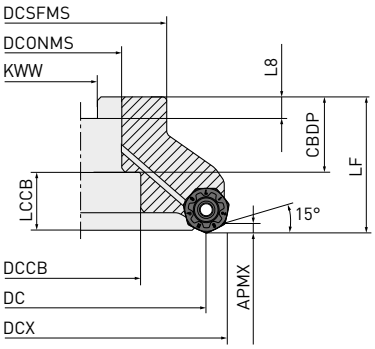
1

Ø 50
Ø 63
Ø 80
Ø 100



2

Ø 125
Ø 160



Right hand tool holder only.

Tool holder type	Set bolt order number			Geometry
AHX475S-050A○○AR	HSC10030H	HSC10035	1	1
AHX475S-063A○○AR	HSC10030H	HSC10035		
AHX475S-080A○○AR	HSC12035H	HSC12035		
		HSC12045		
AHX475S-100B○○AR	HSC16040H	—		
AHX475S-125B○○AR	MBA20040H	—	2	2
AHX475S-160B○○AR	MBA20040H	—		

AHX475S – HIGH FEED MILLING CUTTER

ARBOR TYPE

Order number	Stock	APMX	DC	DCONMS	LF	WT	ZEFF		Type
AHX475S-050A04AR	●	1.6	50	22	50	0.6	4	○	1
AHX475S-050A05AR	●	1.6	50	22	50	0.6	5	○	1
AHX475S-063A05AR	●	1.6	63	22	50	1.0	5	○	1
AHX475S-063A06AR	●	1.6	63	22	50	0.9	6	○	1
AHX475S-080A06AR	●	1.6	80	27	50	1.6	6	○	1
AHX475S-080A08AR	●	1.6	80	27	50	1.5	8	○	1
AHX475S-100A07AR	●	1.6	100	32	63	3.2	7	○	2
AHX475S-100A09AR	●	1.6	100	32	63	3.2	9	○	2
AHX475S-125B08AR	●	1.6	125	40	63	3.8	8	○	2
AHX475S-125B10AR	●	1.6	125	40	63	3.8	10	○	2
AHX475S-160B10AR	●	1.6	160	40	63	5.4	10	○	2
AHX475S-160B12AR	●	1.6	160	40	63	5.3	12	○	2

1/1

1. The cutter body is not supplied with the set bolt for the arbor. Please order a set bolt seperately.
2. ○ = With through coolant holes

340 Vc

MOUNTING DIMENSIONS

Order number	CBDP	DAH	DCCB	DCONMS	DCSFMS	DCX	KWW	L8	Type
AHX475S-050A04AR	20	11	17	22	47	65.6	10.4	6.3	1
AHX475S-050A05AR	20	11	17	22	47	65.6	10.4	6.3	1
AHX475S-063A05AR	20	11	17	22	60	78.6	10.4	6.3	1
AHX475S-063A06AR	20	11	17	22	60	78.6	10.4	6.3	1
AHX475S-080A06AR	23	13	20	27	76	95.6	12.4	7	1
AHX475S-080A08AR	23	13	20	27	76	95.6	12.4	7	1
AHX475S-100A07AR	26	17	26	32	96	115.6	14.4	8	2
AHX475S-100A09AR	26	17	26	32	96	115.6	14.4	8	2
AHX475S-125B08AR	40	56	—	40	100	140.6	16.4	9	2
AHX475S-125B10AR	40	56	—	40	100	140.6	16.4	9	2
AHX475S-160B10AR	40	56	—	40	100	175.6	16.4	9	2
AHX475S-160B12AR	40	56	—	40	100	175.6	16.4	9	2

1/1

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

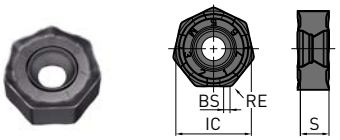
AHX475S – INSERTS

P	Steel	◔	✲		◔	◔	◔	
K	Cast iron			◔	◔	◔	◔	
H	Hardened steel						◔	

Cutting conditions :
●: Stable cutting ◔: General cutting ✲: Unstable cutting

Honing: E: Round

Order number	Class	Honing	MP6120	MP6130	MC5020	MV1020	MV1030	VP15TF	IC	S	BS	RE	APMX	Geometry
NNMU130532ZEN-M	M	E	●	●	●	●	●	●	13.4	5.09	—	3.2	1.6	
NNMU130532ZEN-R	M	E	●	●	●	●	●	●	13.4	5.09	—	3.2	1.6	



GRADE SELECTION

P	PVD					K	PVD		CVD		H	PVD
P10	VP15TF	MP6120		MV1020		K10	VP15TF	MV1020	MV1030	MC5020	H10	
P20			MP6130		MV1030	K20					H20	VP15TF
P30						K30					H30	
P40						K40					H40	

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

AHX475S

RECOMMENDED CUTTING CONDITIONS

DRY CUTTING

	Material	Properties	Grade		Vc	fz	ap	ae
P	Mild steel	<180HB	MV1020	R	220 (170 – 270)	0.6	≤1.6	≤0.5DC
			MV1020	R	220 (170 – 270)	0.8	≤1.6	0.5 – 0.8DC
			MV1020	M	220 (170 – 270)	1.0	≤1.6	0.8 – 1DC
			MP6120	R	150 (100 – 200)	0.6	≤1.6	≤0.5DC
			MP6120	R	150 (100 – 200)	0.8	≤1.6	0.5 – 0.8DC
			MP6120	M	150 (100 – 200)	1.0	≤1.6	0.8 – 1DC
			MV1030	R	140 (80 – 200)	0.6	≤1.6	≤0.5DC
			MV1030	R	140 (80 – 200)	0.8	≤1.6	0.5 – 0.8DC
			MV1030	M	140 (80 – 200)	1.0	≤1.6	0.8 – 1DC
			MP6130	R	130 (80 – 180)	0.6	≤1.6	≤0.5DC
			MP6130	R	130 (80 – 180)	0.8	≤1.6	0.5 – 0.8DC
			MP6130	M	130 (80 – 180)	1	≤1.6	0.8 – 1DC
	Carbon steel Alloy steel	180–280HB	MV1020	R	200 (150 – 250)	0.6	≤1.6	≤0.5DC
			MV1020	R	200 (150 – 250)	0.8	≤1.6	0.5 – 0.8DC
			MV1020	M	200 (150 – 250)	1.0	≤1.6	0.8 – 1DC
			MP6120	R	130 (80 – 180)	0.6	≤1.6	≤0.5DC
			MP6120	R	130 (80 – 180)	0.8	≤1.6	0.5 – 0.8DC
			MP6120	M	130 (80 – 180)	1.0	≤1.6	0.8 – 1DC
			MV1030	R	140 (80 – 200)	0.6	≤1.6	≤0.5DC
			MV1030	R	140 (80 – 200)	0.8	≤1.6	0.5 – 0.8DC
			MV1030	M	140 (80 – 200)	1.0	≤1.6	0.8 – 1DC
			MP6130	R	110 (60 – 160)	0.6	≤1.6	≤0.5DC
			MP6130	R	110 (60 – 160)	0.8	≤1.6	0.5 – 0.8DC
			MP6130	M	110 (60 – 160)	1	≤1.6	0.8 – 1DC
	Carbon steel Alloy steel	280–350HB	MV1020	R	150 (100 – 200)	0.5	≤1.6	≤0.5DC
			MV1020	R	150 (100 – 200)	0.6	≤1.6	0.5 – 0.8DC
			MV1020	R	150 (100 – 200)	0.7	≤1.6	0.8 – 1DC
			MP6120	R	100 (50 – 150)	0.5	≤1.6	≤0.5DC
			MP6120	R	100 (50 – 150)	0.6	≤1.6	0.5 – 0.8DC
			MP6120	R	100 (50 – 150)	0.7	≤1.6	0.8 – 1DC
			MV1030	R	90 (30 – 150)	0.5	≤1.6	≤0.5DC
			MV1030	R	90 (30 – 150)	0.6	≤1.6	0.5 – 0.8DC
			MV1030	R	90 (30 – 150)	0.7	≤1.6	0.8 – 1DC
			MP6130	R	80 (30 – 130)	0.5	≤1.6	≤0.5DC
			MP6130	R	80 (30 – 130)	0.6	≤1.6	0.5 – 0.8DC
			MP6130	R	80 (30 – 130)	0.7	≤1.6	0.8 – 1DC
	Alloy tool steel	<350HB	MP6120	R	100 (50 – 150)	0.5	≤1.6	≤0.5DC
			MP6120	R	100 (50 – 150)	0.6	≤1.6	0.5 – 0.8DC
			MP6120	R	100 (50 – 150)	0.7	≤1.6	0.8 – 1DC
			MP6130	R	80 (30 – 120)	0.5	≤1.6	≤0.5DC
			MP6130	R	80 (30 – 120)	0.6	≤1.6	0.5 – 0.8DC
			MP6130	R	80 (30 – 120)	0.7	≤1.6	0.8 – 1DC
	Pre-hardened steel	35–45HRC	MP6120	R	100 (70 – 130)	0.5	≤1.6	≤0.5DC
			MP6120	R	100 (70 – 130)	0.6	≤1.6	0.5 – 0.8DC
			MP6120	R	100 (70 – 130)	0.7	≤1.6	0.8 – 1DC
			MP6130	R	80 (50 – 110)	0.5	≤1.6	≤0.5DC
			MP6130	R	80 (50 – 110)	0.6	≤1.6	0.5 – 0.8DC
			MP6130	R	80 (50 – 110)	0.7	≤1.6	0.8 – 1DC

AHX475S

RECOMMENDED CUTTING CONDITIONS

DRY CUTTING

	Material	Properties	Grade		Vc	fz	ap	ae
K	Grey cast iron	<350MPa	MC5020	R	150 (100 – 200)	0.6	≤1.6	≤0.5DC
			MC5020	R	150 (100 – 200)	0.8	≤1.6	0.5 – 0.8DC
			MC5020	M	150 (100 – 200)	1.0	≤1.6	0.8 – 1DC
			VP15TF	R	120 (80 – 160)	0.6	≤1.6	≤0.5DC
			VP15TF	R	120 (80 – 160)	0.8	≤1.6	0.5 – 0.8DC
			VP15TF	M	120 (80 – 160)	1.0	≤1.6	0.8 – 1DC
	Ductile cast iron	<450MPa	MV1020	R	200 (150 – 250)	0.6	≤1.6	≤0.5DC
			MV1020	R	200 (150 – 250)	0.8	≤1.6	0.5 – 0.8DC
			MV1020	M	200 (150 – 250)	1.0	≤1.6	0.8 – 1DC
			MC5020	R	150 (100 – 200)	0.6	≤1.6	≤0.5DC
			MC5020	R	150 (100 – 200)	0.8	≤1.6	0.5 – 0.8DC
			MC5020	M	150 (100 – 200)	1.0	≤1.6	0.8 – 1DC
			MV1030	R	140 (80 – 200)	0.6	≤1.6	≤0.5DC
			MV1030	R	140 (80 – 200)	0.8	≤1.6	0.5 – 0.8DC
			MV1030	M	140 (80 – 200)	1.0	≤1.6	0.8 – 1DC
			VP15TF	R	120 (80 – 160)	0.6	≤1.6	≤0.5DC
			VP15TF	R	120 (80 – 160)	0.8	≤1.6	0.5 – 0.8DC
			VP15TF	M	120 (80 – 160)	1	≤1.6	0.8 – 1DC
	Ductile cast iron	<800MPa	MV1020	R	180 (130 – 230)	0.5	≤1.6	≤0.5DC
			MV1020	R	180 (130 – 230)	0.6	≤1.6	0.5 – 0.8DC
			MV1020	R	180 (130 – 230)	0.7	≤1.6	0.8 – 1DC
			MC5020	R	150 (100 – 200)	0.5	≤1.6	≤0.5DC
			MC5020	R	150 (100 – 200)	0.6	≤1.6	0.5 – 0.8DC
			MC5020	R	150 (100 – 200)	0.7	≤1.6	0.8 – 1DC
			MV1030	R	140 (80 – 200)	0.5	≤1.6	≤0.5DC
			MV1030	R	140 (80 – 200)	0.6	≤1.6	0.5 – 0.8DC
			MV1030	R	140 (80 – 200)	0.7	≤1.6	0.8 – 1DC
			VP15TF	R	120 (80 – 160)	0.5	≤1.6	≤0.5DC
			VP15TF	R	120 (80 – 160)	0.6	≤1.6	0.5 – 0.8DC
			VP15TF	R	120 (80 – 160)	0.7	≤1.6	0.8 – 1DC
H	Hardened steel	40–55HRC	VP15TF	R	70 (50 – 90)	0.4	≤1.6	≤0.5DC
			VP15TF	R	70 (50 – 90)	0.5	≤1.6	0.5 – 0.8DC
			VP15TF	R	70 (50 – 90)	0.6	≤1.6	0.8 – 1DC

AHX640S

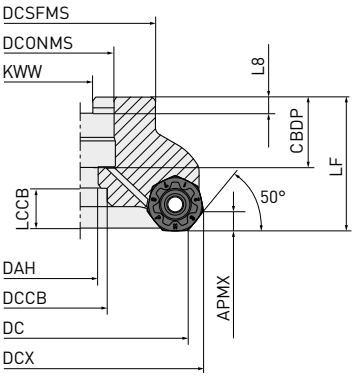
FACE MILL

P M K S H

KAPR: 50°
GAMP: -5°
GAMF: -6°

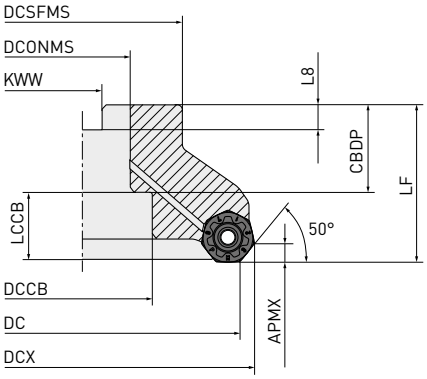
1

Ø 63
Ø 80



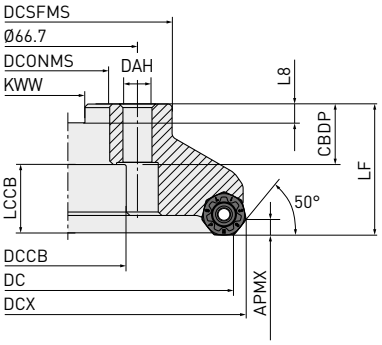
2

Ø 100
Ø 125



3

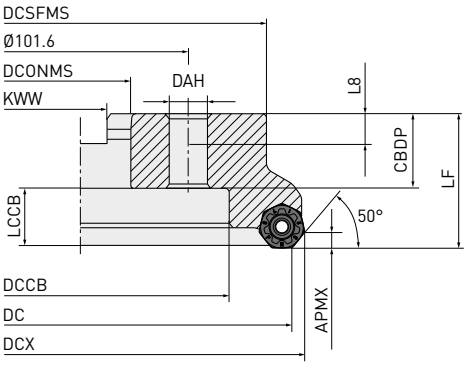
Ø 160



Right hand tool holder only.

4

Ø 200



Tool holder type	Set bolt		Geometry
AHX640S-063A○○AR	HSC10030H	1	1
AHX640S-080A○○AR	HSC12035H		
AHX640S-100B○○AR	MBA16033H		
AHX640S-125B○○AR	MBA20040H	2	2
AHX640S-160C○○NR	—	—	
AHX640S-200C○○NR	—	—	

AHX640S – FACE MILL

ARBOR TYPE

Order number	Stock	APMX	DC	DCONMS	LF	WT	ZEFF		Type
AHX640S-063A04AR	●	6	63	22	50	0.7	4	○	1
AHX640S-063A05AR	●	6	63	22	50	0.6	5	○	1
AHX640S-080A04AR	●	6	80	27	50	1.1	4	○	1
AHX640S-080A06AR	●	6	80	27	50	1.0	6	○	1
AHX640S-100B05AR	●	6	100	32	50	1.7	5	○	2
AHX640S-100B07AR	●	6	100	32	50	1.6	7	○	2
AHX640S-125B06AR	●	6	125	40	63	3.1	6	○	2
AHX640S-125B08AR	●	6	125	40	63	3.0	8	○	2
AHX640S-160C07NR	●	6	160	40	63	5.4	7	—	3
AHX640S-160C10NR	●	6	160	40	63	5.2	10	—	3
AHX640S-200C08NR	●	6	200	60	63	7.8	8	—	4
AHX640S-200C12NR	●	6	200	60	63	7.5	12	—	4

1/1

1. ○ = With through coolant holes

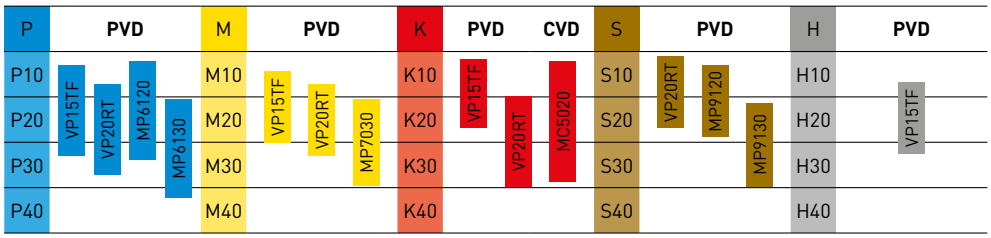
345 Vc

MOUNTING DIMENSIONS

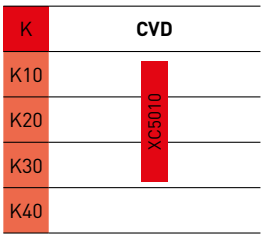
Order number	CBDP	DAH	DCCB	DCONMS	DCSFMS	DCX	KWW	L8	Type
AHX640S-063A04AR	20	11	—	22	50	75.55	10.4	6.3	1
AHX640S-063A05AR	20	11	—	22	50	75.55	10.4	6.3	1
AHX640S-080A04AR	23	13	—	27	56	92.55	12.4	7	1
AHX640S-080A06AR	23	13	—	27	56	92.55	12.4	7	1
AHX640S-100B05AR	32	—	45	32	78	112.55	14.4	8	2
AHX640S-100B07AR	32	—	45	32	78	112.55	14.4	8	2
AHX640S-125B06AR	42	—	56	40	89	137.55	16.4	9	2
AHX640S-125B08AR	42	—	56	40	89	137.55	16.4	9	2
AHX640S-160C07NR	29	—	56	40	120	172.55	16.4	9	3
AHX640S-160C10NR	29	—	56	40	120	172.55	16.4	9	3
AHX640S-200C08NR	32	—	140	60	175	212.55	25.7	14.22	4
AHX640S-200C12NR	32	—	140	60	175	212.55	25.7	14.22	4

1/1

GRADE SELECTION CARBIDE



GRADE SELECTION CERAMIC



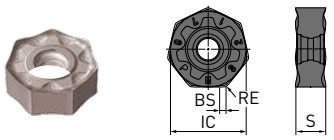
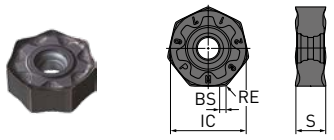
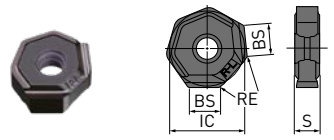
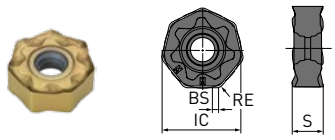
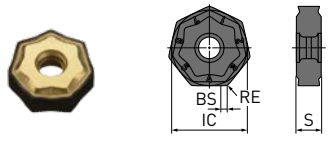
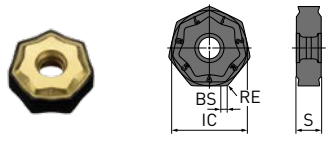
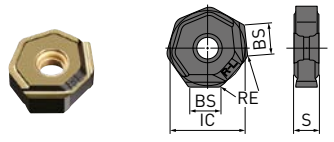
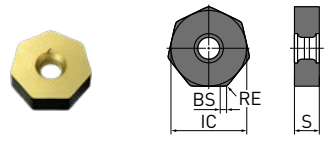
● : Inventory maintained. ★ : Inventory maintained in Japan.

AHX640S – INSERTS

		XC5010	MC5020	MP6120	MP6130	MP7030	MP9120	MP9130	VP15TF	VP20RT
P	Steel			●	✣				●	●
M	Stainless steel					●			●	●
K	Cast iron	●	●						✣	●
S	Heat-resistant alloy, Titanium alloy						●	✣	●	●
H	Hardened steel								●	

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

Honing:
E: Round

Order number	Class	Honing	XC5010	MC5020	MP6120	MP6130	MP7030	MP9120	MP9130	VP15TF	VP20RT	IC	S	BS	RE	APMX	Geometry
L																	
NNMU200712ZER-L	M	E						●	●			20	8.0	1.0	1.2	6	
M/MP																	
NNMU200708ZEN-MP	M	E								●		20	8.0	1.0	0.8	6	
NNMU200708ZEN-M	M	E			●	●						20	8.0	1.0	0.8	6	
WP (Wiper)																	
WNEU2007ZEN7C-WP	M	E								●		20	7.2	7.1	0.8	6	
MM																	
NNMU200712ZER-MM	M	E					●					20	8.0	1.0	1.2	6	
MK																	
NNMU200608ZEN-MK	M	E	●	●						●	★	20	6.55	1.0	0.8	6	
HK																	
NNMU200608ZEN-HK	M	E		●						●	★	20	6.55	1.0	0.8	6	
WK* (Wiper)																	
WNEU2006ZEN7C-WK	M	E		●								20	6.55	7.4	0.8	6	
FT																	
NNMQ200708ZEN-FT	M	E	●									20	6.55	1.0	0.8	6	

* The MK/HK/WK breaker insert is compatible with AHX640S.

1. Possible wiper combinations: MK/HK with WK (wiper) & MP/L/M with WP (wiper).
2. Note that the height differs when MK/HK chipbreaker inserts are used.

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

AHX640S

RECOMMENDED CUTTING CONDITIONS

DRY CUTTING

	Material	Properties	Conditions	Grade		Vc	fz	ap	ae
P	Mild steel	<180HB		MP6120	M	250 (200–300)	0.30 (0.20–0.40)	≤5	≤0.8DC
				VP15TF	MP	250 (200–300)	0.30 (0.20–0.40)	≤5	≤0.8DC
				MP6130	M	220 (170–270)	0.40 (0.30–0.50)	≤5	≤0.8DC
	Carbon steel, Alloy steel	180–280HB		MP6120	M	220 (170–270)	0.30 (0.20–0.40)	≤5	≤0.8DC
				VP15TF	MP	220 (170–270)	0.30 (0.20–0.40)	≤5	≤0.8DC
				MP6130	M	190 (140–240)	0.40 (0.30–0.50)	≤5	≤0.8DC
		280–350HB		MP6120	M	140 (100–180)	0.30 (0.20–0.40)	≤5	≤0.8DC
				VP15TF	MP	140 (100–180)	0.30 (0.20–0.40)	≤5	≤0.8DC
				MP6130	M	110 (70–150)	0.40 (0.30–0.50)	≤5	≤0.8DC
	Alloy tool steel	≤350HB		MP6120	M	140 (100–180)	0.15 (0.10–0.20)	≤3	≤0.8DC
				VP15TF	MP	140 (100–180)	0.15 (0.10–0.20)	≤3	≤0.8DC
				MP6130	M	110 (70–150)	0.25 (0.20–0.30)	≤3	≤0.8DC
	Pre-hardened steel	35–45HRC		MP6120	M	140 (100–180)	0.15 (0.10–0.20)	≤3	≤0.8DC
				VP15TF	MP	140 (100–180)	0.15 (0.10–0.20)	≤5	≤0.8DC
				MP6130	M	110 (70–150)	0.25 (0.20–0.30)	≤3	≤0.8DC
M	Austenitic stainless steel	≤200HB		MP7030	MM	200 (150–250)	0.20 (0.10–0.30)	≤5	≤0.8DC
		≥200HB		MP7030	MM	150 (100–200)	0.20 (0.10–0.30)	≤5	≤0.8DC
	Two-phase stainless steel	≤280HB		MP7030	MM	140 (100–180)	0.15 (0.05–0.25)	≤5	≤0.8DC
	Ferritic and martensitic stainless steel	≤200HB		MP7030	MM	200 (150–250)	0.20 (0.10–0.30)	≤5	≤0.8DC
		≥200HB		MP7030	MM	150 (100–200)	0.20 (0.10–0.30)	≤5	≤0.8DC
	Precipitation hardening stainless steel	≤450HB		MP7030	MM	130 (100–160)	0.15 (0.05–0.25)	≤5	≤0.8DC
K	Grey cast iron	<350MPa		XC5010	MK, FT	800 (500–1000)	0.10 (0.10–0.30)	≤3	≤0.8DC
				MC5020	MK, HK	220 (150–300)	0.30 (0.20–0.40)	≤5	≤0.8DC
				VP15TF	MP	180 (130–230)	0.30 (0.20–0.40)	≤5	≤0.8DC
				VP15TF, VP20RT	MK, HK	180 (130–230)	0.30 (0.20–0.40)	≤5	≤0.8DC
	Ductile cast iron	<450MPa		XC5010	MK, FT	800 (500–1000)	0.10 (0.10–0.30)	≤3	≤0.8DC
				MC5020	MK, HK	200 (150–250)	0.20 (0.10–0.30)	≤5	≤0.8DC
				VP15TF	MP	170 (120–220)	0.20 (0.10–0.30)	≤5	≤0.8DC
				VP15TF, VP20RT	MK, HK	170 (120–220)	0.20 (0.10–0.30)	≤5	≤0.8DC
		<800MPa		XC5010	MK, FT	800 (500–1000)	0.10 (0.10–0.30)	≤3	≤0.8DC
				MC5020	MK, HK	170 (150–200)	0.20 (0.10–0.30)	≤5	≤0.8DC
				VP15TF	MP	140 (100–180)	0.20 (0.10–0.30)	≤5	≤0.8DC
				VP15TF, VP20RT	MK, HK	140 (100–180)	0.20 (0.10–0.30)	≤5	≤0.8DC
H	Hardened steel	40–55HRC		VP15TF	MP	80 (60–100)	0.15 (0.10–0.20)	≤3	≤0.8DC

1/1

1. Wet cutting is recommended for good surface finishing of stainless steel. (Tool life is short compared to dry cutting.)
2. Wet cutting with internal coolant is recommended for titanium and heat resistant alloys.
3. If the clamping rigidity of the work material is low and the tool overhang is long, adjust the cutting speed and feed in the table above.

AHX640S

RECOMMENDED CUTTING CONDITIONS

WET CUTTING

	Material	Properties	Grade		Vc	fz	ap	ae
M	Austenitic stainless steel	≤200HB	MP7030	MM	125 (100–150)	0.15 (0.10–0.20)	≤5	≤0.8DC
		≥200HB	MP7030	MM	100 (75–125)	0.15 (0.10–0.20)	≤5	≤0.8DC
	Two-phase stainless steel	≤280HB	MP7030	MM	80 (60–100)	0.10 (0.05–0.15)	≤5	≤0.8DC
	Ferritic and martensitic stainless steel	≤200HB	MP7030	MM	125 (100–150)	0.15 (0.10–0.20)	≤5	≤0.8DC
		≥200HB	MP7030	MM	100 (75–125)	0.15 (0.10–0.20)	≤5	≤0.8DC
	Precipitation hardening stainless steel	≤450HB	MP7030	MM	70 (50– 90)	0.10 (0.05–0.15)	≤5	≤0.8DC
S	Titanium alloy	—	MP7030	MM	40 (20– 50)	0.15 (0.10–0.20)	≤3	≤0.6DC
			MP9120	L	60 (50– 70)	0.10 (0.05–0.15)	≤3	≤0.6DC
			MP9130	L	40 (20– 50)	0.15 (0.10–0.20)	≤3	≤0.6DC
	Heat resistant alloy	—	MP7030	MM	40 (20– 50)	0.15 (0.10–0.20)	≤3	≤0.6DC
			MP9120	L	60 (50– 70)	0.10 (0.05–0.15)	≤3	≤0.6DC
			MP9130	L	40 (20– 50)	0.15 (0.10–0.20)	≤3	≤0.6DC

1/1

1. Wet cutting is recommended for good surface finishing of stainless steel. (Tool life is short compared to dry cutting.)
2. Wet cutting with internal coolant is recommended for titanium and heat resistant alloys.
3. When clamp rigidity is low and tool overhang is long, it is recommended to reduce the cutting speed and the feed rate by 30 %.

CUTTING CONDITIONS FOR WIPER INSERT

	Material	Properties	Main insert		Wiper insert		Vc	fz	ap	ae
P	Mild steel	≤180HB	VP15TF	MP	VP15TF	WP	250 (200–300)	0.30 (0.20–0.40)	≤0.5	≤0.8DC
			MP6120	M	MP6120	M	250 (200–300)	0.30 (0.20–0.40)	≤0.5	≤0.8DC
	Carbon steel, Alloy steel	180–280HB	VP15TF	MP	VP15TF	WP	220 (170–270)	0.30 (0.20–0.40)	≤0.5	≤0.8DC
			MP6120	M	MP6120	M	220 (170–270)	0.30 (0.20–0.40)	≤0.5	≤0.8DC
		280–350HB	VP15TF	MP	VP15TF	WP	140 (100–180)	0.30 (0.20–0.40)	≤0.5	≤0.8DC
			MP6120	M	MP6120	M	140 (100–180)	0.30 (0.20–0.40)	≤0.5	≤0.8DC
K	Grey cast iron	≤350MPa	MC5020	MK, HK	MC5020	WK	320 (250–400)	0.30 (0.20–0.40)	≤0.5	≤0.8DC
			VP15TF	MP	VP15TF	WP	220 (150–300)	0.30 (0.20–0.40)	≤0.5	≤0.8DC
	Ductile cast iron	≤450MPa	MC5020	MK, HK	MC5020	WK	250 (200–300)	0.20 (0.10–0.30)	≤0.5	≤0.8DC
			VP15TF	MP	VP15TF	WP	200 (150–250)	0.20 (0.10–0.30)	≤0.5	≤0.8DC
		≤800MPa	MC5020	MK, HK	MC5020	WK	220 (200–250)	0.20 (0.10–0.30)	≤0.5	≤0.8DC
			VP15TF	MP	VP15TF	WP	170 (150–200)	0.20 (0.10–0.30)	≤0.5	≤0.8DC
S	Heat resistant alloy	—	VP15TF	MP	VP15TF	WP	40 (20– 50)	0.15 (0.10–0.20)	≤0.5	≤0.8DC
H	Hardened steel	40–55HRC	VP15TF	MP	VP15TF	WP	80 (60–100)	0.15 (0.10–0.20)	≤0.5	≤0.8DC

1/1

1. When clamp rigidity is low and tool overhang is long, it is recommended to reduce the cutting speed and the feed rate by 30 %.
2. Please use WP geometry insert in combination with MP geometry inserts, and use WK geometry insert in combination with MK or HK geometry inserts

AHX640W

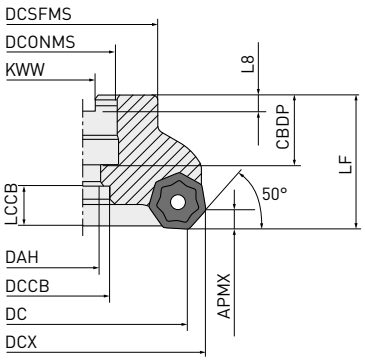
FACE MILLING
HIGH FEED MACHINING OF CAST IRON

K

KAPR: 50°
GAMP: -5°
GAMF: -6°

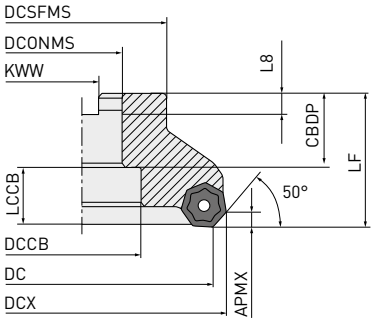
1

Ø 80



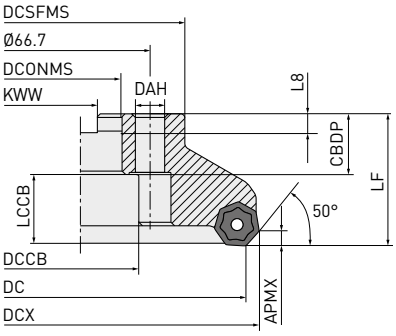
2

Ø 100
Ø 125



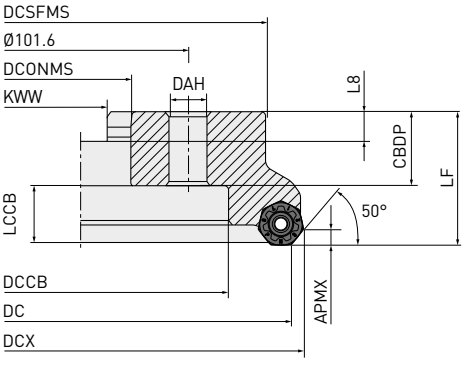
3

Ø 160



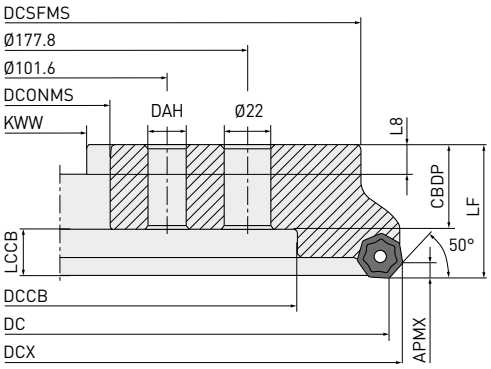
4

Ø 200
Ø 250



5

Ø 315



Right hand tool holder only.

AHX640W – FACE MILLING
HIGH FEED MACHINING OF CAST IRON

ARBOR TYPE

Order number	Stock		APMX	DC	DCONMS	LF	WT	ZEFF	Type
	R	L							
AHX640W-080A08R/L	●	●	6	80	27	50	1.5	8	1
AHX640W-080A10R/L	●	●	6	80	27	50	1.5	10	1
AHX640W-100B10R/L	●	●	6	100	32	50	2.1	10	2
AHX640W-100B14R/L	●	●	6	100	32	50	2.1	14	2
AHX640W-125B12R/L	●	●	6	125	40	63	3.1	12	2
AHX640W-125B18R/L	●	●	6	125	40	63	3.1	18	2
AHX640W-160C16R/L	●	●	6	160	40	63	5.6	16	3
AHX640W-160C22R/L	●	●	6	160	40	63	5.6	22	3
AHX640W-200C20R/L	●	●	6	200	60	63	8.0	20	4
AHX640W-200C28R/L	●	●	6	200	60	63	8.0	28	4
AHX640W-250C24R/L	●	●	6	250	60	63	12.6	24	4
AHX640W-250C36R/L	●	●	6	250	60	63	12.6	36	4
AHX640W-315C28R/L	●	●	6	315	60	80	31.5	28	5
AHX640W-315C44R/L	●	●	6	315	60	80	31.5	44	5

1/1

350 Vc

MOUNTING DIMENSIONS

Order number	CBDP	DAH	DCCB	DCONMS	DCSFMS	DCX	KWW	L8	Type
AHX640W-080A08R/L	23	13	—	27	56	92.6	12.4	7	1
AHX640W-080A10R/L	23	13	—	27	56	92.6	12.4	7	1
AHX640W-100B10R/L	32	—	45	32	70	112.6	14.4	8	2
AHX640W-100B14R/L	32	—	45	32	70	112.6	14.4	8	2
AHX640W-125B12R/L	32	—	56	40	80	137.6	16.4	9	2
AHX640W-125B18R/L	32	—	56	40	80	137.6	16.4	9	2
AHX640W-160C16R/L	29	—	56	40	100	172.6	16.4	9	3
AHX640W-160C22R/L	29	—	56	40	100	172.6	16.4	9	3
AHX640W-200C20R/L	32	—	135	60	155	212.6	25.7	14	4
AHX640W-200C28R/L	32	—	135	60	155	212.6	25.7	14	4
AHX640W-250C24R/L	32	—	180	60	200	262.6	25.7	14	4
AHX640W-250C36R/L	32	—	180	60	200	262.6	25.7	14	4
AHX640W-315C28R/L	57	—	225	60	285	327.6	25.7	14	5
AHX640W-315C44R/L	57	—	225	60	285	327.6	25.7	14	5

1/1

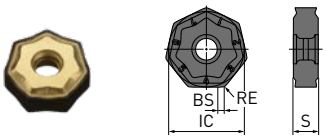
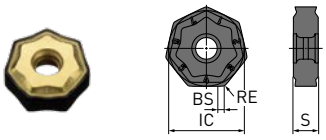
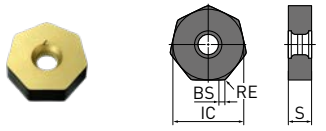
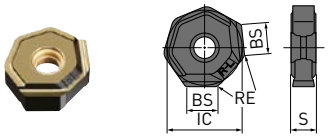
● : Inventory maintained. ★ : Inventory maintained in Japan.

AHX640W – INSERTS

K	Cast iron

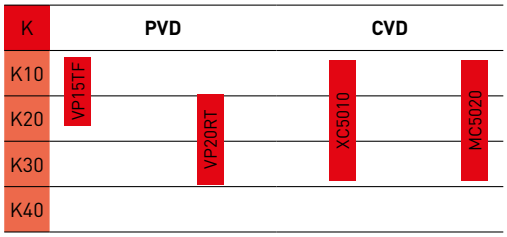
Cutting conditions :
●: Stable cutting ◔: General cutting ✥: Unstable cutting

Honing:
E: Round

Order number	Class	Honing	XC5010	MC5020	VP15TF	VP20RT	IC	S	BS	RE	APMX	Geometry
MK												
NNMU200608ZEN-MK	M	E	●	●	●	●	20	6.1	1.0	0.8	6	
HK												
NNMU200608ZEN-HK	M	E		●	●	●	20	6.1	1.0	0.8	6	
FT												
NNMQ200708ZEN-FT	M	E	●		●		20	6.55	1.0	0.8	6	
WK												
WNEU2006ZEN7C-WK	E	E		●			20	6.55	7.4	0.8	0.5	

1. The inserts can be used with both right and left hand cutters.

GRADE SELECTION



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

AHX640W

RECOMMENDED CUTTING CONDITIONS

GENERAL CUTTING

	Material	Properties	Conditions	Grade		Vc	fz	ap	ae
K	Gray cast iron	<350MPa		XC5010	MK, FT	800 (500–1000)	0.1 (0.1–0.3)	≤3	≤0.8DC
				MC5020	MK, HK	220 (150– 300)	0.3 (0.2–0.4)	≤5	≤0.8DC
				VP15TF/VP20RT	MK, HK	180 (130– 230)	0.3 (0.2–0.4)	≤5	≤0.8DC
	Ductile cast iron	<450MPa		XC5010	MK, FT	800 (500–1000)	0.1 (0.1–0.3)	≤3	≤0.8DC
				MC5020	MK, HK	200 (150– 250)	0.2 (0.1–0.3)	≤5	≤0.8DC
				VP15TF/VP20RT	MK, HK	170 (120– 220)	0.2 (0.1–0.3)	≤5	≤0.8DC
		<800MPa		XC5010	MK, FT	800 (500–1000)	0.1 (0.1–0.3)	≤3	≤0.8DC
				MC5020	MK, HK	170 (150– 200)	0.2 (0.1–0.3)	≤5	≤0.8DC
				VP15TF/VP20RT	MK, HK	140 (100– 180)	0.2 (0.1–0.3)	≤5	≤0.8DC

1/1

1. With reference to the above examples, adjust the cutting conditions according to the machining set up.
2. Tool life when wet cutting is short compared to dry cutting.

FINISHING (USE OF WIPER INSERTS)

	Material	Properties	Conditions	Grade		Vc	fz	ap
K	Gray cast iron	<350MPa		MC5020	MK, HK	320 (250–400)	0.2 (0.1–0.3)	<0.5
				MC5020	MK, HK	270 (200–350)	0.2 (0.1–0.3)	0.5–3
	Ductile cast iron	<450MPa		MC5020	MK, HK	270 (200–350)	0.2 (0.1–0.3)	<0.5
				MC5020	MK, HK	220 (200–250)	0.2 (0.1–0.3)	0.5–3

1/1

1. Please use 2 – 3 wiper inserts when the feed is greater than 6 mm/rev.

MX3030

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MX3030

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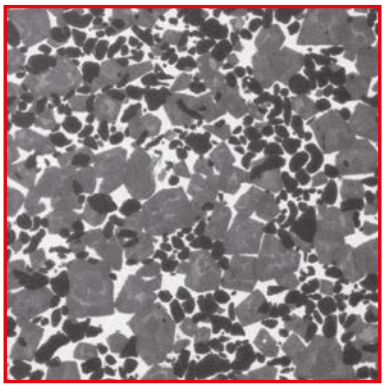
Enables excellent surface finishes even at high efficiency machining conditions.

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

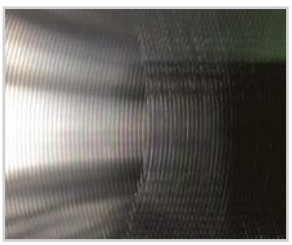
A special alloy is used for the binder material → Fracture resistance properties increased

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

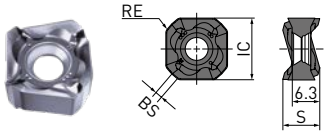
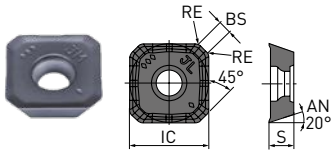
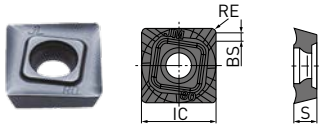
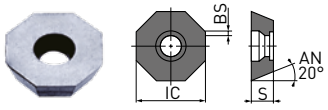
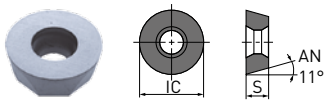
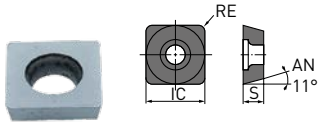
MX3030

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	NX4545	IC	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	★						
SEET13T3AGEN-JL	—	E	E	●	●	13.4	3.97	1.9	1.5	**ASX445** 
SEMT13T3AGSN-JM	—	M	S	●	●					
SOET12T308PEER-JL	R	E	E	●	●	12.7	3.97	1.4	0.8	**ASX400** 
SOMT12T308PEER-JM	R	M	E	●	●					
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	—	—	
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	

1/2

(10 inserts in one case)

355 Vc

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

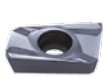
MX3030 – INSERTS

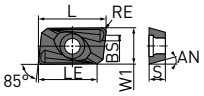
P	Steel	◆	◆
M	Stainless steel	◆	◆
K	Cast iron	◆	

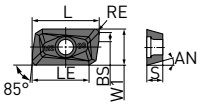
Please note that the cutting conditions differ depending on multiple factors, for more details refer to the recommended cutting conditions.

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

Order number	Hand	Class	Edge preparation	MX3030	NX4545	L	LE	W1	S	BS	RE	Geometry
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)

355 Vc

MX3030

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

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

MX3030

RECOMMENDED CUTTING CONDITIONS

	Material	Properties	Cutter type	Inserts	Vc	ft	
							
P	Mild steel	≤180 HB	WSX445	L, M	180 (130 – 230)	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*	
	Carbon steel Alloy steel	180 – 280 HB	WSX445	L, M	150 (120 – 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*	
			CESP, CFSP, CGSP	—	130 (100 – 160)	0.2	0.4
		280 – 350 HB	WSX445	L, M	150 (120 – 180)	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	
			BRP	—	100 (80 – 160)	0.30*	
M	Stainless steel	≤270 HB	WSX445	L, M	130 (100 – 180)	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	
			BRP4	—	150 (120 – 180)	0.30*	
K	Cast iron Ductile cast iron	≤500 MPa	WSX445	L, M	150 (120 – 180)	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	
			BRP4	—	150 (120 – 180)	0.30*	

1/1

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

NEW

RX1S

EXCHANGEABLE HEAD REAMER FOR EFFICIENT AND EASY REAMING OF A WIDE VARIETY OF APPLICATIONS

Interested in more...

B276

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DIA EDGE

RX1S

EXCHANGEABLE HEAD REAMER

SIMPLE TO CHANGE HEAD WITH HIGH RUNOUT ACCURACY

Optimum head design to suit coolant flow

HELICAL GEOMETRY FOR COMPONENT THROUGH HOLE APPLICATIONS

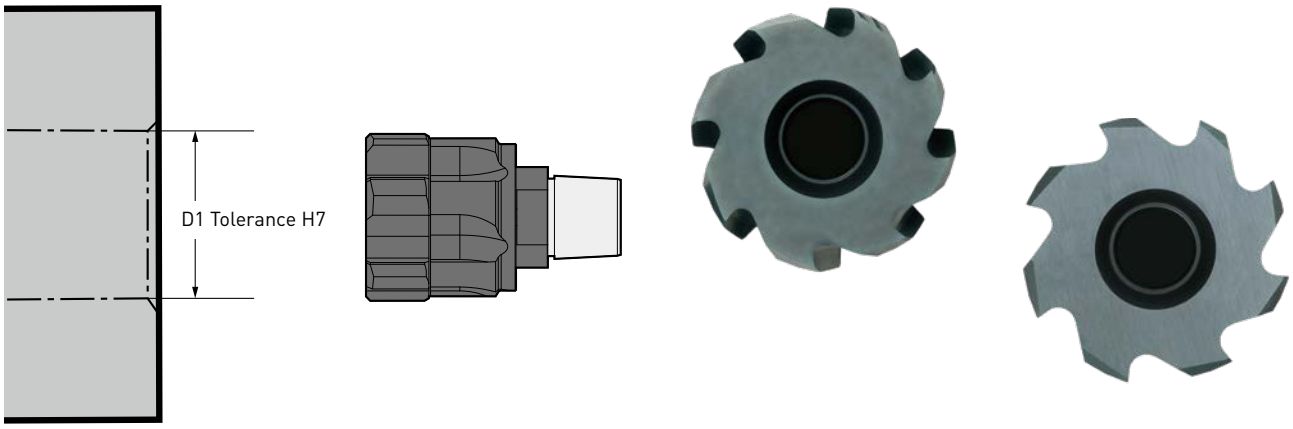
Side coolant holes in the flutes.

STRAIGHT FLUTE GEOMETRY FOR COMPONENT BLIND HOLES

Centre through coolant hole.

EASY TO USE WITH PRECISION HOLE TOLERANCE

H7 WORKPIECE HOLE TOLERANCE



FOR A WIDE RANGE OF MATERIALS

The combination of highly versatile carbide substrate and PVD coating has achieved high precision reaming with a long tool life.

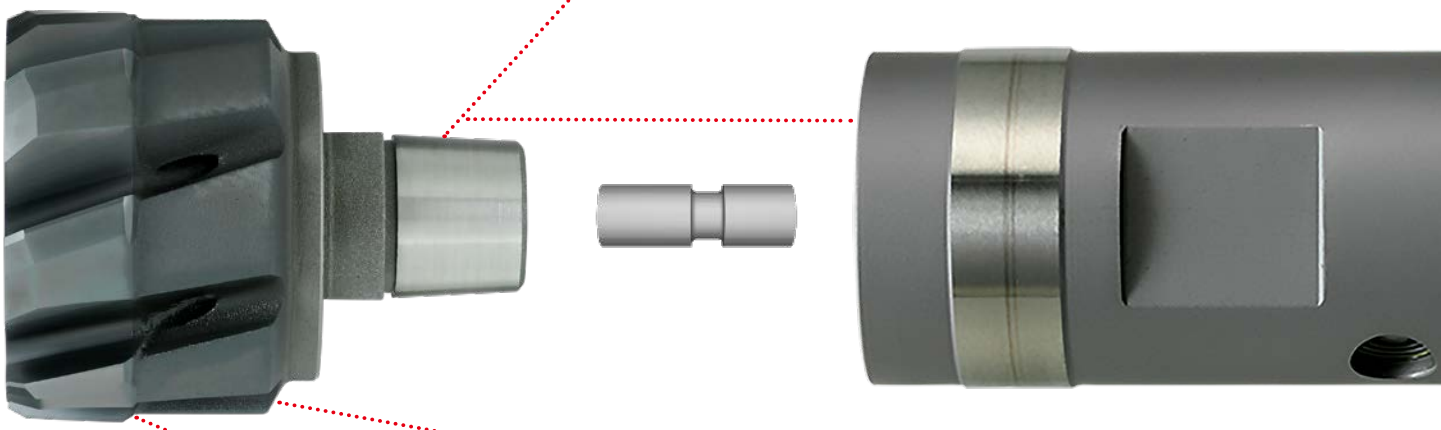
P	M	K	S
Steel	Stainless steel	Cast iron	Heat resistant alloy

CUSTOM MADE OPTIONS

Custom made, optimally designed reaming heads, with different hole tolerance classes, can be manufactured in 1 µm increments, in diameters (DC) 14 mm to 29 mm.

RX1S

EXCHANGEABLE HEAD REAMER



HIGH PRECISION MOUNTING MECHANISM

Double clamping by tapered surface and centre lock achieves high runout accuracy.

SOLID CARBIDE HEAD

High cutting speeds enables elevated performance.

LAPPED AND POLISHED CUTTING EDGE

Excellent surface finish promotes good chip evacuation.

SHORT AND LONG HOLDER OPTIONS AVAILABLE

X03

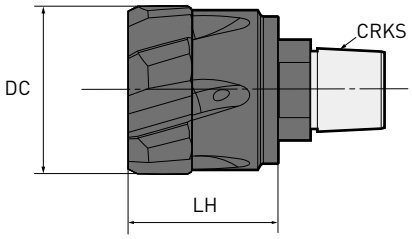
X05

RX1S

HELICAL FLUTE HEAD FOR THROUGH HOLES

P M K S

With side coolant holes in the flutes

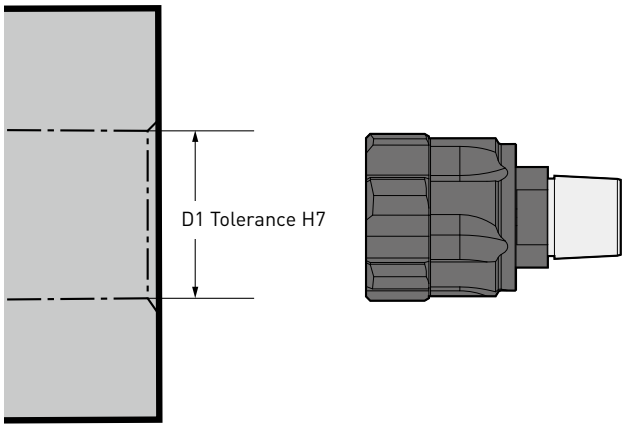


Order number	RP1010	DC	ZEFP	LH	CRKS	Holder
RX1S14000H7DHTP1	●	14	6	17.9	TP1	RX1SX○○S16ATP1
RX1S15000H7DHTP1	●	15	6	17.9	TP1	RX1SX○○S16ATP1
RX1S16000H7DHTP2	●	16	6	17.9	TP2	RX1SX○○S20ATP2
RX1S17000H7DHTP2	●	17	6	17.9	TP2	RX1SX○○S20ATP2
RX1S18000H7DHTP3	●	18	6	17.9	TP3	RX1SX○○S20ATP3
RX1S19000H7DHTP3	●	19	6	17.9	TP3	RX1SX○○S20ATP3
RX1S20000H7DHTP4	●	20	6	17.9	TP4	RX1SX○○S20ATP4
RX1S21000H7DHTP4	●	21	6	17.9	TP4	RX1SX○○S20ATP4
RX1S22000H7DHTP4	●	22	6	17.9	TP4	RX1SX○○S20ATP4
RX1S23000H7DHTP5	●	23	6	18.9	TP5	RX1SX○○S20ATP5
RX1S24000H7DHTP5	●	24	6	18.9	TP5	RX1SX○○S20ATP5
RX1S25000H7DHTP5	●	25	8	18.9	TP5	RX1SX○○S20ATP5
RX1S26000H7DHTP5	●	26	8	18.9	TP5	RX1SX○○S20ATP5
RX1S27000H7DHTP5	●	27	8	18.9	TP5	RX1SX○○S20ATP5
RX1S28000H7DHTP6	●	28	8	18.9	TP6	RX1SX○○S25ATP6
RX1S29000H7DHTP6	●	29	8	18.9	TP6	RX1SX○○S25ATP6

1/1

1. The screw size CRKS for the fastening size of the holder and head must be the same.

363 Vc



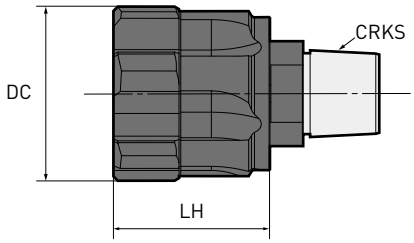
● : Inventory maintained. ★ : Inventory maintained in Japan.

RX1S

STRAIGHT FLUTE HEAD FOR BLIND HOLES

P M K S

With centre through coolant hole



Order number	RP1010	DC	ZEFP	LH	CRKS	Holder
RX1S14000H7DSTP1	●	14	6	17.9	TP1	RX1SX○○S16ATP1
RX1S15000H7DSTP1	●	15	6	17.9	TP1	RX1SX○○S16ATP1
RX1S16000H7DSTP2	●	16	6	17.9	TP2	RX1SX○○S20ATP2
RX1S17000H7DSTP2	●	17	6	17.9	TP2	RX1SX○○S20ATP2
RX1S18000H7DSTP3	●	18	6	17.9	TP3	RX1SX○○S20ATP3
RX1S19000H7DSTP3	●	19	6	17.9	TP3	RX1SX○○S20ATP3
RX1S20000H7DSTP4	●	20	6	17.9	TP4	RX1SX○○S20ATP4
RX1S21000H7DSTP4	●	21	6	17.9	TP4	RX1SX○○S20ATP4
RX1S22000H7DSTP4	●	22	6	17.9	TP4	RX1SX○○S20ATP4
RX1S23000H7DSTP5	●	23	6	18.9	TP5	RX1SX○○S20ATP5
RX1S24000H7DSTP5	●	24	6	18.9	TP5	RX1SX○○S20ATP5
RX1S25000H7DSTP5	●	25	8	18.9	TP5	RX1SX○○S20ATP5
RX1S26000H7DSTP5	●	26	8	18.9	TP5	RX1SX○○S20ATP5
RX1S27000H7DSTP5	●	27	8	18.9	TP5	RX1SX○○S20ATP5
RX1S28000H7DSTP6	●	28	8	18.9	TP6	RX1SX○○S25ATP6
RX1S29000H7DSTP6	●	29	8	18.9	TP6	RX1SX○○S25ATP6

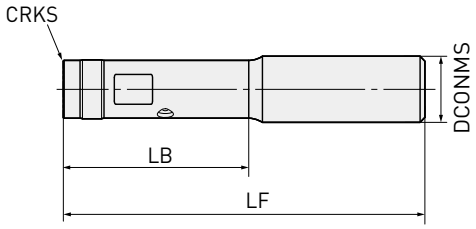
1/1

1. The screw size CRKS for the fastening size of the holder and head must be the same.

363 Vc

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

RX1S



12<DCONMS<16	20<DCONMS<25
0	0
- 0.011	- 0.013

HOLDER

Order number	Stock	CRKS	LB	LF	DCONMS	Min. Head DC	Max. Head DC
RX1SX03S16ATP1	●	TP1	35.0	91.0	16	14	15
RX1SX05S16ATP1	●	TP1	67.0	123.0	16	14	15
RX1SX03S20ATP2	●	TP2	39.0	99.0	20	16	17
RX1SX05S20ATP2	●	TP2	75.0	135.0	20	16	17
RX1SX03S20ATP3	●	TP3	45.0	106.0	20	18	19
RX1SX05S20ATP3	●	TP3	85.0	146.0	20	18	19
RX1SX03S20ATP4	●	TP4	51.5	113.5	20	20	22
RX1SX05S20ATP4	●	TP4	96.5	158.5	20	20	22
RX1SX03S20ATP5	●	TP5	65.5	130.5	20	23	27
RX1SX05S20ATP5	●	TP5	120.5	185.5	20	23	27
RX1SX03S25ATP6	●	TP6	80.5	152.5	25	28	29
RX1SX05S25ATP6	●	TP6	145.5	217.5	25	28	29

1. The screw size CRKS for the fastening size of the holder and head must be the same.
2. A wrench is not included with the holder.

RX1S

SPARE PARTS

Holder type			
	Clamp screw	Drive size	Torque (Nm)
RX1SX□□S16ATP1	RX1ST8TP1	T8	2
RX1SX□□S20ATP2	RX1ST10TP23	T10	3
RX1SX□□S20ATP3	RX1ST10TP23	T10	3
RX1SX□□S20ATP4	RX1ST15TP45	T15	5
RX1SX□□S20ATP5	RX1ST15TP45	T15	5
RX1SX□□S25ATP6	RX1ST25TP6	T25	9

1. The packaging unit of replacement screws contains 5 pieces.

PARTS SOLD SEPARATELY

Holder type	
	Wrench
RX1SX□□S16ATP1	TKY08W
RX1SX□□S20ATP2	TKY10F
RX1SX□□S20ATP3	TKY10F
RX1SX□□S20ATP4	TKY15T
RX1SX□□S20ATP5	TKY15T
RX1SX□□S25ATP6	TKY25T

RX1S

RECOMMENDED CUTTING CONDITIONS

	Material	Properties	Vc	fz	
				DC<20	DC⩾20
P	Mild steel (Ck10)	Hardness ⩽180HB	120 (90 – 155)	0.10 – 0.20	0.10 – 0.22
P	Carbon steel, Alloy steel (Ck45, 42CrMo4 usw.)	Hardness 180–280HB	120 (90 – 155)	0.10 – 0.20	0.10 – 0.22
P	Carbon steel, Alloy steel (36CrNiMo4)	Hardness 280–350HB	100 (75 – 130)	0.10 – 0.20	0.10 – 0.22
M	Austenitic stainless steel (X5CrNi18-9, X5CrNiMo18-10 usw.)	Hardness ⩽200HB	20 (15 – 30)	0.08 – 0.15	0.08 – 0.18
M	Ferritic stainless steel (X8Cr17, X10CrA118 usw.)	—	40 (30 – 60)	0.08 – 0.18	0.08 – 0.20
M	Duplex stainless steel (X3CrNiMoN27-5-2, X2CrNiMoN22-5-3 usw.)	—	20 (15 – 30)	0.08 – 0.15	0.08 – 0.18
M	Hardened stainless steel (X5CrNiCuNb16-4)	—	40 (30 – 60)	0.08 – 0.18	0.08 – 0.20
K	Gray cast iron (GG10, GG30 usw.)	Tensile strength ⩽350MPa	110 (80 – 130)	0.10 – 0.20	0.10 – 0.22
K	Ductile cast iron (GGG40, GGG50 usw.)	Tensile strength ⩽450MPa	90 (65 – 110)	0.10 – 0.20	0.10 – 0.22
S	Heat resistant alloy (Inconel®718 etc.)	—	30 (20 – 40)	0.08 – 0.18	0.10 – 0.20
S	Titanium alloy (Ti-6Al-4V etc.)	—	30 (20 – 40)	0.08 – 0.18	0.10 – 0.20

1/1

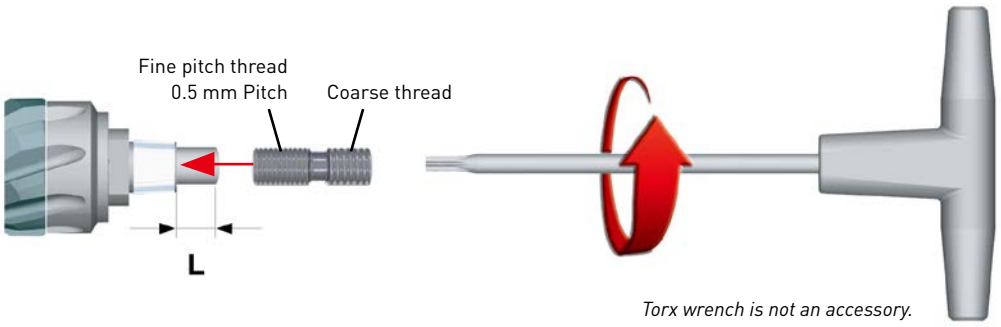
FINISH MACHINING ALLOWANCE BY DIAMETER

DC	14 ⩽ DC<15	15 ⩽ DC < 20	20 ⩽ DC ⩽ 29
Machining allowance	0.15 – 0.30	0.15 – 0.35	0.20 – 0.40

HOW TO INSTALL THE HEAD

1.

Use a Torx wrench to adjust the amount of protrusion according to the L dimension below.
The cutting edges are sharp so protective gloves should be worn.



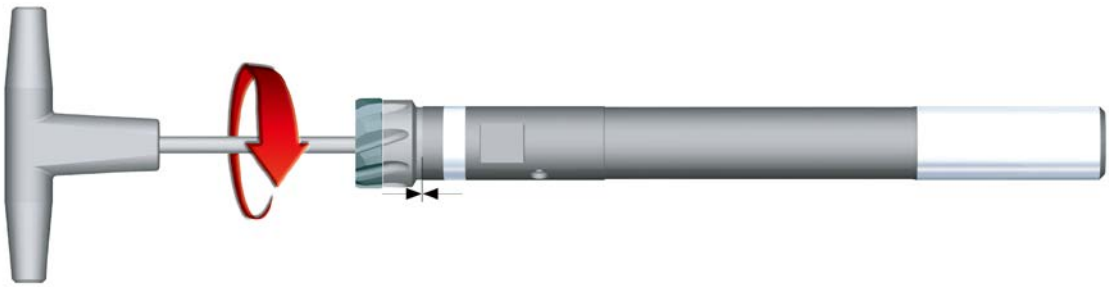
Head DC	L
14 – 27	5.5 – 6.0
28, 29	6.0 – 6.5

2.

Insert the head into the holder.
At this time, a slight gap will be seen between the end face of the holder and the head.

3.

Use a Torx wrench to tighten until the holder and head are firmly clamped.

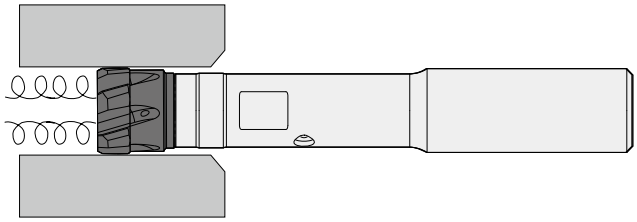


Holder type	Clamp screw	Drive size	Torque (Nm)
RX1SX□□S16ATP1	RX1ST8TP1	T8	2
RX1SX□□S20ATP2, TP3	RX1ST10TP23	T10	3
RX1SX□□S20ATP4, TP5	RX1ST15TP45	T15	5
RX1SX□□S25ATP6	RX1ST25TP6	T25	9

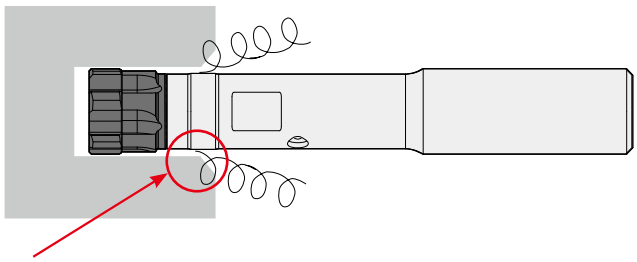
1. The packaging unit of replacement screws contains 5 pieces.

OPERATIONAL GUIDANCE

Please use a helical type head for through holes and a straight type head for blind holes.
The helical type is designed to eject chips forward, and the straight type is designed to eject chips backwards.

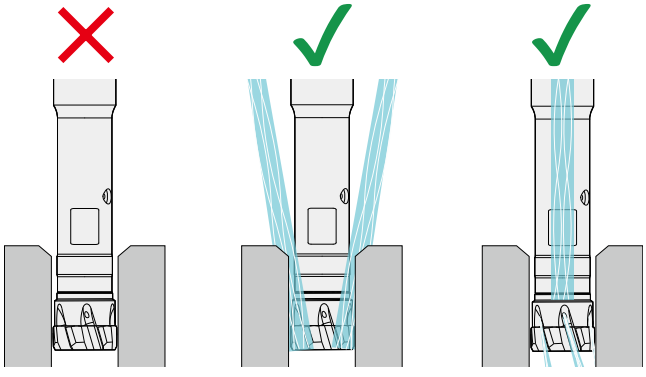


Helical type



Straight type

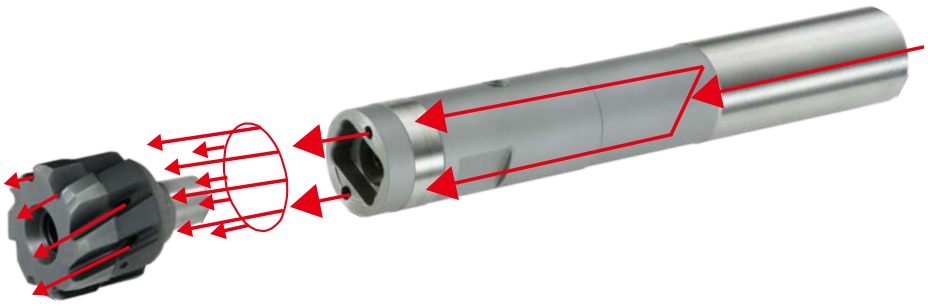
- It is recommend to chamfer the entrance of the pilot hole before reaming.
- When reaming, it is generally recommended to return the tool at the same feed rate.
- When setting the tool on the machine, the run-out accuracy of the cutting edge should be 5 µm or less.
- For the holder, we recommend a hydraulic chuck type.



Dry External Internal

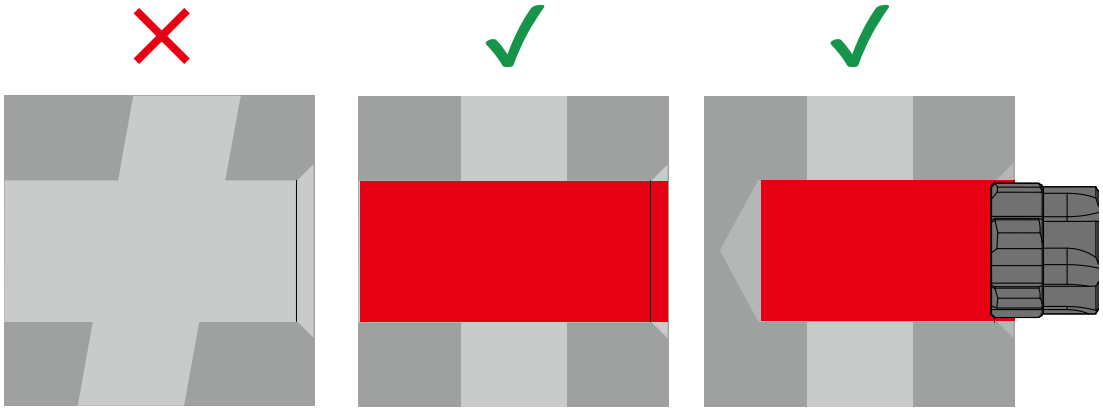
The first recommendation for best results is to use internal through coolant, then external coolant.
Dry cutting is not recommended.
For blind holes, with external coolant, reaming beyond depths of DC x 3 is not recommended.

For reaming with internal through coolant, the pressure must be below 8 MPa.

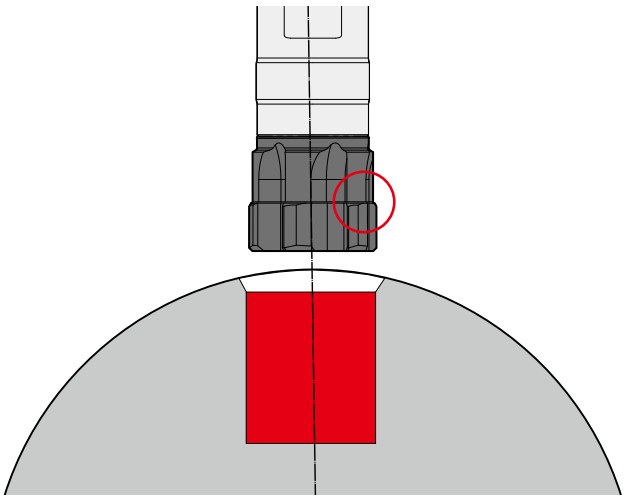


OPERATIONAL GUIDANCE

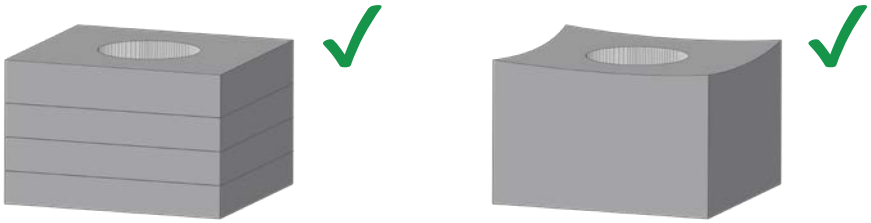
Reaming diagonally intersecting holes is not recommended.



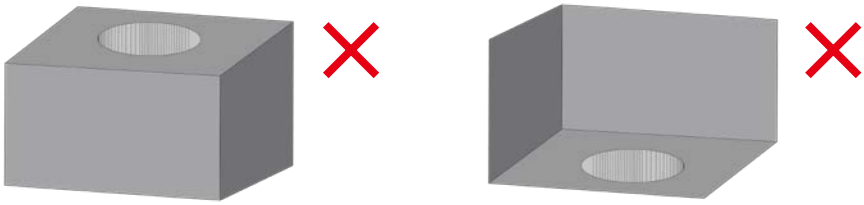
Please chamfer cylindrical surfaces before reaming.



Reaming with stacked plates and a concave centre is possible.



Reaming is not recommended if the entrance/exit of the pilot hole is on an inclined surface.



SYMBOLS

Recommended cutting conditions

NEW New / Product expansion

APPLICATION


Face milling


Chamfer milling


Shoulder milling with R


Face milling close to a wall


Shoulder milling


Side milling


Slot milling


Ramping


Pocket milling


Slot milling with R


Copy milling


T-Slot milling

MACHINING TYPE

Roughing

Medium cutting

Light cutting

Pre-finishing

Finishing

Fine-finishing

TOOL MATERIAL

Ultra micro grain carbide
Ultra micro grain carbide substrate material.

Cubic boron nitride
Mitsubishi Materials' original CBN material.

Ceramic
For high speed efficient machining of super alloys due to the excellent high temperature strength property.

High hardness powder metallurgy HSS
High hardness powder metallurgy HSS substrate material.

High grade high alloy HSS
High grade high alloy HSS substrate material.

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/(AlTiSti)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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