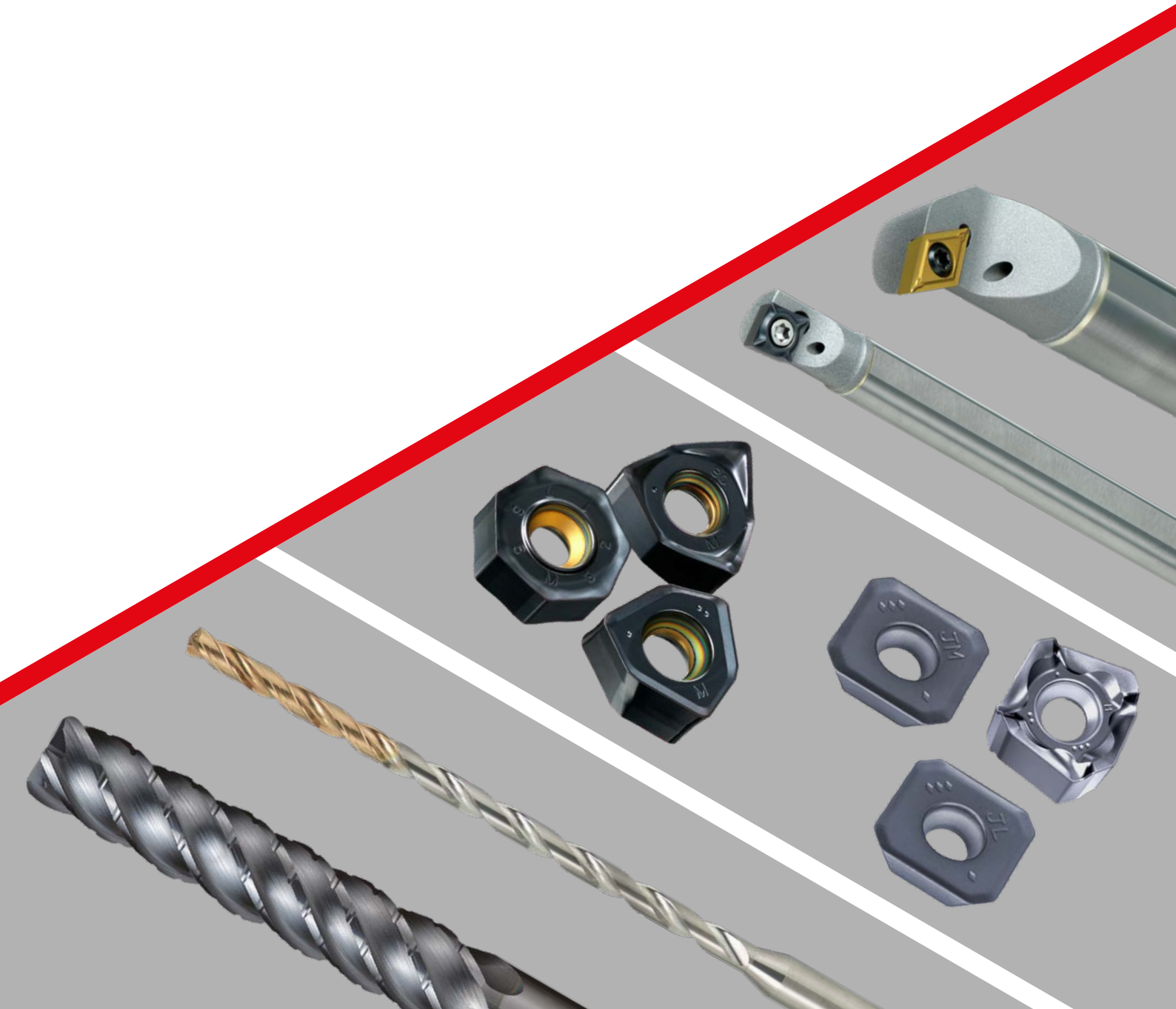
MITSUBISHI MATERIALS

PRODUCT NEWS
2025-1

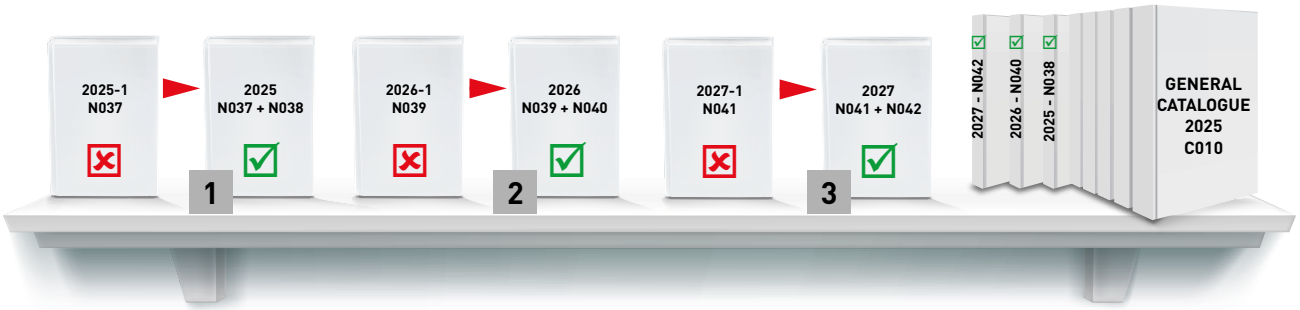


MITSUBISHI MATERIALS

BETTER. TOGETHER.

CATALOGUE SYSTEM

HOW TO REPLACE PRODUCT NEWS BOOKS



NOTES:

1 The Product News 2025-1 – N037 will be integrated into Product News 2025 – N038.

2 The Product News 2026-1 – N039 will be integrated into Product News 2026 – N040.

3 The Product News 2027-1 – N041 will be integrated into Product News 2027 – N042.

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

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

TRANSITION FROM THE EXISTING TO THE NEW GENERAL CATALOGUE

NOTES:

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

NEW

PRODUCT NEWS 2025-1

NEW PRODUCTS AND SERIES EXPANSIONS AT A GLANCE

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

CURRENT, INNOVATIVE, COMPETITIVE

NOTES: This Product News 2025-1 (N037) complements the General Catalogue C010.
It contains all new products and series expansions that have been launched after the release of the C010 catalogue.

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

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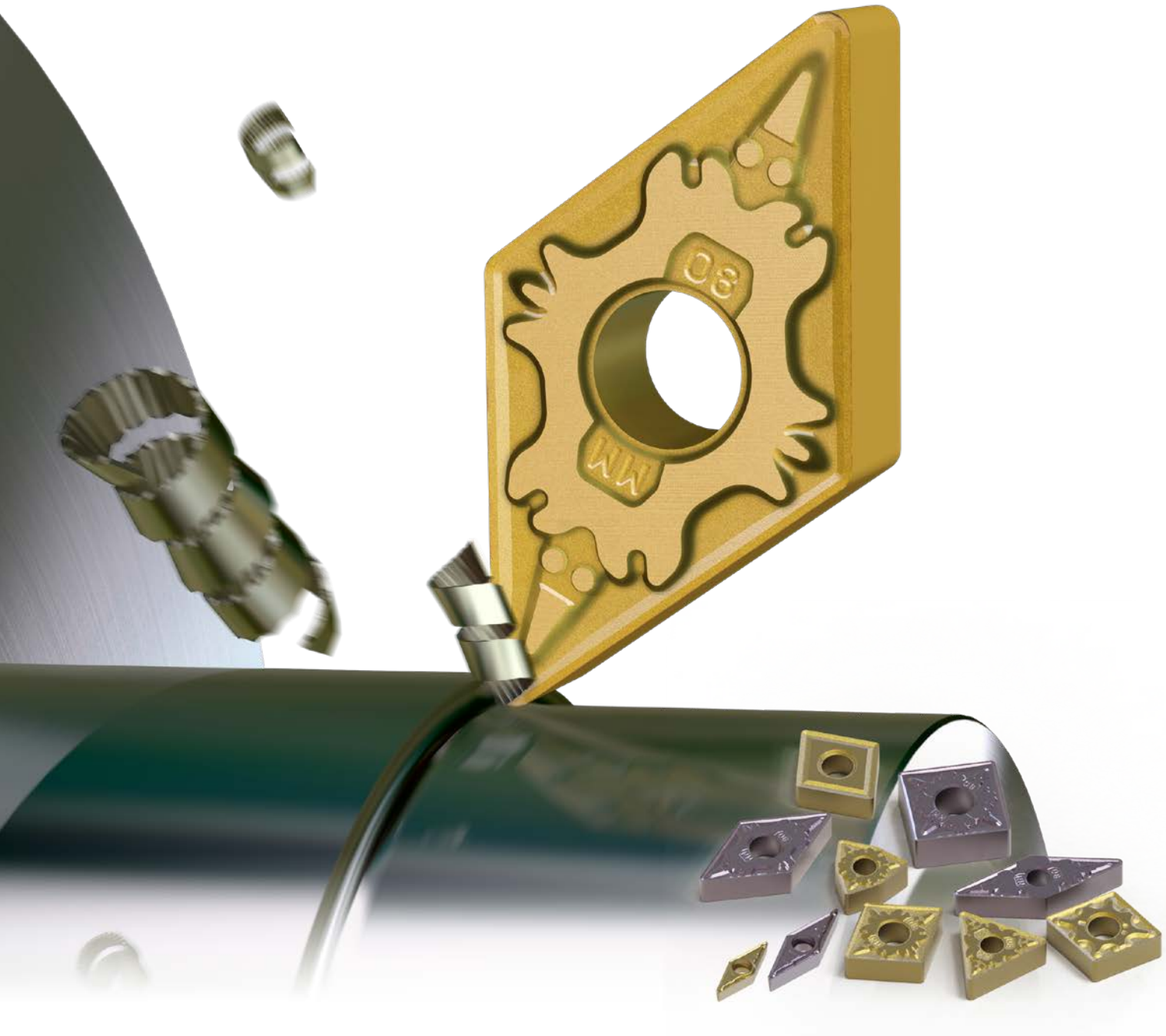
DRILLING TOOLS

MPLUS TOOLS

NEW

MC / MP7100 SERIES

DEDICATED CARBIDE SUBSTRATE
NEW COATING TECHNOLOGY FOR STAINLESS STEEL TURNING



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MITSUBISHI MATERIALS

NEW

MC / MP7100 SERIES

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

MC7125

THE ALL ROUND CHOICE FOR STAINLESS STEEL TURNING

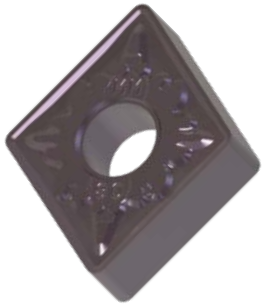
First recommended grade.
Compatible with a wide range of applications, from continuous cutting through to interrupted cutting.
Suitable for a wide variety of stainless steels.

MC7115

FOR HIGH SPEED TURNING

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

MP7135



TOUGHER FOR INTERRUPTED CUTTING

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

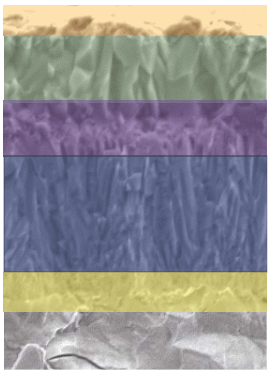
MC / MP7100 SERIES MACHINING VIDEO

MC / MP7100 SERIES

MC7125

THE ALL-ROUNDER FOR STAINLESS STEEL TURNING

Incredibly stable with both plastic deformation and chipping resistance.



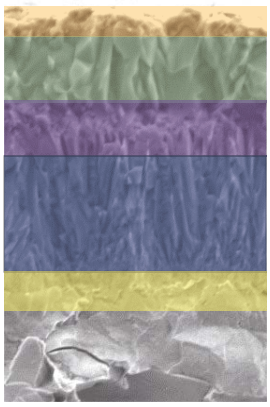
COATING LAYER WITH HIGH ADHESIVE STRENGTH
Tough and Super TOUGH-Grip dramatically improve adhesion strength and maximise the effectiveness of the coating.

SUBSTRATE RESISTANT TO PLASTIC DEFORMATION AND CHIPPING
By optimising the particle size distribution of the main component WC and improving its dispersibility, reduced contact between the WC particles, dramatically improves resistance to plastic deformation and fracture.

MC7115

FOR HIGH SPEED TURNING

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



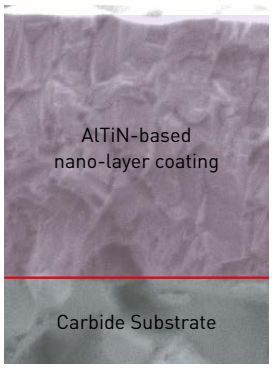
COATING LAYER WITH HIGH ADHESIVE STRENGTH
Tough and Super Tough Grip improve adhesion strength and maximise the effectiveness of the coating. “Super” Nano Texture Technology suppresses crater wear during high speed cutting.

CARBIDE SUBSTRATE THAT IS STRONG FOR HIGH SPEED CUTTING
The hard carbide substrate is resistant to the high temperatures generated during high speed cutting and has excellent resistance to plastic deformation and crater wear.

MP7135

TOUGHER FOR INTERRUPTED CUTTING

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



AlTiN-BASED NANO-LAYER COATING
By layering the highly heat resistant AlTiN coating at the Nano level, excellent wear and chipping resistance has been achieve.

TECHNOLOGY TO IMPROVE ADHESION STRENGTH
Suppresses peeling when machining stainless steel and exhibits excellent chipping resistance.

DEDICATED CARBIDE BASE MATERIAL
A carbide substrate exclusively for stainless steel that combines both wear and fracture resistance.

MC / MP7100 SERIES

COATED GRADE FOR STAINLESS STEEL TURNING

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

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

Notching

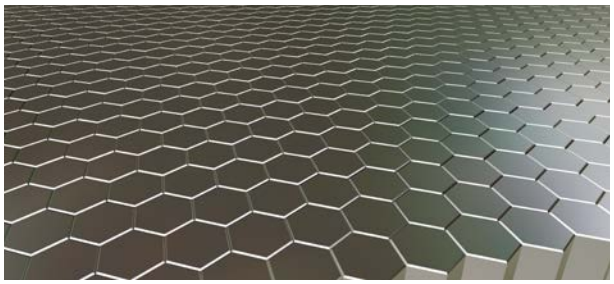
Fracture from welding chipping

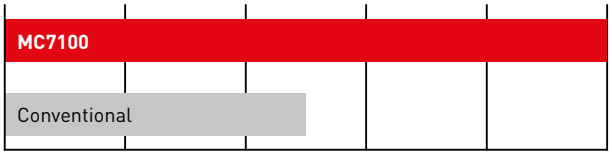
Plastic deformation

FEATURES OF THE MC7100 SERIES COATING

"SUPER" NANO TEXTURE TECHNOLOGY

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



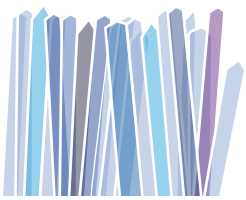


The ratio of Al_2O_3 crystal grains with the same orientation

CRYSTAL ORIENTATION
(Image)

Conventional CVD inserts

Grain size and
growth direction are uneven.



Nano Texture

Uniformity of the grain size and growth direction has improved.

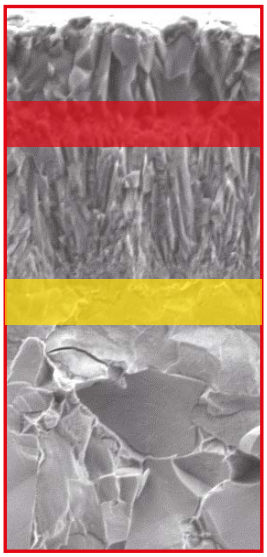
"Super" Nano Texture

Uniformity of the growth
direction has drastically improved.

MC / MP7100 SERIES

TOUGH AND SUB GRIP LAYERS

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



SUPER-TOUGH-GRIP

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

SUB-GRIP

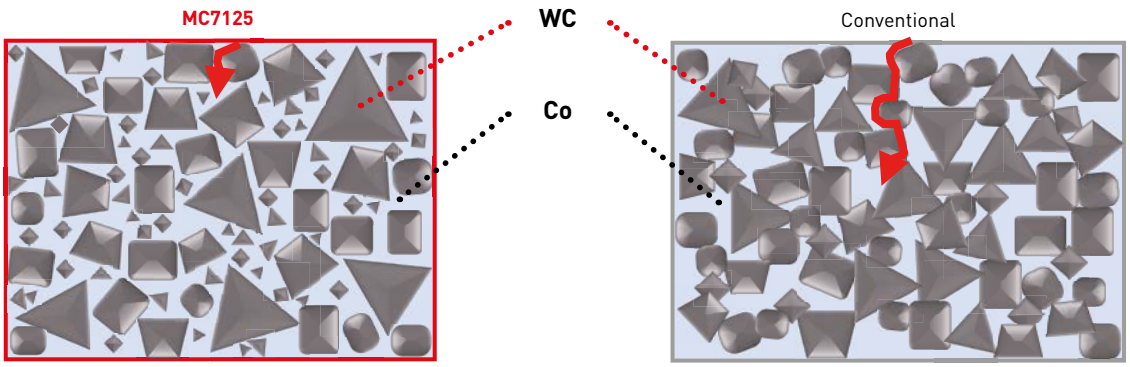
It increases the adhesion strength between the carbide substrate and the coating layer, and prevents the coating from peeling off due to welding.

FEATURES OF THE CARBIDE SUBSTRATES

MC7115
Has crater wear and plastic deformation resistance that are ideal for high-speed cutting of stainless steel.

MP7135
The dedicated carbide substrate has excellent wear resistance and greatly improved chipping resistance.

MC7125
By optimising the particle size distribution, the boundary contact between the low toughness WC particles has been reduced and promotes hardness, thereby dramatically improving plastic deformation and fracture resistance.



Reduces **WC** boundaries and suppresses crack growth.

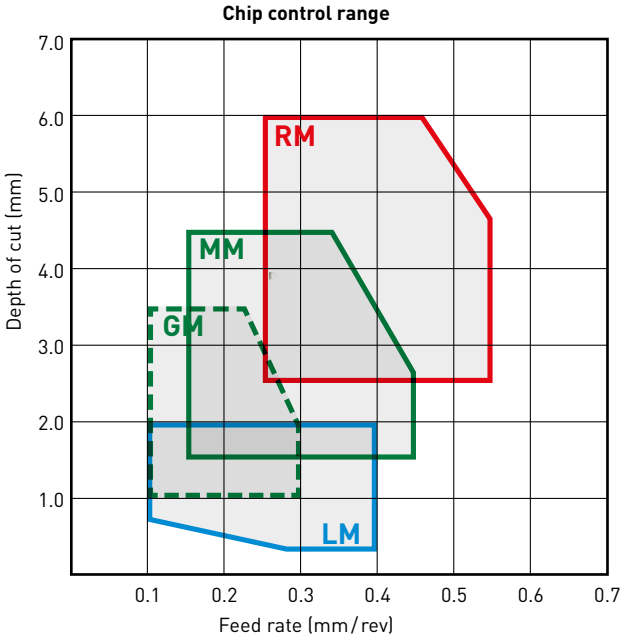
Cracks grow along the **WC** boundaries that are lower in toughness.

CHIPBREAKER SYSTEM

NEGATIVE INSERT FOR EXTERNAL TURNING

M

	Light cutting	Medium cutting	Rough cutting
Stable cutting	LM MC7115	MM MC7115	RM MC7115
General cutting	LM MC7125	MM MC7125	RM MC7125
Unstable cutting	LM MP7135	MM MP7135	RM MP7135



Stable cutting
- Continuous cutting
- Constant depth of cut
- Pre-machined surfaces
- Securely clamped component cutting

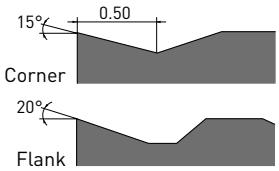
General cutting

Unstable cutting
- Heavy interrupted cutting
- Irregular depth of cut
- Low clamping rigidity cutting

MAIN CHIPBREAKER

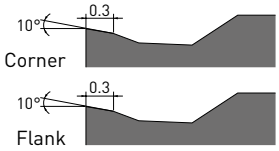
LM CHIPBREAKER FOR LIGHT CUTTING

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



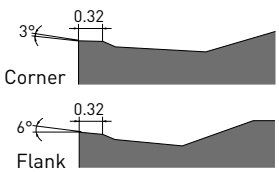
MM CHIPBREAKER FOR MEDIUM CUTTING

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



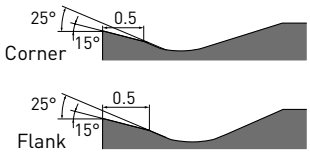
RM CHIPBREAKER FOR ROUGH CUTTING

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



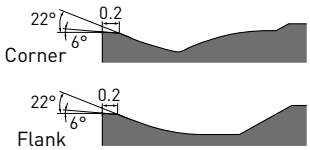
GM CHIPBREAKER

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



MA CHIPBREAKER

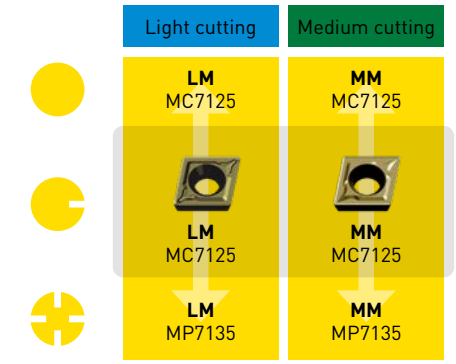
Multi-Assist chipbreaker
Suitable for medium cutting range.

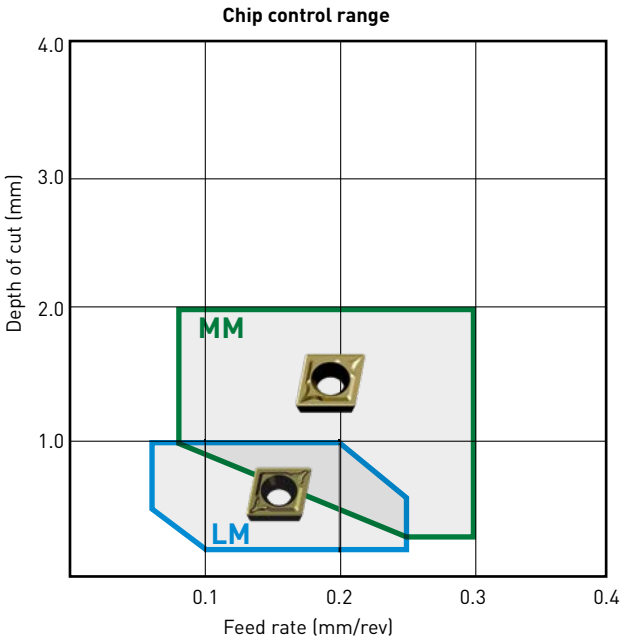


CHIPBREAKER SYSTEM

5°, 7°, 11° POSITIVE INSERT

M





Stable cutting
- Continuous cutting
- Constant depth of cut
- Pre-machined surfaces
- Securely clamped component cutting

General cutting

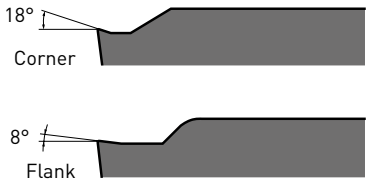
Unstable cutting
- Heavy interrupted cutting
- Irregular depth of cut
- Low clamping rigidity cutting

MAIN CHIPBREAKER

LM CHIPBREAKER FOR LIGHT CUTTING

First recommendation for light cutting of stainless steel
The large rake angle gives a sharp cutting edge that prevents chip welding, which in turn helps to control the surface finish. The protruding chipbreaker provides an ideal range of chip control.

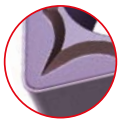
5°, 7°, 11° Positive Insert

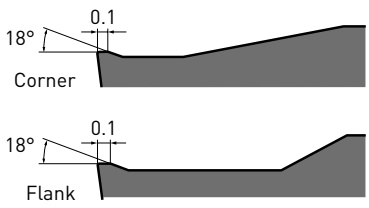


MM CHIPBREAKER FOR MEDIUM CUTTING

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

5°, 7° Positive Insert



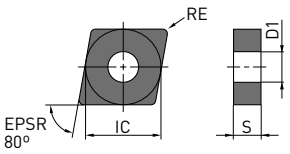


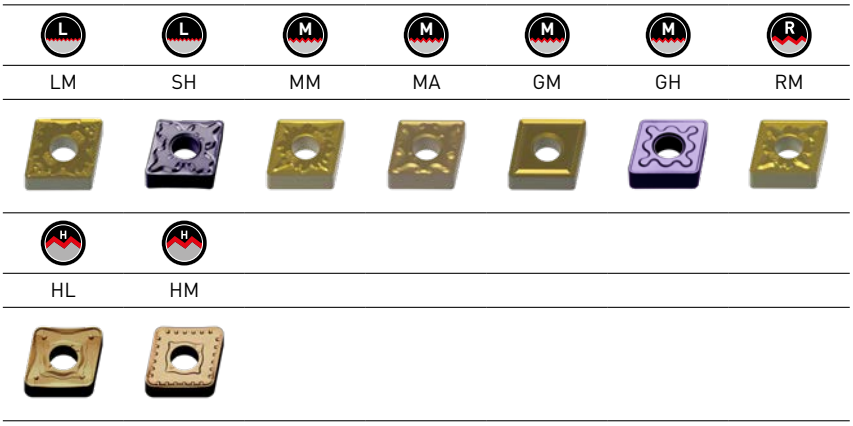
CNMG, CNMM

NEGATIVE INSERTS (WITH HOLE)

M Class

CNMG, CNMM





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

(10 inserts in one case)

26 Vc

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

CNMG, CNMM – NEGATIVE INSERTS (WITH HOLE)

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

2/2

(10 inserts in one case)

26 Vc

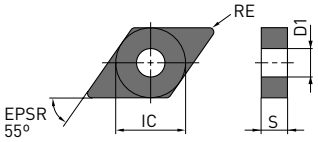
● : Inventory maintained. ★ : Inventory maintained in Japan.

DNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

DNMG



LM	SH	MM	MA	GM	GH	RM
						

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

(10 inserts in one case)

26 Vc

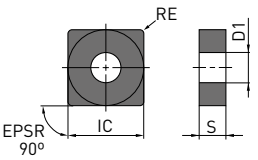
● : Inventory maintained. ★ : Inventory maintained in Japan.

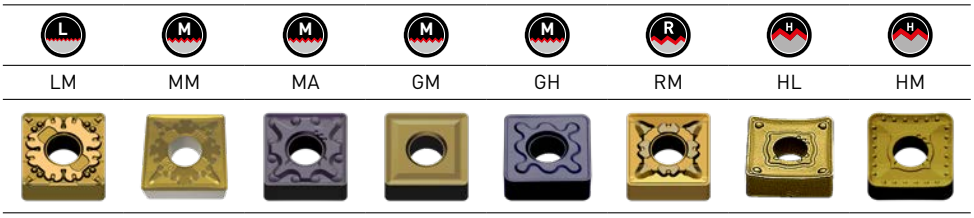
SNMG, SNMM

NEGATIVE INSERTS (WITH HOLE)

M Class

SNMG, SNMM





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

(10 inserts in one case)

26

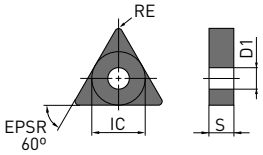
● : Inventory maintained. ★ : Inventory maintained in Japan.

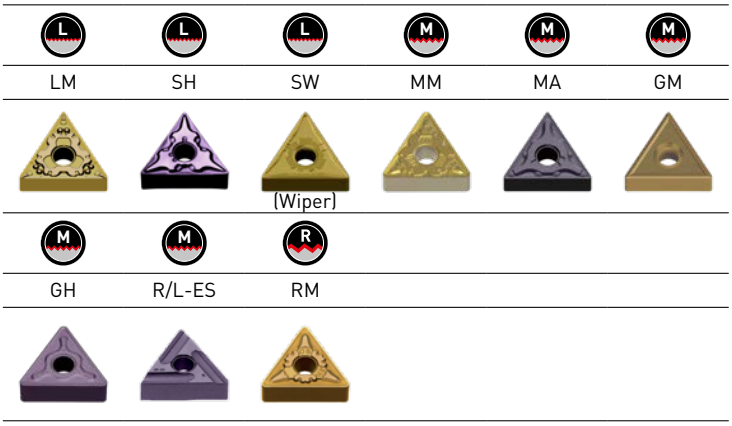
TNMG, TNMX

NEGATIVE INSERTS (WITH HOLE)

M Class

TNMG, TNMX





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

(10 inserts in one case)

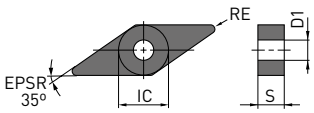
● : Inventory maintained. ★ : Inventory maintained in Japan.

VNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

VNMG



LM	MM	MA	GM
			

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

(10 inserts in one case)

26 Vc

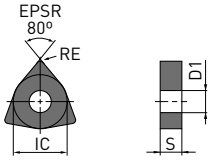
● : Inventory maintained. ★ : Inventory maintained in Japan.

WNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

WNMG



LM	SH	MM	MA	GM	GH
					

RM


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

(10 inserts in one case)

26 Vc

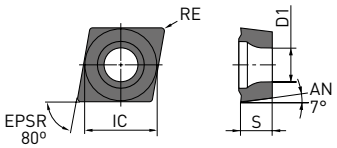
● : Inventory maintained. ★ : Inventory maintained in Japan.

CCMT, CCMH, CPMH

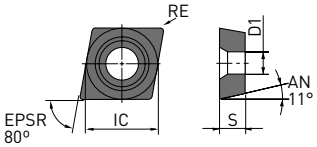
7°, 11° POSITIVE INSERTS (WITH HOLE)

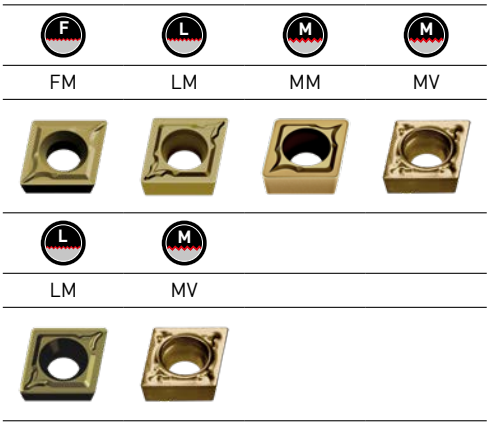
M Class

CCMT, CCMH



CPMH





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

(10 inserts in one case)

26 Vc

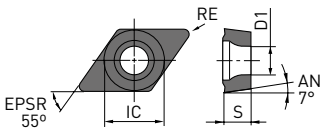
● : Inventory maintained. ★ : Inventory maintained in Japan.

DCMT

7° POSITIVE INSERTS (WITH HOLE)

M Class

DCMT



FM	LM	MM	MV
			

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

(10 inserts in one case)

26 Vc

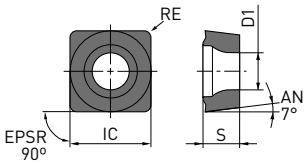
● : Inventory maintained. ★ : Inventory maintained in Japan.

SCMT

7° POSITIVE INSERTS (WITH HOLE)

M Class

SCMT



L	M
LM	MM

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

1/1

(10 inserts in one case)

26 Vc

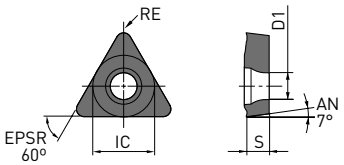
● : Inventory maintained. ★ : Inventory maintained in Japan.

TCMT, TPMH

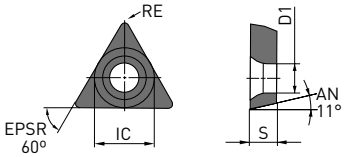
7°, 11° POSITIVE INSERTS (WITH HOLE)

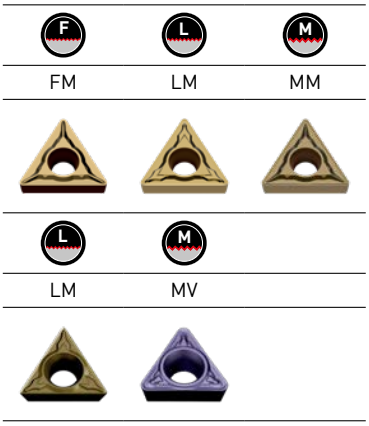
M Class

TCMT



TPMH





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

(10 inserts in one case)

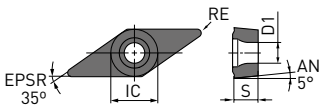
● : Inventory maintained. ★ : Inventory maintained in Japan.

VBMT, VCMT

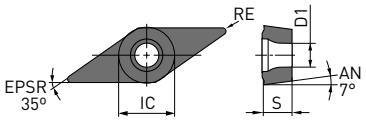
5°, 7° POSITIVE INSERTS (WITH HOLE)

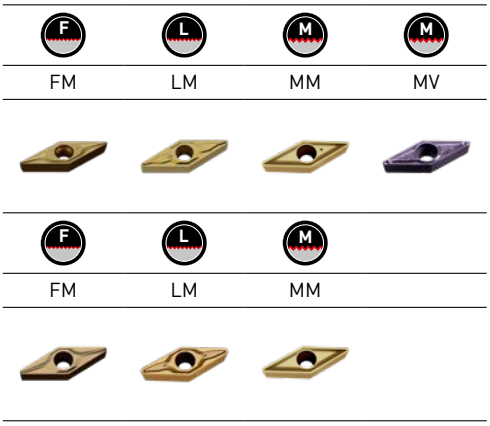
M Class

VBMT



VCMT





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

(10 inserts in one case)

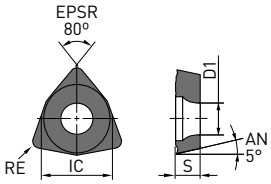
● : Inventory maintained. ★ : Inventory maintained in Japan.

WBMT, WCMT, WPMT

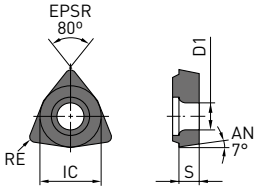
5°, 7°, 11° POSITIVE INSERTS (WITH HOLE)

M Class

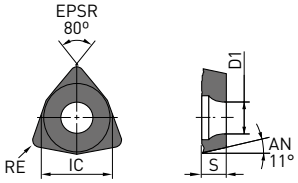
WBMT



WCMT



WPMT



L-MV

MM

MV

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

(10 inserts in one case)

26 Vc

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

MC / MP7100 SERIES

RECOMMENDED CUTTING CONDITIONS

NEGATIVE INSERTS (FOR EXTERNAL TURNING)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

8/8

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

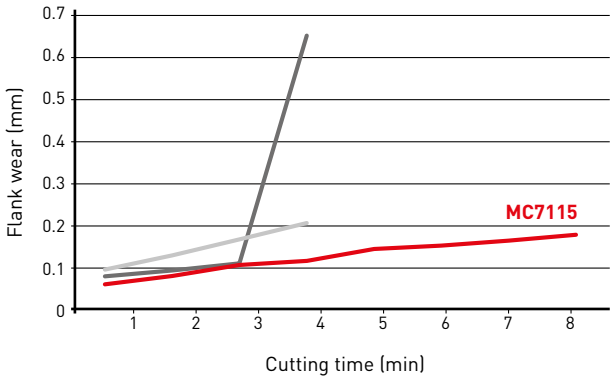
Cutting Conditions : ● : Stable cutting ◐ : General cutting ✣ : Unstable cutting

MC / MP7100

APPLICATION EXAMPLES

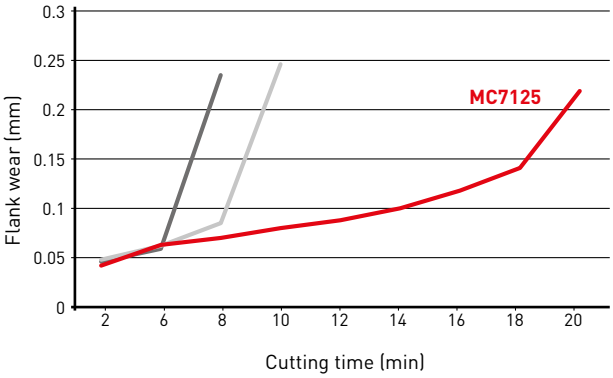
MC7115: COMPARISON OF WEAR RESISTANCE DURING WET CUTTING

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



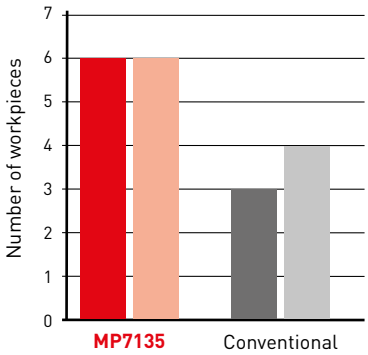
MC7125: COMPARISON OF WEAR RESISTANCE DURING WET CUTTING

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



MP7135: INTERMITTENT CUTTING COMPARISON

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

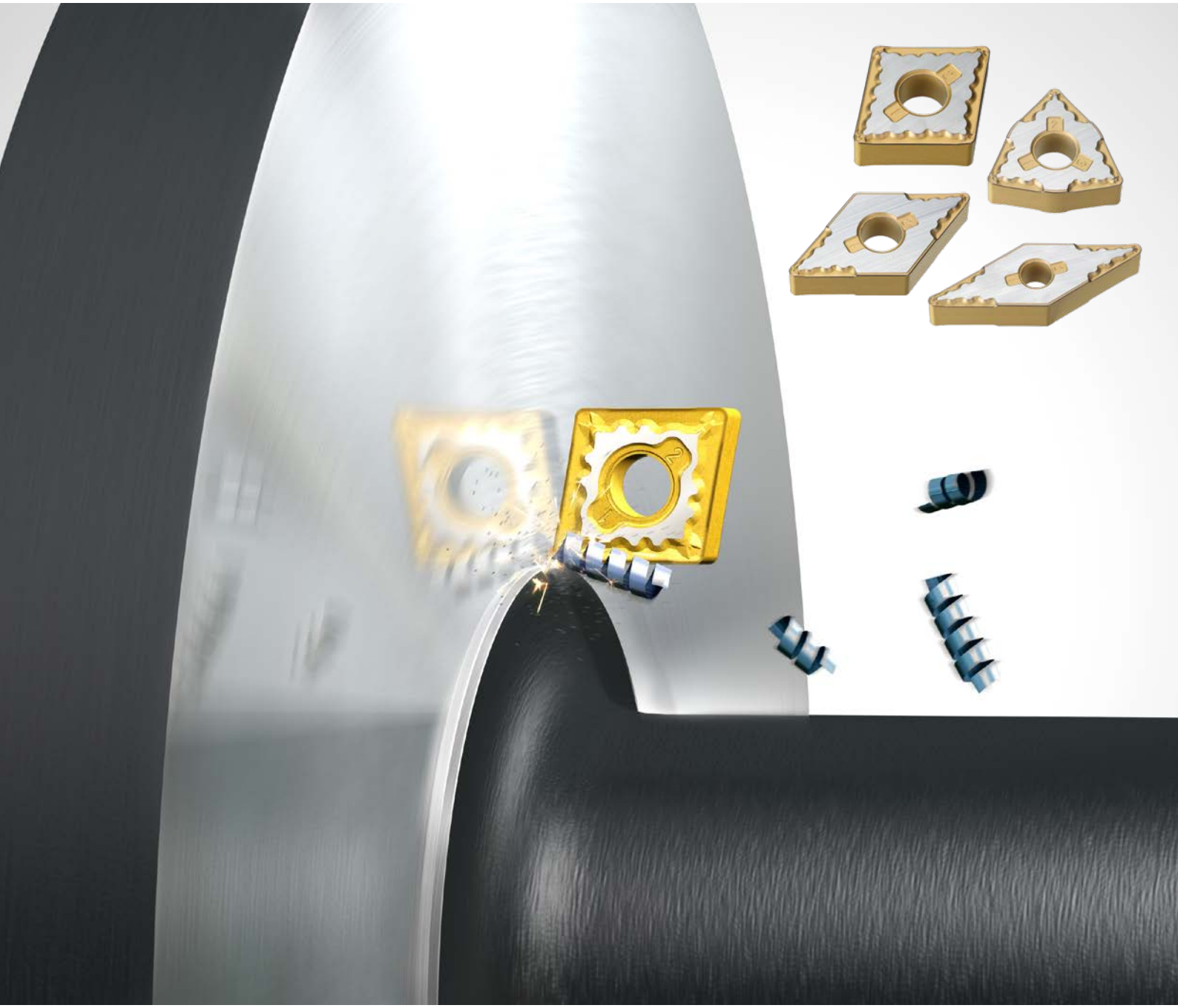


■ : MC/MP7100 ■ A ■ B : Conventional tool

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

MC6100 SERIES

BRINGING THE ULTIMATE HIGH SPEED CUTTING PERFORMANCE



Interested in more...

B266

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MITSUBISHI MATERIALS

NEW

FPH CHIPBREAKER

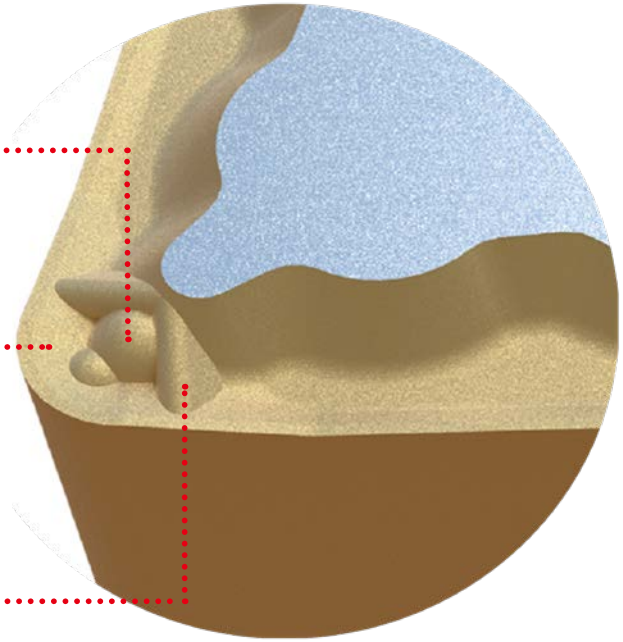
FOR LOW DEPTHS OF CUT AND HIGH FEED FINISHING

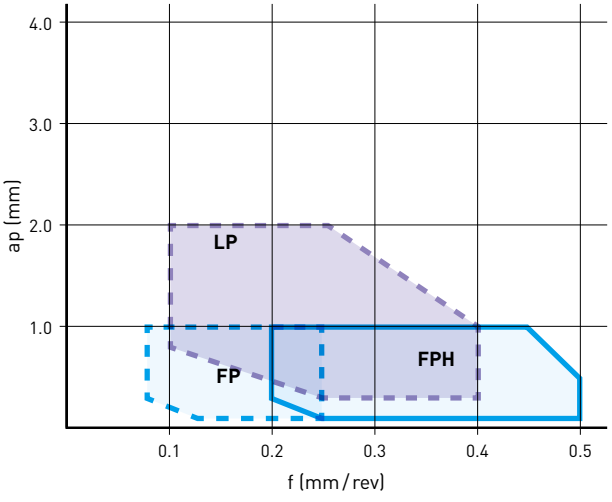
The combination of a positive land cutting edge shape and a two-stage protrusion optimises chip generation at low depths of cut, high feed conditions, thereby reducing machining times.

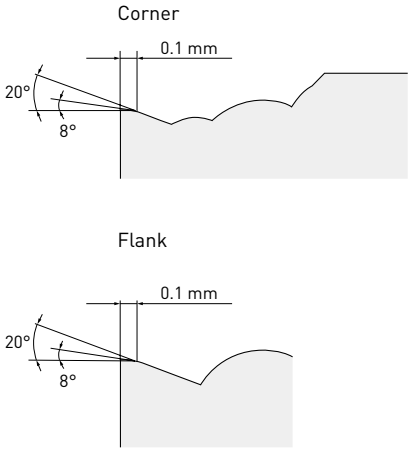
Main Convex
Provides consistent chip curling effect even for the thicker chips produced at high feed rates.

Positive Land
Optimum balance of sharpness and fracture resistance.

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







HOW TO USE

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

NEW

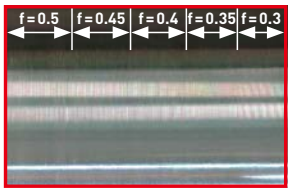
FPH CHIPBREAKER

CUTTING PERFORMANCE

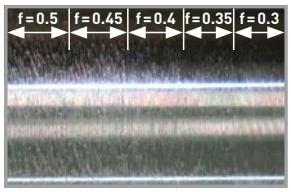
DIN 1.7225 (42CRMO4): COMPARISON OF CHIPS AND FINISHED SURFACE

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

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



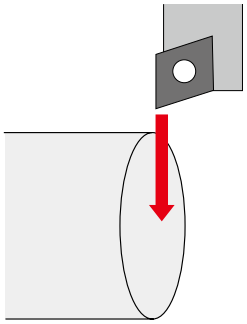
MC6135 + FPH

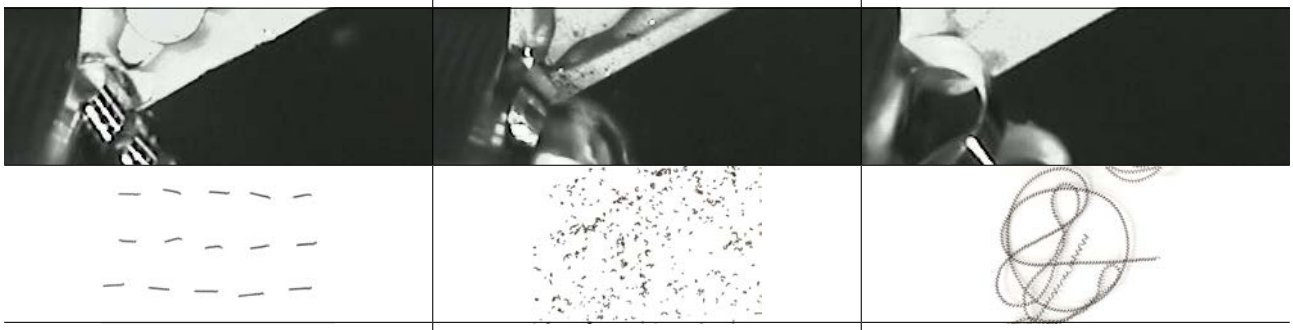


Conventional

CHIP COMPARISON

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



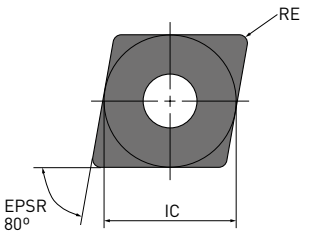
FPH	Conventional finish cutting chipbreaker	Conventional light cutting chipbreaker
		
Broken into pieces of ideal length.	Excessive division. This is a condition where the finished surface is prone to scratches.	Long chips are being generated. There is a high risk of it wrapping around the workpiece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

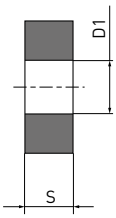
CNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

CNMG





F

FPH

Order number	F L M R H	MC6115	MC6125	MC6135	IC	S	RE	D1
CNMG120404-FPH	F	●	●	●	12.7	4.76	0.4	5.16
CNMG120408-FPH	F	●	●	●	12.7	4.76	0.8	5.16
CNMG120412-FPH	F	●	●	●	12.7	4.76	1.2	5.16

1/1

(10 inserts in one case)

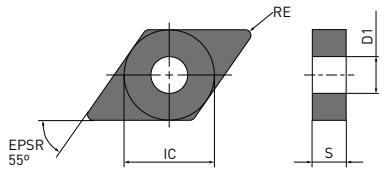
41 Vc

DNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

DNMG



F

FPH

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

1/1

(10 inserts in one case)

41 Vc

● / ★ = Expansion

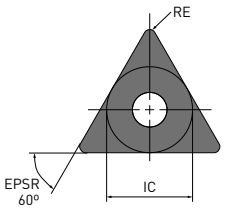
● : Inventory maintained. ★ : Inventory maintained in Japan.

TNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

TNMG



F

FPH

Order number	F L M R H	MC6115	MC6125	MC6135	IC	S	RE	D1
TNMG160404-FPH	F	●	●	●	9.525	4.76	0.4	3.81
TNMG160408-FPH	F	●	●	●	9.525	4.76	0.8	3.81
TNMG160412-FPH	F	●	●	●	9.525	4.76	1.2	3.81

1/1

(10 inserts in one case)

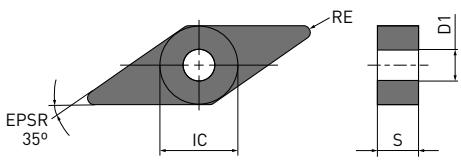
41 Vc

VNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

VNMG



F

FPH

Order number	F L M R H	MC6115	MC6125	MC6135	IC	S	RE	D1
VNMG160404-FPH	F	●	●	●	9.525	4.76	0.4	3.81
VNMG160408-FPH	F	●	●	●	9.525	4.76	0.8	3.81
VNMG160412-FPH	F	●	●	●	9.525	4.76	1.2	3.81

1/1

(10 inserts in one case)

41 Vc

● / ★ = Expansion

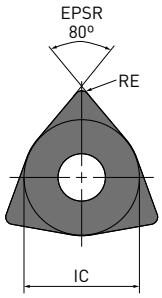
● : Inventory maintained. ★ : Inventory maintained in Japan.

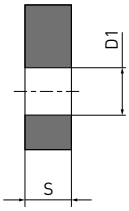
WNMG

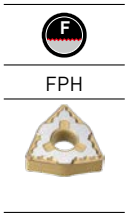
NEGATIVE INSERTS (WITH HOLE)

M Class

WNMG







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

1/1

(10 inserts in one case)

41 Vc

● / ★ = Expansion

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

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	MC6115	FPH	275 – 525	0.20 – 0.50	0.10 – 1.00
			◐	F	1	MC6125	FPH	300 – 465	0.20 – 0.50	0.10 – 1.00
			✣	F	3	MC6135	FPH	245 – 370	0.20 – 0.50	0.10 – 1.00

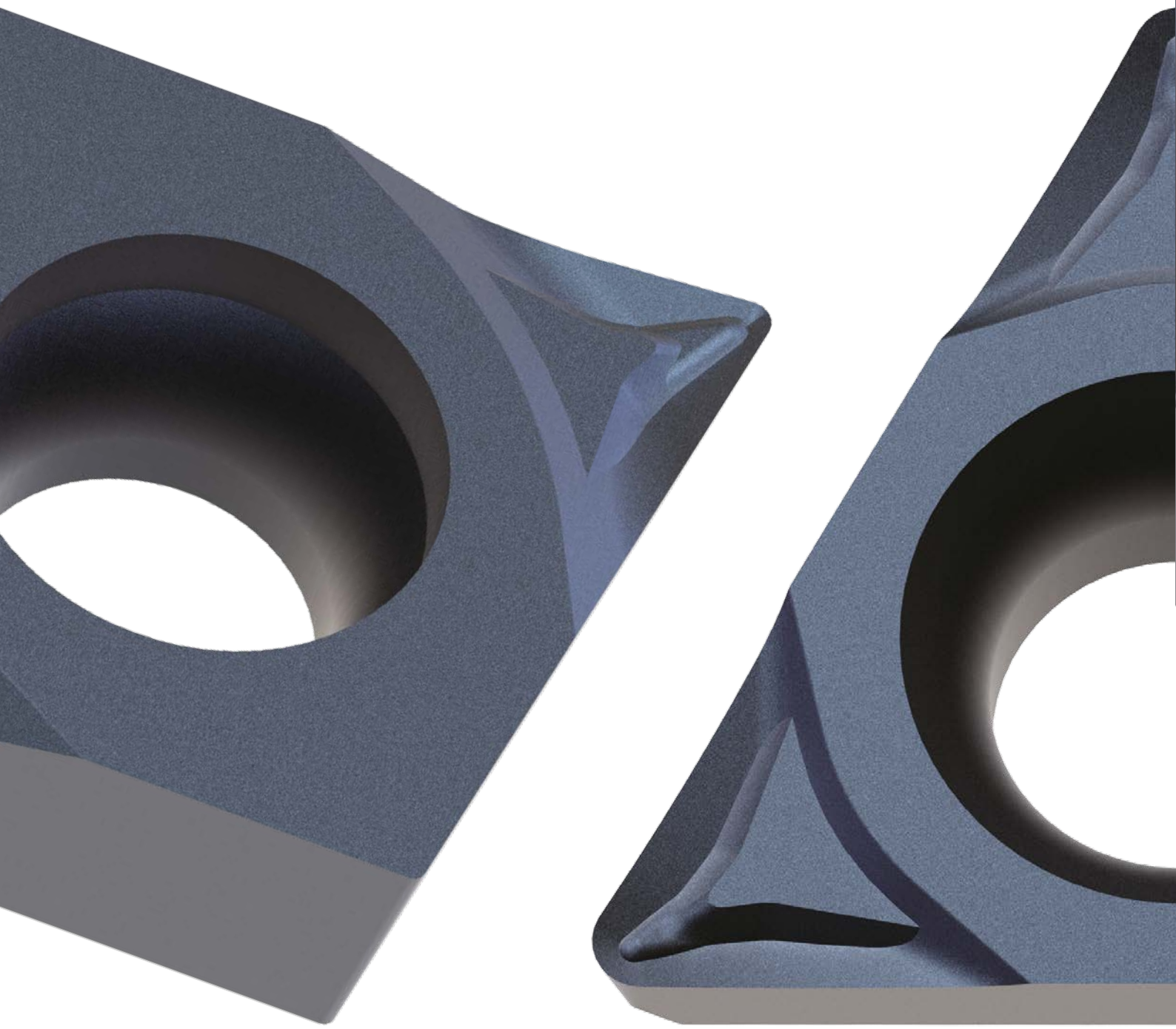
1/1

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

NEW

FSF/FSF-P CHIPBREAKER

IDEAL CHIPBREAKER FOR SMALL DEPTHS OF CUT AND FINISHING OPERATIONS



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B210-I

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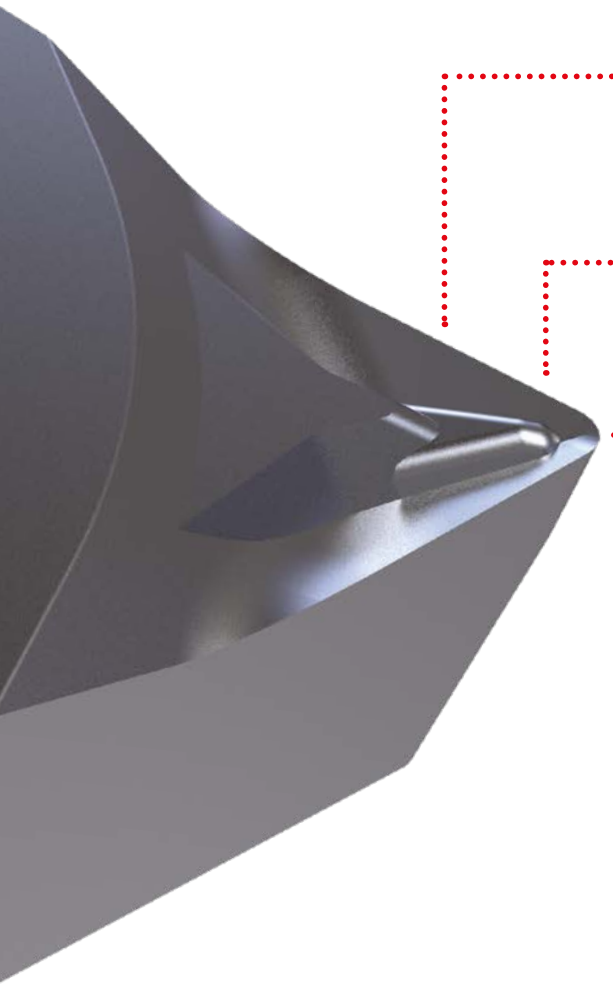
MITSUBISHI MATERIALS

FSF/FSF-P CHIPBREAKER

CHIPBREAKER FOR SMALL DEPTHS OF CUT

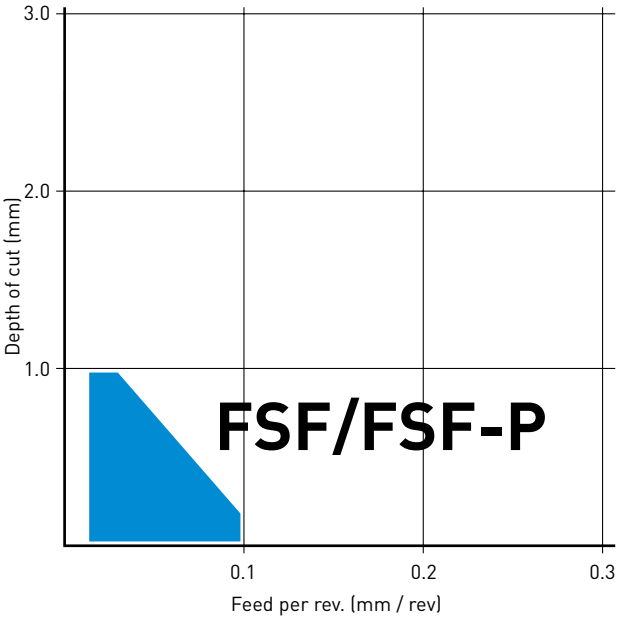


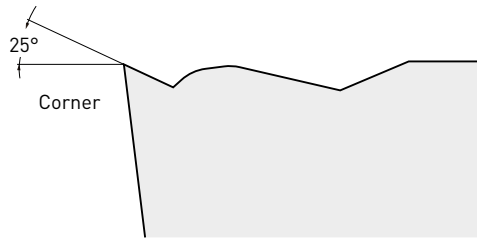
SHARP CUTTING EDGE
The sharp 25° rake angle provides a sharp cutting edge and a beautifully finished surface.

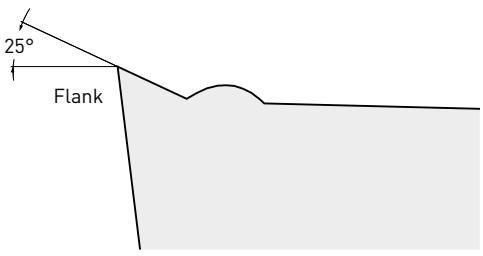
LOW CUTTING RESISTANCE
Low cutting resistance design with gentle chipbreaker protrusion.

MULTI-STAGE CHIPBREAKER
Corresponds to fluctuations in depth of cut.

APPLICATION RANGE



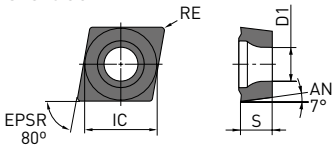


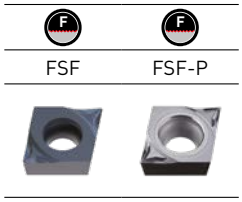


CCGT

7° POSITIVE INSERTS (WITH HOLE)

G Class





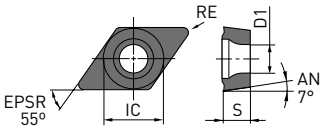
Order number		MP9025	MS7025	MS9025	VP30RT	HTI10	IC	S	RE	D1
CCGT03S101M-FSF	F	●					3.97	1.39	0.1	2.0
CCGT03S102M-FSF	F	●					3.97	1.39	0.2	2.0
CCGT04T001M-FSF	F	●					4.76	1.79	0.1	2.4
CCGT04T002M-FSF	F	●					4.76	1.79	0.2	2.4
CCGT060201M-FSF	F	●					6.35	2.38	0.1	2.8
CCGT060202M-FSF	F	●					6.35	2.38	0.2	2.8
CCGT060204M-FSF	F	●					6.35	2.38	0.4	2.8
CCGT03S101M-FSF-P	F		●	●			3.97	1.39	0.1	2.0
CCGT03S102M-FSF-P	F		●	●			3.97	1.39	0.2	2.0
CCGT04T001M-FSF-P	F		●	●			4.76	1.79	0.1	2.4
CCGT04T002M-FSF-P	F		●	●			4.76	1.79	0.2	2.4
CCGT0602V5M-FSF-P	F		●		●		6.35	2.38	0.05	2.8
CCGT060201M-FSF-P	F		●	●	●		6.35	2.38	0.1	2.8
CCGT060202M-FSF-P	F		●	●	●		6.35	2.38	0.2	2.8
CCGT060204M-FSF-P	F		●	●	●		6.35	2.38	0.4	2.8
CCGT09T3V5M-FSF-P	F		●		●		9.525	3.97	0.05	4.4
CCGT09T301M-FSF-P	F		●	●	●		9.525	3.97	0.1	4.4
CCGT09T302M-FSF-P	F		●		●		9.525	3.97	0.2	4.4
CCGT09T304M-FSF-P	F		●		●		9.525	3.97	0.4	4.4

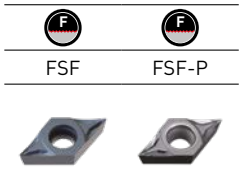
● : Inventory maintained. ★ : Inventory maintained in Japan.

DCGT

7° POSITIVE INSERTS (WITH HOLE)

G Class





Order number		MP9025	MS7025	MS9025	VP30RT	HTI10	IC	S	RE	D1
DCGT070201M-FSF	F	●					6.35	2.38	0.1	2.8
DCGT070202M-FSF	F	●					6.35	2.38	0.2	2.8
DCGT11T301M-FSF	F	●					9.525	3.97	0.1	4.4
DCGT11T302M-FSF	F	●					9.525	3.97	0.2	4.4
DCGT0702V5M-FSF-P	F		●		●		6.35	2.38	0.05	2.8
DCGT070201M-FSF-P	F		●	●	●		6.35	2.38	0.1	2.8
DCGT070202M-FSF-P	F		●	●	●		6.35	2.38	0.2	2.8
DCGT11T3V5M-FSF-P	F		●		●		9.525	3.97	0.05	4.4
DCGT11T301M-FSF-P	F		●	●	●		9.525	3.97	0.1	4.4
DCGT11T302M-FSF-P	F		●	●	●		9.525	3.97	0.2	4.4
DCGT11T304M-FSF-P	F		●		●		9.525	3.97	0.4	4.4

1/1

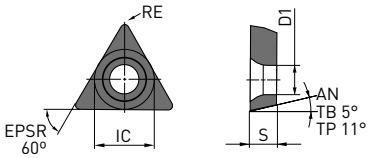
48 Vc

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

TBGT, TPGH

5°, 11° POSITIVE INSERTS (WITH HOLE)

G Class



FSF-P	FSF	FSF-P
		

Order number	F M	MP9025	MS7025	MS9025	VP30RT	HTI10	IC	S	RE	D1
TBGT060101M-FSF-P	F		●	●	●		3.97	1.59	0.1	2.3
TBGT060102M-FSF-P	F		●		●		3.97	1.59	0.2	2.3
TPGH090201M-FSF	F	●					5.56	2.38	0.1	2.9
TPGH090202M-FSF	F	●					5.56	2.38	0.2	2.9
TPGH090204M-FSF	F	●					5.56	2.38	0.4	2.9
TPGH080201M-FSF-P	F		●	●	●		4.76	2.38	0.1	2.4
TPGH080202M-FSF-P	F		●		●		4.76	2.38	0.2	2.4
TPGH090201M-FSF-P	F		●	●	●		5.56	2.38	0.1	2.9
TPGH090202M-FSF-P	F		●	●	●		5.56	2.38	0.2	2.9
TPGH090204M-FSF-P	F		●	●	●		5.56	2.38	0.4	2.9

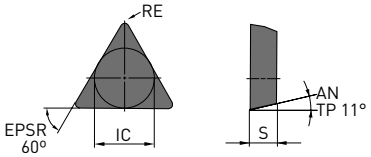
1/1

48 Vc

TPGB

11° POSITIVE INSERTS (WITHOUT HOLE)

G Class



Strong cutting edge
Flat Top


Order number	F M	MP9025	MS7025	MS9025	VP30RT	HTI10	IC	S	RE	D1
TPGB110201	M					●	6.35	2.38	0.1	—
TPGB110202	M					●	6.35	2.38	0.2	—
TPGB110204	M					●	6.35	2.38	0.4	—
TPGB160304	M					●	9.525	3.18	0.4	—
TPGB160308	M					●	9.525	3.18	0.8	—
TPGB080202	M					●	4.76	2.38	0.2	—
TPGB080204	M					●	4.76	2.38	0.4	—
TPGB080208	M					●	4.76	2.38	0.8	—
TPGB090202	M					●	5.56	2.38	0.2	—
TPGB090204	M					●	5.56	2.38	0.4	—
TPGB1102V5	M					●	6.35	2.38	0.05	—
TPGN090202	–					●	5.56	2.38	0.2	—
TPGN090204	–					●	5.56	2.38	0.4	—
TPGN090208	–					●	5.56	2.38	0.8	—

1/1

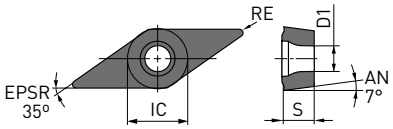
● : Inventory maintained. ★ : Inventory maintained in Japan.

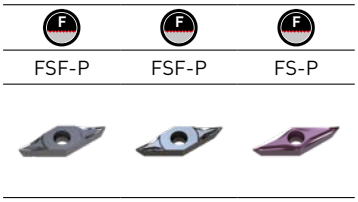
48 Vc

VCGT, VPGT

7°, 11° POSITIVE INSERTS (WITH HOLE)

G Class





Order number	F	M	MP9025	MS7025	MS9025	VP30RT	HTI10	IC	S	RE	D1
VCGT110301M-FSF-P	F			●	●	●		6.35	3.18	0.1	2.8
VCGT110302M-FSF-P	F			●		●		6.35	3.18	0.2	2.8
VCGT110304M-FSF-P	F			●		●		6.35	3.18	0.4	2.8
VPGT110301M-FSF-P	F			●	●	●		6.35	3.18	0.1	2.9
VPGT110302M-FSF-P	F			●		●		6.35	3.18	0.2	2.9
VPGT110304M-FSF-P	F			●		●		6.35	3.18	0.4	2.9
VPGT110301M-FS-P	F			●		●		6.35	3.18	0.1	2.9
VPGT110302M-FS-P	F			●		●		6.35	3.18	0.2	2.9

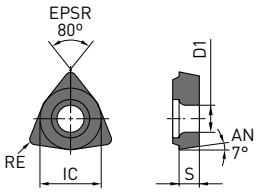
1/1

48 Vc

WCGT

7° POSITIVE INSERTS (WITH HOLE)

G Class



Order number	F	M	MP9025	MS7025	MS9025	VP30RT	HTI10	IC	S	RE	D1
WCGT020101M-FSF-P	F			●	●	●		3.97	1.59	0.1	2.3
WCGT020102M-FSF-P	F			●	●	●		3.97	1.59	0.2	2.3
WCGTL30201M-FSF-P	F			●	●	●		4.76	2.38	0.1	2.3
WCGTL30202M-FSF-P	F			●	●	●		4.76	2.38	0.2	2.3
WCGT040201M-FSF-P	F			●	●	●		6.35	2.38	0.1	2.8
WCGT040202M-FSF-P	F			●	●	●		6.35	2.38	0.2	2.8
WCGT06T301M-FSF-P	F				●			9.525	3.97	0.1	4.4
WCGT06T302M-FSF-P	F			●	●	●		9.525	3.97	0.2	4.4
WCGT06T304M-FSF-P	F			●		●		9.525	3.97	0.4	4.4

1/1

48 Vc

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

FSF/FSF-P CHIPBREAKER

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED

	Material	Properties	F M	Cutting condition	MP9025 Vc	MS7025 Vc	MS9025 Vc	VP30RT Vc	HTI10 Vc
P	Soft magnetic iron, Mild steel	≤180 HB	F	●	—	100 – 300	—	—	—
				✣	—	—	—	155 – 190	—
	Carbon steel, Alloy steel	180–280 HB	F	●	—	40 – 130	—	—	—
				✣	—	—	—	115 – 140	—
	Carbon steel, Alloy steel	280–350 HB	F	✣	—	—	—	80 – 100	—
M	Austenitic stainless steel	≤200 HB	F	●	—	40 – 100	60 – 150	—	—
				✣	—	—	—	50 – 90	—
	Ferritic and martensitic stainless steel	≤200 HB	F	●	—	40 – 100	—	—	—
			F	✣	—	—	—	50 – 90	—
	Austenitic, Ferritic and martensitic stainless steel	>200 HB	F	✣	—	—	—	40 – 75	—
	Electromagnetic stainless steel	230 HBW	F	●	—	40 – 160	50 – 180	—	—
	Duplex stainless steel	≤280 HB	F	✣	—	—	—	35 – 60	—
	Precipitation hardening stainless steel	<450 HB	F	✣	70 – 85	40 – 80	50 – 100	—	—
K	Grey cast iron	≤350 MPa	M	◔ ✣	—	—	—	—	90 – 125
	Ductile cast iron	≤450 MPa	M	● ◔ ✣	—	—	—	—	70 – 100
	Ductile cast iron	≤800 MPa	M	● ◔ ✣	—	—	—	—	60 – 90
N	Aluminium alloys	—	M	● ◔ ✣	—	—	—	—	300 – 700
S	Heat resistant alloys	—	F	●	—	—	40 – 140	—	—
				✣	25 – 40	—	—	—	—

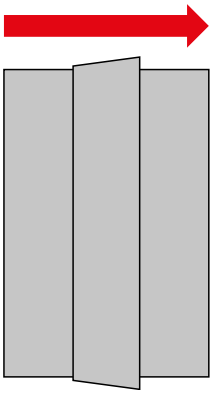
1/1

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

APPLICATION EXAMPLES

EXTERNAL TURNING

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



Cutting Conditions: ●: Stable cutting ◔: General cutting ✣: Unstable cutting
Cutting Area: F: Finish cutting M: Medium cutting

BORING BARS FOR SMALL PARTS MACHINING

COMPATIBLE WITH SWISS-TYPE AUTOMATIC LATHES

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MITSUBISHI MATERIALS

BORING BARS FOR SMALL PARTS MACHINING

OVERALL LENGTH COMPATIBLE WITH SWISS-TYPE AUTOMATIC LATHES

SCREW-ON TYPE

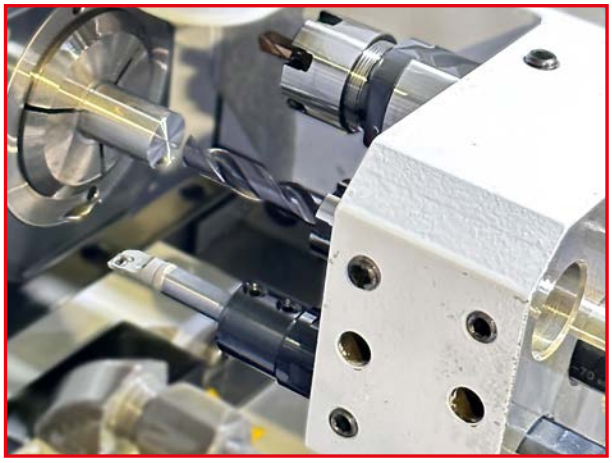
CARBIDE SHANK:
80 mm, 90 mm, 140 mm, 180 mm

HARD STEEL SHANK*:
70 mm, 80 mm, 90 mm
* The shank material has excellent resistance to damage caused by chip evacuation.

STEEL SHANK:
90 mm, 150 mm

WITH COOLANT HOLE
Some items with small diameter carbide shanks do not have a coolant hole.
Please check the series list on page 51.

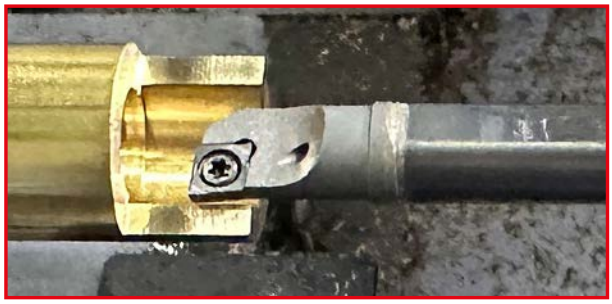
NO NEED TO SHORTEN THE SHANK
The length of the tools are compatible with Swiss-type automatic lathes, therefore no need to cut the shank to prevent interference.



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
H	Hard steel 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°
J	142°

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

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

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

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

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)	
070	70
080	80
090	90
140	140
150	150
180	180
200	200
250	250

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°	Hard Steel	70,80,90	5 – 10	4 – 8		◎				53	70
			Hard Steel	90	12	10		◎		◎		54	
RHOMBIC 80° **Normal clearance 11°**	SCLP	95°	Hard Steel	90	12	10		◎		◎		55	78
TRIANGULAR 60° **Normal clearance 7°**	STUC	93°	Hard Steel	80	7 – 10	6 – 8	◎					56	87
			Hard Steel	90	12	10	◎			◎		57	
TRIANGULAR 60° **Normal clearance 11°**	STUP	93°	Hard Steel	80	10	8	◎					58	90
			Hard Steel	90	12	10	◎			◎		59	
RHOMBIC 55° **Normal clearance 7°**	SDUC	93°	Hard Steel	90	14	10			◎	◎		60	81
RHOMBIC 55° **Normal clearance 7°**	SDQC	107.5°	Hard Steel	90	13	10			◎	◎		61	81
RHOMBIC 35° **Normal clearance 7°**	SVUC	93°	Carbide	140	16	12			◎	◎		62	96
			Steel	90	16	12			◎	◎		63	
	SVPC	117.5°	Carbide	140	16	10			◎	◎		64	
			Hard Steel	90	16	10			◎	◎		65	
	SVJC	142°	Steel	90, 150	16 – 20	12 – 16			◎	◎		67	
RHOMBIC 35° **Normal clearance 5°**	SVUB	93°	Carbide	180	20 – 34	16 – 25			◎	◎		62	93
			Steel	150, 200	20 – 40	16 – 32			◎	◎		63	
	SVPB	117.5°	Carbide	180	20 – 34	12 – 25			◎	◎		64	
			Steel	150, 200	20 – 40	12 – 32			◎	◎		66	
	SVJB	142°	Steel	150, 200, 250	25 – 50	20 – 40			◎	◎		67	
TRIGON **Normal clearance 7°**	SWUC	93°	Hard Steel	70,80	6 – 10	5 – 8	◎	◎				68	98
			Hard Steel	80	12	10	◎	◎		◎		69	

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

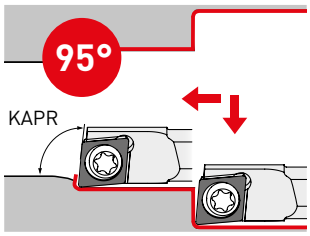
Insert type	Clamp screw
TPGX0802○○ (Ø4.76)	CS200T
TPGX/TPMX0902○○ (Ø5.56)	CS250T
TPGX/TPMX1103○○ (Ø9.525)	CS300890T

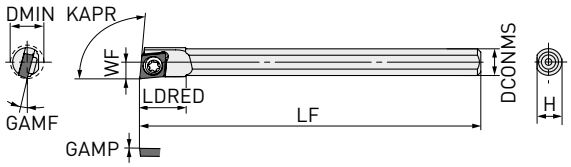
1. Shortening is necessary if the screw is too long.

NEW

H-SCLC

HARD STEEL SHANK WITHOUT COOLANT HOLE





Right hand tool holder shown.

CC○○-Inserts

FP	FS
	
(06)	(06)
PCBN/PCD	
R/L-F	
	
(03,04)	(03,04)

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

102 Vc

SPARE PARTS

Boring bar type	Clamp screw *	Wrench
H○○-○○SCLCR/L03	TS16	TKY06F
H○○-○○SCLCR/L04	TS21	TKY06F
H○○-○○SCLCR/L06	TS25	TKY08F

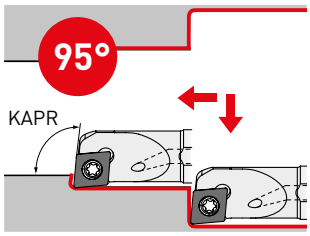
* Clamp torque (Nm): TS16 = 0.6, TS21 = 0.6, TS25 = 1.0

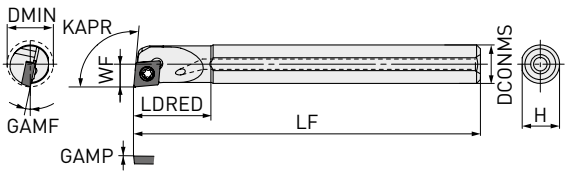
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

H-SCLC-C

HARD STEEL SHANK WITH COOLANT HOLE





Right hand tool holder shown.

CC○○-Inserts

FP	FS
	
(06)	(06)
PCBN/PCD	
R/L-F	
	
(06)	(06)

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

1/1

102 Vc

SPARE PARTS

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

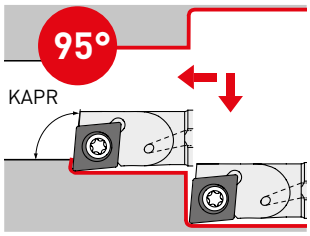
* Clamp torque (Nm): TS25 = 1.0

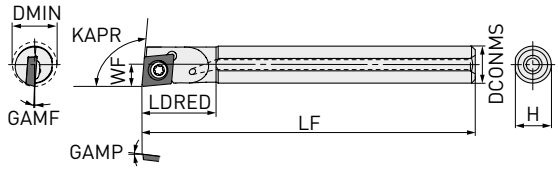
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

H-SCLP-C

HARD STEEL SHANK WITH COOLANT HOLE





Right hand tool holder shown.

CP○○-Inserts

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

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

1/1

102 Vc

SPARE PARTS

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

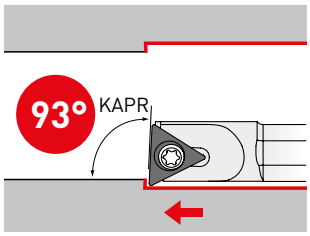
* Clamp torque (Nm): TS3D = 2.5

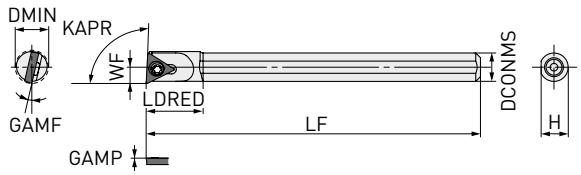
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

H-STUC

HARD STEEL SHANK WITHOUT COOLANT HOLE





Right hand tool holder shown.

TC○○-Inserts

F	F
FP	R/L-F
	
(09)	(06)
L	M
LP	MK
	
(09)	(09)

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

1/1

102 Vc

SPARE PARTS

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

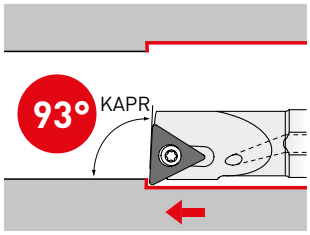
* Clamp torque (Nm): TS2C = 0.6, TS22 = 0.6

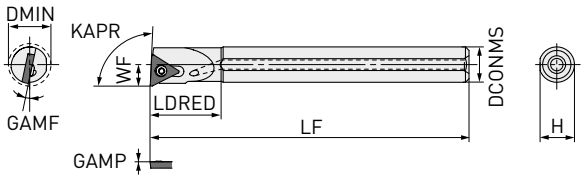
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

H-STUC-C

HARD STEEL SHANK WITH COOLANT HOLE





Right hand tool holder shown.

TC○○-Inserts

F	F
FP	FM
	
(09)	(09)
L	M
LP	MK
	
(09)	(09)

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

1/1

102 Vc

SPARE PARTS

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

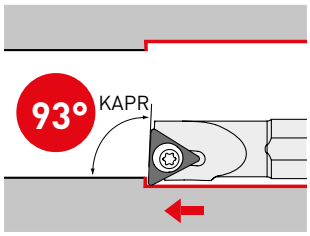
* Clamp torque (Nm): TS22 = 0.6

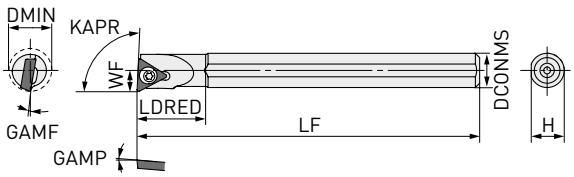
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

H-STUP

HARD STEEL SHANK WITHOUT COOLANT HOLE





Right hand tool holder shown.

TP○○-Inserts

FS	FV
	
(08)	(08)
Flat Top	
LP	
	
(08)	(08)

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

1/1

102 Vc

SPARE PARTS

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

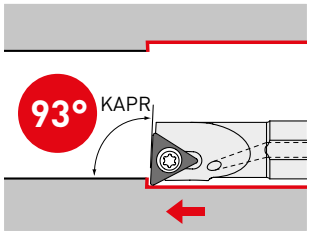
* Clamp torque (Nm): TS2D = 0.6

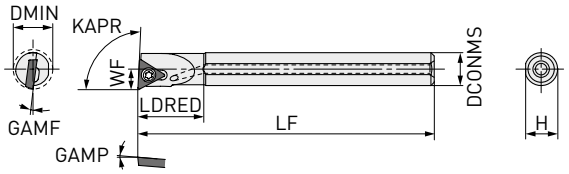
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

H-STUP-C

HARD STEEL SHANK WITH COOLANT HOLE





Right hand tool holder shown.

TP○○-Inserts

FS	FV
	
(09)	(09)
Flat Top	
LP	
	
(09)	(09)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	H	GAMF	GAMP	Insert number	
H12-10STUPR09-090-C	●	R	12	10	90	20	6.2	9.7	8°	5°	TP○○	0902○○
H12-10STUPL09-090-C	●	L	12	10	90	20	6.2	9.7	8°	5°		0902○○

1/1

102 Vc

SPARE PARTS

Boring bar type	Clamp screw *	Wrench
H12-10STUPR/L09	TS25D	TKY08F

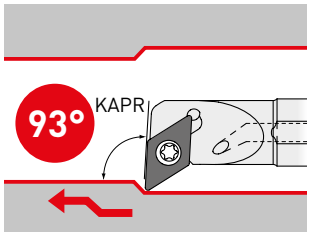
* Clamp torque (Nm): TS25D = 1.6

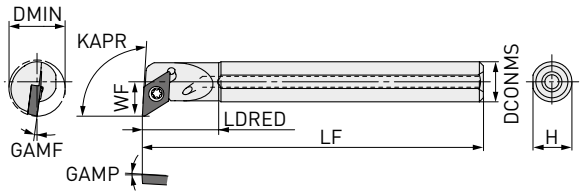
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

H-SDUC-C

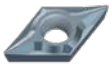
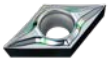
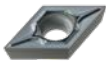
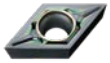
HARD STEEL SHANK WITH COOLANT HOLE

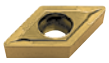
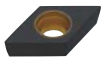




Right hand tool holder shown.

DC○○-Inserts

FS	FS-P	LS	LS-P
			
(07)	(07)	(07)	(07)

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

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

1/1

102 Vc

SPARE PARTS

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

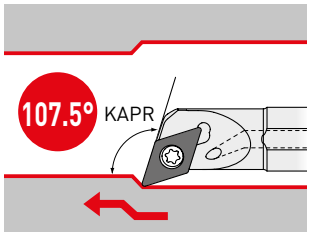
* Clamp torque (Nm): TS25 = 1.0

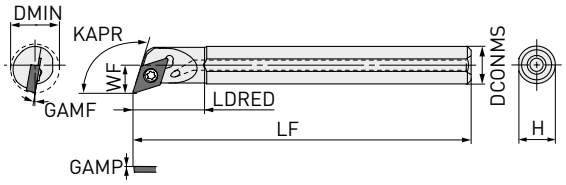
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

H-SDQC-C

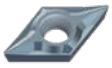
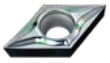
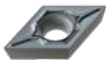
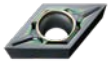
HARD STEEL SHANK WITH COOLANT HOLE

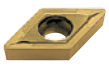
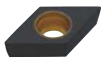




Right hand tool holder shown.

DC○○-Inserts

FS	FS-P	LS	LS-P
			
(07)	(07)	(07)	(07)

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

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

1/1

102 Vc

SPARE PARTS

Boring bar type	Clamp screw *	Wrench
H13-10SDQCR/L07	TS25	TKY08F

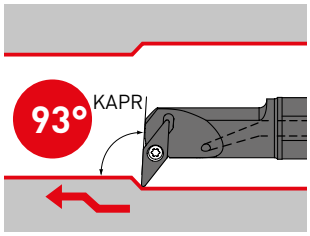
* Clamp torque (Nm): TS25 = 1.0

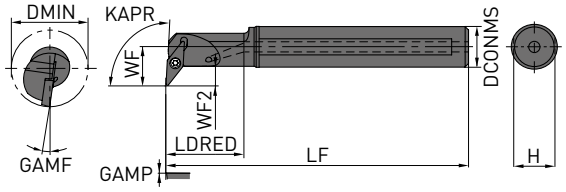
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

C-SVUC/B-C

CARBIDE SHANK BORING BAR WITH COOLANT HOLE





Right hand tool holder shown.

VC/VB○○-Inserts

FP	FM	LP	LM
			
(11,16)	(08,11,16)	(08,11,16)	(08,11,16)

MP	MM	Standard	PCBN/PCD
			
(16)	(16)	(16)	(11,16)

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

1/1

102 Vc

SPARE PARTS

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

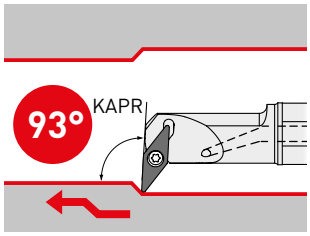
* Clamp torque (Nm): TS202 = 0.6, TS255 = 1.0, TS35D = 3.5

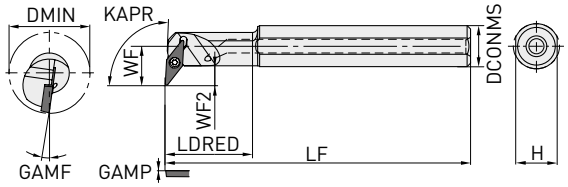
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

S-SVUC/B-C

STEEL SHANK BORING BAR WITH COOLANT HOLE





Right hand tool holder shown.

VC/VB○○-Inserts

FP	FM	LP	LM
			
(11,16)	(08,11,16)	(08,11,16)	(08,11,16)

MP	MM	Standard	PCBN/PCD
			
(16)	(16)	(16)	(11,16)

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

1/1

102 Vc

SPARE PARTS

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

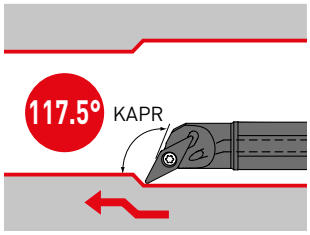
* Clamp torque (Nm): TS202 = 0.6, TS255 = 1.0, TS35D = 3.5

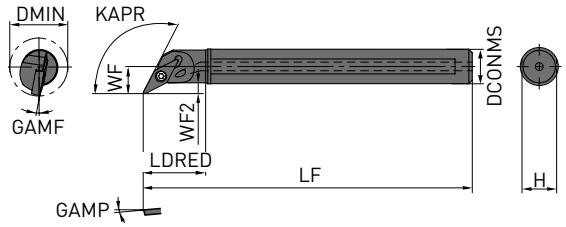
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

C-SVPC/B-C

STEEL SHANK BORING BAR WITH COOLANT HOLE





Right hand tool holder shown.

VC/VB○○-Inserts

FP	FM	LP	LM
			
(11,16)	(08,11,16)	(08,11,16)	(08,11,16)

MP	MM	Standard	PCBN/PCD
			
(16)	(16)	(16)	(11,16)

Order number	Stock	Hand	DMIN	DCONMS	LF	LDRED	WF	WF2	H	GAMF	GAMP	Insert number	
C16-10SVPCR08-140-C	●	R	16	10	140	18	8.0	3.1	9	8°	-5°	VC○○	0802○○
C16-10SVPCL08-140-C	●	L	16	10	140	18	8.0	3.1	9	8°	-5°		0802○○
C20-12SVPBR11-180-C	●	R	20	12	180	23	10.0	4.1	11	8°	-5°	VB○○	1103○○
C20-12SVPBL11-180-C	●	L	20	12	180	23	10.0	4.1	11	8°	-5°		1103○○
C25-16SVPBR11-180-C	●	R	25	16	180	28	12.5	4.6	15	6°	-5°		1103○○
C25-16SVPBL11-180-C	●	L	25	16	180	28	12.5	4.6	15	6°	-5°		1103○○
C30-20SVPBR11-180-C	●	R	30	20	180	32	15.0	5.1	19	5°	-5°		1103○○
C34-25SVPBR16-180-C	●	R	34	25	180	38	17.0	4.9	24	13°	-5°		1604○○

1/1

102 Vc

SPARE PARTS

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

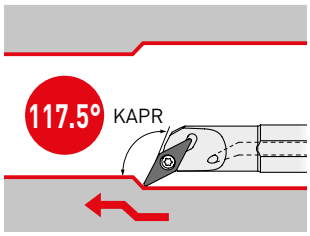
* Clamp torque (Nm): TS202 = 0.6, TS255 = 1.0, TS35D = 3.5

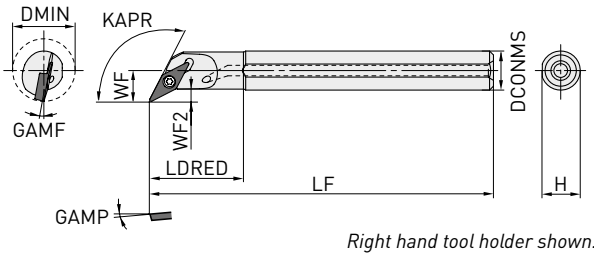
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

H-SVPC-C

HARD STEEL SHANK WITH COOLANT HOLE





Right hand tool holder shown.

VC○○-Inserts

F	
FM	
	
(08)	
L	L
LP	LM
	
(08)	(08)

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

1/1

102 Vc

SPARE PARTS

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

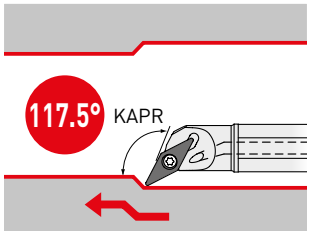
* Clamp torque (Nm): TS202 = 0.6

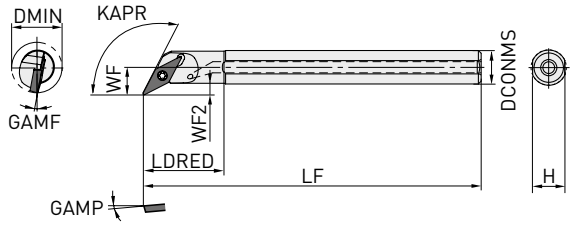
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

S-SVPB-C

STEEL SHANK BORING BAR WITH COOLANT HOLE





Right hand tool holder shown.

VB○○-Inserts

FP	FM	LP	LM
			
(11,16)	(08,11,16)	(08,11,16)	(08,11,16)

MP	MM	Standard	PCBN/PCD
			
(16)	(16)	(16)	(11,16)

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

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102 Vc

SPARE PARTS

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

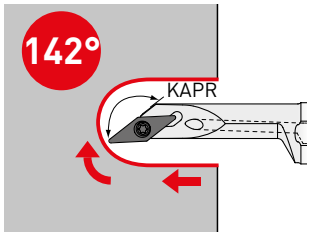
* Clamp torque (Nm): TS255 = 1.0, TS35D = 3.5

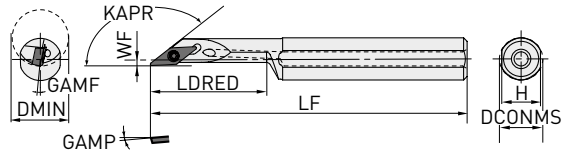
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

S-SVJC/B-C

STEEL SHANK BORING BAR WITH COOLANT HOLE





Right hand tool holder shown.

VC/VB○○-Inserts

FP	FM	LP	LM
			
(11,16)	(08,11,16)	(08,11,16)	(08,11,16)

MP	MM	Standard	PCBN/PCD
			
(16)	(16)	(16)	(11,16)

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

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102 Vc

SPARE PARTS

Boring bar type	Clamp screw *	Wrench
S○○-○○SVJCR08	TS202	TKY06F
S○○-○○SVJBR11	TS255	TKY08F
S○○-○○SVJBR16	TS35D	TKY15F

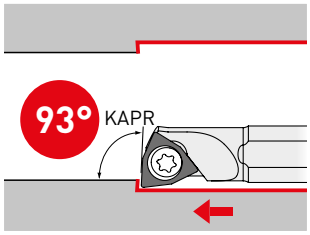
* Clamp torque (Nm): TS202 = 0.6, TS255 = 1.0, TS35D = 3.5

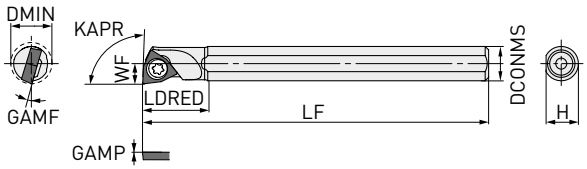
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

H-SWUC

HARD STEEL SHANK WITHOUT COOLANT HOLE





Right hand tool holder shown.

WC○○-Inserts

F	M
FV	MP
	
(02,L3,04)	(02,L3,04)
M	PCBN/PCD
Standard	
	
(02,L3,04)	(L3)

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

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102 Vc

SPARE PARTS

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

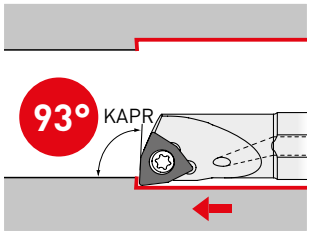
* Clamp torque (Nm): TS21 = 0.6, TS2 = 0.6, TS25 = 1.0

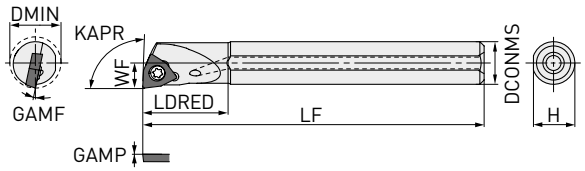
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

H-SWUC-C

HARD STEEL SHANK WITH COOLANT HOLE





Right hand tool holder shown.

WC○○-Inserts

F	
FV	
	
(04)	
M	M
MP	Standard
	
(04)	(04)

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

1/1

102 Vc

SPARE PARTS

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

* Clamp torque (Nm): TS25 = 1.0

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

CC TYPE INSERTS

80° WITH HOLE

		Coated																						Coated Cermet				Cermet		Carbide						Shape
Order number	RE	MS6015	MC6115	MC6125	MC6135	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	HT105T	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

1/8

*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	MC6135	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
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	
CCMT09T302-LP	0.2	
CCMT060208-LP	0.8	
CCMT09T304-LP	0.4	
CCMT09T308-LP	0.8	Light cutting

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*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	MC6135	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	HT105T	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
CCET060201MR-SRF	0.1																			●																			R/L-SRF
CCET060201ML-SRF	0.1																			●																			
CCET060202MR-SRF	0.2																			●																			
CCET060202ML-SRF	0.2																			●																			
CCET060204MR-SRF	0.4																			●																			
CCET060204ML-SRF	0.4																			●																			
CCET09T301MR-SRF	0.1																			●																			
CCET09T301ML-SRF	0.1																			●																			
CCET09T302MR-SRF	0.2																			●																			
CCET09T302ML-SRF	0.2																			●																			
CCET09T304MR-SRF	0.4																			●																			
CCET09T304ML-SRF	0.4																			●																			Light cutting
CCMH060202-SV	0.2						●							★	●										●			★											SV
CCMH060204-SV	0.4						●							★	●										●			●											
																																						Light 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	MC6135	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	HT105T	HT110	TF15
P	Steel	◔	●	◔	✣	◶	❁	○	◶	❁	◔	●	◔	✣	○	✣	◔	◔	✣	◔				❁	✣	❁	◔	○	○	◶	○	◶			❁			○
M	Stainless steel										◔	●	◔	✣	○	✣				◔				◶	❁	✣	❁		○	○		○			❁			
K	Cast iron																◔	◔	✣					◶	❁				○	○		○						
N	Non-ferrous metal																																			◶	○
S	Heat resistant alloy, Titanium alloy																			◔	●	◔	✣	◶	❁								●	◔			◶	

Order number	RE	Shape
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	
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

*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	MC6135	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-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
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

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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	MC6135	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
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

*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	MC6135	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
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)

7/8

*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					Shape
Order number	RE	MS6015	MC6115	MC6125	MC6135	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	
CCMW060202	0.2																																		●		Flat Top
CCMW060204	0.4															★	●	●	★																●		●	★	
CCMW060208	0.8																★	●	★																			
CCMW09T304	0.4																●	●	●																★		●	
CCMW09T308	0.8																●	●	●																●		●	
CCMW09T312	1.2																★	●	★																			
CCGW060200	0.0																																				Flat Top
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																																				

*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						Shape
Order number	RE	MS6015	MC6115	MC6125	MC6135	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	
CPMH080202-FP	0.2			●	●																																	FP
CPMH080204-FP	0.4			●	●																																	
CPMH090302-FP	0.2			●	●																																	
CPMH090304-FP	0.4			●	●																																	
CPMH090308-FP	0.8			●	●																																	Finish cutting
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					
Order number	RE	MS6015	MC6115	MC6125	MC6135	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		●	●	★																																	
CPMH080208-LP	0.8		●	●	●																																	
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

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.

CP TYPE INSERTS, 80° WITH HOLE

		Coated																				Coated Cermet				Cermet		Carbide					
		MS6015	MC6115	MC6125	MC6135	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
P	Steel	◉	●	◉	✣	◶	❁	○	◶	❁													❁	✣	❁		◉	○	○	◶	○	◶			❁			○
M	Stainless steel										◉	●	◉	✣	○	✣				◉			◶	❁	✣	❁		○	○		○				❁			
K	Cast iron																◉	◉	✣				◶	❁				○	○		○				❁	○	◶	○
N	Non-ferrous metal																																				◶	○
S	Heat resistant alloy, Titanium alloy																			◉	●	◉	✣	◶	❁								●	◉			◶	

Order number	RE	Shape
CPMH080204-MP	0.4	MP
CPMH080208-MP	0.8	
CPMH090304-MP	0.4	
CPMH090308-MP	0.8	
		Medium cutting
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	

*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

		Coated																						Coated Cermet				Cermet		Carbide						Shape
Order number	RE	MS6015	MC6115	MC6125	MC6135	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	HT105T	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																									★										●		Medium cutting ~
DCGT11T308-AZ	0.8																									★										●		Finish cutting

1/6

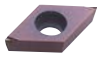
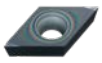
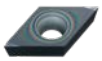
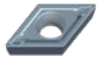
*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.
(10 inserts in one case)

●: 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					
Order number	RE	MS6015	MC6115	MC6125	MC6135	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	Shape
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
DCET070201MR-SRF	0.1*2																			●																		R/L-SRF
DCET070201ML-SRF	0.1*2																			●																		
DCET070202MR-SRF	0.2*2																			●																		
DCET070202ML-SRF	0.2*2																			●																		
DCET070204MR-SRF	0.4*2																			●																		
DCET070204ML-SRF	0.4*2																			●																		
DCET11T301ML-SRF	0.1*2																			●																		
DCET11T302ML-SRF	0.2*2																			●																		
DCET11T304ML-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

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*2 Indicates the maximum value of the corner R.
(10 inserts in one case)

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
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◔: General cutting (2nd recommendation)
✥: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion
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DC TYPE INSERTS, 55° WITH HOLE

		Coated																						Coated Cermet				Cermet		Carbide					
		MS6015	MC6115	MC6125	MC6135	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	HT105T	HT110	TF15
Order number	RE																																					
DCGT070201M-LS	0.1*2																			●	●	●			●													
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																			●	●	●			●													
DCGT0702V5M-LS-P	0.05*2																			●																		
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	●									●									●													●					
DCMT070202-SV	0.2							★	●					★	●										●					★		●	●					
DCMT070204-SV	0.4							●	●					★	●										●					●		●	●					
DCMT070208-SV	0.8							●	●					★	●										●					★		●	★					
DCMT11T302-SV	0.2							●	●					★	●										●					●		●	●					
DCMT11T304-SV	0.4							●	●					★	●										●					●		●	●					
DCMT11T308-SV	0.8							●	●					★	●										●					●		●	★					
DCMX070202-SW	0.2		●	●	●																		●														
DCMX070204-SW	0.4		●	●	●																		●														
DCMX070208-SW	0.8		●	●	●																		●														
DCMX11T302-SW	0.2		●	●	●																		●														
DCMX11T304-SW	0.4		●	●	●																		●														
DCMX11T308-SW	0.8		●	●	●																		●														
DCGT0702V3R-SS	0.03																							★													
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	●																																				

Shape: LS — Light cutting; LS-P — Light cutting; SV — Light cutting; SW — Light cutting; R/L-SS

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(10 inserts in one case)

●: Stable cutting (1st recommendation)
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✤: Unstable cutting (1st recommendation)
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DC TYPE INSERTS, 55° WITH HOLE

		Coated																						Coated Cermet				Cermet		Carbide					
Order number	RE	MS6015	MC6115	MC6125	MC6135	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	Shape
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
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

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

● / ★ = Expansion

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DC TYPE INSERTS, 55° WITH HOLE

		Coated																				Coated Cermet				Cermet		Carbide						
Order number	RE	MS6015	MC6115	MC6125	MC6135	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	Shape
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
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

5/6

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DC TYPE INSERTS, 55° WITH HOLE

		Coated																				Coated Cermet				Cermet	Carbide					
		MS6015	MC6115	MC6125	MC6135	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
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.
*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					
		MS6015	MC6115	MC6125	MC6135	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
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	
TCMT110202-LP	0.2	
TCMT110204-LP	0.4	
TCMT110208-LP	0.8	
TCMT16T304-LP	0.4	
TCMT16T308-LP	0.8	Light cutting

1/3

*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.

TC TYPE INSERTS, 60° WITH HOLE

		Coated																						Coated Cermet				Cermet		Carbide						
		MS6015	MC6115	MC6125	MC6135	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
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

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	MC6135	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	
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																																					

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.

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	MC6135	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	HT105T	HTi10	TF15	
TPMH090202-FP	0.2		●	●	●																																FP
TPMH090204-FP	0.4		●	●	●																																
TPMH110302-FP	0.2		●	●	●																																
TPMH110304-FP	0.4		●	●	●																																
TPMH110308-FP	0.8		●	●	●																																Finish cutting
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

		Coated																						Coated Cermet				Cermet	Carbide						
Order number	RE	MS6015	MC6115	MC6125	MC6135	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	Shape
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	MC6135	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	●	●	●																		●																
TPMX110308-SW	0.8	●	●	●																		●																Light cutting (Wiper)
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

		Coated																				Coated Cermet				Cermet		Carbide						
		MS6015	MC6115	MC6125	MC6135	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	HT105T	HTI10	TF15
P	Steel	●	●	●	✣	◶	❁	○	◶	❁										◶				❁	✣	❁	●	○	○	◶	○	◶			❁			○
M	Stainless steel										●	●	●	✣	○	✣				●				◶	❁	✣	❁		○	○		○				❁			
K	Cast iron																●	●	✣					◶	❁				○	○		○				❁	○	◶	○
N	Non-ferrous metal																																				◶	○
S	Heat resistant alloy, Titanium alloy																			●	●	●	✣	◶	❁								●	●				◶	

Order number	RE																																					Shape
VBMT110302-FP	0.2	●	●	★	●	●		●																			●				●								FP
VBMT110304-FP	0.4	●	●	★	●	●		●																			●				●								
VBMT110308-FP	0.8	●	★	★	●	●		★																			★				★								
VBMT160404-FP	0.4	●	●	★	●	●		●																			●				●								
VBMT160408-FP	0.8	●	●	★	●	●		●																			●				●								
VBMT160412-FP	1.2	●	●	●																																		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
VBGT110301M-FS-P	0.1																			●																		FS-P
VBGT110302M-FS-P	0.2																			●																		
VBGT110304M-FS-P	0.4																			●																		
VBGT160401M-FS-P	0.1																			●																		
VBGT160402M-FS-P	0.2																			●																		
VBGT160404M-FS-P	0.4																			●																		
VBGT160408M-FS-P	0.8																			●																		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

*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						
P	Steel	●	●	●	✣	◶	❁	○	◶	❁												◕	○	○	◶	○	◶		❁		○			
M	Stainless steel										◕	●	◕	✣	○	✣				◕					◶	❁	❁	❁			❁				
K	Cast iron																◕	◕	✣						◶	❁		○			❁	○	◶	○
N	Non-ferrous metal																															◶	○	
S	Heat resistant alloy, Titanium alloy																◕	●	◕	✣	◶	❁							●	◕		◶		

Order number	RE	MS6015	MC6115	MC6125	MC6135	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	Shape
VBMT110304-LP	0.4		●	●	★	●	●		★																		●				★								LP
VBMT110308-LP	0.8		●	●	★	●	●		●																		★				●								
VBMT160404-LP	0.4		●	●	★	●	●		●																		●				●								
VBMT160408-LP	0.8		●	●	★	●	●		●																		●				●								
VBMT160412-LP	1.2		●	●	●																																		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
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

*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					
Order number	RE	MS6015	MC6115	MC6125	MC6135	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	Shape
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
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

		Coated																						Coated Cermet				Cermet		Carbide						Shape
		MS6015	MC6115	MC6125	MC6135	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	HT05T	HTi10	TF15	
P	Steel	◕	●	◕	✣	◶	❁	○	◶	❁														❁	✣	❁	◕	○	○	◶	○	◶			❁			○	
M	Stainless steel										◕	●	◕	✣	○	✣				◕			◶	❁	✣	❁		○	○		○				❁				
K	Cast iron																◕	◕	✣				◶	❁				○	○		○				❁	○	◶	○	
N	Non-ferrous metal																																				◶	○	
S	Heat resistant alloy, Titanium alloy																			◕	●	◕	✣	◶	❁								●	◕			◶		
Order number	**RE**																																						
VCMT080202-FP	0.2		●	●	●																																	FP
VCMT080204-FP	0.4		●	●	●																																	
																																						 Finish cutting
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					
Order number	RE	MS6015	MC6115	MC6125	MC6135	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	HT105T	HTi10	TF15	Shape
VCET080202MR-SRF	0.2*2																			●																		R/L-SRF
VCET080202ML-SRF	0.2*2																			●																		
VCET080204MR-SRF	0.4*2																			●																		
VCET080204ML-SRF	0.4*2																			●																		
VCET110301MR-SRF	0.1*2																			●																		
VCET110301ML-SRF	0.1*2																			●																		
VCET110302MR-SRF	0.2*2																			●																		
VCET110302ML-SRF	0.2*2																			●																		
VCET110304MR-SRF	0.4*2																			●																		
VCET110304ML-SRF	0.4*2																			●																		Finish cutting
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

2/2

*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.

WC TYPE INSERTS

80° WITH HOLE

		Coated																						Coated Cermet				Cermet		Carbide					
		MS6015	MC6115	MC6125	MC6135	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	MC6135	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

1/2

*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 WITH HOLE

		Coated																						Coated Cermet				Cermet		Carbide					
		MS6015	MC6115	MC6125	MC6135	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
VPET1103V3R-SRF	0.03	R/L-SRF
VPET1103V3L-SRF	0.03	
		
		Finish cutting
VPET080201MR-SRF	0.1*2	R/L-SRF
VPET080201ML-SRF	0.1*2	
VPET080202MR-SRF	0.2*2	
VPET080202ML-SRF	0.2*2	
VPET110301MR-SRF	0.1*2	
VPET110301ML-SRF	0.1*2	
VPET110302MR-SRF	0.2*2	
VPET110302ML-SRF	0.2*2	Finish cutting

2/2

*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					Shape
Order number	RE	MS6015	MC6115	MC6125	MC6135	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	
TPMR110304-LM	0.4											●													●													LM
TPMR110308-LM	0.8											●													●													
TPMR160304-LM	0.4											●													●													
TPMR160308-LM	0.8											●													●													
																																						Light cutting
TPMR110304-MM	0.4											●													●													MM
TPMR110308-MM	0.8											●													●													
TPMR160304-MM	0.4											●													●													
TPMR160308-MM	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.

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

General Catalogue

RECOMMENDED CUTTING CONDITIONS

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

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

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

RECOMMENDED CUTTING CONDITIONS

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

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

1/1

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

RECOMMENDED CUTTING CONDITIONS

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

	Material	Properties	Cutting mode	Grade	Vc
K	Gray cast iron	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

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

	Material	Properties	Cutting mode	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

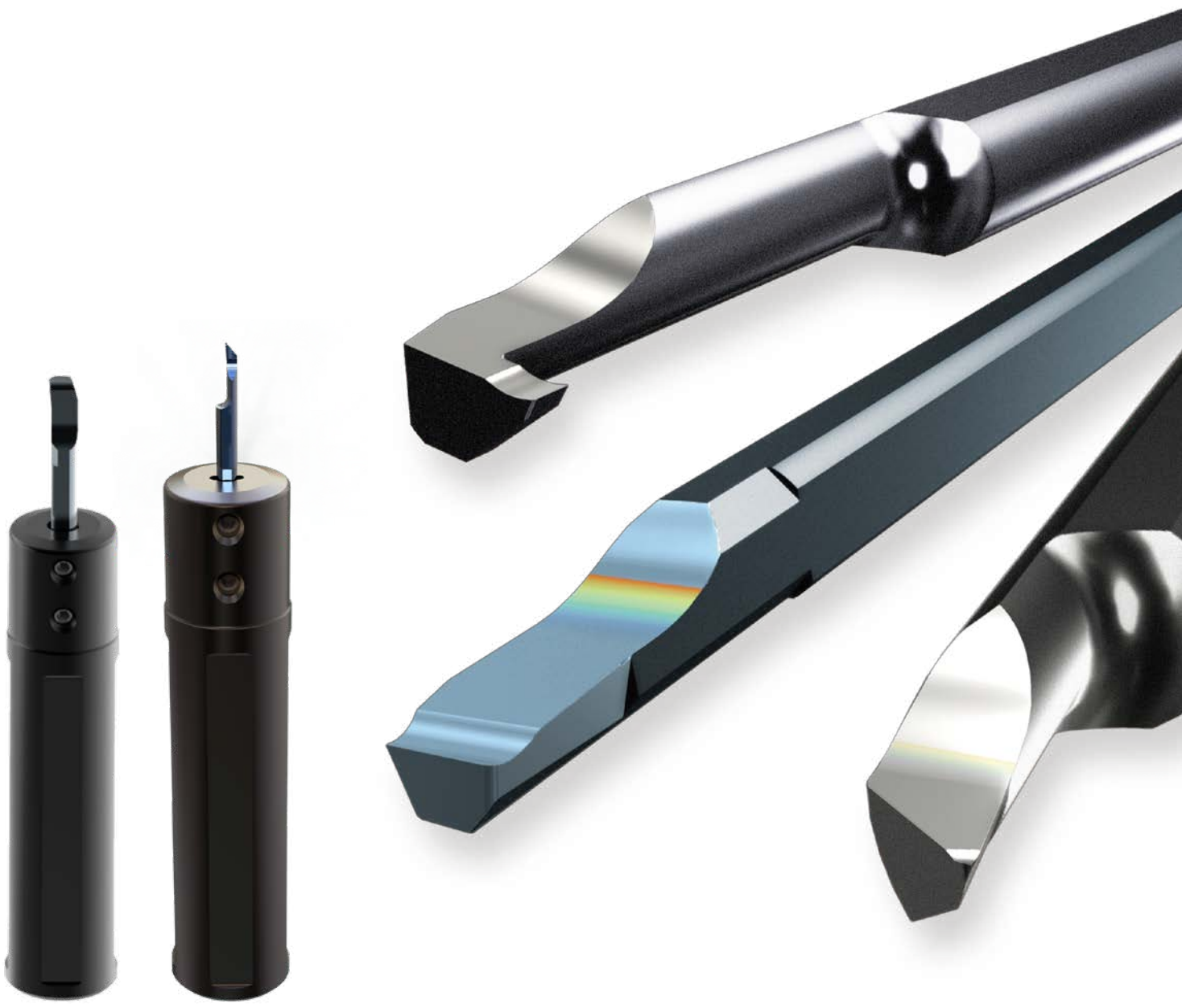
1/1

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

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

MICRO-MINI TWIN

BORING BAR FOR HIGH PRECISION AND SMALL PARTS MACHINING



Interested in more...

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MITSUBISHI MATERIALS

MICRO-MINI TWIN

IDEAL FOR SMALL-DIAMETER BORING OF STEELS AND STAINLESS STEEL

ECONOMICAL, SOLID SHANK TYPE WITH TWO CUTTING EDGES

A cutting edge on each end provides reduced tooling costs.

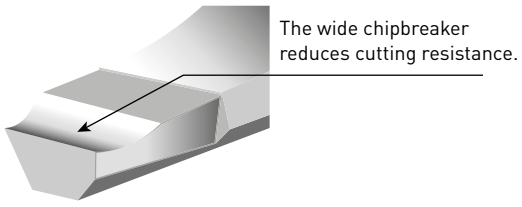
MULTI PURPOSE BORING BAR
The multi-functionality of the MICRO-MINI TWIN enables a wide application range that covers boring, grooving and threading and is available with or without a chipbreaker.

MINIMUM CUTTING DIAMETER:

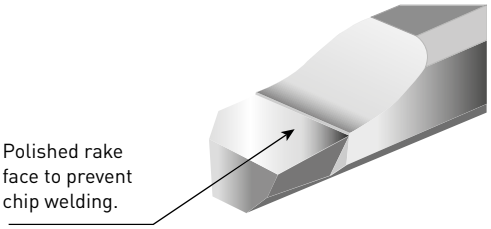
Boring:	Ø 2.2 mm ~
	RE: 0.05, 0.1, 0.15, 0.2
Copying:	Ø 3.5 mm ~
Grooving:	Ø 3 mm ~
Threading:	Ø 3 mm ~

AVAILABLE WITH OR WITHOUT A CHIPBREAKER

With chipbreaker



Without chipbreaker



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

CUTTING PERFORMANCE

POLISHED RAKE FACE

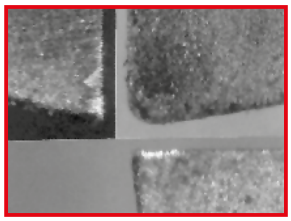
MACHINING OF STAINLESS STEEL

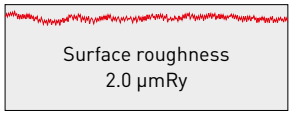
Insert	CB05RS, VP15TF
Material	1.4301 (X5CrNi18-9)
Vc (m/min)	100
fr (mm/rev)	0.02
ap (mm)	0.1
Coolant	Wet cutting

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

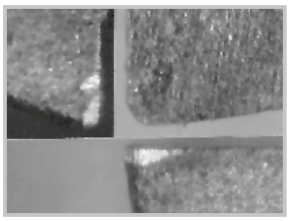
CUTTING EDGE WEAR

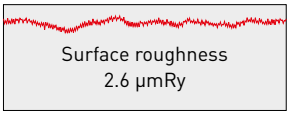
MICRO-MINI TWIN
(Polished rake face)



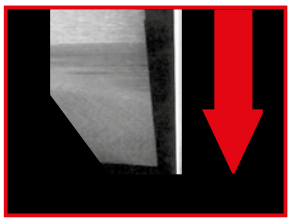


Conventional

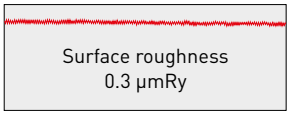




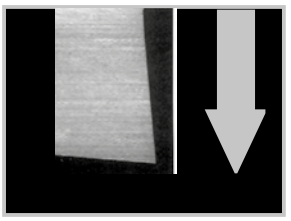
MICRO-MINI TWIN
(Polished rake face)



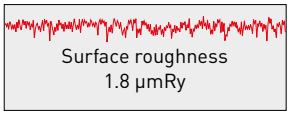
Direction of
measurement



Conventional



Direction of
measurement

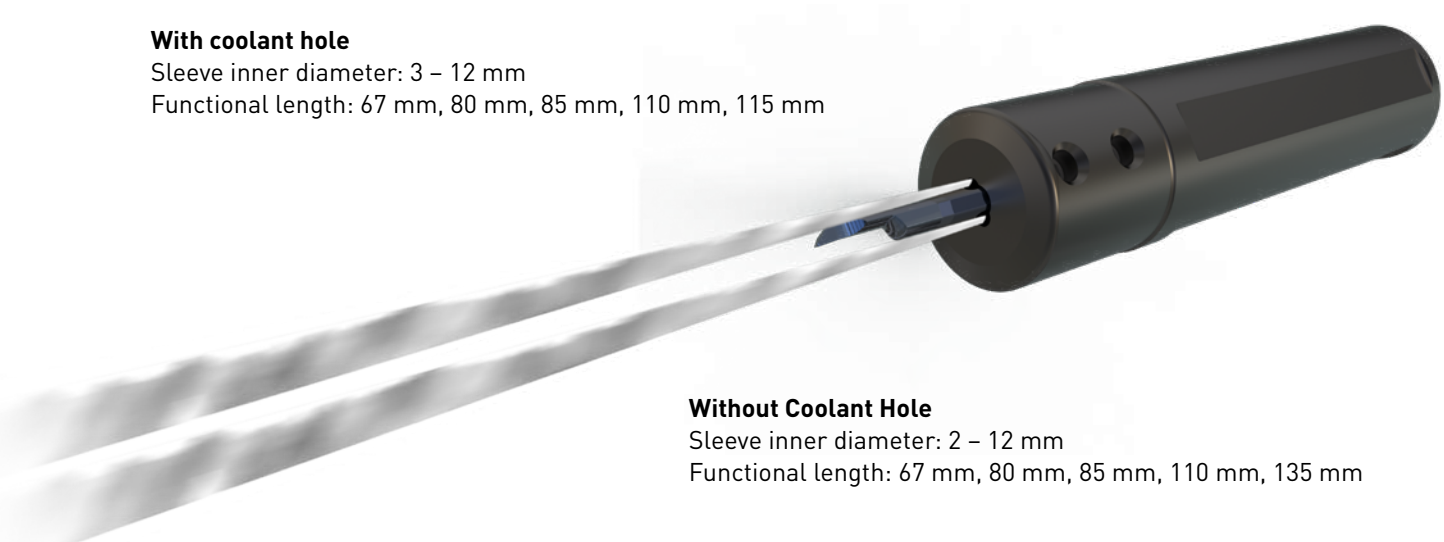


NEW

SLEEVE

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

With coolant hole
Sleeve inner diameter: 3 – 12 mm
Functional length: 67 mm, 80 mm, 85 mm, 110 mm, 115 mm



Without Coolant Hole
Sleeve inner diameter: 2 – 12 mm
Functional length: 67 mm, 80 mm, 85 mm, 110 mm, 135 mm

MS9025

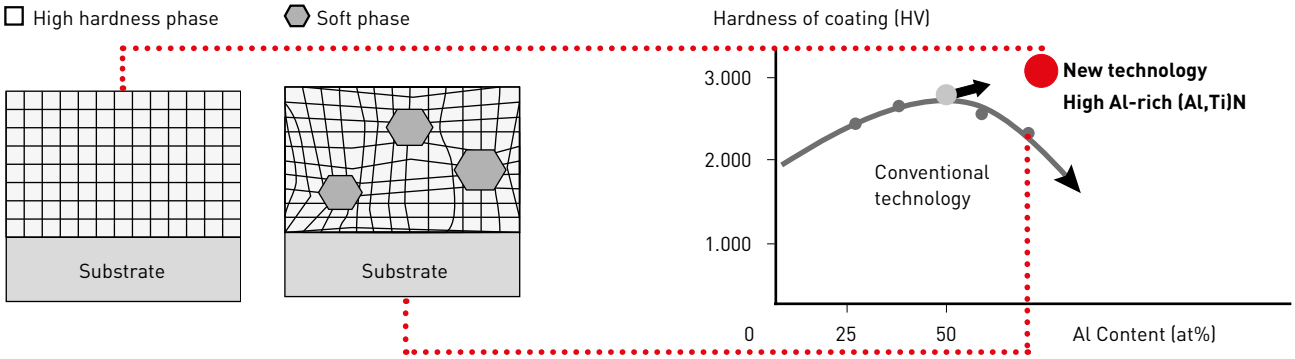
PVD COATED GRADES FOR HIGH PRECISION AND SMALL PARTS MACHINING

Effectively reduces notch wear whilst also providing fracture resistance.

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

HIGH AL AND CONVENTIONAL COATING COMPARISON

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

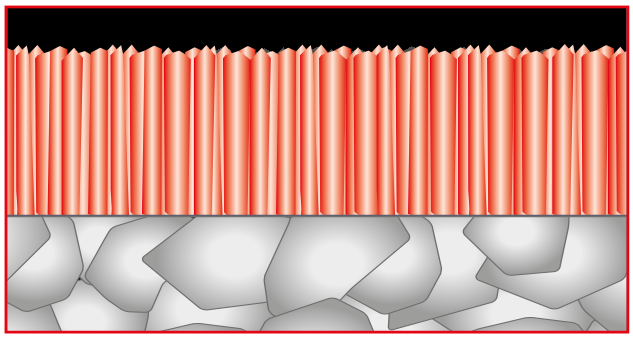


SMOOTH SURFACE OF THE COATING

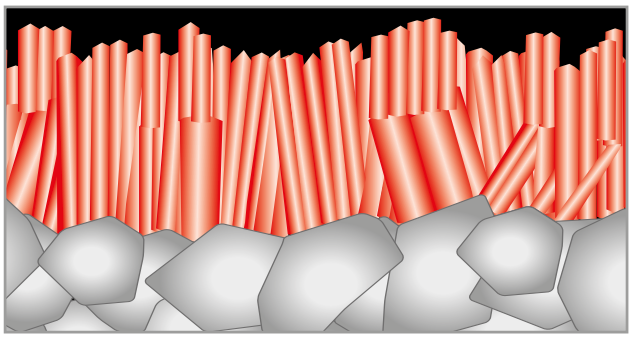
The even surface of the coating has been achieved by first making the carbide substrate smooth then by promoting straight growth of the coating crystals. This leads to excellent welding resistance.

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

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.

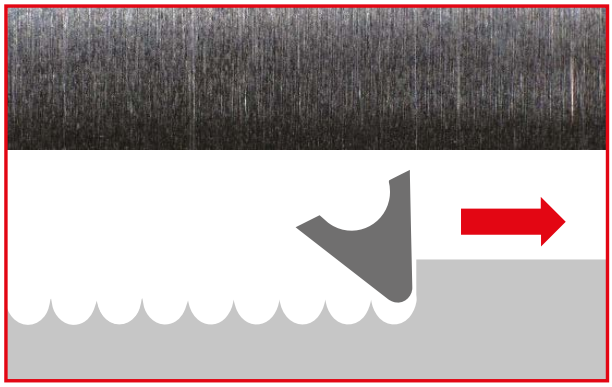
NANO-MULTILAYER COATING

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.

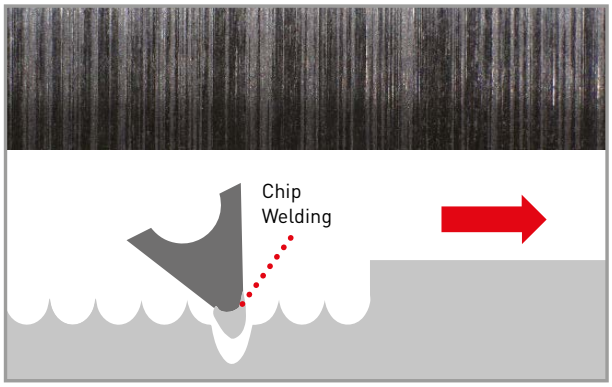
IMPROVED QUALITY OF THE MACHINED SURFACE

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



MS7025



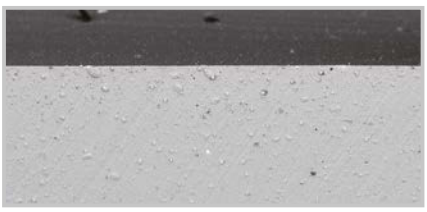
Conventional

IMPROVED MACHINED SURFACE QUALITY

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

MS7025

Enlarged photo of the cutting edge

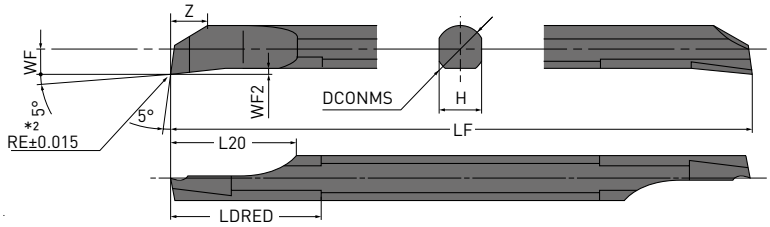


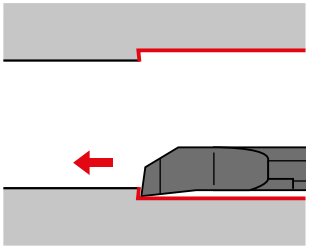
Conventional

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

CB-TYPE

MICRO-MINI TWIN FOR INTERNAL MACHINING





Right hand tool only.

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

1/2

*1 DMIN: Min. Cutting Diameter
*2 The RE dimension represents the size before grinding a chip breaker.
1. (MICRO-MINI TWIN is available in 1 piece in one pack.)

113 Vc

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

CB-TYPE, MICRO-MINI TWIN FOR INTERNAL MACHINING

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

*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.)

113 Vc

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

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.

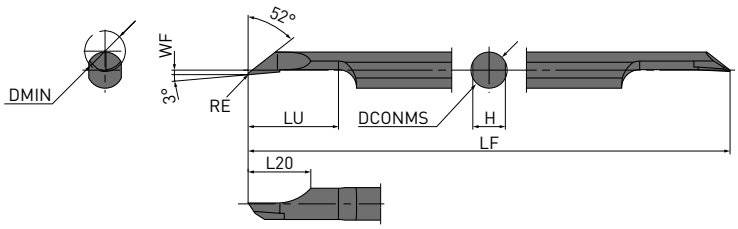
TF15

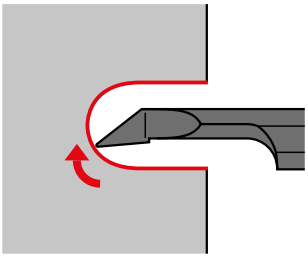
N Non-ferrous metal

- For machining non-ferrous metals.

CR-TYPE

MICRO-MINI TWIN FOR INTERNAL COPYING





Right hand tool only.

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

1/1

114 Vc

RECOMMENDED CUTTING CONDITIONS

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

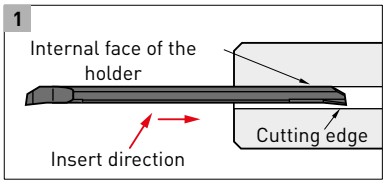
When using a square type holder:

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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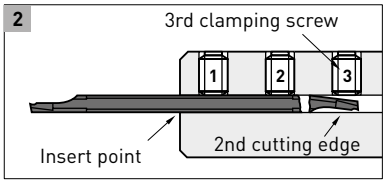

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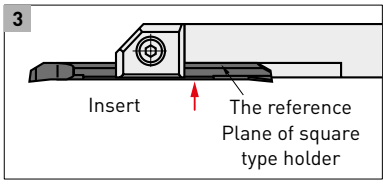


Tighten the clamping screw ensuring the MICRO-MINI TWIN boring bars is in contact with the reference plane of square type holder.

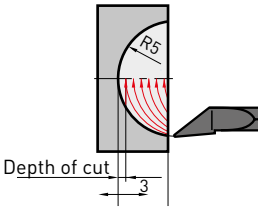
MACHINING METHODS OF THE CR-TYPE

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

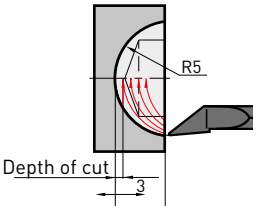
Insert	CR05RS-01B
Workpiece material	C20
Vc (m/min)	80
f (mm/rev)	0.05
ap (mm)	0.05
Coolant	Wet cutting

PROFILE TURNING

Machining a workpiece without a pre-prepared hole

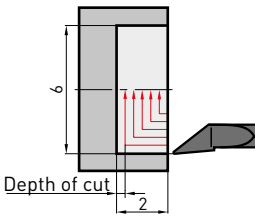


Machining a workpiece with a pre-prepared hole

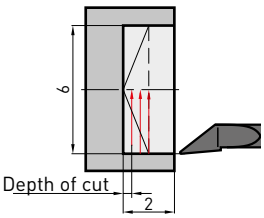


INNER END FACING

Machining a workpiece without a pre-prepared hole

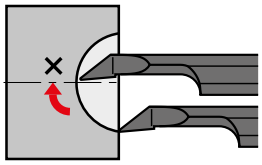


Machining a workpiece with a pre-prepared hole



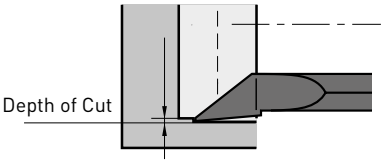
NOTES FOR USE

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.

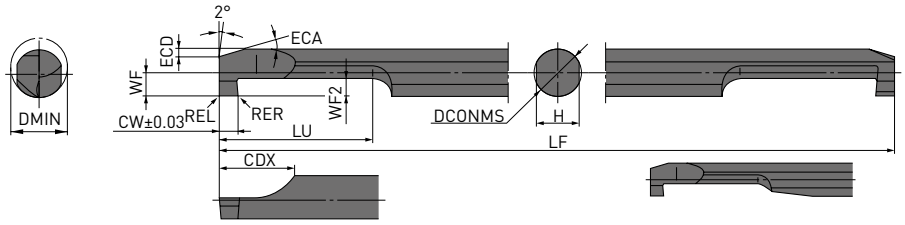
COPYING



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	MS7025	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.

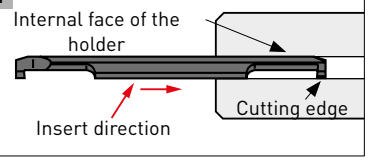
When using a square type holder:

[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.

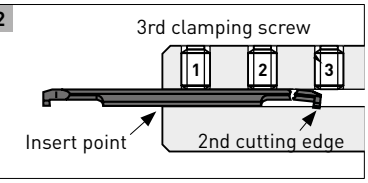
[2] Make sure that the clamping screws are tightened to the recommended values.

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

1



2



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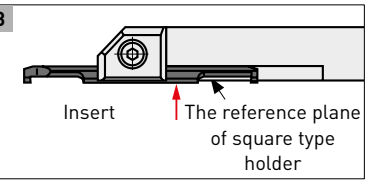
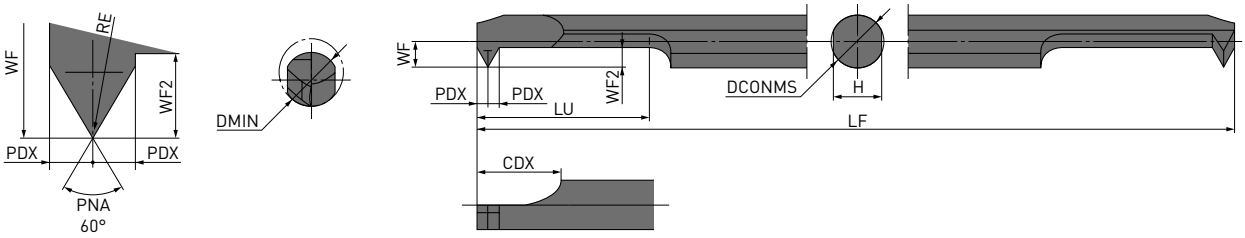


Tighten the clamping screw ensuring making the micro-mini twin boring bars in contact with the reference plane of square type holder.

CT-TYPE

MICRO-MINI TWIN



Order number	MS7025	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
CT035RS-M5B	●	●			with	4.0	0.03	3.5	60	10.4	6.5	1.55	0.7	1.45	3.15
CT0407RS-M6			★	★	without	4.5	0.05	4.0	60	7.6	7.0	1.8	0.8	1.7	3.6
CT04RS-M6			●	●	without	4.5	0.05	4.0	60	15.6	7.0	1.8	0.8	1.7	3.6
CT04RS-M6B	●	●	●	●	with	4.5	0.05	4.0	60	15.6	7.0	1.8	0.8	1.7	3.6
CT045RS-M7B	●	●			with	5.0	0.05	4.5	70	15.8	7.5	2.05	0.9	1.95	4.05
CT0511RS-M8			★	★	without	6.0	0.05	5.0	70	11	8.0	2.3	1.0	2.2	4.5
CT05RS-M8			●	●	without	6.0	0.05	5.0	70	21	8.0	2.3	1.0	2.2	4.5
CT05RS-M8B	●	●	●	●	with	6.0	0.05	5.0	70	21	8.0	2.3	1.0	2.2	4.5
CT0611RS-M10			★	★	without	7.0	0.05	6.0	75	11	8.0	2.8	1.0	2.2	5.4
CT06RS-M10			●	●	without	7.0	0.05	6.0	75	21	8.0	2.8	1.0	2.2	5.4
CT06RS-M10B	●	●	●	●	with	7.0	0.05	6.0	75	21	8.0	2.8	1.0	2.2	5.4

1/1

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

119 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.

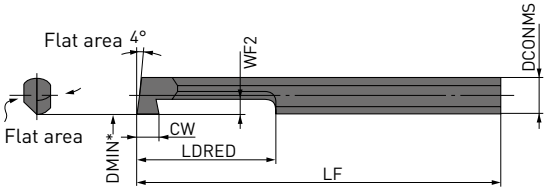
METRIC

	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.)

121 Vc

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

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

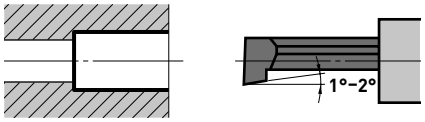
* Cutting edge is not honed. Please hone according to the workpiece before machining.

GRINDING THE CUTTING EDGE OF MICRO-MINI BORING BAR

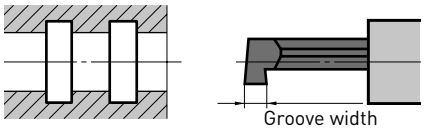
- MICRO-MINI boring bars can be used for boring and grooving without any modifications. It can also be reground as shown below.
- For shaping and regrinding, use a diamond whetstone approximately #250 – #400.
- Please grind according to the application using the figure below as a reference.

APPLICATION

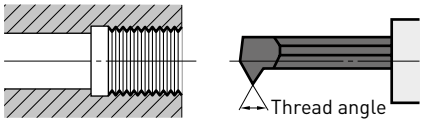
BORING



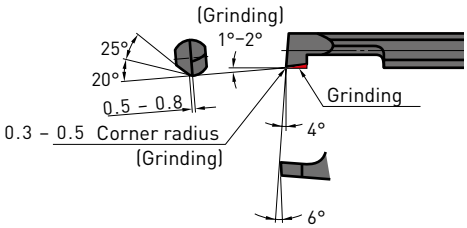
GROOVING

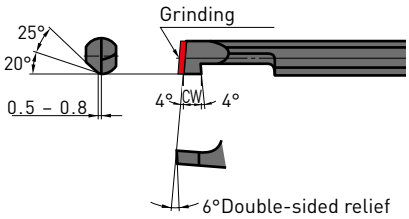


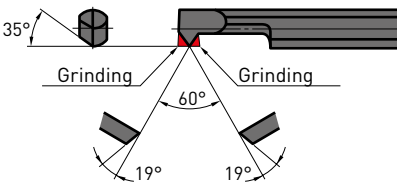
THREADING



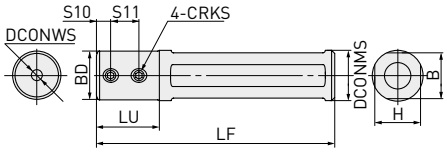
GRINDING EXAMPLES







ROUND TYPE HOLDER



WITHOUT COOLANT HOLE

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

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

ROUND TYPE HOLDER

WITHOUT COOLANT HOLE

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

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

ROUND TYPE HOLDER

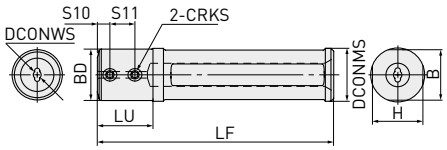
WITHOUT COOLANT HOLE

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

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

NEW

ROUND TYPE HOLDER



WITH COOLANT HOLE

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

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

ROUND TYPE HOLDER

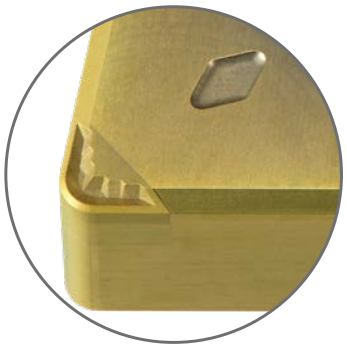
WITH COOLANT HOLE

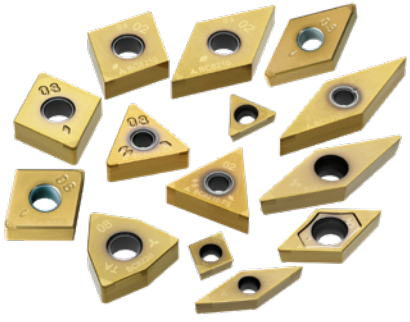
Order number	Stock	DCONMS	DCONWS	BD	LF	LU	H	B	S10	S11
SLV250110045A	●	25.0	4.5	20.0	110	20	23.9	23.9	4.5	9
SLV250110050A	●	25.0	5.0	20.0	110	20	23.9	23.9	4.5	9
SLV250110060A	●	25.0	6.0	20.0	110	20	23.9	23.9	5.0	10
SLV250110070A	●	25.0	7.0	20.0	110	20	23.9	23.9	5.0	10
SLV250110080A	●	25.0	8.0	20.0	110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

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

BC8200 / MB8200 SERIES

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





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B249

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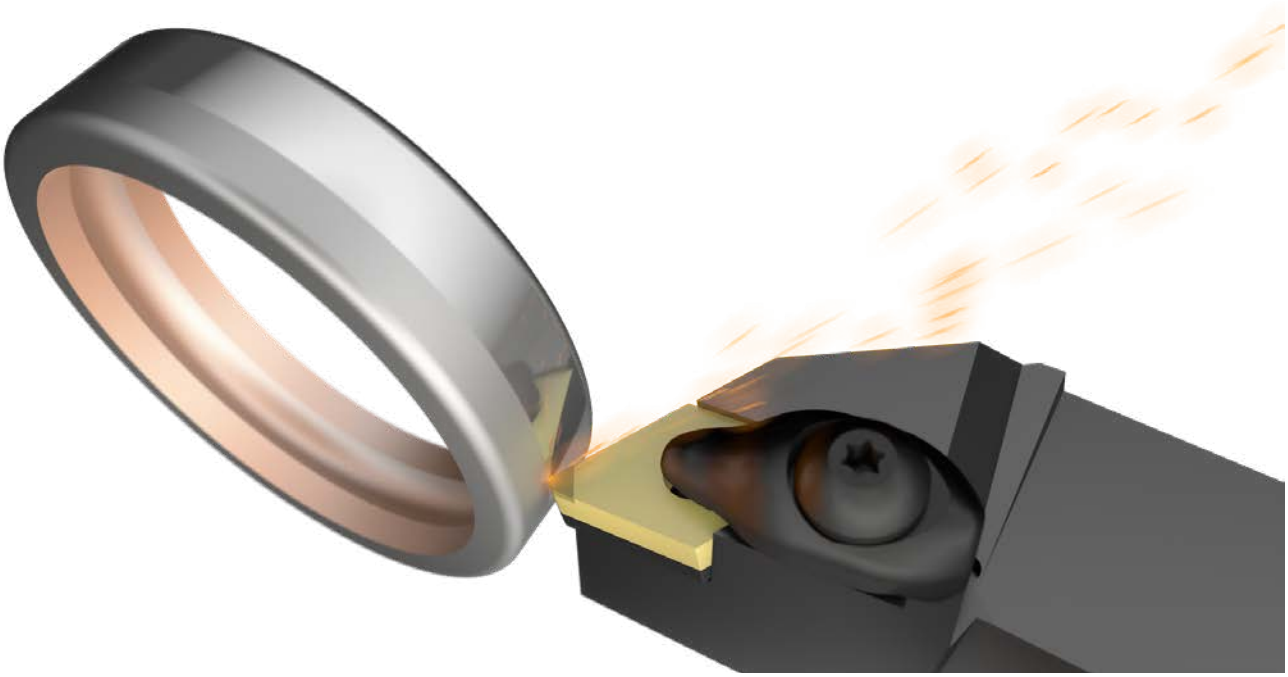
MITSUBISHI MATERIALS

BC8200 SERIES

BC8210

FOR CONTINUOUS AND LIGHT INTERRUPTED CUTTING

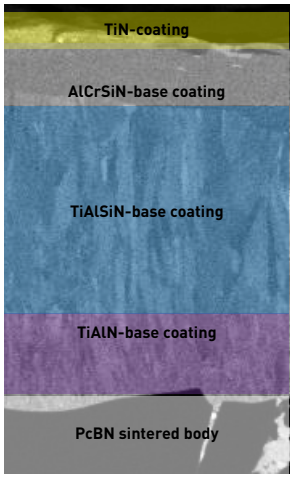


HIGH-SPEED MACHINING WITH OUTSTANDING TOOL LIFE

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

NEW PVD COATING FOR LONG TOOL LIFE

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

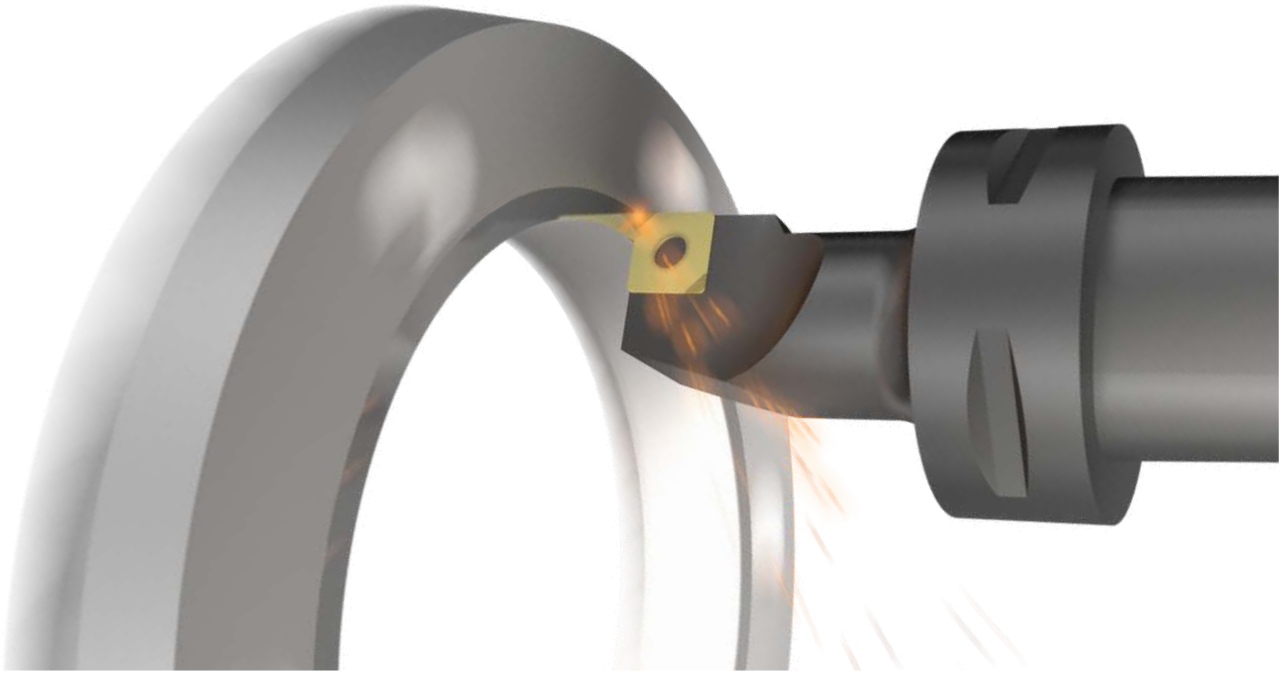


- Gold colour aids easy identification of used edges.
- Strong resistance to chipping absorbs impact forces.
- Excellent wear resistance and abrasion resistant layer.
- Improved strength of adhesion to the PcBN substrate prevents peeling.
- Excellent crater wear and chipping resistance exclusive BC8210 sintered substrate.

BC8200 SERIES

BC8220

FOR GENERAL APPLICATIONS

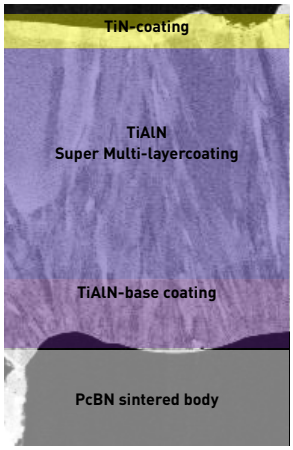


ACHIEVES IMPRESSIVE TOOL LIFE OVER A WIDE RANGE OF CUTTING CONDITIONS

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

NEW PVD COATING WITH IDEAL BALANCE OF WEAR AND CHIPPING RESISTANCE

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



- Gold colour aids easy identification of used edges.
- High wear and chipping resistance.
- Improved strength of the adhesion to the PcBN substrate prevents peeling.
- Excellent crater wear and chipping resistance. Exclusive BC8220 sintered body.

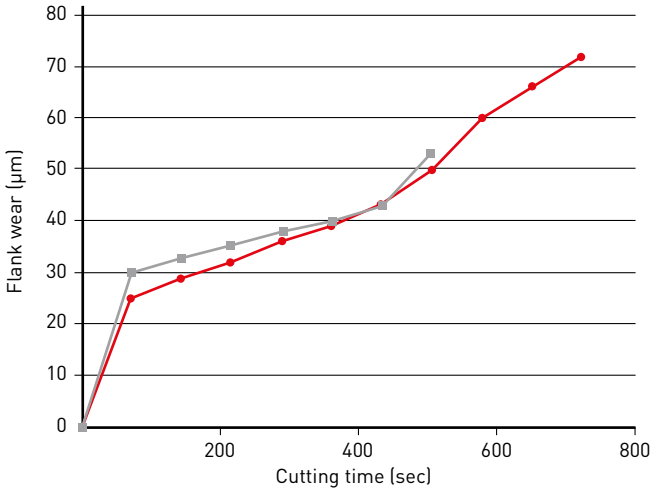
BC8210

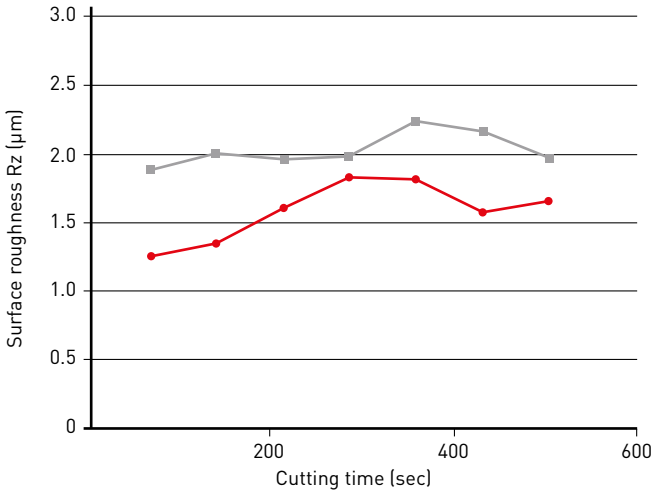
CUTTING PERFORMANCE

COMPARISON OF CONTINUOUS CUTTING

BC8210 reduces flank wear and maintains good surface finishes.

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





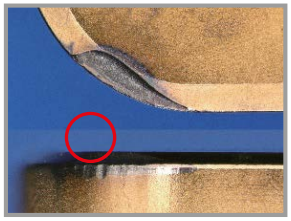
COMPARISON OF LIGHT INTERRUPTED CUTTING

BC8210 provides excellent chipping resistance.

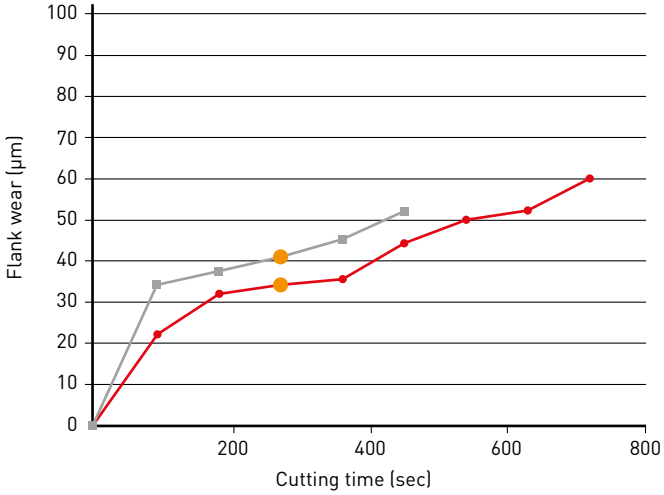
Insert	NP-CNGA120408VA2 BC8210
Material	DIN 20Cr4
Vc (m/min)	160
f (mm/rev)	0.1
ap (mm)	0.2
Cutting mode	Dry cutting

CHIPPING AFTER MACHINING 360 SECONDS

BC8210



Conventional



BC8220

CUTTING PERFORMANCE

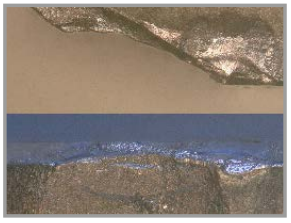
COMPARISON OF FRACTURE RESISTANCE DURING MEDIUM INTERRUPTED CUTTING

BC8220 has excellent chipping and fracture resistance.

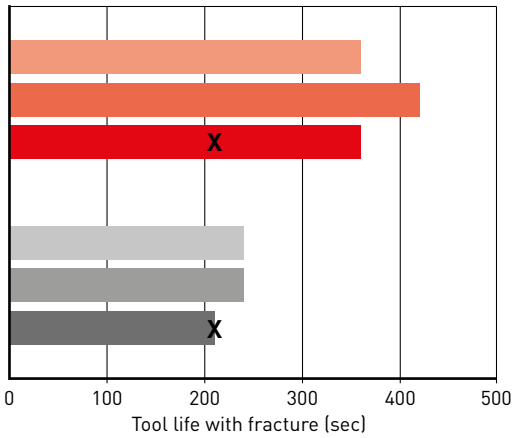
Insert	NP-CNGA120408VA2 BC8220
Material	DIN 20Cr4
Vc (m/min)	250
f (mm/rev)	0.15
ap (mm)	0.1
Cutting mode	Dry cutting

FRACTURE AFTER MACHINING 210 SECONDS

BC8220



Conventional



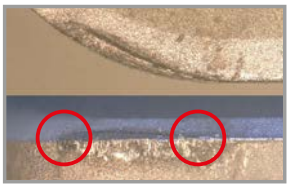
COMPARISON OF FRACTURE RESISTANCE DURING HEAVY INTERRUPTED CUTTING

BC8220 has improved chipping resistance when compared to conventional products.

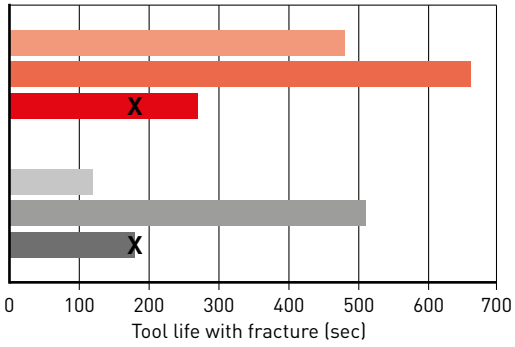
Insert	NP-CNGA120408VA2 BC8220
Material	DIN 20Cr4
Vc (m/min)	200
f (mm/rev)	0.05
ap (mm)	0.1
Cutting mode	Wet cutting

CHIPPING AFTER MACHINING 180 SECONDS

BC8220

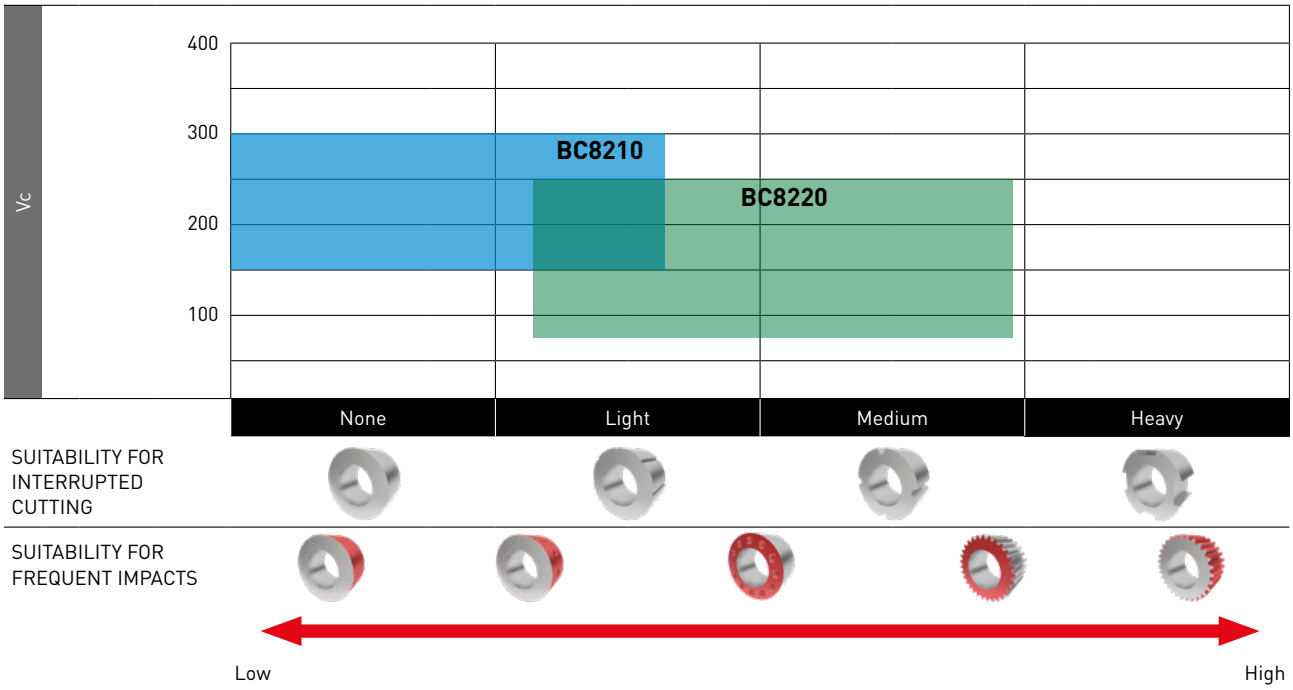


Conventional



BC8200 SERIES

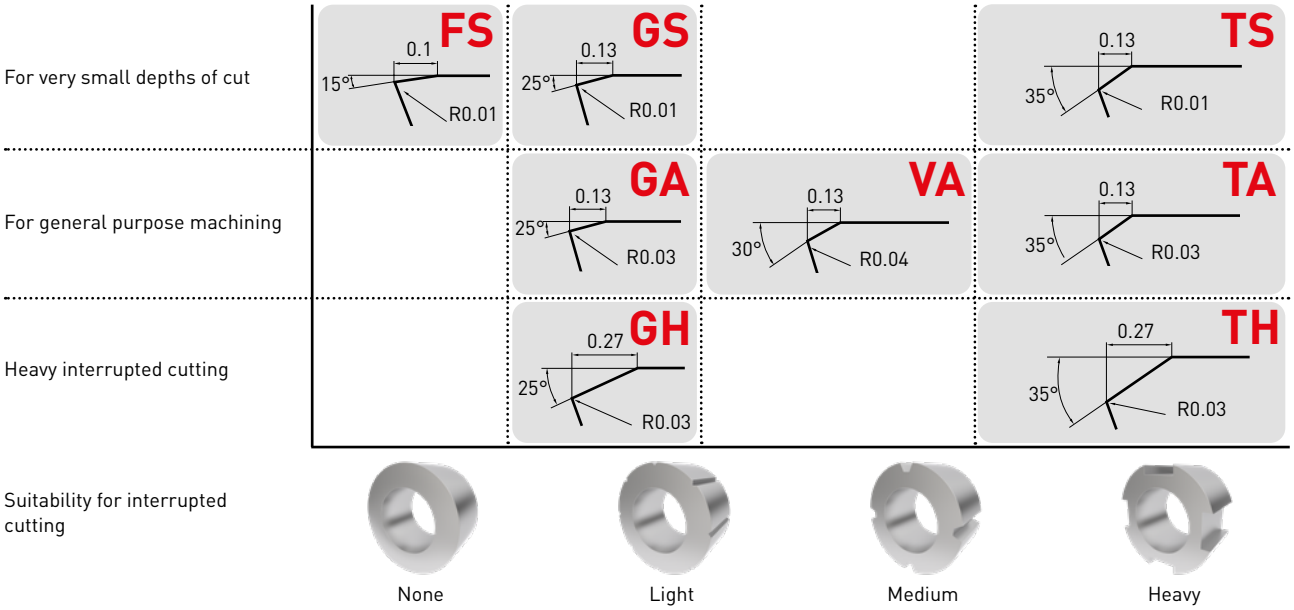
BC8200 COATED PCBN SERIES



BC8200 SERIES

EDGE PREPARATION (HONING)

A wide variety of cutting edge preparations are available for all applications.
VA honing type with improved facture resistance for high speeds and feeds.



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

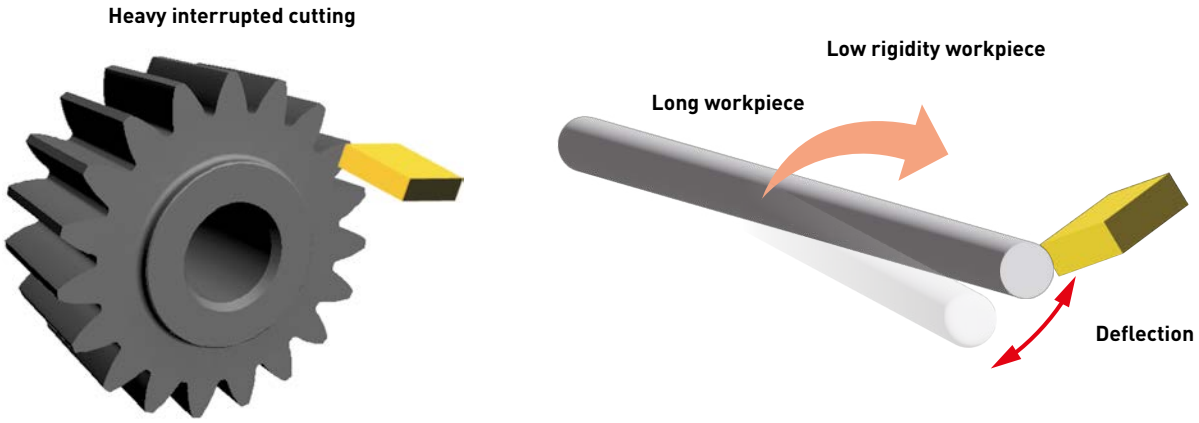
NEW

MB8200 SERIES

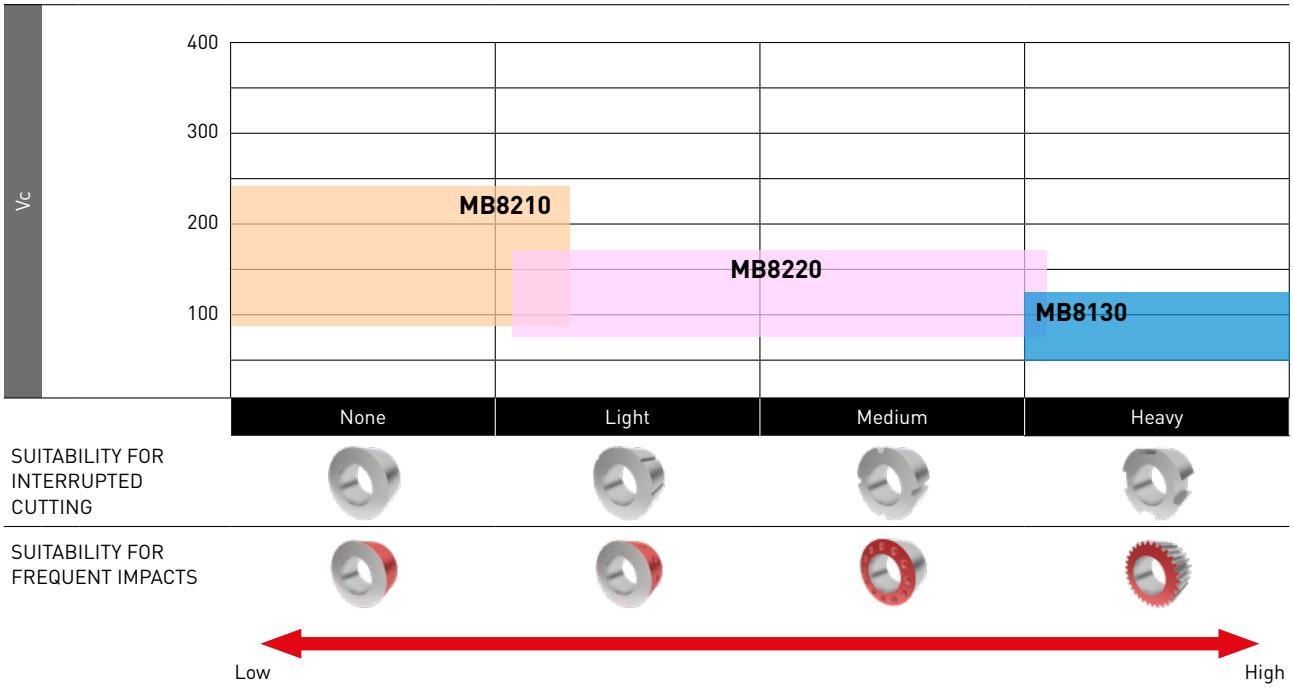
UNCOATED PCBN GRADE FOR TURNING HARDENED STEEL

DISPLAYS EXCELLENT CUTTING PERFORMANCE DURING MEDIUM INTERRUPTED MACHINING

RECOMMENDED MACHINING



RECOMMENDED APPLICATION AREA



MB8210

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

MB8220

Displays excellent cutting performance during medium interrupted machining.

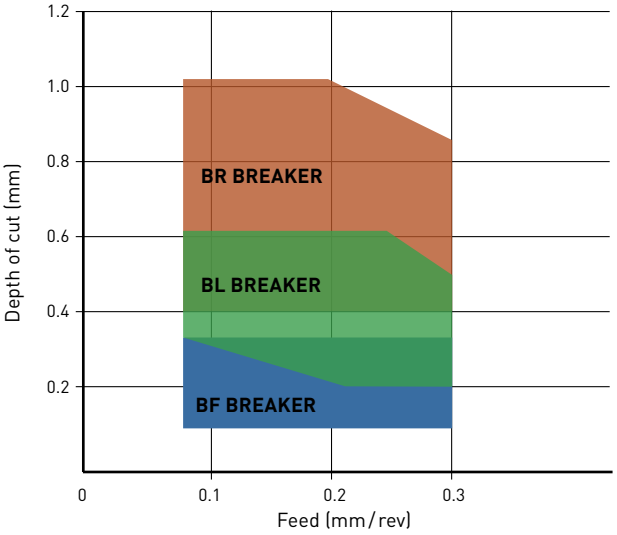
NEW

BC8200 SERIES

FEATURES OF THE INSERT

CHIPBREAKER

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



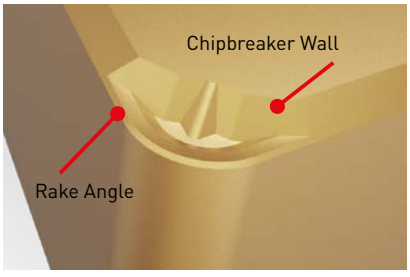
Breaker system for excellent chip control when finishing, removing carburized layers, high load machining and for hard-soft machining.

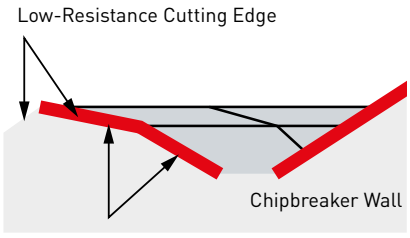
BL BREAKER (BC8220)

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

Cutting Performance

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

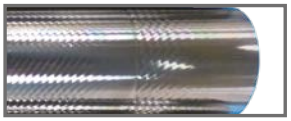




2 Step Rake Angle

CONDITION OF THE FINISHED SURFACE

BL



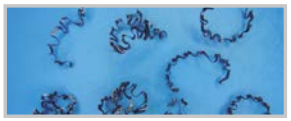
Conventional A

Conventional B

CHIP SHAPE

BL

Conventional A



Conventional B

BC8200 SERIES

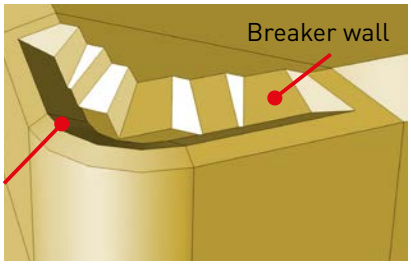
FEATURES OF THE INSERT

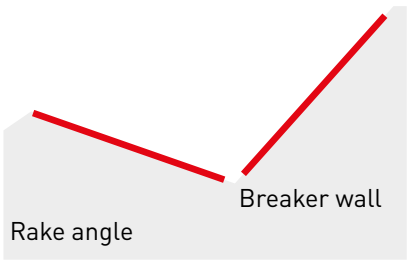
BR BREAKER (BC8220)

A reduced number of passes needed and improved chip control during high depths of cut.
Chips are formed with the effect from the rake angle and the multi stage breaker wall supports a wide range of cuts.

Recommended cutting conditions:

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



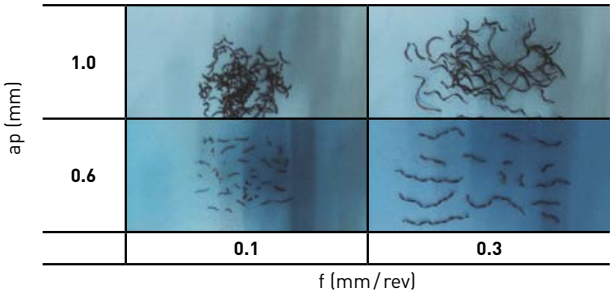


Rake angle

Achieves ideal chip control even at high depths of cut.

Cutting Performance

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

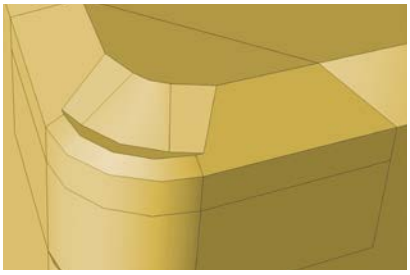


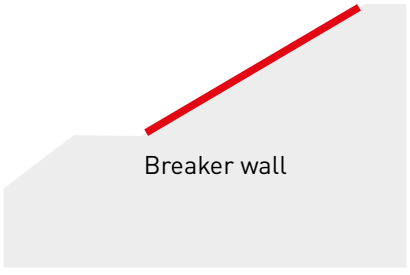
BM BREAKER (BC8220)

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

Recommended cutting conditions:

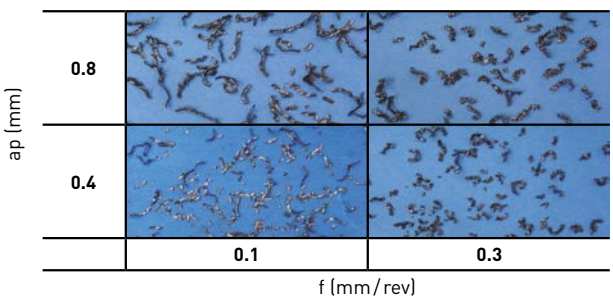
Vc (m/min)	80 – 200
f (mm/rev)	<0.3
ap (mm)	0.3 – 0.8





Cutting Performance

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



BC8200 SERIES

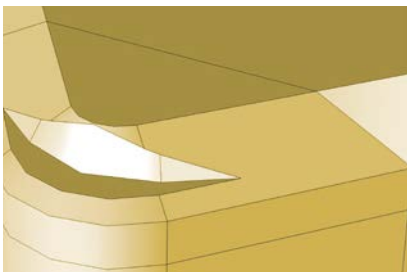
FEATURES OF THE INSERT

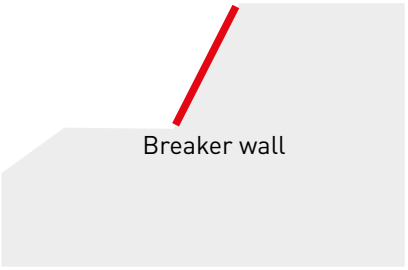
BF BREAKER (BC8210, BC8220)

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

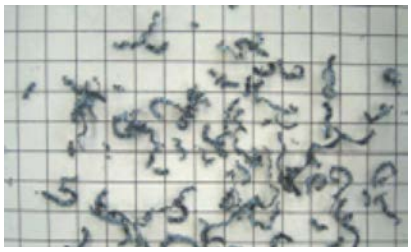
Recommended cutting conditions:

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



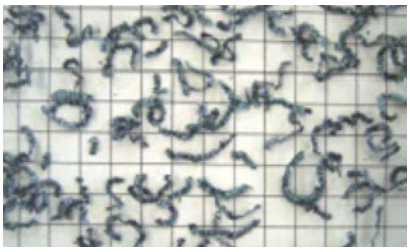


External turning



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

Boring



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

Cutting Performance

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

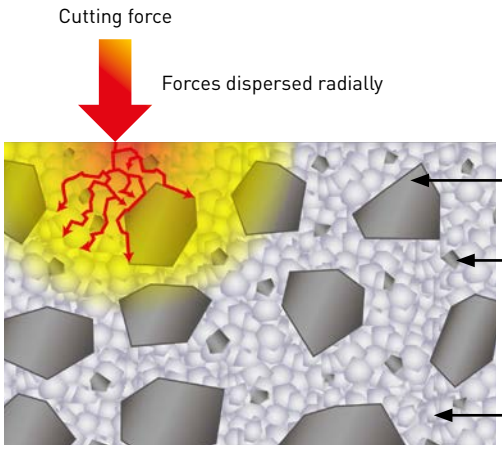
BC8200 / MB8200 SERIES

OPTIMISED SUBSTRATE TECHNOLOGY

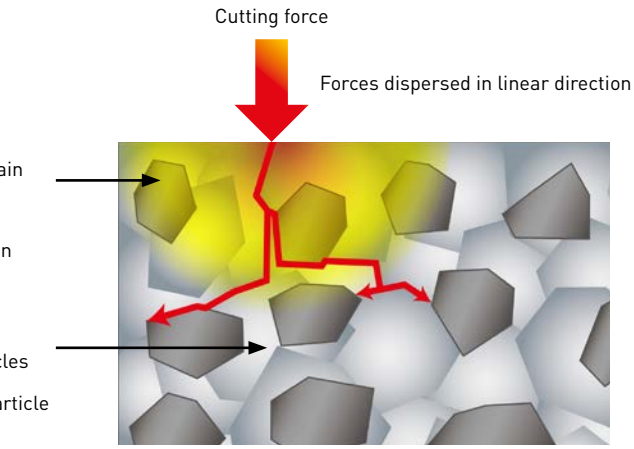
PCBN SUBSTRATE FEATURING TOUGHNESS AND CRATER WEAR RESISTANCE

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

BC8200 / BC8100 SERIES



CONVENTIONAL

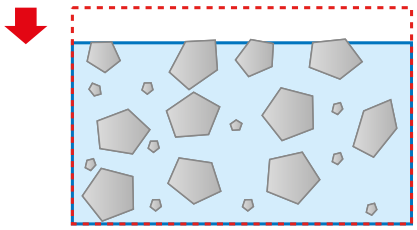


The ultra micro-particle binder for coated and uncoated PcBN inserts prevents linear crack development to avoid sudden fracturing.

POSITIVE EFFECT OF THE NEWLY DEVELOPED, HEAT RESISTANT BINDER

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

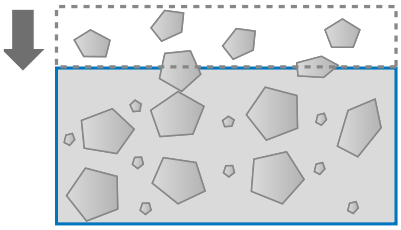
BC8200 / MB8200 SERIES



Reduce crater wear

Suppresses the binder wear caused by cutting heat.

CONVENTIONAL

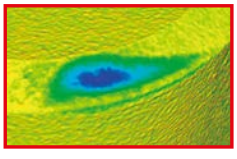


Crater wear progress

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

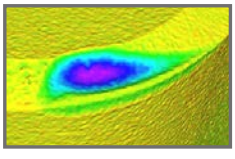
BC8200 / MB8200 SERIES

Small crater wear



CONVENTIONAL

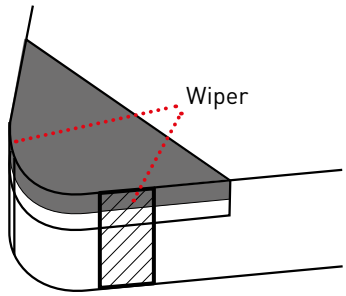
Large crater wear



Crater wear

Small — Large

WIPER INSERT



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

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

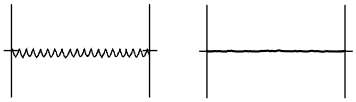
INCREASED TOOL LIFE
When using in high feed conditions, the time required to cut one component is decreased, thus more parts can be machined with each insert. In addition, the high feed rate prevents rubbing which delays the progression of wear, thereby increasing tool life.

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

RECOMMENDED CUTTING CONDITIONS AND PERFORMANCE

HIGH PRECISION FINISHING

Without wiper | **With wiper**



Ry = 3.2 µm | Ry = 1.0 µm

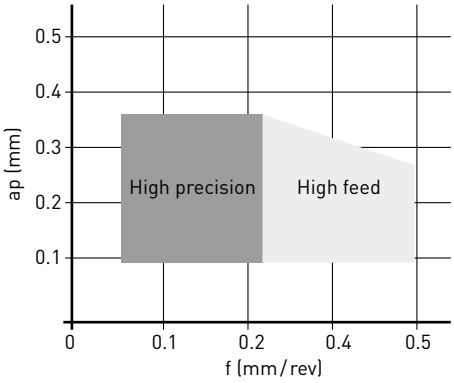
Vc (m/min)	100
f (mm/rev)	0.1
ap (mm)	0.1
Cutting mode	Dry cutting

HIGH FEED MACHINING

Without wiper | **With wiper**

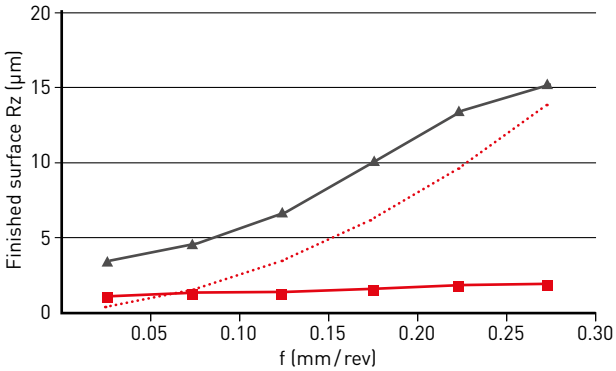
Ry = 12.2 µm | Ry = 1.2 µm

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



CUTTING PERFORMANCE

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

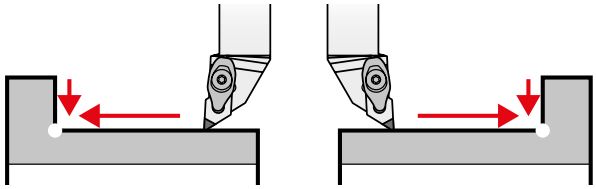


WL-Wiper
No wiper
Theoretical finished surface roughness

COMBINATION OF BF BREAKER AND WS WIPER INSERT

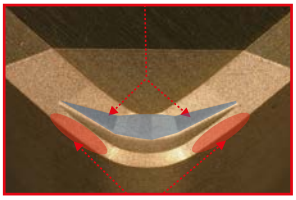
CNGM and DNGM types are now available with new inserts that combine a BF chipbreaker with a WS wiper Insert (BF-○NGM○○○○○○TAWS2). It is effective for chip control and improvement of finished surface roughness without concern about the hand of the tool even during continuous external turning or internal turning and facing.

Effect of chipbreaker and wiper insert



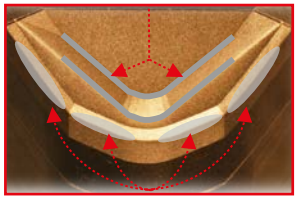
Demonstrates the effects of breaker and wiper Insert in both right handed and left handed cutting.

BF CHIPBREAKER



WS Wiper Insert (Neutral)
BF-CNGM120408TSWS2

BF CHIPBREAKER



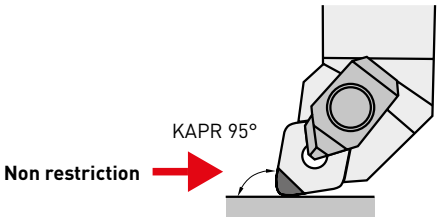
WS Wiper Insert (Neutral)
BF-DNGM150412TAWS2

NOTES FOR USE

WHEN USING A CNGM TYPE

No Restriction for Holders

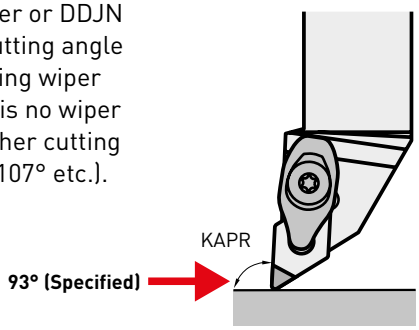
A standard holder can be used.
(*A double clamp, high rigidity tool is recommended.)



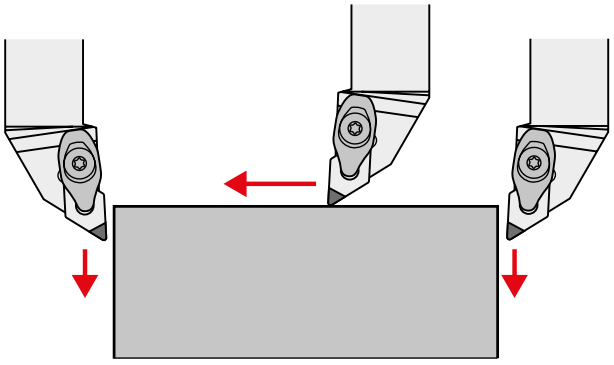
WHEN USING A DNGM TYPE

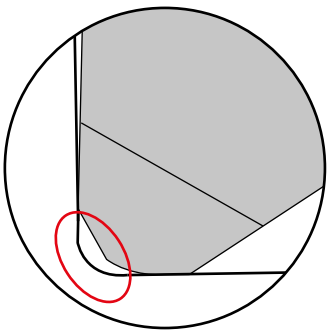
Restriction for Holders

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



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





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

IDENTIFICATION

BF	–	CNGM	120404	TA	WS	2	__
		Insert shape	Insert size			Number of cutting edges	

Insert geometry

BR	For high depth of cut chipbreaker
BL BM	For medium depth of cut chipbreaker
BF	For finish cutting chipbreaker
NP	New petit cut

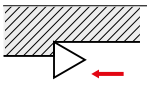
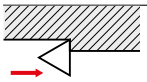
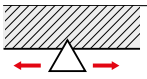
Cutting edge preparation

FS	Continuous cutting
GS GA GH	General cutting
VA	For high speed, High feed cutting
TS TA TH	Interrupted cutting

Wiper

WS	With wiper
No mark	Without wiper

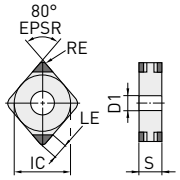
Cutting direction*

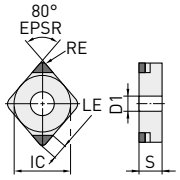
Figure	Symbol
	JR Right
	JL Left
	No mark Neutral

CNGA, CNGM

NEGATIVE INSERTS (WITH HOLE)

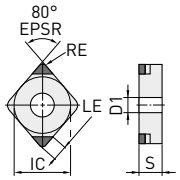
Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-CNGA120404GA4		●			4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GA4		●			4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GA4		●			4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404GS4	●				4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GS4	●				4	12.7	4.76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

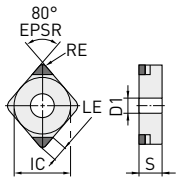




CNGA, CNGM – NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-CNGA120402FS2	★				2	12.7	4.76	0.2	5.16	1.7	
NP-CNGA120404FS2	●	●	●		2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408FS2	●	●	●		2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412FS2	●	●	●		2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404VA2		●			2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408VA2		●			2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412VA2		●			2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404TA2	●	●			2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408TA2	●	●			2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412TA2	●	●			2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404TS2	●	●			2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408TS2	●	●			2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412TS2	●	●			2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120408TH2	●	★			2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412TH2	●	★			2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404FSWS2	●		●		2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408FSWS2	●		●		2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412FSWS2	●		●		2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404GAWS2		●		●	2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GAWS2		●		★	2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GAWS2		●		●	2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404GSWS2	●				2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GSWS2	●				2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GSWS2	●				2	12.7	4.76	1.2	5.16	2.2	
BF-CNGM120408TAWS2		●			2	12.7	4.76	0.8	5.16	2.0	
BF-CNGM120412TAWS2		●			2	12.7	4.76	1.2	5.16	2.2	
BF-CNGM120404TS2	●				2	12.7	4.76	0.4	5.16	1.8	
BF-CNGM120408TS2	●				2	12.7	4.76	0.8	5.16	2.0	
BF-CNGM120412TS2	●				2	12.7	4.76	1.2	5.16	2.2	
BF-CNGM120408TSWS2	●				2	12.7	4.76	0.8	5.16	2.0	
BF-CNGM120412TSWS2	●				2	12.7	4.76	1.2	5.16	2.2	
NEW BL-CNGM120404TN2		●			2	12.7	4.76	0.4	5.16	1.8	
NEW BL-CNGM120408TN2		●			2	12.7	4.76	0.8	5.16	2.0	
NEW BL-CNGM120412TN2		●			2	12.7	4.76	1.2	5.16	2.2	
BM-CNGM120404TA2		●			2	12.7	4.76	0.4	5.16	1.8	
BM-CNGM120408TA2		●			2	12.7	4.76	0.8	5.16	2.0	
BM-CNGM120412TA2		●			2	12.7	4.76	1.2	5.16	2.2	
BR-CNGM120404TA2		●			2	12.7	4.76	0.4	5.16	1.8	
BR-CNGM120408TA2		●			2	12.7	4.76	0.8	5.16	2.0	
BR-CNGM120412TA2		●			2	12.7	4.76	1.2	5.16	2.2	





157 Vc

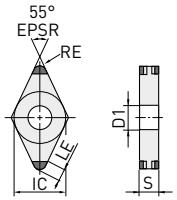
● / ★ = Expansion

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

DNGA, DNGM

NEGATIVE INSERTS (WITH HOLE)

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

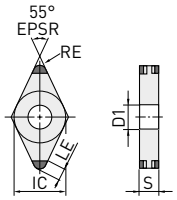


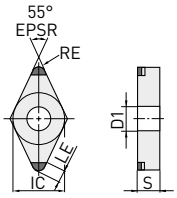
● / ★ = Expansion

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

DNGA, DNGM – NEGATIVE INSERTS (WITH HOLE)

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





● / ★ = Expansion

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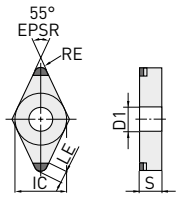
DNGA, DNGM – NEGATIVE INSERTS (WITH HOLE)

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



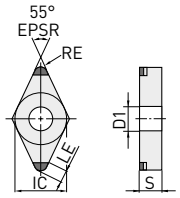
157 Vc

● / ★ = Expansion

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

DNGA, DNGM – NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
BF-DNGM150408TAWS2		●			2	12.7	4.76	0.8	5.16	2.4	
BF-DNGM150412TAWS2		●			2	12.7	4.76	1.2	5.16	2.6	
BF-DNGM150404TS2	★				2	12.7	4.76	0.4	5.16	2.1	
BF-DNGM150408TS2	★				2	12.7	4.76	0.8	5.16	2.0	
BF-DNGM150412TS2	★				2	12.7	4.76	1.2	5.16	1.8	
BF-DNGM150408TSWS2	★				2	12.7	4.76	0.8	5.16	2.4	
BF-DNGM150412TSWS2	★				2	12.7	4.76	1.2	5.16	2.6	
NEW BL-DNGM150404TN2		●			2	12.7	4.76	0.4	5.16	2.1	
NEW BL-DNGM150408TN2		●			2	12.7	4.76	0.8	5.16	2.0	
NEW BL-DNGM150412TN2		●			2	12.7	4.76	1.2	5.16	1.8	
BM-DNGM150404TA2		★			2	12.7	4.76	0.4	5.16	2.1	
BM-DNGM150408TA2		★			2	12.7	4.76	0.8	5.16	2.0	
BM-DNGM150412TA2		★			2	12.7	4.76	1.2	5.16	1.8	
BR-DNGM150404TA2		●			2	12.7	4.76	0.4	5.16	2.1	
BR-DNGM150408TA2		★			2	12.7	4.76	0.8	5.16	2.0	
BR-DNGM150412TA2		★			2	12.7	4.76	1.2	5.16	1.8	
BR-DNGM150604TA2		●			2	12.7	6.35	0.4	5.16	2.1	
BR-DNGM150608TA2		●			2	12.7	6.35	0.8	5.16	2.0	
BR-DNGM150612TA2		●			2	12.7	6.35	1.2	5.16	1.8	



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157 Vc

● / ★ = Expansion

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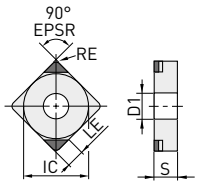
SNGA

NEGATIVE INSERTS (WITH HOLE)

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

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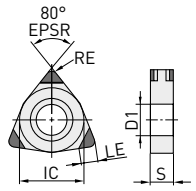
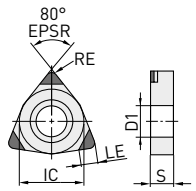
WNGA

NEGATIVE INSERTS (WITH HOLE)

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

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● / ★ = Expansion

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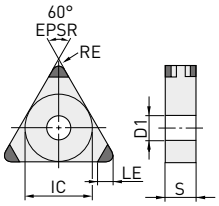
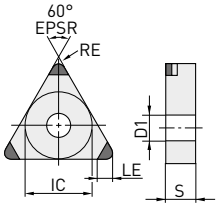
TNGA, TNGM

NEGATIVE INSERTS (WITH HOLE)

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





● / ★ = Expansion

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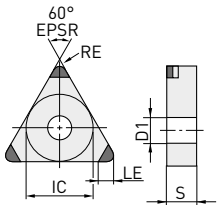
TNGA, TNGM – NEGATIVE INSERTS (WITH HOLE)

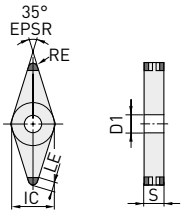
Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-TNGA160404VA3		★			3	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408VA3		●			3	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412VA3		★			3	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160404TA3		●			3	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408TA3		●			3	9.525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

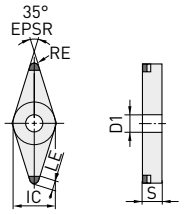


VNGA, VNGM

NEGATIVE INSERTS (WITH HOLE)

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





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157 Vc

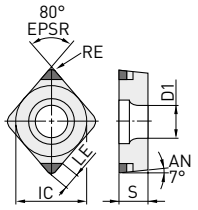
● / ★ = Expansion

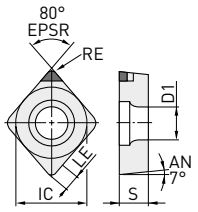
● : Inventory maintained. ★ : Inventory maintained in Japan.

CCGW 7°, CCGT 7°, CPGB 11°

POSITIVE INSERTS (WITH HOLE)

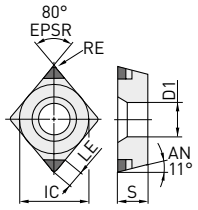
Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-CCGW060202GA2		●			2	6.35	2.38	0.2	2.8	1.7	
NP-CCGW060204GA2		●		●	2	6.35	2.38	0.4	2.8	1.8	
NP-CCGW060208GA2		●		●	2	6.35	2.38	0.8	2.8	2.0	
NP-CCGW09T302GA2		●			2	9.525	3.97	0.2	4.4	1.7	
NP-CCGW09T304GA2	●	●		●	2	9.525	3.97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





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

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



157 Vc

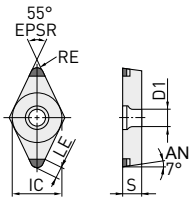
● / ★ = Expansion

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

DCGW 7°, DCGT 7°

POSITIVE INSERTS (WITH HOLE)

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



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157 Vc

● / ★ = Expansion

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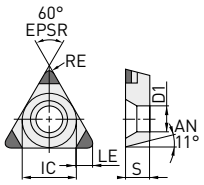
TPGB 11°

POSITIVE INSERTS (WITH HOLE)

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



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157 Vc

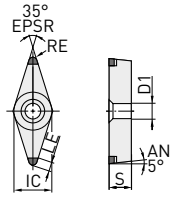
● / ★ = Expansion

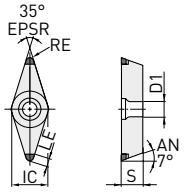
● : Inventory maintained. ★ : Inventory maintained in Japan.

VBGW 5°, VBGT 5°, VCGW 7°

POSITIVE INSERTS (WITH HOLE)

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





1/1

157 Vc

● / ★ = Expansion

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

BC8200 / MB8200 SERIES

RECOMMENDED CUTTING CONDITIONS

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

1/1

NEW

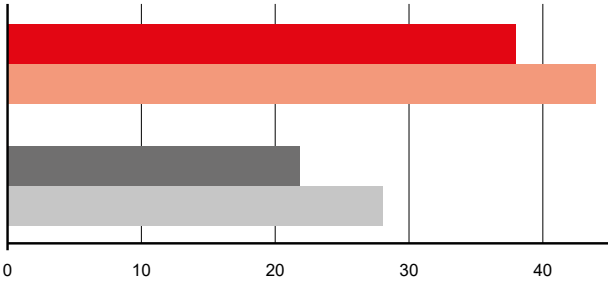
MB8200 SERIES

CUTTING PERFORMANCE

COMPARISON OF CONTINUOUS CUTTING : SCR420 (60HRC)

MB8210 achieves stable machining during continuous cutting.

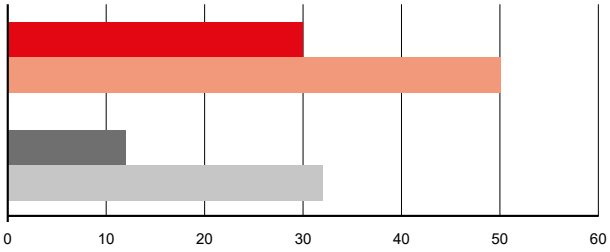
Material	20Cr4 (60HRC)
Insert	CNGA120408
Vc (m/min)	180
f (mm/rev)	0.15
ap (mm)	0.2
Cutting mode	Dry cutting



COMPARISON OF LIGHT INTERRUPTED CUTTING : SCR420 (60HRC)

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

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



RECOMMENDED CUTTING CONDITIONS

	Material	Grade	Cutting mode	Vc	f	ap	Coolant
H	Hardened steels (Heat treated steels)	**MB8210**	External continuous cutting		–0.20	–0.30	Dry, wet
		MB8220	External interrupted cutting		–0.20	–0.50	

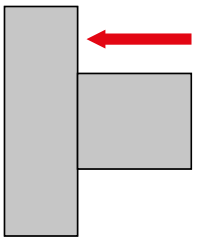
50 100 150 200 250

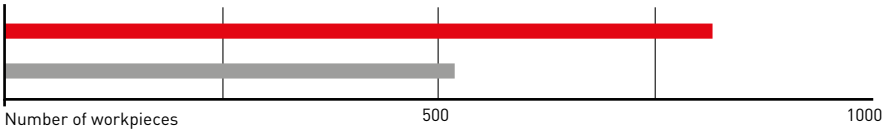
■ : Mitsubishi Materials tool ■ ■ : Conventional tool

BC8200 SERIES

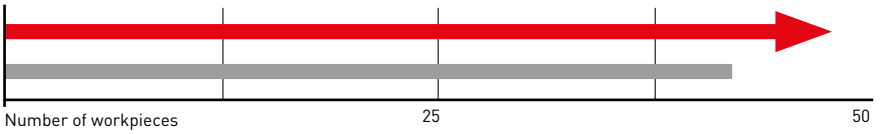
APPLICATION EXAMPLES

Insert	NP-CNGA120412GSWS2 BC8210
Material	Non-micro alloyed Steel
Cutting mode	External continuous cutting
Vc (m/min)	260
f (mm/rev)	0.20
ap (mm)	0.15
Cutting mode	Dry cutting
Result	During continuous cutting, it was possible to maintain a good surface roughness and achieve a tool life of 1.6 X or more when compared to conventional products.

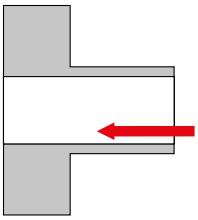


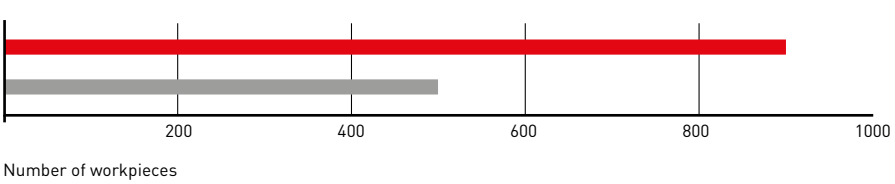


Insert	NP-DCGW11T304GS2 BC8210
Material	DIN 16MnCr5
Cutting mode	Internal continuous cutting
Vc (m/min)	240
f (mm/rev)	0.08
ap (mm)	0.20
Cutting mode	Dry cutting
Result	The same tool life as continuous cutting was achieved. Good surface roughness compared to conventional products was also maintained.



Insert	NP-CCGW09T308GS2 BC8210
Material	DIN 16MnCr5
Component	Automobile parts
Cutting mode	Internal continuous cutting
Vc (m/min)	140
f (mm/rev)	0.07
ap (mm)	0.10
Cutting mode	Dry cutting
Result	By significantly suppressing the deterioration of the surface of the insert, tool life was extended during continuous cutting to 1.8 x longer than that of conventional products.



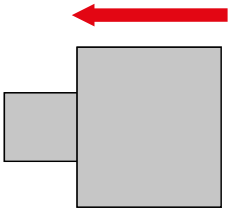


■ : Mitsubishi Materials tool ■ : Conventional tool

BC8200 SERIES

APPLICATION EXAMPLES

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

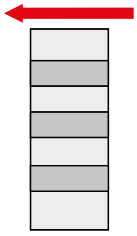


Result

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

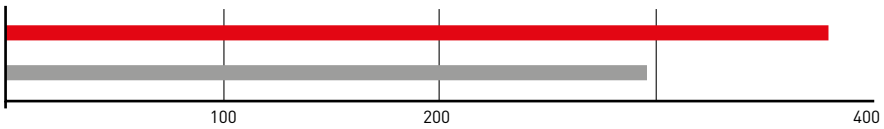
Number of workpieces

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



Result

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



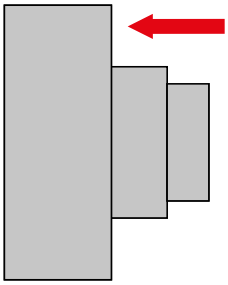
Number of workpieces

■: Mitsubishi Materials tool ■: Conventional tool

BC8200 SERIES

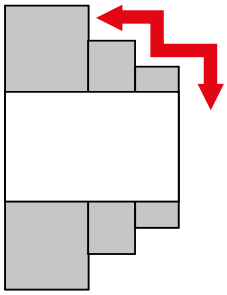
APPLICATION EXAMPLES

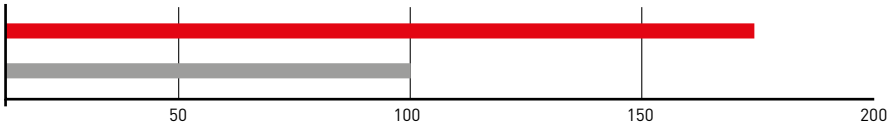
Insert	BR-CNGM120408TA2 BC8220
Material	Steel (62-64HRC)
Component	Gear
Cutting mode	External continuous cutting
Vc (m/min)	150 – 170
f (mm/rev)	0.1 – 0.2
ap (mm)	0.7
Cutting mode	Dry cutting
Result	While conventional products can machine up to 300 pieces, BC8220 can machine up to 450 pieces.



Number of workpieces

Insert	BR-DNGM150408TA2 BC8220
Material	SMnC420 (59-63HRC)
Component	Gear
Cutting mode	External continuous interrupted turning
Vc (m/min)	180
f (mm/rev)	0.03 – 0.13
ap (mm)	1.0 – 1.1
Cutting mode	Dry cutting
Result	The BR breaker removed the required material in one pass compared to a conventional product that took 4 passes. This gave the BR breaker a tool life 1.5 times greater than the conventional product.





Number of workpieces

■ : Mitsubishi Materials tool ■ : Conventional tool

VQ SERIES

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

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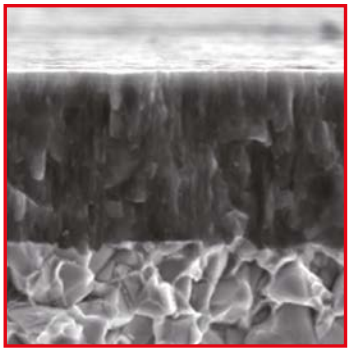
VQ SERIES

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

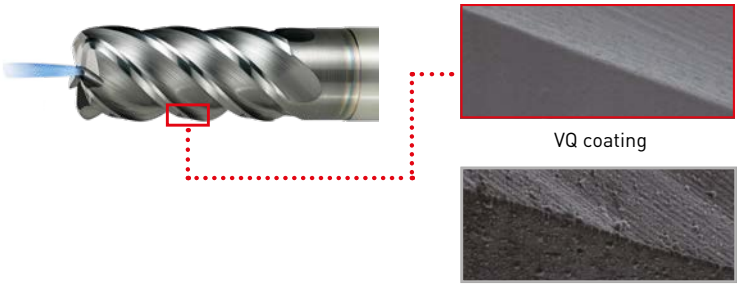


- Smoothened "ZERO-μ Surface".
- Newly developed (Al, Cr)N PVD coating.
- Super-fine-particle, super-hard base material.

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.

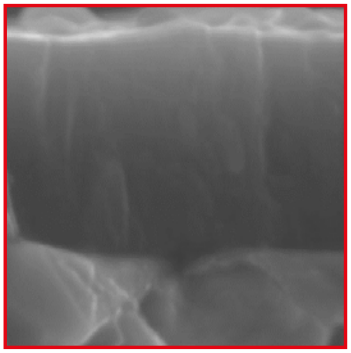


VQ coating

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

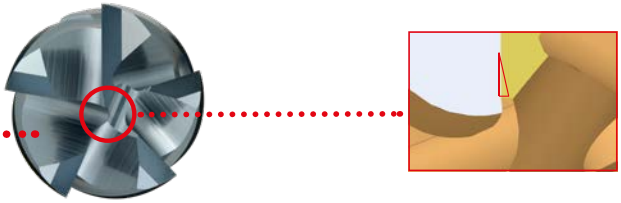
NEW

VQLCS / VQELCS / VQJCSR / VQLCSR / VQELCSR

END MILL WITH IRREGULAR PITCH FLUTES AND CHIPBREAKER GEOMETRY

UNIQUE END CUTTING EDGE GEOMETRY

The unique end cutting edge geometry achieves high chipping resistance.



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

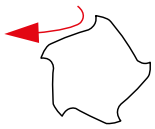
Due to its excellent vibration damping properties, chatter and vibration are suppressed making stable machining possible.

CHIPBREAKER FUNCTION

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

CHIP POCKET GEOMETRY FOR HIGH EFFICIENCY MACHINING

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



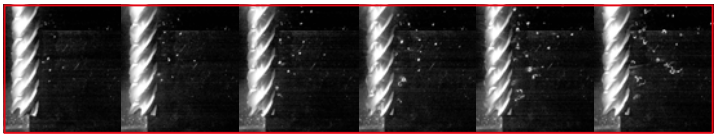
Ideal chip pocket geometry

VQJCS / VQLCS

CHIPBREAKER FUNCTION: HIGH-SPEED CAMERA COMPARISON

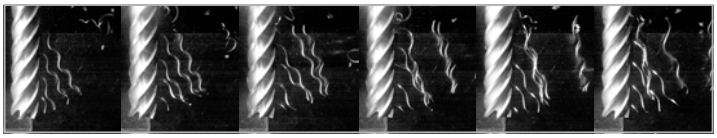
The excellent chip breaking properties reduces chip clogging and removes chips efficiently while also reducing chips collecting together on the machine.

VQLCS



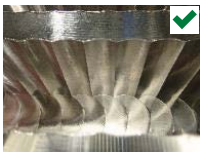
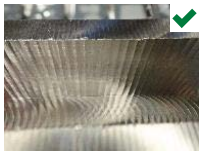
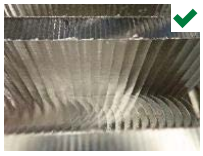
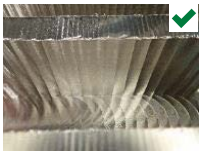
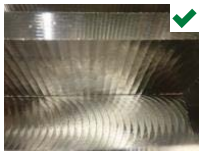
After Machining with VQLCS

Without breaker



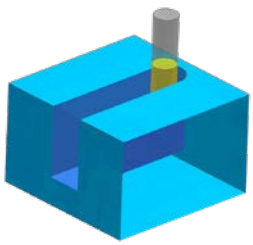
After Machining with conventional

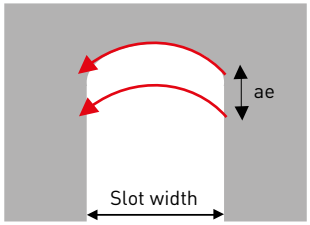
EVALUATION OF TROCHOIDAL MILLING

	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	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)



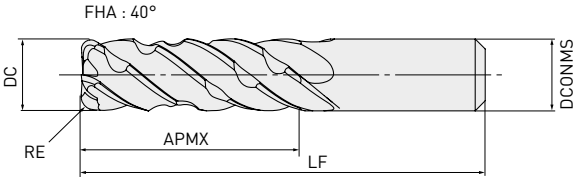


NEW

VQJCSRB

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

P M N S



RE ⩽ 0.3	RE ⩾ 0.5
±0.015	±0.020

DC⩽12	DC>12
0 - 0.030	0 - 0.040

DCONMS = 6	DCONMS = 8, 10	DCONMS = 12	DCONMS = 16	DCONMS = 20
0 -0.005	0 - 0.006	0 - 0.008	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	RE	APMX	LF	DCONMS	ZEFP
VQJCSRBD0600R010	★	6	0.1	18	70	6	5
VQJCSRBD0600R020	★	6	0.2	18	70	6	5
VQJCSRBD0600R030	●	6	0.3	18	70	6	5
VQJCSRBD0600R050	●	6	0.5	18	70	6	5
VQJCSRBD0600R100	●	6	1.0	18	70	6	5
VQJCSRBD0800R020	★	8	0.2	24	80	8	5
VQJCSRBD0800R030	●	8	0.3	24	80	8	5
VQJCSRBD0800R050	●	8	0.5	24	80	8	5
VQJCSRBD0800R100	●	8	1.0	24	80	8	5
VQJCSRBD0800R150	●	8	1.5	24	80	8	5
VQJCSRBD0800R200	★	8	2.0	24	80	8	5
VQJCSRBD1000R020	★	10	0.2	30	90	10	5
VQJCSRBD1000R030	★	10	0.3	30	90	10	5
VQJCSRBD1000R050	●	10	0.5	30	90	10	5
VQJCSRBD1000R100	●	10	1.0	30	90	10	5
VQJCSRBD1000R150	●	10	1.5	30	90	10	5
VQJCSRBD1000R200	●	10	2.0	30	90	10	5

1/2

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

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

NEW

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

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

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.

168 Vc

NEW

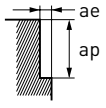
VQJCSRB

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

	Material	DC	Vc	n	Vf	ap	ae	hm	h max
P	Carbon steel, Alloy steel, Mild steel	6	200	10600	1800	18	0.9	0.010	0.019
		8	200	8000	1800	24	1.2	0.013	0.025
		10	200	6400	1700	30	1.5	0.016	0.029
		12	200	5300	1700	36	1.8	0.019	0.035
		16	200	4000	1400	48	2.4	0.020	0.039
		20	200	3200	1200	60	3.0	0.023	0.043
	Pre-hardened 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	0.5	0.006	0.012
		8	120	4800	1000	24	0.6	0.008	0.016
		10	120	3800	900	30	0.8	0.010	0.019
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, Cobalt chromium alloy	6	100	5300	800	18	0.5	0.006	0.012
		8	100	4000	800	24	0.6	0.008	0.016
		10	100	3200	800	30	0.8	0.010	0.019
		12	100	2700	700	36	0.9	0.011	0.021
		16	100	2000	600	48	1.2	0.012	0.023
		20	100	1600	500	60	1.5	0.013	0.026
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	0.30	0.003	0.007
		12	40	1100	100	36	0.36	0.003	0.007
		16	40	800	100	48	0.48	0.004	0.007
		20	40	600	100	60	0.60	0.004	0.007

1/1



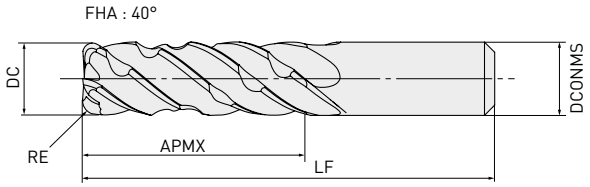
1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work. When measuring the tool length, please use a mechanical contact type or a laser tool setter.
2. The irregular pitch flute end mill has a larger effect on controlling vibration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

NEW

VQLCSRB

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

P M N S



RE ⩽ 0.3	RE ⩾ 0.5
±0.015	±0.020

DC ⩽ 12	DC > 12
0 - 0.030	0 - 0.040

DCONMS = 6	DCONMS = 8, 10	DCONMS = 12	DCONMS = 16	DCONMS = 20
0 -0.005	0 - 0.006	0 - 0.008	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	RE	APMX	LF	DCONMS	ZEFP
VQLCSRBD0600R010	★	6	0.1	24	70	6	5
VQLCSRBD0600R020	★	6	0.2	24	70	6	5
VQLCSRBD0600R030	●	6	0.3	24	70	6	5
VQLCSRBD0600R050	●	6	0.5	24	70	6	5
VQLCSRBD0600R100	●	6	1.0	24	70	6	5
VQLCSRBD0800R020	★	8	0.2	32	90	8	5
VQLCSRBD0800R030	●	8	0.3	32	90	8	5
VQLCSRBD0800R050	●	8	0.5	32	90	8	5
VQLCSRBD0800R100	●	8	1.0	32	90	8	5
VQLCSRBD0800R150	●	8	1.5	32	90	8	5
VQLCSRBD0800R200	★	8	2.0	32	90	8	5
VQLCSRBD1000R020	★	10	0.2	40	100	10	5
VQLCSRBD1000R030	★	10	0.3	40	100	10	5
VQLCSRBD1000R050	●	10	0.5	40	100	10	5
VQLCSRBD1000R100	●	10	1.0	40	100	10	5
VQLCSRBD1000R150	●	10	1.5	40	100	10	5
VQLCSRBD1000R200	●	10	2.0	40	100	10	5

1. 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.

171 Vc

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

NEW

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

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

2/2

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

171 Vc

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

NEW

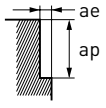
VQLCSRB

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

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

1/1



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.

NEW

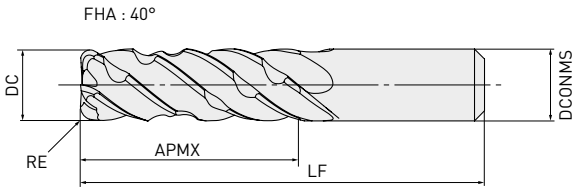
VQELCSRB

40°

RE<0.5 RE≥0.5

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

P M N S



RE ≤ 0.3	RE ≥ 0.5
±0.015	±0.020

DC ≤ 12	DC > 12
0 - 0.030	0 - 0.040

DCONMS = 6	DCONMS = 8, 10	DCONMS = 12	DCONMS = 16	DCONMS = 20
0 -0.005	0 - 0.006	0 - 0.008	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	RE	APMX	LF	DCONMS	ZEFP
VQELCSRBD0600R010	★	6	0.1	30	80	6	5
VQELCSRBD0600R020	★	6	0.2	30	80	6	5
VQELCSRBD0600R030	●	6	0.3	30	80	6	5
VQELCSRBD0600R050	●	6	0.5	30	80	6	5
VQELCSRBD0600R100	●	6	1.0	30	80	6	5
VQELCSRBD0800R020	★	8	0.2	40	100	8	5
VQELCSRBD0800R030	●	8	0.3	40	100	8	5
VQELCSRBD0800R050	●	8	0.5	40	100	8	5
VQELCSRBD0800R100	●	8	1.0	40	100	8	5
VQELCSRBD0800R150	●	8	1.5	40	100	8	5
VQELCSRBD0800R200	★	8	2.0	40	100	8	5
VQELCSRBD1000R020	★	10	0.2	50	110	10	5
VQELCSRBD1000R030	★	10	0.3	50	110	10	5
VQELCSRBD1000R050	●	10	0.5	50	110	10	5
VQELCSRBD1000R100	●	10	1.0	50	110	10	5
VQELCSRBD1000R150	●	10	1.5	50	110	10	5
VQELCSRBD1000R200	●	10	2.0	50	110	10	5

1/2

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

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

NEW

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

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

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.

174 Vc

NEW

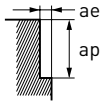
VQELCSRB

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

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

1/1



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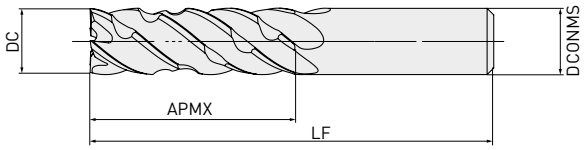
2. The irregular pitch flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the workpiece material installation is poor, vibration or abnormal sounds can occur. In that case, please adjust the revolution, feed rate and depth of cut.
3. The revolution and feed rate can be increased with a smaller depth of cut.
4. For machining stainless steel, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

VQLCS

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

P M N S



DC≤12	DC>12
0 -0.030	0 -0.040

DCONMS=6	DCONMS=8, 10	DCONMS=12	DCONMS=16	DCONMS=20
0 -0.005	0 -0.006	0 -0.008	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
	VQLCSD0600	●	6	24	70	6	5
	VQLCSD0800	●	8	32	90	8	
	VQLCSD1000	●	10	40	100	10	
	VQLCSD1200	●	12	48	110	12	
NEW	VQLCSD1600	●	16	64	130	16	
NEW	VQLCSD2000	●	20	80	150	20	

1/1

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

176 Vc

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

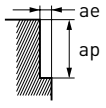
VQLCS

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

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

1/1



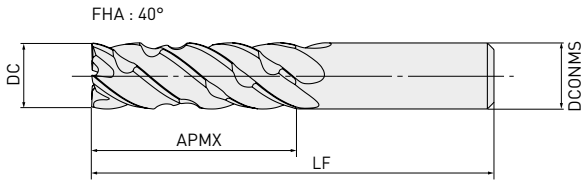
1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work. When measuring the tool length, please use a mechanical contact type or a laser tool setter.
2. The irregular pitch flute end mill has a larger effect on controlling vibration 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.

NEW

VQELCS

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

P M N S



DC≤12	DC>12
0 -0.030	0 -0.040

DCONMS=6	DCONMS=8, 10	DCONMS=12	DCONMS=16	DCONMS=20
0 -0.005	0 -0.006	0 -0.008	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
VQELCSD0600	●	6	30	80	6	5
VQELCSD0800	●	8	40	100	8	
VQELCSD1000	●	10	50	110	10	
VQELCSD1200	●	12	60	125	12	
VQELCSD1600	●	16	80	150	16	
VQELCSD2000	●	20	100	170	20	

1/1

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.

178 Vc

NEW

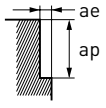
VQELCS

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

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

1/1



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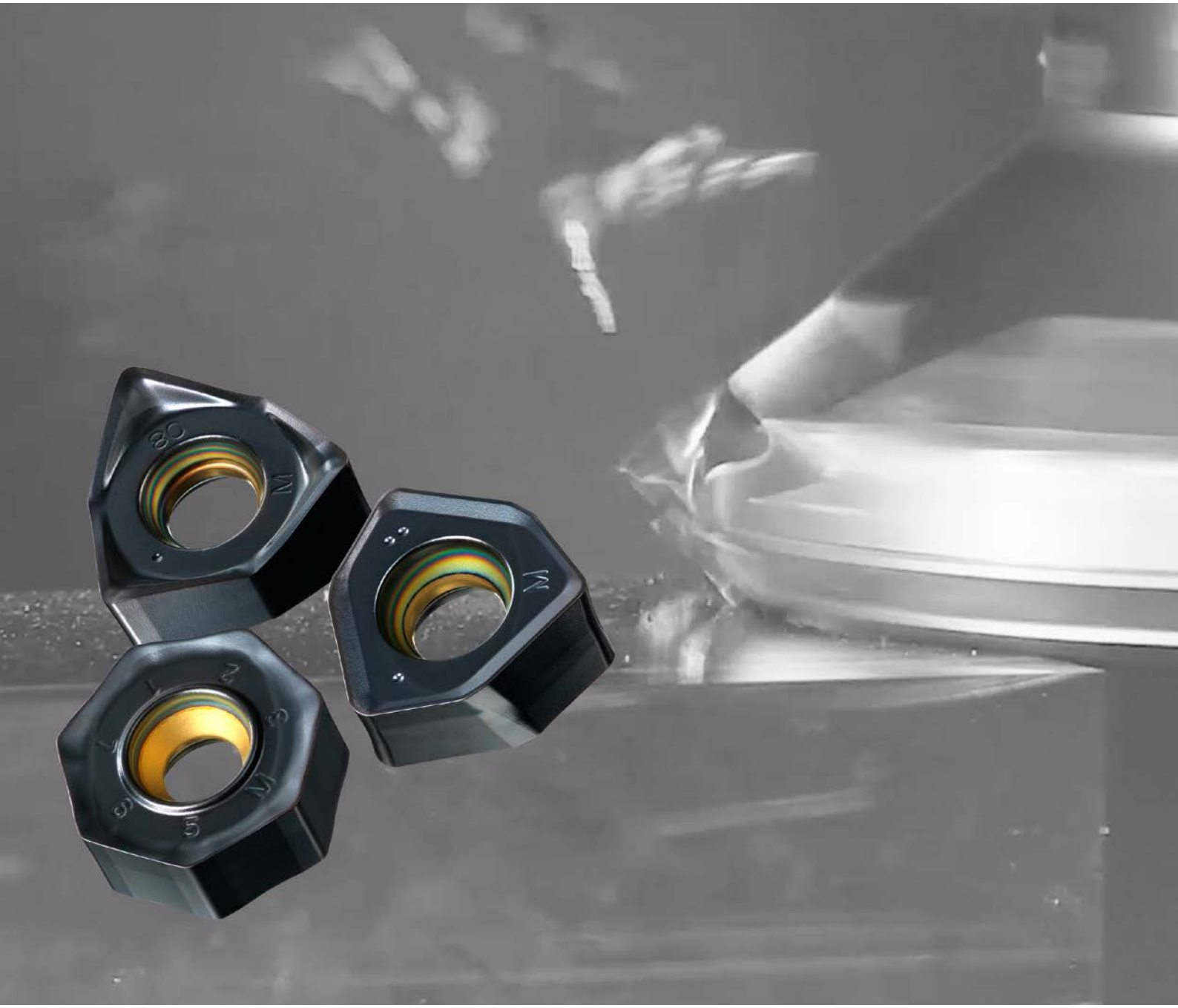
MV1000 SERIES

SETTING A NEW STANDARD FOR TOOL LIFE



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B270

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MITSUBISHI MATERIALS

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

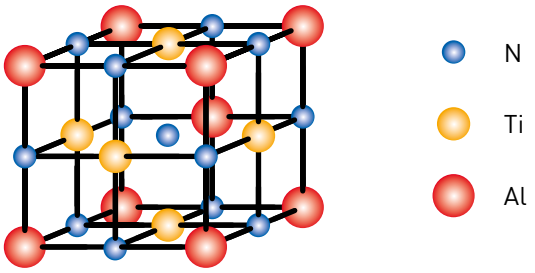
Exclusive cemented carbide substrate.

MV1000 SERIES

COMPLETE COATING TECHNOLOGY THAT REWRITES CURRENT TOOL LIFE STANDARDS

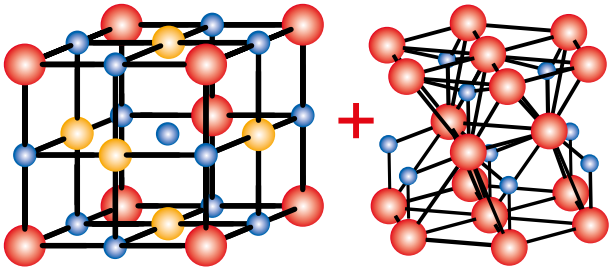
DUE TO THE NEWLY DEVELOPED Al-RICH COATING

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.



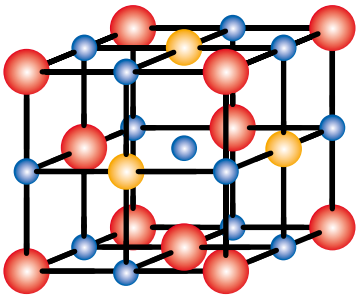
The combination of atoms with different sizes creates an exceptionally hard crystal structure.

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.

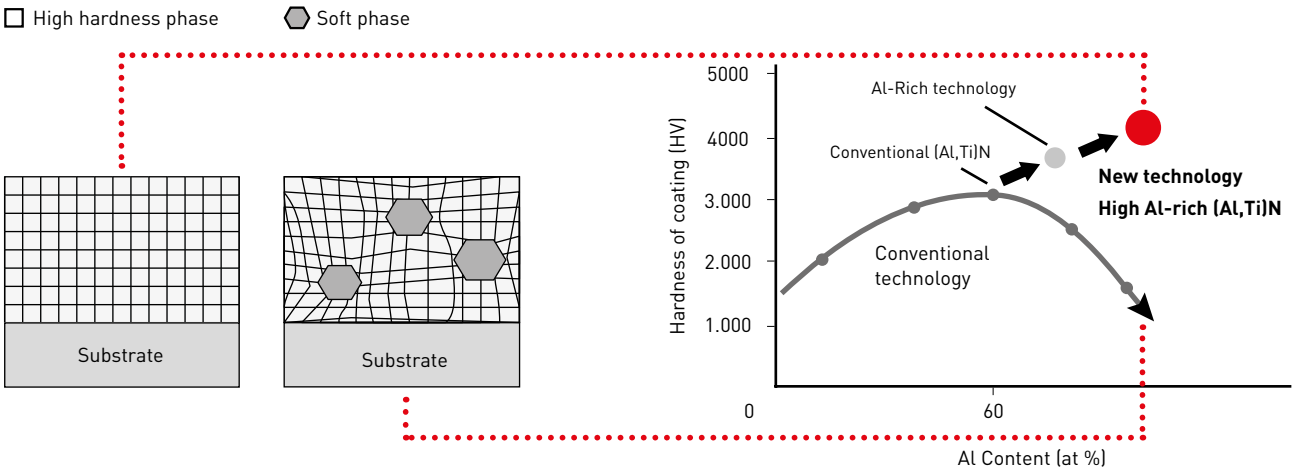


When the Al ratio is over 60 %, a softer crystal phase is formed.

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

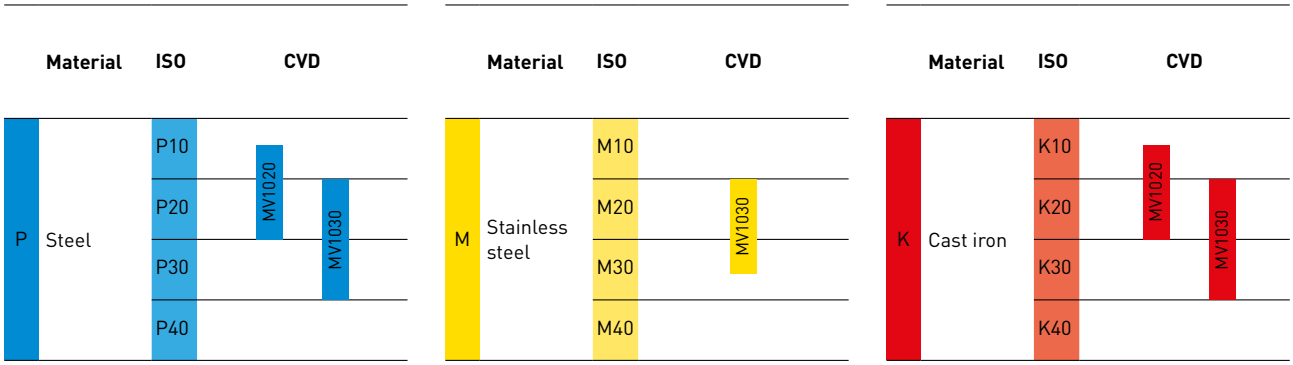
COATED CARBIDE GRADE FOR MILLING

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

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

(10 inserts in one case)

186 – 188

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

NEW

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

(10 inserts in one case)

189 – 191 Vc

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

NEW

MV1000 SERIES – INSERTS

P	Steel	◆	◆
M	Stainless steel		◆
K	Cast iron	◆	◆

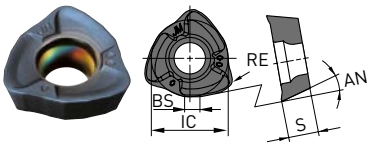
Please note that the cutting conditions differ depending on multiple factors, for more details refer to the recommended cutting conditions.

Honing:
E: Round S: Chamfer + round

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

Geometry

AJX



3/3

(10 inserts in one case)

192 Vc

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

NEW

AHX440S

RECOMMENDED CUTTING CONDITIONS

DRY CUTTING

	Material	Properties	Vc		fz	ap	ae
			MV1020	MV1030			
P	Mild steel	≤180HB	300 (200 – 400)	245 (190 – 300)	0.3 (0.2 – 0.4)	≤3	≤0.8 DC
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

RECOMMENDED CUTTING CONDITIONS

DRY CUTTING

	Material	Properties		Vc		fz	ap	ae
				MV1020	MV1030			
P	Mild steel	≤180HB	R	220 (170 – 270)	140 (80 – 200)	0.6	≤1.6	≤0.5 DC
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 %.

NEW

AHX640S

RECOMMENDED CUTTING CONDITIONS

DRY CUTTING

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

1/1

NEW

ASX445

RECOMMENDED CUTTING CONDITIONS

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		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		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

RECOMMENDED CUTTING CONDITIONS

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		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		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

NEW

APX3000/4000

RECOMMENDED CUTTING CONDITIONS

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	Austenitic stainless steel	≤200HB	●●	L	M	—	180 (140 – 210)	—	170 (130 – 200)	—	140 (110 – 160)	—	140 (110 – 160)
M	Austenitic stainless steel	>200HB	●●	L	M	—	150 (110 – 180)	—	140 (100 – 160)	—	110 (80 – 130)	—	110 (80 – 130)
M	PH stainless steel	<450HB	●●	L	M	—	140 (110 – 170)	—	140 (110 – 170)	—	140 (110 – 170)	—	140 (110 – 170)
K	Gray cast iron	≤450HB	●●	M	L	200 (150 – 280)	150 (100 – 200)	190 (140 – 270)	140 (90 – 190)	170 (130 – 240)	125 (80 – 170)	170 (130 – 240)	100 (80 – 120)
K	Ductile cast iron	≤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)

1/1

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

NEW

ARP5/6

RECOMMENDED CUTTING CONDITIONS

DRY CUTTING

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

1/1

WET CUTTING

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

1/1

NEW

BRP

RECOMMENDED CUTTING CONDITIONS

DRY CUTTING

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

1/1

FEED PER TOOTH (mm/t.)

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

NEW

AJX

RECOMMENDED CUTTING CONDITIONS

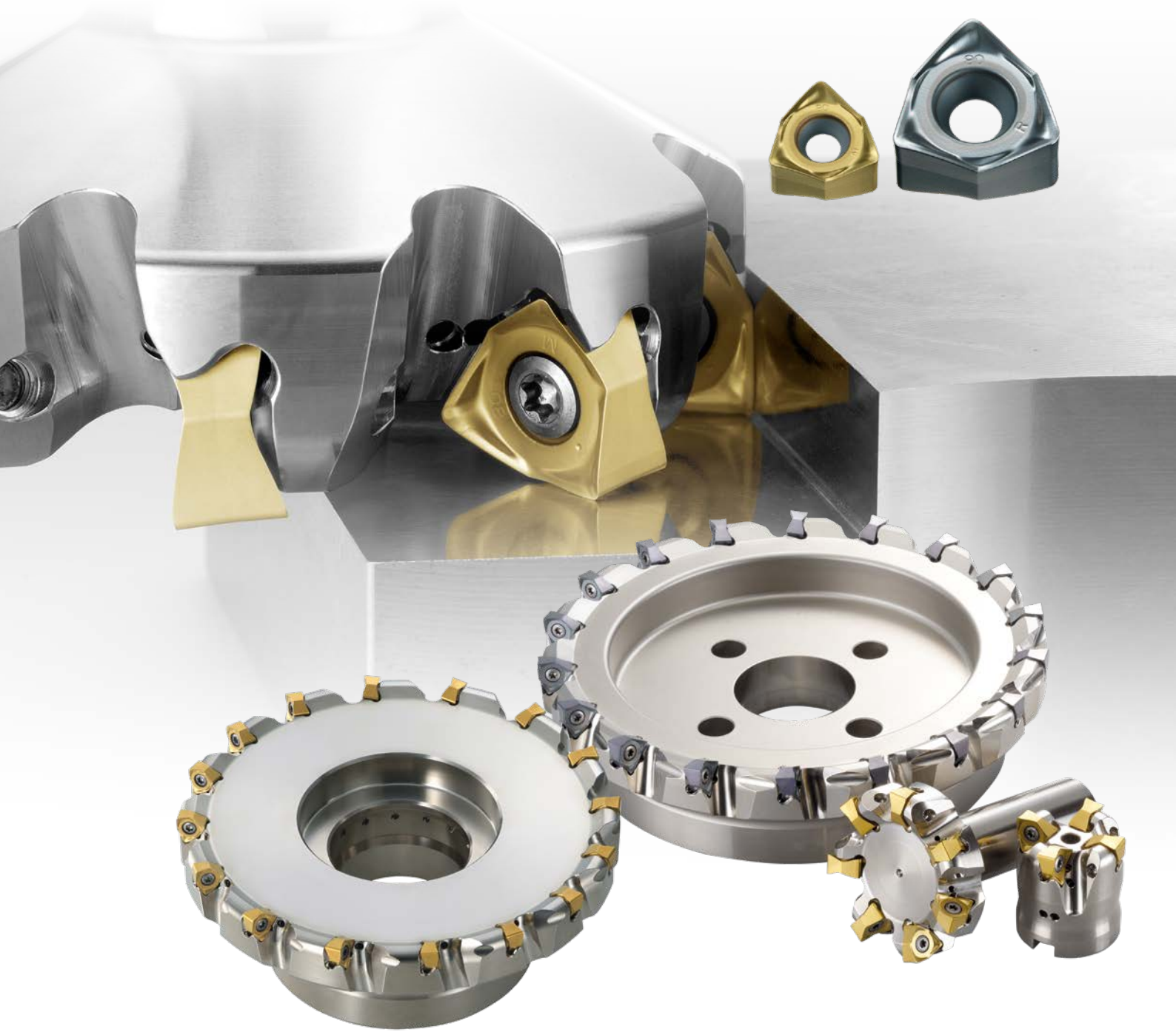
CUTTING SPEED (DRY CUTTING)

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

1/1

WWX SERIES

A NEW LEVEL OF VERSATILITY



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MITSUBISHI MATERIALS

WWX SERIES

STABLE AND RELIABLE

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

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

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

PRODUCT RANGE WWX200

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

PRODUCT RANGE WWX400

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

APPLICATION

- General machining
- Face milling
- Shoulder milling

P M K N H S

FEATURES

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

WWX SERIES

UNIQUE PROPERTIES

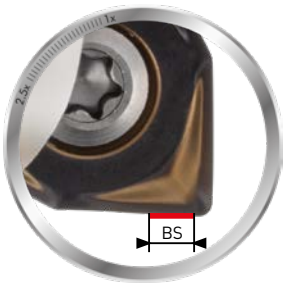
CHOICE AND AVAILABILITY
Diameters 25 – 160 mm (WWX200) / 50 – 250 mm (WWX400) are all available in coarse, fine and extra-fine pitch geometries. Providing a wide choice of sizes means the ideal milling body can be selected for a huge range of applications.

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

PERFECT 90° WALL MACHINING AND INSERTS WITH MAXIMUM DEPTH OF CUT UP TO 5 MM (WWX200) / 8 MM (WWX400)
Clever positioning of the insert generates extremely low cutting resistance and helps to generate accurate 90° walls under all machining conditions.

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

LARGE RADIUS OF MINOR CUTTING EDGE
To meet the modern expectations regarding surface finish quality, a specially defined radius (R = 100 mm) with a cutting width BS of 0.5 – 1.7 mm, is used as a wiper geometry across all L, M and R chipbreakers.

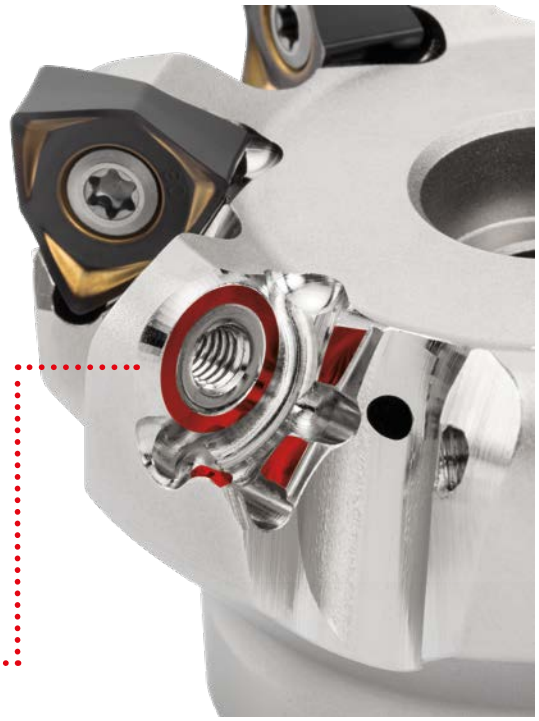


WWX SERIES

INSERTS

PRECISE INSERT POSITIONING
IN COMBINATION WITH STRONG INSERT CLAMPING
Four contact surfaces inside the insert pocket, plus use of a large clamping screw provides precise, but stable and secure clamping of the inserts.
Therefore, WWX200 / WWX400 can be recommended for both semi-roughing and finish machining.

Strong **X** geometry



SHOULDER AND WALL MACHINING
WITHOUT CHIP INTERFERENCE
Use of a convex main cutting edge allows for precise 90° shoulder machining and reduces contact between ejected chips and the workpiece.

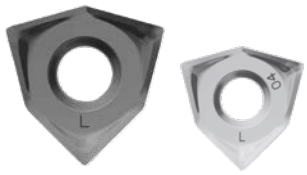
WWX200 / WWX400

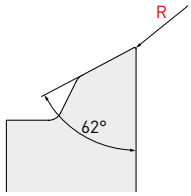
Conventional

WWX SERIES

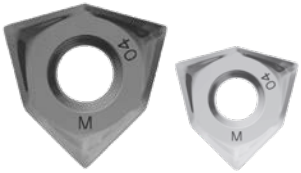
GRADES AND CHIPBREAKERS

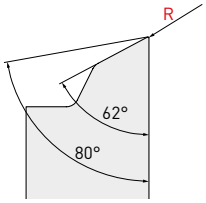
An extensive choice of grades and chipbreakers ensures the optimal choice is available for stable and efficient machining over a wide range of applications.



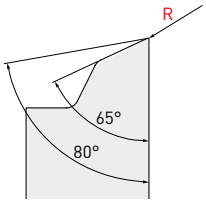


L-BREAKER
Recommended for machining that requires reduced cutting loads, or for machining HRSA materials.





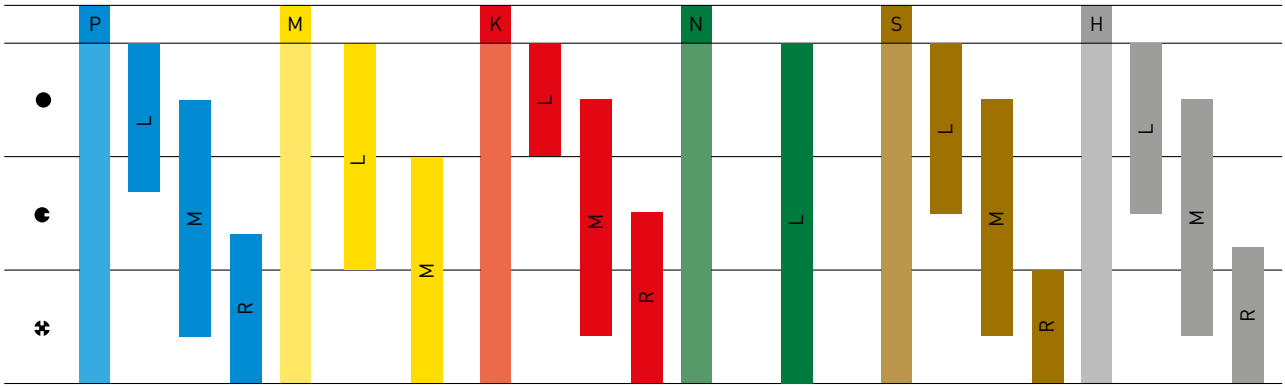
M-BREAKER
Outstanding balance of cutting edge sharpness and stability. First choice all-rounder, suitable for a variety of materials and applications.



R-BREAKER
First recommendation for interrupted cutting conditions.

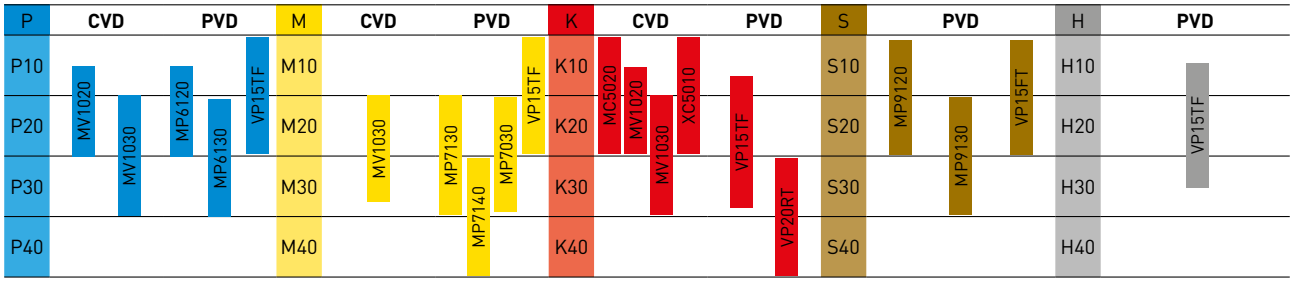
APPLICATION OF CHIPBREAKERS

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



WWX SERIES

GRADES FOR MACHINING A WIDE RANGE OF MATERIALS



MV1020
This grade has advanced wear and thermal shock resistance and also achieves stable cutting at unprecedented cutting speeds, especially when machining steel and ductile cast iron, thus greatly reducing work time.

MV1030
The new Al-Rich coating also provides excellent wear resistance. An unprecedented performance against sudden breakage was also realised especially during problematic wet cutting and when machining stainless steels.

MP6120
For general milling of steel.

MP6130
For interrupted milling of steel.

MP7130
For general milling of stainless steel.

MC5020
For general milling of cast iron.

MP9120
For general milling of HRSA and titanium alloy.

MP9130
For interrupted and general milling of HRSA and Titanium alloy.

TF15
For general milling of aluminium.

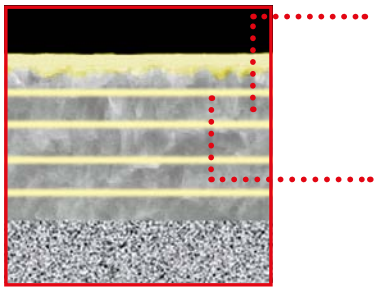
VP15TF
For stable machining when the coating is combined with a high wear and fracture resistant carbide substrate.

MP6100/MP7100/MP9100 SERIES

TOUGH-∑ TECHNOLOGY

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

Al-Ti-Cr-N BASED PVD COATING



Graphical representation

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

Best Layer for Each Material

Thermal Cracks | Notching | Welding by Chipping

MV1000 SERIES

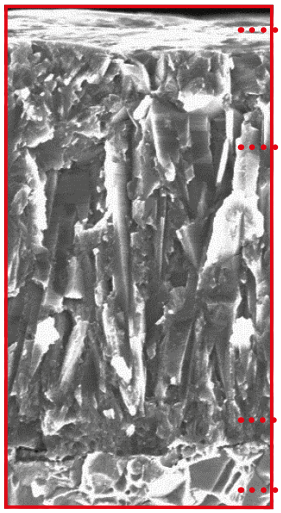
COATED CARBIDE GRADE FOR MILLING

ADVANCED WEAR RESISTANCE

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

ADVANCED THERMAL SHOCK RESISTANCE

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



Graphical representation

EXCELLENT WELDING RESISTANCE

Smooth surface.

OUTSTANDING WEAR RESISTANCE

Newly developed Al-Rich coating.

EXCELLENT CHIPPING RESISTANCE FOR STABLE MACHINING

Newly developed bonding layer.

FRACTURE RESISTANCE FOR THE ULTIMATE STABILITY

Exclusive cemented carbide substrate.

NEW LEVEL OF VERSATILITY

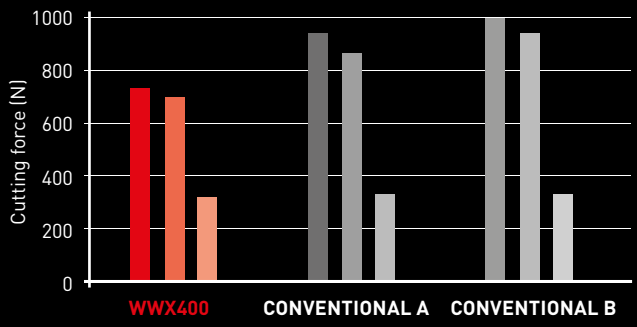
BENEFITS

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

WWX400

CUTTING FORCE

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

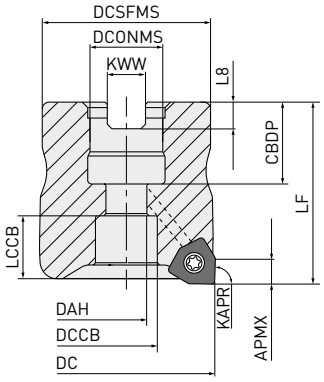


WWX200

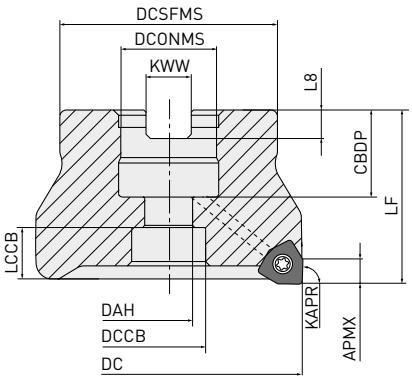
90° FACE MILLING CUTTER

P M K N S H

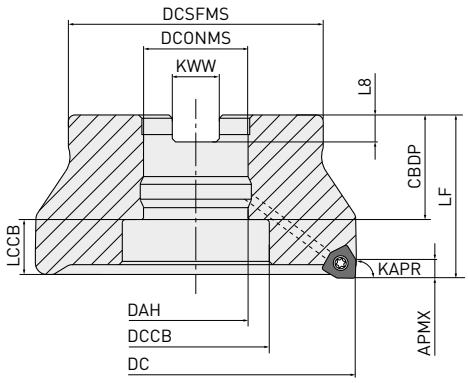
1
Ø40
Ø50



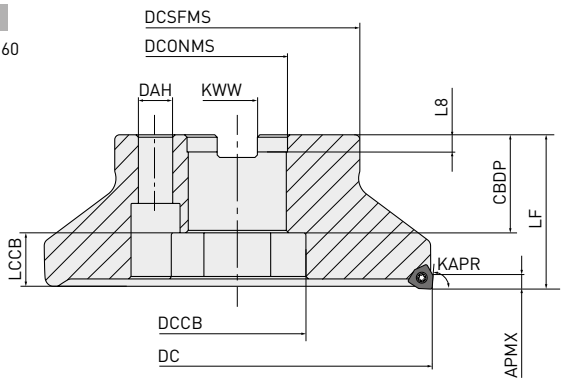
2
Ø63
Ø80



3
Ø100
Ø125
Ø160



4
Ø160



Right hand tool holder only.

ARBOR TYPE

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

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

WWX200 – 90° FACE MILLING CUTTER – ARBOR TYPE

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

2/2

1. The maximum spindle speeds RPMX are set to ensure tool and insert stability.
2. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
3. ○ = With through coolant holes
4. A set bolt to the arbor is not supplied with the body. Please refer to page 205, when ordering.
5. Please use a set bolt of the FMC type on the cutter body from 40 to 100 in diameter (DC).
6. Please use a set bolt of the FMA type on the cutter body from 125 to 160 in diameter (DC).

210 Vc

MOUNTING DIMENSIONS

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

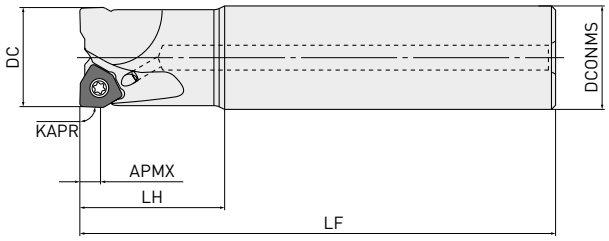
1/1

WWX200

90° FACE MILLING CUTTER

P M K N S H

1



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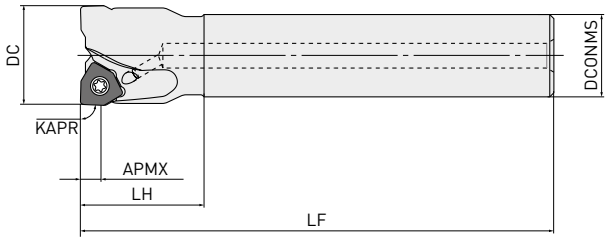


Right hand tool holder only.

SHANK TYPE

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

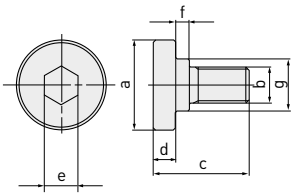
1. The maximum spindle speeds RPMX are set to ensure tool and insert stability.
2. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
3. ○ = With through coolant holes

210 Vc

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

WWX200

PARTS SOLD SEPARATELY – SET BOLT

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

1. Internal coolant is necessary with the set bolt.

SPARE PARTS

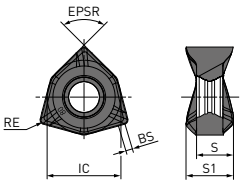
Tool holder type	 * Clamp screw	 Wrench (Insert)	 Anti-seize lubricant
WWX200 Arbor type	TPS3R	TIP10D	MK1KS
WWX200 Shank type			

* Clamp torque (N • m): TPS3R = 2.0

INSERTS

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

Cutting conditions :
●: Stable cutting ◐: General cutting
✱: Unstable cutting
Honing:
E: Round F: Sharp edge S: Chamfer + round
T: Chamfer Z: Stable

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

1/1

(10 inserts in one case)

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

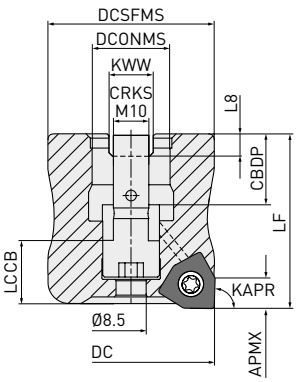
WWX400

90° KAPR

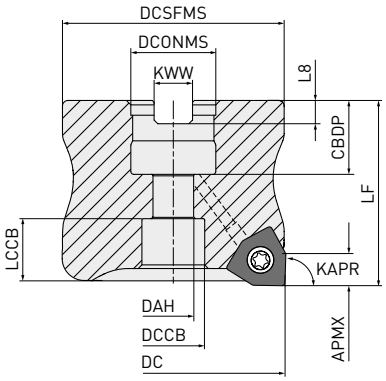
90° FACE MILLING CUTTER

P M K N S H

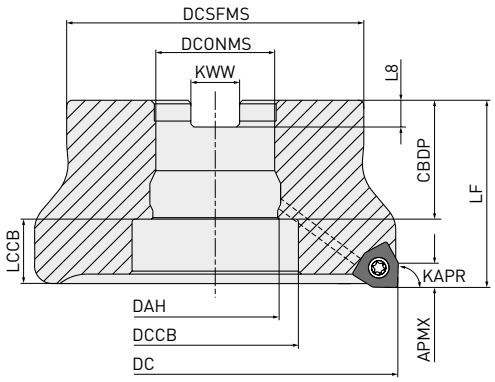
1
Ø50



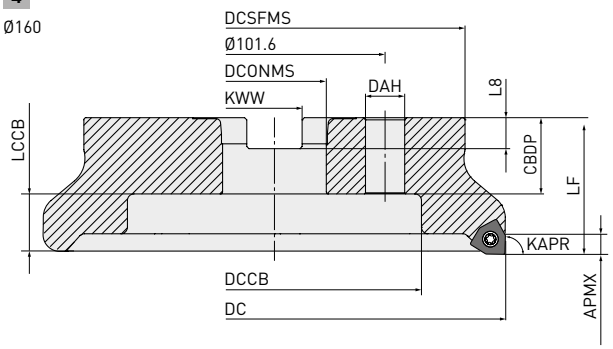
2
Ø63
Ø80



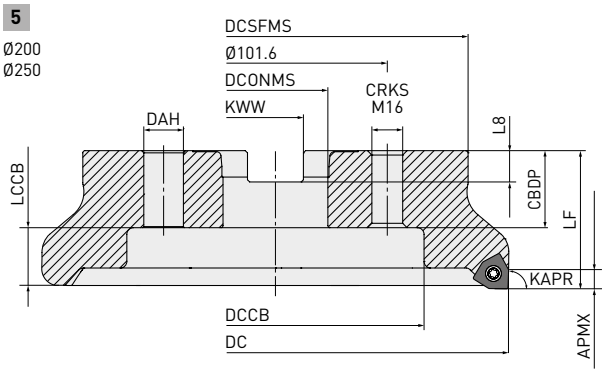
3
Ø100
Ø125



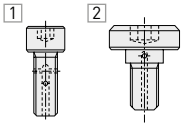
4
Ø160



5
Ø200
Ø250



Right hand tool holder only.

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

WWX400 – 90° FACE MILLING CUTTER – ARBOR TYPE

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

1/1

1. The maximum spindle speeds RPMX are set to ensure tool and insert stability.
2. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
3. ○ = With through coolant holes
4. A set bolt to the arbor is not supplied with the body. Please refer to page 208, when ordering.
5. Please use a set bolt of the FMC type on the cutter body from 63 to 100 in diameter (DC).
6. Please use a set bolt of the FMA type on the cutter body from 125 to 250 in diameter (DC).

210 Vc

MOUNTING DIMENSIONS

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

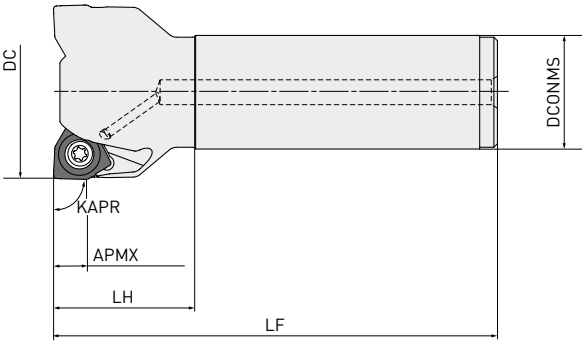
1/1

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

WWX400

90° FACE MILLING CUTTER

P M K N S H



Right hand tool holder only.

SHANK TYPE

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

1/1

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

210 Vc

SPARE PARTS

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

* Clamp torque (N • m): TS5R = 5.0

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

WWX400

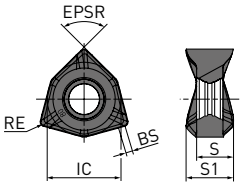
INSERTS

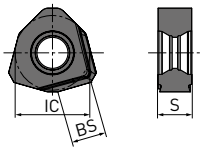
		MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	TF15	MC5020	MV1020	NEW MV1030
P	Steel	●	◐				✱			◐	◐
M	Stainless steel			●			◐				◐
K	Cast iron						✱		◐	◐	◐
N	Non-ferrous material							◐			
S	Heat resistant alloy, Titanium alloy				●	◐					
H	Hardened steel	◐					●				

Cutting conditions :
●: Stable cutting ◐: General cutting
✱: Unstable cutting
Honing:
E: Round F: Sharp edge S: Chamfer + round
T: Chamfer Z: Stable

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

Geometry
Right hand insert only.





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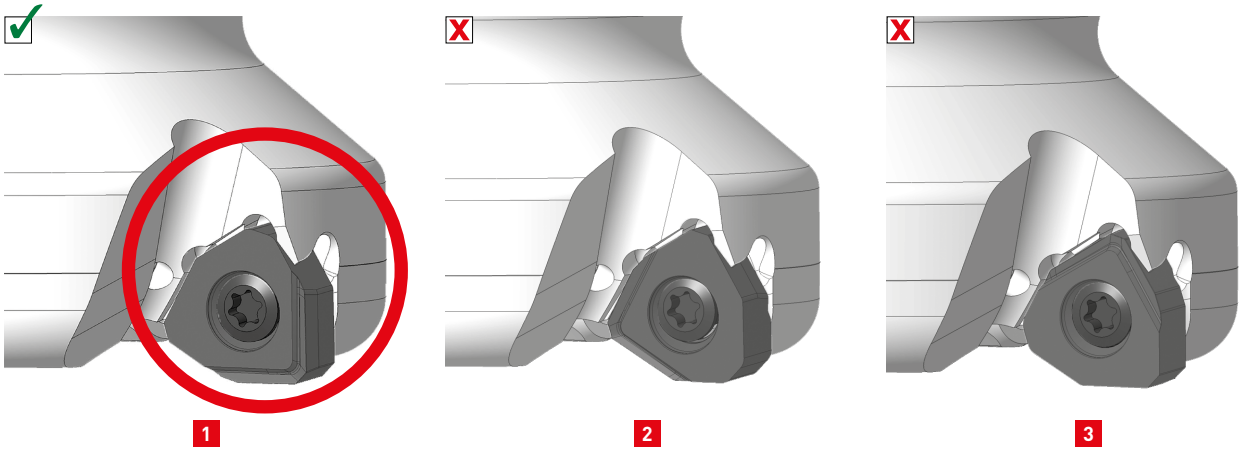
(10 inserts in one case)

210 Vc

INSTRUCTIONS FOR USE OF WIPER INSERTS



Wiper inserts for WWX400 are two-cornered. Please set as shown in picture 1.
Excellent surface finishes can be achieved with one wiper.
Set more than 2 wiper inserts, equally spaced, when the feed per revolution is larger than 6.5 mm/rev.
When choosing a wiper insert select a general grade that is similar to the ideal cutting conditions.

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

WWX200 /400

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED / DRY CUTTING

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

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

WWX200/400 – CUTTING SPEED / DRY CUTTING

	Material	Properties	Cutting conditions	Grade	Vc		
					ae ≤ 0.5 DC	ae ≤ 0.8 DC	ae = DC
M	Ferritic and martensitic Stainless steel	≤200HB	●	MV1030	180 (160 – 200)	160 (140 – 180)	—
			●	MP7130	180 (160 – 200)	160 (140 – 180)	—
			◐	MV1030	170 (150 – 190)	150 (130 – 170)	
			◐	MP7130	170 (150 – 190)	150 (130 – 170)	—
			◐	VP15TF	170 (150 – 190)	150 (130 – 170)	—
			✤	MP7130	150 (130 – 170)	130 (110 – 150)	—
			✤	VP15TF	150 (130 – 170)	130 (110 – 150)	—
	Duplex stainless steel	≤280HB	●	MP7130	160 (140 – 180)	140 (120 – 160)	—
			◐	MP7130	150 (130 – 170)	130 (110 – 150)	—
			◐	VP15TF	150 (130 – 170)	130 (110 – 150)	—
			✤	MP7130	130 (110 – 150)	110 (90 – 130)	—
			✤	VP15TF	130 (110 – 150)	110 (90 – 130)	—
	Precipitation hardening Stainless steel	<450HB	●	MP7130	140 (120 – 160)	—	—
			◐	MP7130	130 (110 – 150)	—	—
			◐	VP15TF	130 (110 – 150)	—	—
			✤	MP7130	110 (90 – 130)	—	—
			✤	VP15TF	110 (90 – 130)	—	—
K	Gray cast iron	≤350MPa	●	MC5020	250 (210 – 290)	230 (190 – 270)	210 (170 – 250)
			◐	MC5020	240 (200 – 280)	220 (180 – 260)	200 (160 – 240)
			◐	VP15TF	240 (200 – 280)	220 (180 – 260)	—
			✤	MC5020	220 (180 – 260)	200 (160 – 240)	180 (140 – 220)
			✤	VP15TF	220 (180 – 260)	200 (160 – 240)	180 (140 – 220)
	Ductile cast iron	≤450MPa	●	MV1020	240 (200 – 310)	220 (170 – 280)	200 (150 – 260)
			●	MV1030	210 (170 – 250)	190 (150 – 230)	170 (130 – 210)
			●	MC5020	220 (180 – 260)	200 (160 – 240)	180 (140 – 220)
			◐	MV1020	230 (190 – 300)	210 (160 – 270)	190 (140 – 250)
			◐	MV1030	210 (170 – 250)	190 (150 – 230)	170 (130 – 210)
			◐	MC5020	210 (170 – 250)	190 (150 – 230)	170 (130 – 210)
			◐	VP15TF	210 (170 – 250)	190 (150 – 230)	—
			✤	MC5020	190 (150 – 230)	170 (130 – 210)	150 (110 – 190)
			✤	VP15TF	190 (150 – 230)	170 (130 – 210)	150 (110 – 190)
	Ductile cast iron	≤800MPa	●	MV1020	210 (160 – 280)	190 (140 – 250)	160 (120 – 210)
			●	MC5020	180 (140 – 220)	160 (120 – 200)	140 (100 – 180)
			●	MV1030	170 (130 – 210)	150 (110 – 190)	130 (90 – 170)
			◐	MV1020	200 (150 – 270)	180 (130 – 240)	150 (110 – 200)
			◐	MV1030	170 (130 – 210)	150 (110 – 190)	130 (90 – 170)
			◐	MC5020	170 (130 – 210)	150 (110 – 190)	130 (90 – 170)
			◐	VP15TF	170 (130 – 210)	150 (110 – 190)	—
			✤	MC5020	150 (110 – 190)	130 (90 – 170)	110 (70 – 150)
			✤	VP15TF	150 (110 – 190)	130 (90 – 170)	110 (70 – 150)
H	Hardened steel	40 – 55HRC	●◐	VP15TF	50 (30 – 70)	—	—
			◐	MP6120	40 (30 – 70)	—	—

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

WWX200 /400

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED / WET CUTTING

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

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

WWX200/400 – CUTTING SPEED / WET CUTTING

	Material	Properties	Cutting conditions	Grade	Vc		
					ae ≤ 0.5 DC	ae ≤ 0.8 DC	ae = DC
P	Duplex stainless steel	≤280HB	●	MP7130	120 (110 – 130)	100 (90 – 110)	—
			◔	MP7130	110 (100 – 120)	90 (80 – 100)	—
			◔	VP15TF	110 (100 – 120)	90 (80 – 100)	—
			✣	MP7130	90 (80 – 100)	70 (60 – 80)	—
			✣	VP15TF	90 (80 – 100)	70 (60 – 80)	—
	Precipitation hardening Stainless steel	<450HB	●	MP7130	120 (110 – 130)	—	—
			◔	MP7130	110 (100 – 120)	—	—
			◔	VP15TF	110 (100 – 120)	—	—
			✣	MP7130	90 (80 – 100)	—	—
			✣	VP15TF	90 (80 – 100)	—	—
K	Gray cast iron		●	MC5020	170 (150 – 190)	150 (130 – 170)	130 (110 – 150)
			◔	MC5020	160 (140 – 180)	140 (120 – 160)	120 (100 – 140)
			◔	VP15TF	160 (140 – 180)	140 (120 – 160)	—
			✣	MC5020	140 (120 – 160)	120 (100 – 140)	100 (80 – 120)
			✣	VP15TF	140 (120 – 160)	120 (100 – 140)	100 (80 – 120)
	Ductile cast iron	≤450MPa	●	MV1020	200 (180 – 240)	180 (150 – 220)	150 (130 – 200)
			●	MC5020	170 (150 – 190)	150 (130 – 170)	130 (110 – 150)
			●	MV1030	160 (140 – 180)	140 (120 – 160)	120 (100 – 140)
			◔	MV1020	190 (170 – 230)	170 (140 – 210)	140 (120 – 190)
			◔	MV1030	160 (140 – 180)	140 (120 – 160)	120 (100 – 140)
			◔	MC5020	160 (140 – 180)	140 (120 – 160)	120 (100 – 140)
			◔	VP15TF	160 (140 – 180)	140 (120 – 160)	—
			✣	MC5020	140 (120 – 160)	120 (100 – 140)	100 (80 – 120)
			✣	VP15TF	140 (120 – 160)	120 (100 – 140)	100 (80 – 120)
	Ductile cast iron	≤800MPa	●	MV1020	180 (170 – 210)	160 (150 – 190)	140 (120 – 160)
			●	MC5020	160 (150 – 170)	140(130 – 150)	120 (110 – 130)
			●	MV1030	150 (140 – 160)	130 (120 – 140)	110 (100 – 120)
			◔	MV1020	170 (160 – 200)	150 (140 – 180)	120 (110 – 150)
			◔	MV1030	150 (140 – 160)	130 (120 – 140)	110 (100 – 120)
			◔	MC5020	150 (140 – 160)	130 (120 – 140)	110 (100 – 120)
			◔	VP15TF	150 (140 – 160)	130 (120 – 140)	—
			✣	MC5020	130 (120 – 140)	110 (100 – 120)	90 (80 – 100)
			✣	VP15TF	130 (120 – 140)	110 (100 – 120)	90 (80 – 100)
N	Aluminium alloy	Si<5%	●	TF15	500 (300 – 900)	500 (300 – 900)	500 (300 – 900)
			◔	TF15	500 (300 – 900)	500 (300 – 900)	500 (300 – 900)
			✣	TF15	400 (200 – 800)	400 (200 – 800)	400 (200 – 800)
S	Titanium alloy	—	●	MP9120	80 (60 – 100)	—	—
			◔	MP9120	70 (50 – 90)	—	—
			✣	MP9130	60 (40 – 80)	—	—
	Heat resistant alloy	—	●	MP9120	60 (50 – 70)	—	—
			◔	MP9120	50 (30 – 60)	—	—
			✣	MP9130	40 (20 – 40)	—	—
H	Hardened steel	40 – 55HRC	●◔	VP15TF	50 (30 – 70)	—	—
			◔	MP6120	40 (30 – 70)	—	—

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

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

WWX200

RECOMMENDED CUTTING CONDITIONS

DEPTH OF CUT / FEED PER TOOTH

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

1/2

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

WWX200 – DEPTH OF CUT / FEED PER TOOTH

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

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

WWX400

RECOMMENDED CUTTING CONDITIONS

DEPTH OF CUT / FEED PER TOOTH

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

1/2

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

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

WWX400 – DEPTH OF CUT / FEED PER TOOTH

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

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

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

MX3030

NEW CERMET GRADE FOR A WIDER RANGE OF APPLICATIONS

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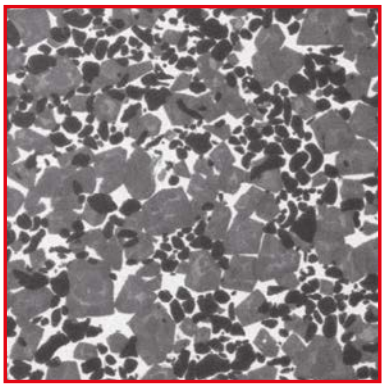
MX3030

NEW CERMET GRADE FOR A WIDER RANGE OF APPLICATIONS

Enables excellent surface finishes even at high efficiency machining conditions.

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

Cermet has a low affinity with iron, excellent thermal stability and oxidation resistance, and is therefore a suitable grade for finishing. However, it does not have the same bonding strength as cemented carbide thereby creating the challenge to compensate for fracture resistance.
MX3030 solves the challenge with higher thermal conductivity than conventional products and has excellent thermal cracking resistance. Therefore, it is possible to suppress wear and maintain high quality surface finishes. Also, since MX3030 has excellent toughness, improved machining efficiency even at large depths of cut can be realised.



MX3030

A special alloy is used for the binder material → Fracture resistance properties increased

High hardness Ti compound particles are used in the substrate → High wear resistance properties

MILD STEEL DIN ST37-2 SURFACE FINISH COMPARISON

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

MX3030

Conventional

MX3030

INSERTS

P	Steel	◆
M	Stainless steel	◆
K	Cast iron	◆

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

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

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

(10 inserts in one case)

222 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	IC	L	LE	W1	S	BS	RE	Geometry
SPMW090304	—	M	T	★	9.525	—	—	—	3.18	—	0.4	**CESP, SFSP, CGSP**
SPMW090308	—	M	T	★	9.525	—	—	—	3.18	—	0.8	
SPMW120304	—	M	T	★	12.7	—	—	—	3.18	—	0.4	
SPMW120308	—	M	T	●	12.7	—	—	—	3.18	—	0.8	
APMT1135PDER-H1	R	M	E	★	—	11.25	9	6.35	3.5	1.5	0.4	**BAP300**
APMT1135PDER-H2	R	M	E	★	—	11.25	9	6.35	3.5	1.2	0.8	
APMT1135PDER-M2	R	M	E	★	—	11.18	9	6.35	3.5	1.2	0.8	
APMT1604PDER-H2	R	M	E	★	—	17.11	14	9.525	4.76	1.4	0.8	**BAP400, SRM2**
APMT1604PDER-M2	R	M	E	★	—	17.10	14	9.525	4.76	1.4	0.8	

2/2

(10 inserts in one case)

222 Vc

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

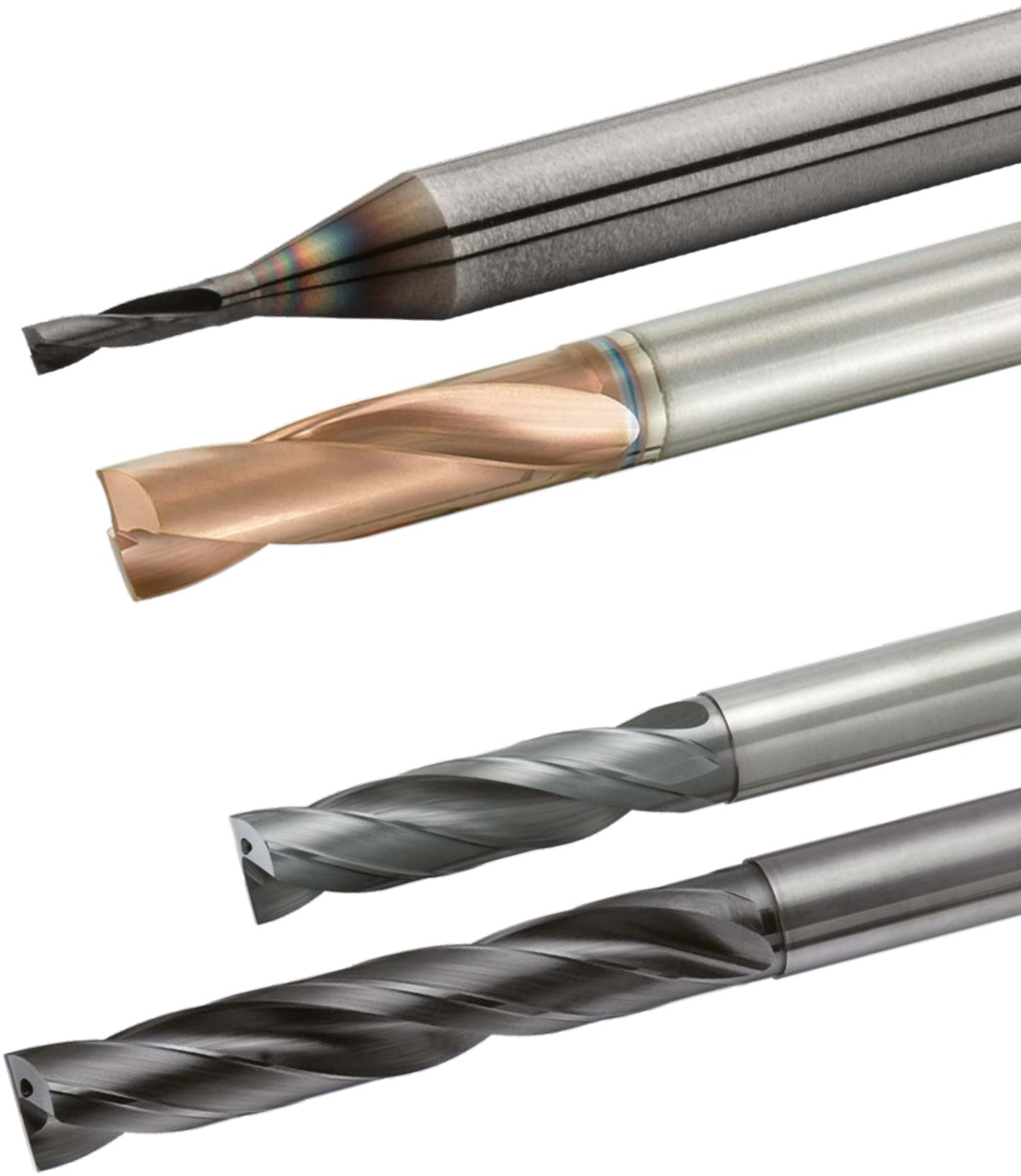
	Material	Properties	Cutter type	Inserts	Vc	ft	
							
P	Mild steel	≤180 HB	WSX445	L, M	180 (130 – 230)	0.15	
			APX3000	M	160 (120 – 200)	0.15	
			ASX445	JL	180 (130 – 250)	0.15	
			ASX445	JM	180 (130 – 250)	0.2	
			ASX400	JL	180 (130 – 250)	0.15	
			ASX400	JM	180 (130 – 250)	0.18	
			OCTACUT	—	180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

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

1. For APX3000, the feed rate is for cutter diameter DC of 12 – 16 mm, cutting depth ae ≤DC x 0.25, and ap ≤ 4 mm.

DFAS / MFE

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



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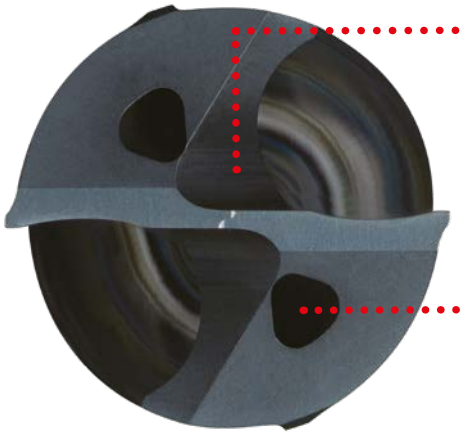
SOLID CARBIDE FLAT BOTTOM DRILLS WITH INTERNAL COOLANT DC 3.0 – 14



OPTIMISED CHIP CONTROL AND LOAD REDUCTION

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

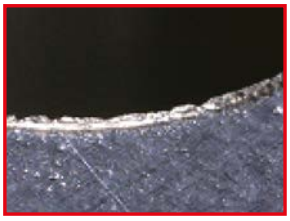
TRI-COOLING TECHNOLOGY FOR ALL DIAMETERS

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

ORIGINAL SHARP CUTTING EDGE SHAPE

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

COMPARISON OF BURRS WHEN MACHINING TITANIUM ALLOY



DFAS
0.08 mm

Conventional
0.12 mm

COATED GRADE DP102A

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

MINI-MFE

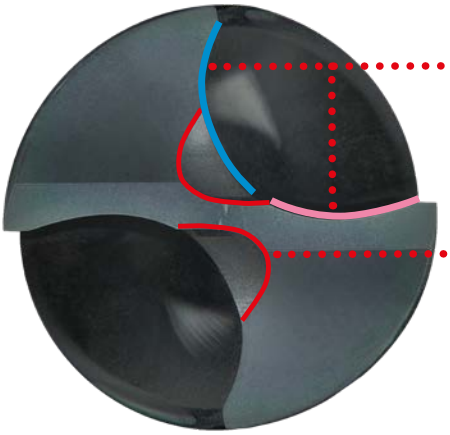
SMALL DIAMETER SOLID CARBIDE FLAT BOTTOM DRILLS
DC 0.75 – 2.95

UNIQUE SHARP CUTTING EDGES

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

EXCELLENT CHIP CONTROL

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



POINT THINNING FOR LOWER THRUST FORCE

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

MFE

Conventional

COATED GRADE DP102A

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

SHARP CUTTING EDGES WITH LONG TOOL LIFE

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

100 HOLES

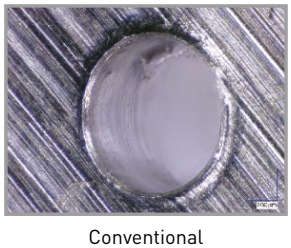
MFE

Conventional

Al-Cr-N Based PVD Coating

500 HOLES

MFE

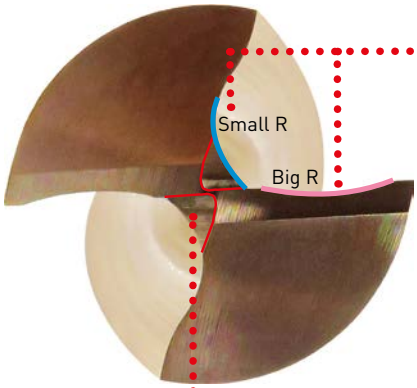


Conventional

NEW

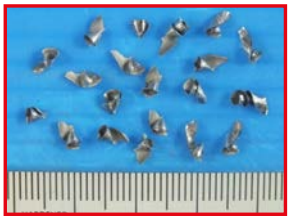
MFE

SOLID CARBIDE FLAT BOTTOM DRILLS
DC 3.0 – 20.0



EXCELLENT CHIP CONTROL

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



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

NEW "Z" POINT THINNING WITH LOWER THRUST FORCE

New point thinning provides excellent chip evacuation.

GASH LAND FOR A STRONGER CORNER

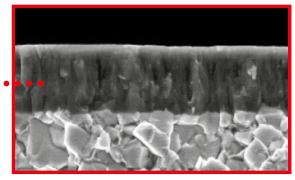
Gash land (0 degree rake) provides excellent chipping resistance.

ZERO-μ SURFACE

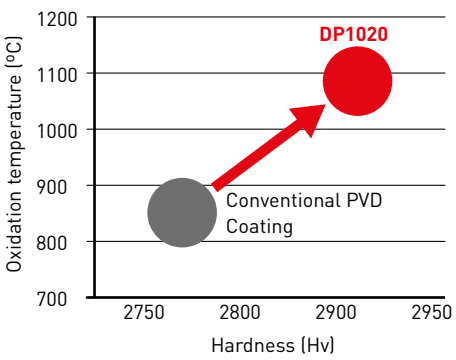
Smooth surface provides reduced deflection and excellent positional accuracy.

COATED GRADE DP1020

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



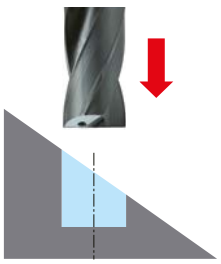
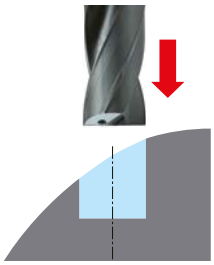
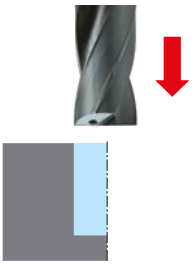
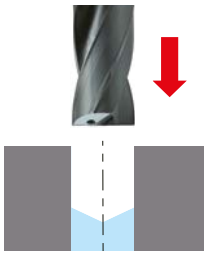
With accumulated AlTiCrN based PVD coating



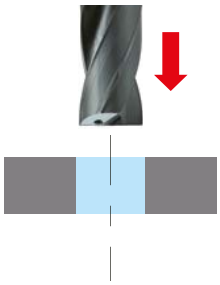
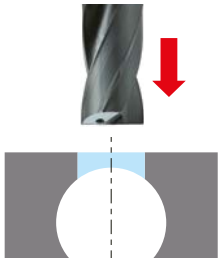
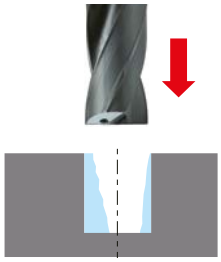
DFAS / MFE

HIGH EFFICIENCY OVER A WIDE APPLICATION RANGE

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

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

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

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

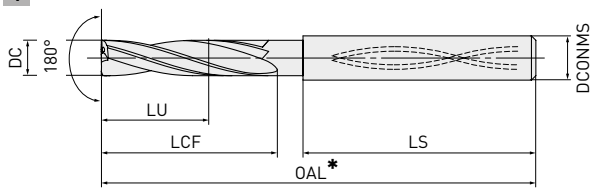
NEW

DFAS-E

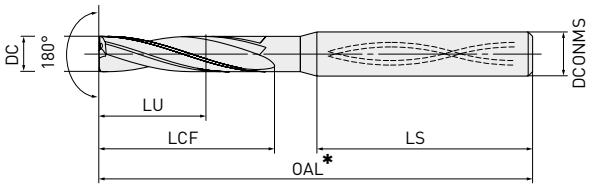
SOLID CARBIDE FLAT BOTTOM DRILLS
m7 TOLERANCE

P M K N S

1



2



3≤DC≤6	6<DC≤10	10<DC≤14
+ 0.016 + 0.004	+ 0.021 + 0.006	+ 0.025 + 0.007
4≤DCONMS≤6	6<DCONMS≤10	10<DCONMS≤14
0 – 0.008	0 – 0.009	0 – 0.011

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

* DIN6537-K

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

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

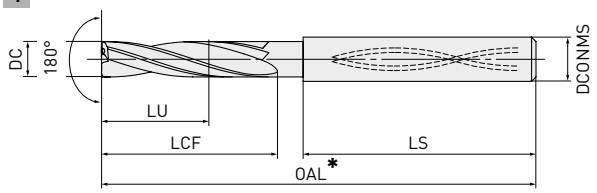
Order number	DP102A	DC	L/D	LU	LCF	LS	OAL*	DCONMS	Type
DFAS0510X03S060E	●	5.1	3	15.3	25	38.6	66	6	2
DFAS0520X03S060E	●	5.2	3	15.6	25	38.6	66	6	2
DFAS0530X03S060E	●	5.3	3	15.9	25	38.7	66	6	2
DFAS0540X03S060E	●	5.4	3	16.2	25	38.7	66	6	2
DFAS0550X03S060E	●	5.5	3	16.5	25	38.8	66	6	2
DFAS0560X03S060E	●	5.6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

* DIN6537-K

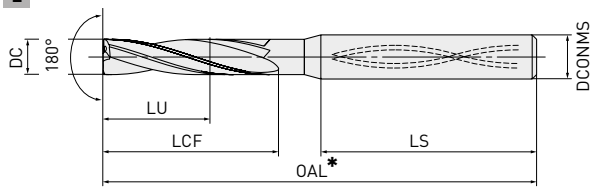
● : Inventory maintained. ★ : Inventory maintained in Japan.

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

1



2



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

* DIN6537-K

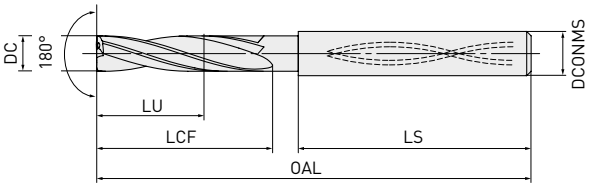
236 Vc

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

DFAS

SOLID CARBIDE FLAT BOTTOM DRILLS
h8 TOLERANCE

P M K N S



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

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

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

236 Vc

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

DFAS – SOLID CARBIDE FLAT BOTTOM DRILLS, h8 TOLERANCE

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

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

DFAS – SOLID CARBIDE FLAT BOTTOM DRILLS, h8 TOLERANCE

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

DFAS – SOLID CARBIDE FLAT BOTTOM DRILLS, h8 TOLERANCE

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

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

DFAS – SOLID CARBIDE FLAT BOTTOM DRILLS, h8 TOLERANCE

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

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236 Vc

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

DFAS / DFAS-E

RECOMMENDED CUTTING CONDITIONS

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

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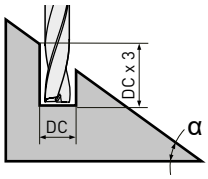
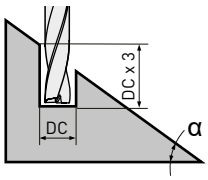
1. This should be the depth from the uppermost surface of the workpiece material when machining on an angled surface. (Refer to diagram)
2. The cutting table above assumes drilling on a flat surface.
   For hole drilling on an angled surface, adjust the feed rate in accordance with the inclination angle.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



DFAS / DFAS-E

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

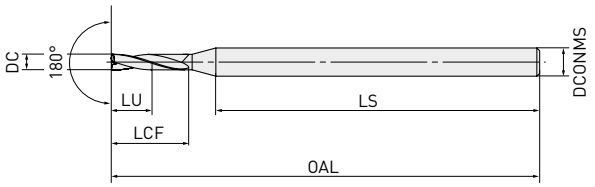
1. This should be the depth from the uppermost surface of the workpiece material when machining on an angled surface. (Refer to diagram)
2. The cutting table above assumes drilling on a flat surface.
   For hole drilling on an angled surface, adjust the feed rate in accordance with the inclination angle.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



MINI-MFE

FOR SMALL DIAMETER HOLES
DC 0.75 – 2.95

P M K N



0.75≤DC≤2.95	
0 – 0.014	

DCONMS = 3	DCONMS = 4
0 – 0.006	0 – 0.008

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

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

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

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

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

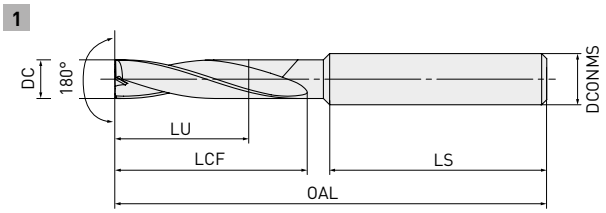
NEW

MFE

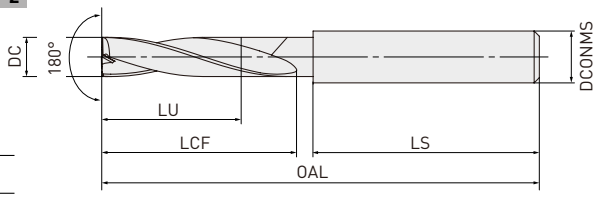
SOLID CARBIDE FLAT BOTTOM DRILLS
h7 TOLERANCE

P M K N

1



2



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

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

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

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MFE – SOLID CARBIDE FLAT BOTTOM DRILLS, h7 TOLERANCE

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

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

MFE – SOLID CARBIDE FLAT BOTTOM DRILLS, h7 TOLERANCE

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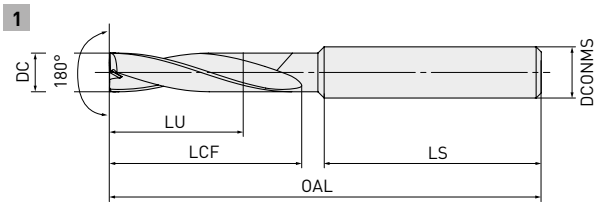

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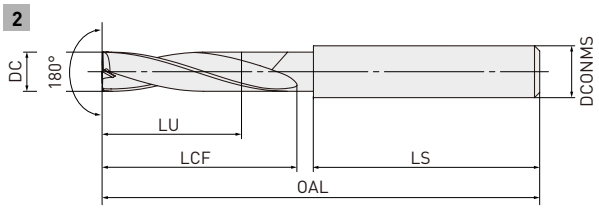


Order number	DP1020	DC	L/D	LU	LCF	LS	OAL	DCONMS	Type
MFE0930X02S100	★	9.3	2	18.6	38	42.6	84	10	1
MFE0940X02S100	★	9.4	2	18.8	38	42.7	84	10	1
MFE0950X02S100	★	9.5	2	19.0	38	42.7	84	10	1
MFE0960X02S100	★	9.6	2	19.2	40	40.8	84	10	1
MFE0970X02S100	★	9.7	2	19.4	40	40.8	84	10	1
MFE0980X02S100	★	9.8	2	19.6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

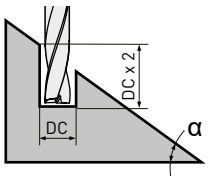
MINI-MFE / MFE

RECOMMENDED CUTTING CONDITIONS

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

1/2

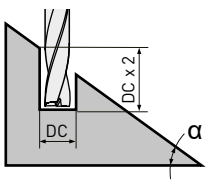
1. The recommended hole depth is DC x 2. This should be the depth from the uppermost surface of the workpiece when machining on an angled surface. (Refer to diagram)
2. The above cutting table assumes drilling on a flat surface.
   For hole drilling on an angled surface, adjust the feed rate in accordance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



MINI-MFE / MFE

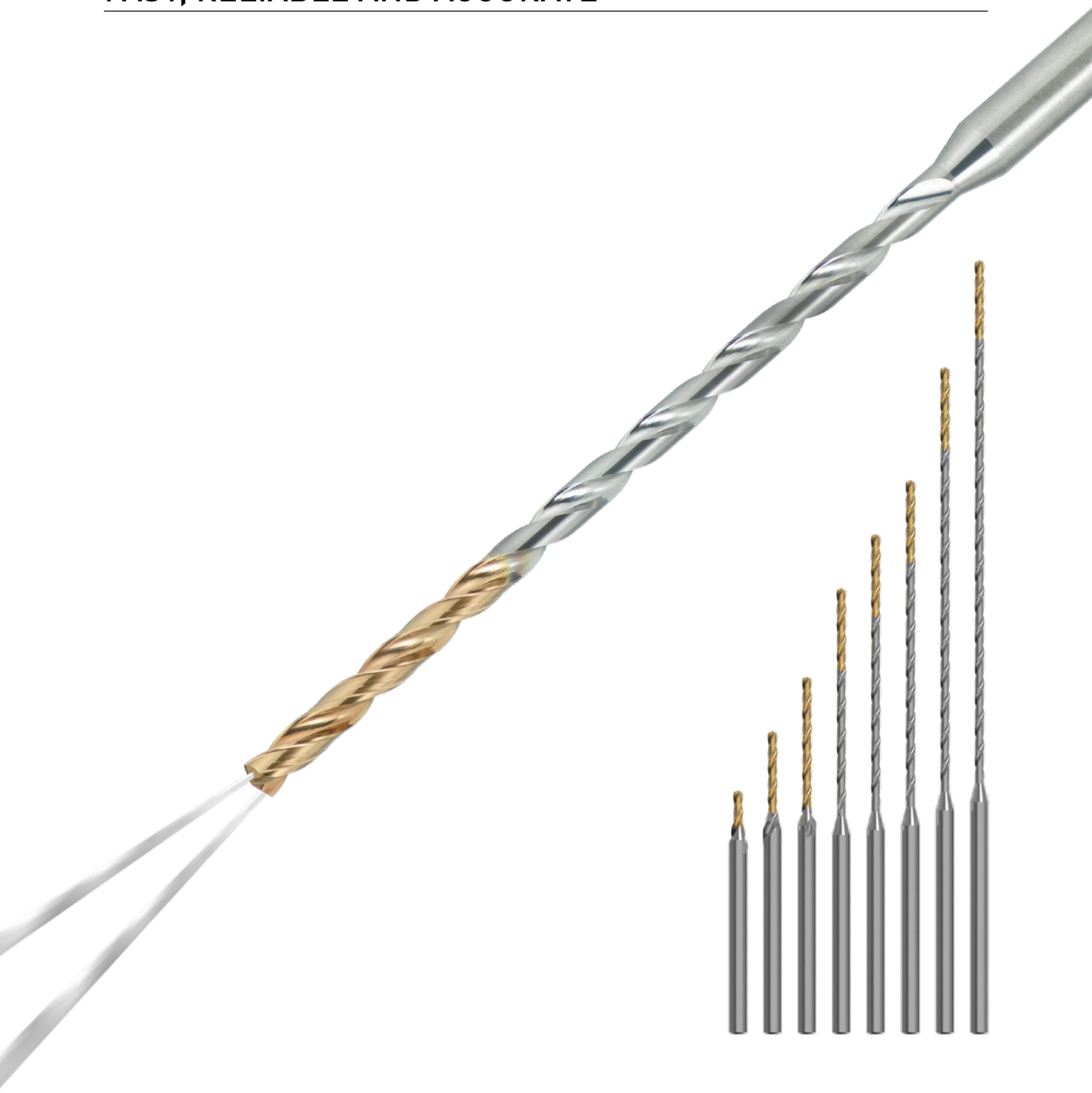
	Material	Properties	DC	L/D	n	α = 0° fr
M	Stainless steel	≤200HB	0.75	≤2	10600	0.007 (0.003 – 0.011)
			1.0	≤2	7900	0.007 (0.003 – 0.011)
			1.5	≤2	5300	0.010 (0.005 – 0.015)
			2.0	≤2	4700	0.015 (0.010 – 0.020)
			2.5	≤2	3800	0.015 (0.010 – 0.020)
			3.0	≤2	3100	0.020 (0.010 – 0.030)
			4.0	≤2	2300	0.030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

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



MINI DVAS

SOLID CARBIDE TRISTAR DRILL SERIES
FAST, RELIABLE AND ACCURATE



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MITSUBISHI MATERIALS

MINI DVAS

HIGH EFFICIENCY, LONG TOOL LIFE, HIGH PRECISION

TRISTAR, A NEW GENERATION DRILL SERIES PROVIDES 3 STRONG ADVANTAGES

TRISTAR: **FAST**

Conventional deep hole drilling is usually a slow process.

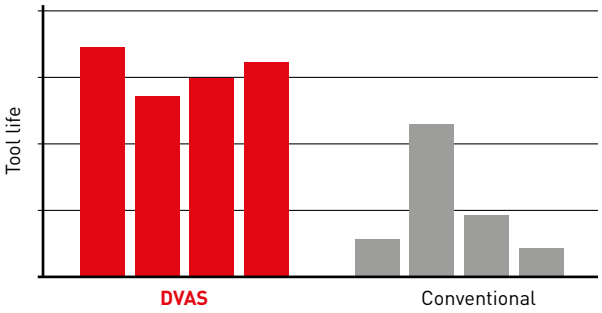
DVAS drills can perform at higher feeds and speeds meaning faster drilling cycles.

Cutting time 8 s/hole

TRISTAR: **RELIABLE**

Breakages, short tool life and lack of coolant can be common with standard tools.

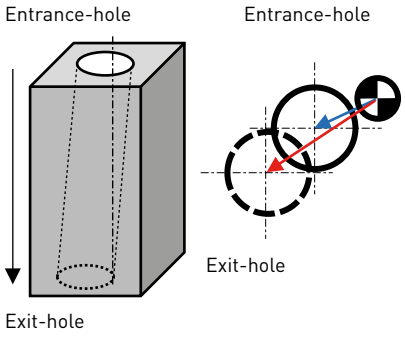
DVAS – Tool life exceeds all normal expectations.

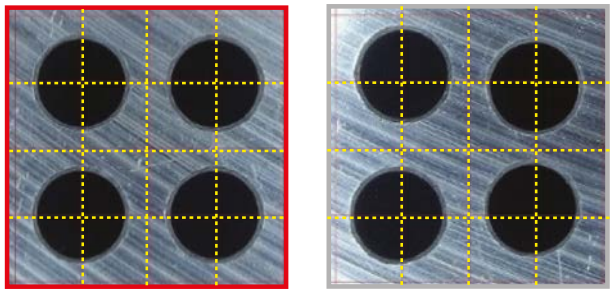


TRISTAR: **ACCURATE**

Conventionally drilled holes can wander considerably and have poor positioning.

Straighter holes and improved dimensional accuracy are enabled by using DVAS drills.





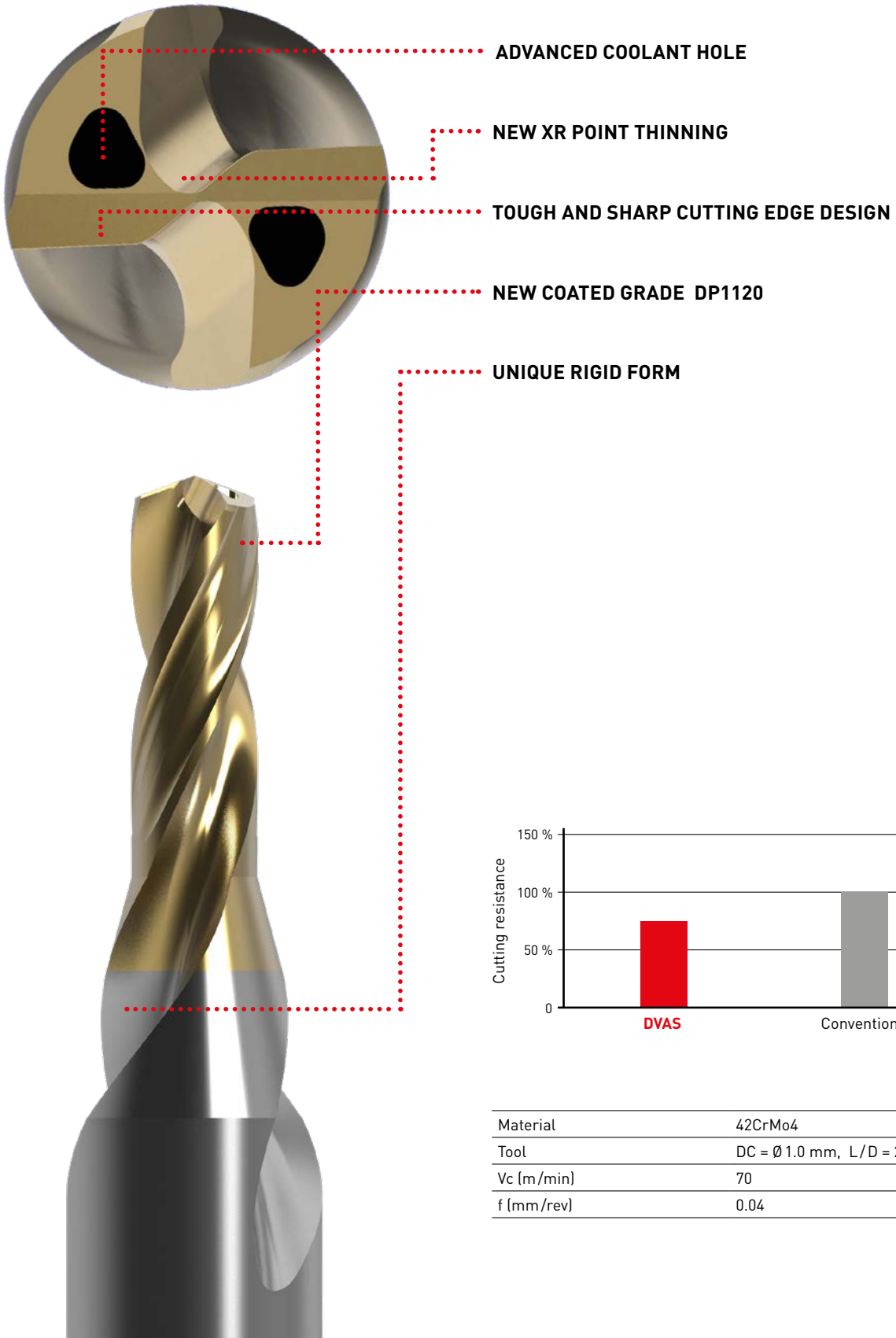
DVAS

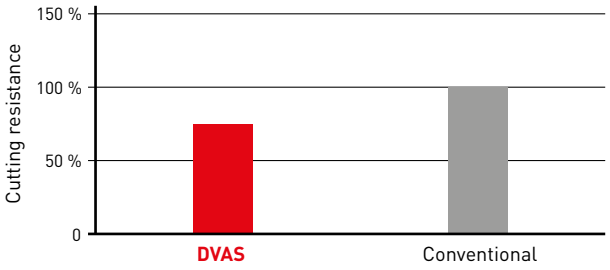
Conventional

MINI DVAS

FAST, RELIABLE AND ACCURATE
NEW STANDARDS ENABLED BY FIVE TECHNOLOGIES

The first of the TRISTAR series is a small diameter drill with 5 technological features for fast, reliable and accurate drilling.
Ø 1.0 mm – Ø 2.9 mm L/D = 2 – 50





Material	42CrMo4
Tool	DC = Ø 1.0 mm, L/D = 20
Vc (m/min)	70
f (mm/rev)	0.04

DRILLS SELECTION

DVAS - SOLID CARBIDE TRISTAR DRILL SERIES

	Product code	DC	Size	Item	Hole depth	Material					Shape
						P	M	K	N	S	
Pilot drill	DVAS○○○X02	Ø1.0 – Ø2.9	0.1	20	2	◎	◎	○	○	◎	
	DVAS○○○X07	Ø1.0 – Ø2.9	0.1	20	7	◎	◎	○	○	◎	
Long drill	DVAS○○○X12	Ø1.0 – Ø2.9	0.1	20	12	◎	◎	○	○	◎	
	DVAS○○○X20	Ø1.0 – Ø2.9	0.1	20	20	◎	◎	○	○	◎	
	DVAS○○○X25	Ø1.0 – Ø2.9	0.1	20	25	◎	◎	○	○	◎	
	DVAS○○○X30	Ø1.0 – Ø2.9	0.1	20	30	◎	◎	○	○	◎	
	DVAS○○○X40	Ø1.0 – Ø2.9	0.1	20	40	◎	◎	○	○	◎	
	DVAS○○○X50	Ø1.0 – Ø2.5	0.5	20	50	◎	◎	○	○	◎	

IDENTIFICATION

Coolant

S Internal coolant

L/D

X50 L/D = 50

X02 L/D = 2

DVA | **S** | **0100** | **X50** | **S040**

Applications

DVA General-purpose

Diameter

0100 | Ø 1.0 mm

0290 | Ø 2.9 mm

Type of Shank

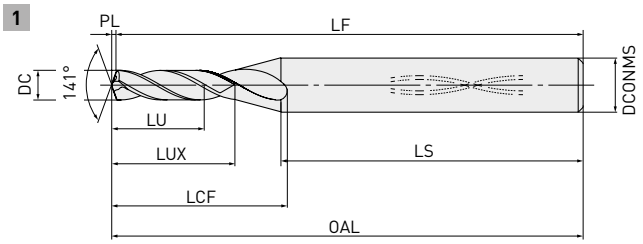
S040 Shank diameter 4 mm

MINI DVAS

SOLID CARBIDE PILOT DRILLS - TRISTAR DRILLS

P M K N S

1



DC<3
0.006
-0.004

DCONMS = 4
0
-0.008

Order number	DP1120	DC	DCONMS	L/D	LU	LUX	LCF	LS	OAL	LF	PL	Type
DVAS0100X02S040	●	1.0	4	2	2.2	3.2	8.6	41.2	50.0	49.8	0.2	1
DVAS0110X02S040	●	1.1	4	2	2.4	3.5	9.0	41.1	50.0	49.8	0.2	1
DVAS0120X02S040	●	1.2	4	2	2.6	3.9	9.4	41.0	50.0	49.8	0.2	1
DVAS0130X02S040	●	1.3	4	2	2.8	4.2	9.9	40.8	50.0	49.8	0.2	1
DVAS0140X02S040	●	1.4	4	2	3.0	4.5	10.3	40.7	50.0	49.8	0.2	1
DVAS0150X02S040	●	1.5	4	2	3.3	4.8	10.7	40.6	50.0	49.7	0.3	1
DVAS0160X02S040	●	1.6	4	2	3.5	5.1	11.1	40.4	50.0	49.7	0.3	1
DVAS0170X02S040	●	1.7	4	2	3.7	5.5	11.6	40.3	50.0	49.7	0.3	1
DVAS0180X02S040	●	1.8	4	2	3.9	5.8	12.0	40.2	50.0	49.7	0.3	1
DVAS0190X02S040	●	1.9	4	2	4.1	6.1	12.4	40.0	50.0	49.7	0.3	1
DVAS0200X02S040	●	2.0	4	2	4.4	6.4	12.9	39.9	50.0	49.6	0.4	1
DVAS0210X02S040	●	2.1	4	2	4.6	6.7	13.3	39.8	50.0	49.6	0.4	1
DVAS0220X02S040	●	2.2	4	2	4.8	7.0	13.7	39.7	50.0	49.6	0.4	1
DVAS0230X02S040	●	2.3	4	2	5.0	7.4	14.1	44.5	55.0	54.6	0.4	1
DVAS0240X02S040	●	2.4	4	2	5.2	7.7	14.6	44.4	55.0	54.6	0.4	1
DVAS0250X02S040	●	2.5	4	2	5.5	8.0	15.0	44.3	55.0	54.6	0.4	1
DVAS0260X02S040	●	2.6	4	2	5.7	8.3	15.4	44.1	55.0	54.5	0.5	1
DVAS0270X02S040	●	2.7	4	2	5.9	8.6	15.8	44.0	55.0	54.5	0.5	1
DVAS0280X02S040	●	2.8	4	2	6.1	8.9	16.3	43.9	55.0	54.5	0.5	1
DVAS0290X02S040	●	2.9	4	2	6.3	9.3	16.7	43.7	55.0	54.5	0.5	1

1/1

254 Vc

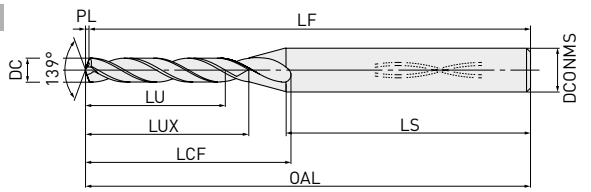
● : Inventory maintained. ★ : Inventory maintained in Japan.

MINI DVAS

SOLID CARBIDE TRISTAR DRILL

P M K S N

2



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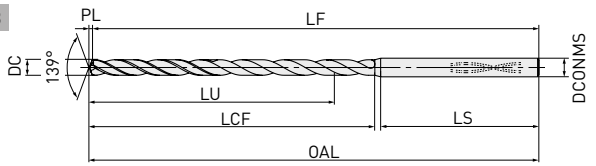

DC<3
0
-0.010

DCONMS = 4
0
-0.008

Order number	DP1120	DC	DCONMS	L/D	LU	LUX	LCF	LS	OAL	LF	PL	Type
DVAS0100X07S040	●	1.0	4	7	7.2	8.2	13.6	41.2	55.0	54.8	0.2	2
DVAS0100X12S040	●	1.0	4	12	12.2	13.2	18.6	39.2	58.0	57.8	0.2	2
DVAS0100X20S040	●	1.0	4	20	20.2	—	23.2	38.2	67.0	66.8	0.2	3
DVAS0100X25S040	●	1.0	4	25	25.2	—	28.2	39.2	73.0	72.8	0.2	3
DVAS0100X30S040	●	1.0	4	30	30.2	—	33.2	40.2	79.0	78.8	0.2	3
DVAS0100X40S040	●	1.0	4	40	40.2	—	43.2	41.2	90.0	89.8	0.2	3
DVAS0100X50S040	●	1.0	4	50	50.2	—	53.2	43.2	102.0	101.8	0.2	3
DVAS0110X07S040	●	1.1	4	7	7.9	9.1	14.5	40.6	55.0	54.8	0.2	2
DVAS0110X12S040	●	1.1	4	12	13.4	14.6	20.0	38.1	58.0	57.8	0.2	2
DVAS0110X20S040	●	1.1	4	20	22.2	—	25.5	36.1	67.0	66.8	0.2	3
DVAS0110X25S040	●	1.1	4	25	27.7	—	31.0	36.6	73.0	72.8	0.2	3
DVAS0110X30S040	●	1.1	4	30	33.2	—	36.5	37.1	79.0	78.8	0.2	3
DVAS0110X40S040	●	1.1	4	40	44.2	—	47.5	37.1	90.0	89.8	0.2	3
NEW DVAS0110X50S040	●	1.1	4	50	55.2	—	58.5	38.1	102.0	101.8	0.2	3
DVAS0120X07S040	●	1.2	4	7	8.6	9.9	15.4	40.0	55.0	54.8	0.2	2
DVAS0120X12S040	●	1.2	4	12	14.6	15.9	21.4	39.0	60.0	59.8	0.2	2
DVAS0120X20S040	●	1.2	4	20	24.2	—	27.8	38.0	71.0	70.8	0.2	3
DVAS0120X25S040	●	1.2	4	25	30.2	—	33.8	38.0	77.0	76.8	0.2	3
DVAS0120X30S040	●	1.2	4	30	36.2	—	39.8	39.0	84.0	83.8	0.2	3
DVAS0120X40S040	●	1.2	4	40	48.2	—	51.8	40.0	97.0	96.8	0.2	3
NEW DVAS0120X50S040	●	1.2	4	50	60.2	—	63.8	41.0	110.0	109.8	0.2	3
DVAS0130X07S040	●	1.3	4	7	9.3	10.7	16.4	39.3	55.0	54.8	0.2	2
DVAS0130X12S040	●	1.3	4	12	15.8	17.2	22.9	37.8	60.0	59.8	0.2	2
DVAS0130X20S040	●	1.3	4	20	26.2	—	30.1	35.8	71.0	70.8	0.2	3
DVAS0130X25S040	●	1.3	4	25	32.7	—	36.6	35.3	77.0	76.8	0.2	3
DVAS0130X30S040	●	1.3	4	30	39.2	—	43.1	35.8	84.0	83.8	0.2	3
DVAS0130X40S040	●	1.3	4	40	52.2	—	56.1	35.8	97.0	96.8	0.2	3
NEW DVAS0130X50S040	●	1.3	4	50	65.2	—	69.1	35.8	110.0	109.8	0.2	3

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

254 Vc

MINI DVAS – SOLID CARBIDE TRISTAR DRILL

	Order number	DP1120	DC	DCONMS	L/D	LU	LUX	LCF	LS	OAL	LF	PL	Type
	DVAS0140X07S040	●	1.4	4	7	10.1	11.5	17.3	38.7	55.0	54.7	0.3	2
	DVAS0140X12S040	●	1.4	4	12	17.1	18.5	24.3	39.7	63.0	62.7	0.3	2
	DVAS0140X20S040	●	1.4	4	20	28.3	—	32.5	37.7	75.0	74.7	0.3	3
	DVAS0140X25S040	●	1.4	4	25	35.3	—	39.5	37.7	82.0	81.7	0.3	3
	DVAS0140X30S040	●	1.4	4	30	42.3	—	46.5	38.7	90.0	89.7	0.3	3
	DVAS0140X40S040	●	1.4	4	40	56.3	—	60.5	39.7	105.0	104.7	0.3	3
NEW	DVAS0140X50S040	●	1.4	4	50	70.3	—	74.5	40.7	120.0	119.7	0.3	3
	DVAS0150X07S040	●	1.5	4	7	10.8	12.3	18.2	38.1	55.0	54.7	0.3	2
	DVAS0150X12S040	●	1.5	4	12	18.3	19.8	25.7	38.6	63.0	62.7	0.3	2
	DVAS0150X20S040	●	1.5	4	20	30.3	—	34.8	35.6	75.0	74.7	0.3	3
	DVAS0150X25S040	●	1.5	4	25	37.8	—	42.3	35.1	82.0	81.7	0.3	3
	DVAS0150X30S040	●	1.5	4	30	45.3	—	49.8	35.6	90.0	89.7	0.3	3
	DVAS0150X40S040	●	1.5	4	40	60.3	—	64.8	35.6	105.0	104.7	0.3	3
	DVAS0150X50S040	●	1.5	4	50	75.3	—	79.8	35.6	120.0	119.7	0.3	3
	DVAS0160X07S040	●	1.6	4	7	11.5	13.1	19.2	39.4	57.0	56.7	0.3	2
	DVAS0160X12S040	●	1.6	4	12	19.5	21.1	27.2	40.4	66.0	65.7	0.3	2
	DVAS0160X20S040	●	1.6	4	20	32.3	—	37.1	37.4	79.0	78.7	0.3	3
	DVAS0160X25S040	●	1.6	4	25	40.3	—	45.1	38.4	88.0	87.7	0.3	3
	DVAS0160X30S040	●	1.6	4	30	48.3	—	53.1	41.4	99.0	98.7	0.3	3
	DVAS0160X40S040	●	1.6	4	40	64.3	—	69.1	39.4	113.0	112.7	0.3	3
NEW	DVAS0160X50S040	●	1.6	4	50	80.3	—	85.1	40.4	130.0	129.7	0.3	3
	DVAS0170X07S040	●	1.7	4	7	12.2	14.0	20.1	38.8	57.0	56.7	0.3	2
	DVAS0170X12S040	●	1.7	4	12	20.7	22.5	28.6	39.3	66.0	65.7	0.3	2
	DVAS0170X20S040	●	1.7	4	20	34.3	—	39.4	35.3	79.0	78.7	0.3	3
	DVAS0170X25S040	●	1.7	4	25	42.8	—	47.9	35.8	88.0	87.7	0.3	3
	DVAS0170X30S040	●	1.7	4	30	51.3	—	56.4	38.3	99.0	98.7	0.3	3
	DVAS0170X40S040	●	1.7	4	40	68.3	—	73.4	35.3	113.0	112.7	0.3	3
NEW	DVAS0170X50S040	●	1.7	4	50	85.3	—	90.4	35.3	130.0	129.7	0.3	3
	DVAS0180X07S040	●	1.8	4	7	12.9	14.8	21.0	40.2	59.0	58.7	0.3	2
	DVAS0180X12S040	●	1.8	4	12	21.9	23.8	30.0	41.2	69.0	68.7	0.3	2
	DVAS0180X20S040	●	1.8	4	20	36.3	—	41.7	38.2	84.0	83.7	0.3	3
	DVAS0180X25S040	●	1.8	4	25	45.3	—	50.7	39.2	94.0	93.7	0.3	3
	DVAS0180X30S040	●	1.8	4	30	54.3	—	59.7	40.2	104.0	103.7	0.3	3
	DVAS0180X40S040	●	1.8	4	40	72.3	—	77.7	41.2	123.0	122.7	0.3	3
NEW	DVAS0180X50S040	●	1.8	4	50	90.3	—	95.7	43.2	143.0	142.7	0.3	3
	DVAS0190X07S040	●	1.9	4	7	13.7	15.6	21.9	39.5	59.0	58.6	0.4	2
	DVAS0190X12S040	●	1.9	4	12	23.2	25.1	31.4	40.0	69.0	68.6	0.4	2
	DVAS0190X20S040	●	1.9	4	20	38.4	—	44.1	36.0	84.0	83.6	0.4	3
	DVAS0190X25S040	●	1.9	4	25	47.9	—	53.6	36.5	94.0	93.6	0.4	3
	DVAS0190X30S040	●	1.9	4	30	57.4	—	63.1	37.0	104.0	103.6	0.4	3
	DVAS0190X40S040	●	1.9	4	40	76.4	—	82.1	37.0	123.0	122.6	0.4	3
NEW	DVAS0190X50S040	●	1.9	4	50	95.4	—	101.1	38.0	143.0	142.6	0.4	3
	DVAS0200X07S040	●	2.0	4	7	14.4	16.4	22.9	41.9	62.0	61.6	0.4	2
	DVAS0200X12S040	●	2.0	4	12	24.4	26.4	32.9	42.9	73.0	72.6	0.4	2
	DVAS0200X20S040	●	2.0	4	20	40.4	—	46.4	40.9	91.0	90.6	0.4	3
	DVAS0200X25S040	●	2.0	4	25	50.4	—	56.4	41.9	102.0	101.6	0.4	3
	DVAS0200X30S040	●	2.0	4	30	60.4	—	66.4	42.9	113.0	112.6	0.4	3
	DVAS0200X40S040	●	2.0	4	40	80.4	—	86.4	45.9	136.0	135.6	0.4	3
	DVAS0200X50S040	●	2.0	4	50	100.4	—	106.4	47.9	158.0	157.6	0.4	3

MINI DVAS – SOLID CARBIDE TRISTAR DRILL

	Order number	DP1120	DC	DCONMS	L/D	LU	LUX	LCF	LS	OAL	LF	PL	Type
	DVAS0210X07S040	●	2.1	4	7	15.1	17.2	23.8	41.3	62.0	61.6	0.4	2
	DVAS0210X12S040	●	2.1	4	12	25.6	27.7	34.3	41.8	73.0	72.6	0.4	2
	DVAS0210X20S040	●	2.1	4	20	42.4	—	48.7	38.8	91.0	90.6	0.4	3
	DVAS0210X25S040	●	2.1	4	25	52.9	—	59.2	39.3	102.0	101.6	0.4	3
	DVAS0210X30S040	●	2.1	4	30	63.4	—	69.7	39.8	113.0	112.6	0.4	3
	DVAS0210X40S040	●	2.1	4	40	84.4	—	90.7	41.8	136.0	135.6	0.4	3
NEW	DVAS0210X50S040	●	2.1	4	50	105.4	—	111.7	42.8	158.0	157.6	0.4	3
	DVAS0220X07S040	●	2.2	4	7	15.8	18.1	24.7	40.6	62.0	61.6	0.4	2
	DVAS0220X12S040	●	2.2	4	12	26.8	29.1	35.7	40.6	73.0	72.6	0.4	2
	DVAS0220X20S040	●	2.2	4	20	44.4	—	51.0	36.6	91.0	90.6	0.4	3
	DVAS0220X25S040	●	2.2	4	25	55.4	—	62.0	36.6	102.0	101.6	0.4	3
	DVAS0220X30S040	●	2.2	4	30	66.4	—	73.0	36.6	113.0	112.6	0.4	3
	DVAS0220X40S040	●	2.2	4	40	88.4	—	95.0	37.6	136.0	135.6	0.4	3
NEW	DVAS0220X50S040	●	2.2	4	50	110.4	—	117.0	37.6	158.0	157.6	0.4	3
	DVAS0230X07S040	●	2.3	4	7	16.5	18.9	25.7	43.0	65.0	64.6	0.4	2
	DVAS0230X12S040	●	2.3	4	12	28.0	30.4	37.2	44.5	78.0	77.6	0.4	2
	DVAS0230X20S040	●	2.3	4	20	46.4	—	53.3	41.5	98.0	97.6	0.4	3
	DVAS0230X25S040	●	2.3	4	25	57.9	—	64.8	43.0	111.0	110.6	0.4	3
	DVAS0230X30S040	●	2.3	4	30	69.4	—	76.3	44.5	124.0	123.6	0.4	3
	DVAS0230X40S040	●	2.3	4	40	92.4	—	99.3	47.5	150.0	149.6	0.4	3
NEW	DVAS0230X50S040	●	2.3	4	50	115.4	—	122.3	50.5	176.0	175.6	0.4	3
	DVAS0240X07S040	●	2.4	4	7	17.2	19.7	26.6	42.4	65.0	64.6	0.4	2
	DVAS0240X12S040	●	2.4	4	12	29.2	31.7	38.6	43.4	78.0	77.6	0.4	2
	DVAS0240X20S040	●	2.4	4	20	48.4	—	55.6	39.4	98.0	97.6	0.4	3
	DVAS0240X25S040	●	2.4	4	25	60.4	—	67.6	40.4	111.0	110.6	0.4	3
	DVAS0240X30S040	●	2.4	4	30	72.4	—	79.6	41.4	124.0	123.6	0.4	3
	DVAS0240X40S040	●	2.4	4	40	96.4	—	103.6	43.4	150.0	149.6	0.4	3
NEW	DVAS0240X50S040	●	2.4	4	50	120.4	—	127.6	45.4	176.0	175.6	0.4	3
	DVAS0250X07S040	●	2.5	4	7	18.0	20.5	27.5	41.7	65.0	64.5	0.5	2
	DVAS0250X12S040	●	2.5	4	12	30.5	33.0	40.0	42.2	78.0	77.5	0.5	2
	DVAS0250X20S040	●	2.5	4	20	50.5	—	58.0	37.2	98.0	97.5	0.5	3
	DVAS0250X25S040	●	2.5	4	25	63.0	—	70.5	37.7	111.0	110.5	0.5	3
	DVAS0250X30S040	●	2.5	4	30	75.5	—	83.0	38.2	124.0	123.5	0.5	3
	DVAS0250X40S040	●	2.5	4	40	100.5	—	108.0	39.2	150.0	149.5	0.5	3
	DVAS0250X50S040	●	2.5	4	50	125.5	—	133.0	40.2	176.0	175.5	0.5	3
	DVAS0260X07S040	●	2.6	4	7	18.7	21.3	28.4	41.1	65.0	64.5	0.5	2
	DVAS0260X12S040	●	2.6	4	12	31.7	34.3	41.4	41.1	78.0	77.5	0.5	2
	DVAS0260X20S040	●	2.6	4	20	52.5	—	60.3	35.1	98.0	97.5	0.5	3
	DVAS0260X25S040	●	2.6	4	25	65.5	—	73.3	35.1	111.0	110.5	0.5	3
	DVAS0260X30S040	●	2.6	4	30	78.5	—	86.3	35.1	124.0	123.5	0.5	3
	DVAS0260X40S040	●	2.6	4	40	104.5	—	112.3	35.1	150.0	149.5	0.5	3
NEW	DVAS0260X50S040	●	2.6	4	50	130.5	—	138.3	35.1	176.0	175.5	0.5	3
	DVAS0270X07S040	●	2.7	4	7	19.4	22.2	29.4	43.5	68.0	67.5	0.5	2
	DVAS0270X12S040	●	2.7	4	12	32.9	35.7	42.9	45.0	83.0	82.5	0.5	2
	DVAS0270X20S040	●	2.7	4	20	54.5	—	62.6	42.0	107.0	106.5	0.5	3
	DVAS0270X25S040	●	2.7	4	25	68.0	—	76.1	43.5	122.0	121.5	0.5	3
	DVAS0270X30S040	●	2.7	4	30	81.5	—	89.6	45.0	137.0	136.5	0.5	3
	DVAS0270X40S040	●	2.7	4	40	108.5	—	116.6	48.0	167.0	166.5	0.5	3
NEW	DVAS0270X50S040	●	2.7	4	50	135.5	—	143.6	51.0	197.0	196.5	0.5	3

MINI DVAS – SOLID CARBIDE TRISTAR DRILL

	Order number	DP1120	DC	DCONMS	L/D	LU	LUX	LCF	LS	OAL	LF	PL	Type
	DVAS0280X07S040	●	2.8	4	7	20.1	23.0	30.3	42.8	68.0	67.5	0.5	2
	DVAS0280X12S040	●	2.8	4	12	34.1	37.0	44.3	43.8	83.0	82.5	0.5	2
	DVAS0280X20S040	●	2.8	4	20	56.5	—	64.9	39.8	107.0	106.5	0.5	3
	DVAS0280X25S040	●	2.8	4	25	70.5	—	78.9	40.8	122.0	121.5	0.5	3
	DVAS0280X30S040	●	2.8	4	30	84.5	—	92.9	41.8	137.0	136.5	0.5	3
	DVAS0280X40S040	●	2.8	4	40	112.5	—	120.9	43.8	167.0	166.5	0.5	3
NEW	DVAS0280X50S040	●	2.8	4	50	140.5	—	148.9	45.8	197.0	196.5	0.5	3
	DVAS0290X07S040	●	2.9	4	7	20.8	23.8	31.2	42.2	68.0	67.5	0.5	2
	DVAS0290X12S040	●	2.9	4	12	35.3	38.3	45.7	42.7	83.0	82.5	0.5	2
	DVAS0290X20S040	●	2.9	4	20	58.5	—	67.2	37.7	107.0	106.5	0.5	3
	DVAS0290X25S040	●	2.9	4	25	73.0	—	81.7	38.2	122.0	121.5	0.5	3
	DVAS0290X30S040	●	2.9	4	30	87.5	—	96.2	38.7	137.0	136.5	0.5	3
	DVAS0290X40S040	●	2.9	4	40	116.5	—	125.2	39.7	167.0	166.5	0.5	3
NEW	DVAS0290X50S040	●	2.9	4	50	145.5	—	154.2	40.7	197.0	196.5	0.5	3
													4/4

254 Vc

MINI DVAS

RECOMMENDED CUTTING CONDITIONS

	Material	DC	L/D	Vc	n	fr
P	Mild steel Carbon steel, Alloy steel	1.0	2 – 30	65 (30 – 100)	20700	0.035 (0.020 – 0.050)
		1.0	40, 50	65 (30 – 100)	20700	0.030 (0.020 – 0.040)
		1.5	2 – 30	65 (30 – 100)	13800	0.053 (0.030 – 0.075)
		1.5	40, 50	65 (30 – 100)	13800	0.045 (0.030 – 0.060)
		2.0	2 – 30	70 (40 – 100)	11100	0.070 (0.040 – 0.100)
		2.0	40, 50	70 (40 – 100)	11100	0.060 (0.040 – 0.080)
		2.5	2 – 30	70 (40 – 100)	8900	0.088 (0.050 – 0.125)
		2.5	40, 50	70 (40 – 100)	8900	0.075 (0.050 – 0.100)
		2.9	2 – 30	70 (40 – 100)	7700	0.102 (0.058 – 0.145)
		2.9	40, 50	70 (40 – 100)	7700	0.087 (0.058 – 0.116)
M	Austenitic stainless steel, Ferritic stainless steel Ferritic and martensitic stainless steel Precipitation hardening stainless steel	1.0	2 – 30	60 (20 – 100)	19100	0.025 (0.010 – 0.040)
		1.0	40, 50	60 (20 – 100)	19100	0.020 (0.010 – 0.030)
		1.5	2 – 30	60 (20 – 100)	12700	0.038 (0.015 – 0.060)
		1.5	40, 50	60 (20 – 100)	12700	0.030 (0.015 – 0.045)
		2.0	2 – 30	60 (20 – 100)	9500	0.050 (0.020 – 0.080)
		2.0	40, 50	60 (20 – 100)	9500	0.040 (0.020 – 0.060)
		2.5	2 – 30	60 (20 – 100)	7600	0.063 (0.025 – 0.100)
		2.5	40, 50	60 (20 – 100)	7600	0.050 (0.025 – 0.075)
		2.9	2 – 30	60 (20 – 100)	6600	0.073 (0.029 – 0.116)
		2.9	40, 50	60 (20 – 100)	6600	0.058 (0.029 – 0.087)
K	Cast iron Ductile cast iron	1.0	2 – 30	70 (40 – 100)	22300	0.035 (0.020 – 0.050)
		1.0	40, 50	70 (40 – 100)	22300	0.030 (0.020 – 0.040)
		1.5	2 – 30	70 (40 – 100)	14900	0.053 (0.030 – 0.075)
		1.5	40, 50	70 (40 – 100)	14900	0.045 (0.030 – 0.060)
		2.0	2 – 30	70 (40 – 100)	11100	0.070 (0.040 – 0.100)
		2.0	40, 50	70 (40 – 100)	11100	0.060 (0.040 – 0.080)
		2.5	2 – 30	70 (40 – 100)	8900	0.088 (0.050 – 0.125)
		2.5	40, 50	70 (40 – 100)	8900	0.075 (0.050 – 0.100)
		2.9	2 – 30	70 (40 – 100)	7700	0.102 (0.058 – 0.145)
		2.9	40, 50	70 (40 – 100)	7700	0.087 (0.058 – 0.116)
N	Aluminium alloy	1.0	2 – 30	140 (100 – 180)	31800	0.040 (0.020 – 0.060)
		1.0	40, 50	140 (100 – 180)	31800	0.035 (0.020 – 0.050)
		1.5	2 – 30	140 (100 – 180)	21200	0.060 (0.030 – 0.090)
		1.5	40, 50	140 (100 – 180)	21200	0.053 (0.030 – 0.075)
		2.0	2 – 30	140 (100 – 180)	15900	0.080 (0.040 – 0.120)
		2.0	40, 50	140 (100 – 180)	15900	0.070 (0.040 – 0.100)
		2.5	2 – 30	140 (100 – 180)	12700	0.100 (0.050 – 0.150)
		2.5	40, 50	140 (100 – 180)	12700	0.088 (0.050 – 0.125)
		2.9	2 – 30	140 (100 – 180)	11000	0.116 (0.058 – 0.174)
		2.9	40, 50	140 (100 – 180)	11000	0.102 (0.058 – 0.145)

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1. This recommended condition is only when using internal coolant.
2. Check the condition of chips and perform step machining if necessary. * Reference of step length: 0.2 to 1.0 DC
3. Adjust the cutting conditions according to machine tool and workpiece clamp rigidity and machining geometry, etc.
4. Machining depths exceeding flute length (LU) are not recommend.
5. Clamp the drill so that the drill runout is within 0.003 mm.
6. Do not clamp the flute part of the drill.

MINI DVAS

	Material	DC	L/D	Vc	n	fr
S	Heat resistant alloy	1.0	2 – 30	30 (10 – 50)	9500	0.015 (0.010 – 0.020)
		1.0	40, 50	30 (10 – 50)	9500	0.015 (0.010 – 0.020)
		1.5	2 – 30	30 (10 – 50)	6400	0.023 (0.015 – 0.030)
		1.5	40, 50	30 (10 – 50)	6400	0.023 (0.015 – 0.030)
		2.0	2 – 30	30 (10 – 50)	4800	0.030 (0.020 – 0.040)
		2.0	40, 50	30 (10 – 50)	4800	0.030 (0.020 – 0.040)
		2.5	2 – 30	30 (10 – 50)	3800	0.038 (0.025 – 0.050)
		2.5	40, 50	30 (10 – 50)	3800	0.038 (0.025 – 0.050)
		2.9	2 – 30	30 (10 – 50)	3300	0.044 (0.029 – 0.058)
		2.9	40, 50	30 (10 – 50)	3300	0.044 (0.029 – 0.058)
	Titanium alloy	1.0	2 – 30	30 (20 – 40)	9500	0.020 (0.010 – 0.030)
		1.0	40, 50	30 (20 – 40)	9500	0.020 (0.010 – 0.030)
		1.5	2 – 30	30 (20 – 40)	6400	0.030 (0.015 – 0.045)
		1.5	40, 50	30 (20 – 40)	6400	0.030 (0.015 – 0.045)
		2.0	2 – 30	30 (20 – 40)	4800	0.040 (0.020 – 0.060)
		2.0	40, 50	30 (20 – 40)	4800	0.040 (0.020 – 0.060)
		2.5	2 – 30	30 (20 – 40)	3800	0.050 (0.025 – 0.075)
		2.5	40, 50	30 (20 – 40)	3800	0.050 (0.025 – 0.075)
		2.9	2 – 30	30 (20 – 40)	3300	0.058 (0.029 – 0.087)
		2.9	40, 50	30 (20 – 40)	3300	0.058 (0.029 – 0.087)
	Cobalt chrome alloy	1.0	2 – 30	60 (30 – 90)	19100	0.020 (0.010 – 0.030)
		1.0	40, 50	60 (30 – 90)	19100	0.020 (0.010 – 0.030)
		1.5	2 – 30	60 (30 – 90)	12700	0.030 (0.015 – 0.045)
		1.5	40, 50	60 (30 – 90)	12700	0.030 (0.015 – 0.045)
		2.0	2 – 30	60 (30 – 90)	9500	0.040 (0.020 – 0.060)
		2.0	40, 50	60 (30 – 90)	9500	0.040 (0.020 – 0.060)
		2.5	2 – 30	60 (30 – 90)	7600	0.050 (0.025 – 0.075)
		2.5	40, 50	60 (30 – 90)	7600	0.050 (0.025 – 0.075)
		2.9	2 – 30	60 (30 – 90)	6600	0.058 (0.029 – 0.087)
		2.9	40, 50	60 (30 – 90)	6600	0.058 (0.029 – 0.087)

1. This recommended condition is only when using internal coolant.
2. Check the condition of chips and perform step machining if necessary. * Reference of step length: 0.2 to 1.0 DC
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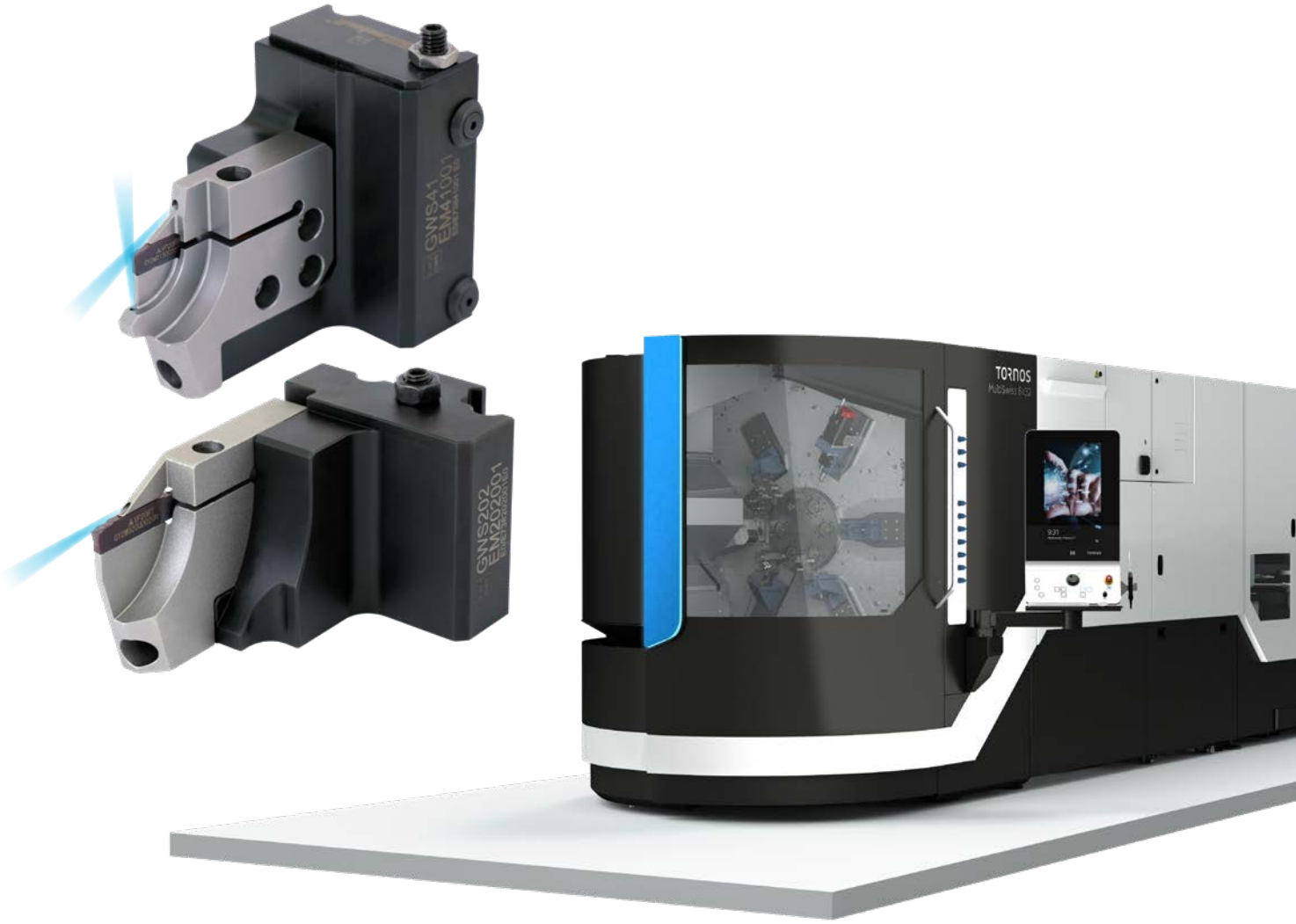
NEW

G80A (MPLUS)

PARTING OFF SYSTEM FOR TORNOS MULTI-SPINDLE MACHINES



In cooperation with

Göltenbodt®
Innovation and Precision.

TORNOS

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MP112

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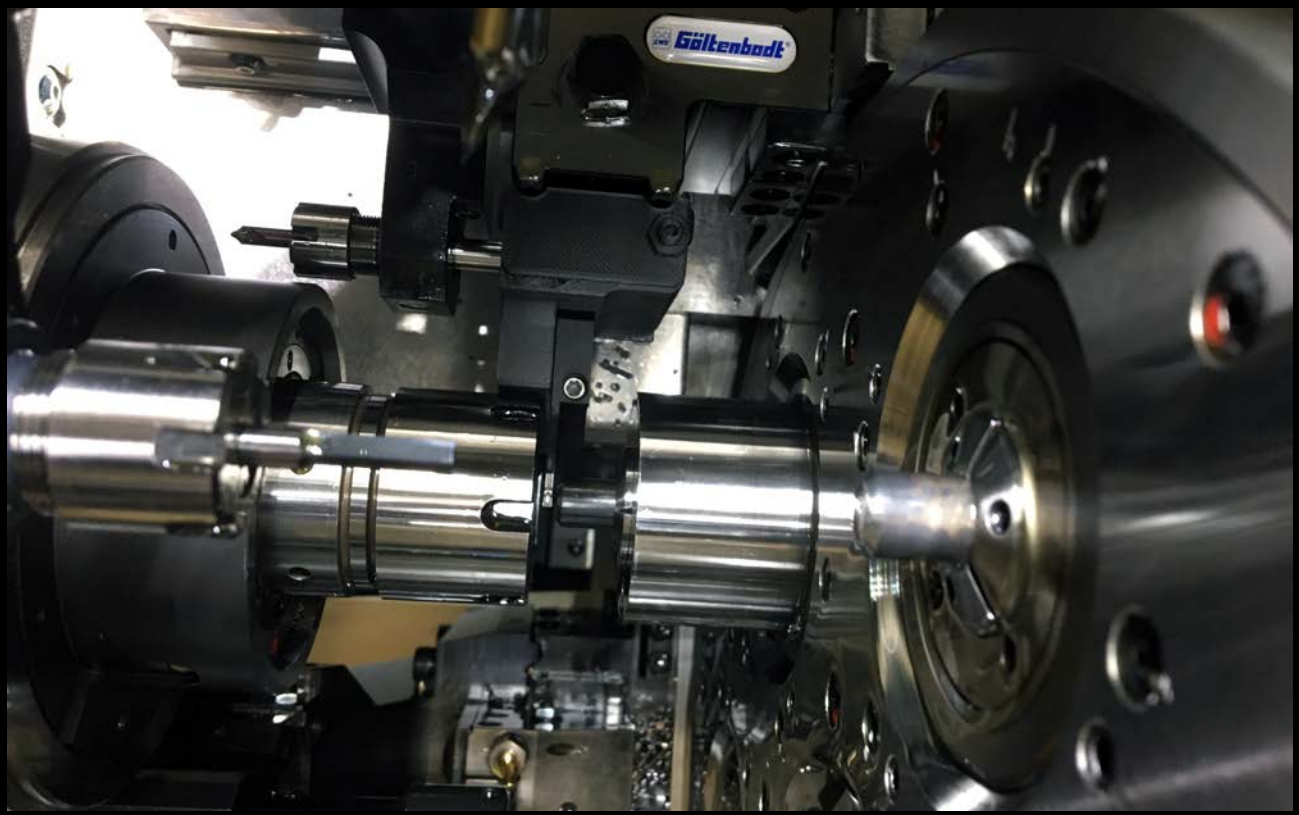
PARTING OFF IN SERIES

MODULAR – PERFORMANCE – UNCOMPROMISING

Regardless of the industry, it is the deep knowledge of the details that ultimately makes the difference and distinguishes the best from the rest. Whether it is in the medical or automotive industries, general mechanical engineering or the consumer goods industry, the components should be designed using the least space, weight or resources for the same function.

This means, small parts have to be produced in an efficient and precise way, as it has been done for many years on multi-spindle machines. Completely independent of any component details, one of the key elements in the whole machining process is reliable parting off.



The new G80A parting-off system, also includes the details that offer added performance, reliability and efficiency. The targeted internal coolant supply makes the process even more reliable and enables longer tool life.

Easy handling both when changing inserts and when setting the centre height are added features. The grooving modules are specially designed for the conditions on the machine, which significantly increases stability.

PARTING OFF SYSTEM FOR TORNOS MULTI-SPINDLE MACHINES

FOR THE LIMITED SPACE IN MULTI-SPINDLE MACHINES

Reliable parting off with modular tools specially designed for Swiss multi-spindle machines in cooperation with Göltenbodt. Efficientand reliable processing is realised due to the optimized internal through coolant supply for parting off widths from 1.5 mm.

Product range

- Quick change adapter system GWS41
- Quick change adapter system GWS202
- Modules for GY indexable inserts
- GY indexable inserts

Characteristics

- Designed for the limited space between the main and counter spindle
- Secure and accurate clamping of the indexable insert
- Optimised through coolant supply

SPECIALLY DESIGNED FEATURES FOR EFFICIENCY AND EASE OF USE

BENEFITS

- High process reliability
- Internal coolant supply optimised for long tool life
- Small grooving width for maximum material utilisation

G80A

PARTING OFF SYSTEM FOR TORNOS MULTI-SPINDLE MACHINES

Internal coolant supply up to 8 Mpa
for optimal coolant on the cutting edge.

Stability based on the proven
Göltenbodt GWS column guide system.
Quick change, easy centre height
setting and precision in one system.

Accessible and strong clamping
of the indexable insert.

Optimal stability and function by
individual alignment of the components
and with regards to the limited space in
these type of machines.

G80A

PARTING OFF SYSTEM FOR TORNOS MULTI-SPINDLE MACHINES

Designed respectively for the current Tornos Multi-Swiss machines the following combinations are available.

Multi-Swiss 6 x 16 | Multi-Swiss 8 x 26 | Multi-Swiss 6 x 32

6 x 16

8 x 26
6 x 32

Göltenbodt Innovation and Precision.

Göltenbodt system GWS41 (page 261+262)

Modul G80A w = 1.5 – w = 2.0

Mplus...

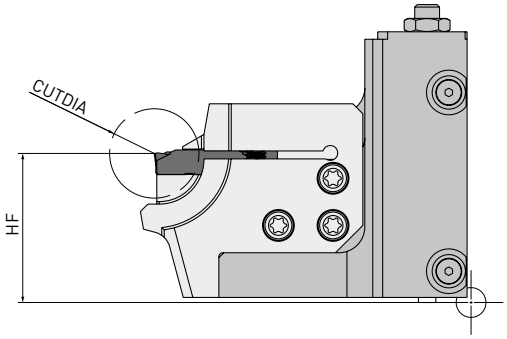
Göltenbodt system GWS202 (page 263+264)

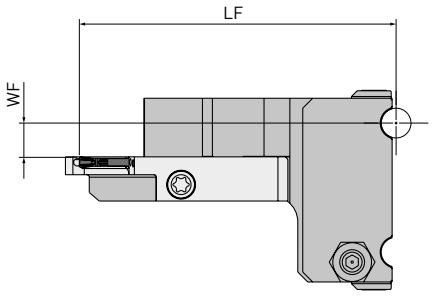
Modul G80A w = 2.0

Wide variety of GY-grooving inserts for applications in different materials

G80A

QUICK CHANGE TYPE ADAPTERS GWS41





Order number	Stock	Hand	GWS system	Suitable for machine	CUTDIA	LF X-Axis	HF Y-Axis	WF Z-Axis
EM41001	●	R	41	MS 6 x 16	16	63.8*	30	7.15 (cw = 1.5) / 6.9 (cw = 2.0)

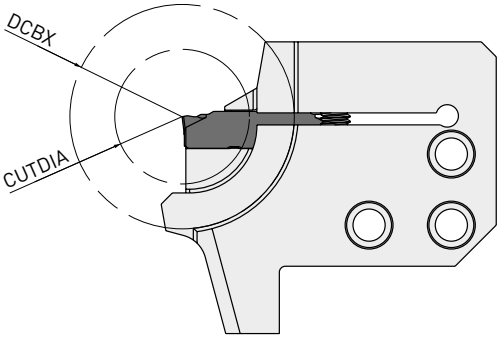
1/1

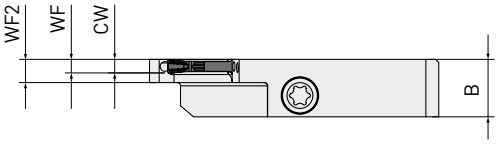
1. Module shown only for dimensional visualisation.
* Spindle nut diameter max. 30 mm.

● : Inventory maintained.

G80A

MODULE FOR QUICK CHANGE ADAPTER GWS41





Order number	Stock	Hand	GWS system	Suitable for machine	CUTDIA	DCBX	Seat size	CW	WF	WF2	B	IK
G80A-EM410RL16GYC2-E	●	R	41	MS 6x16	16	30	C	1.5	1.85	3.6	8.9	FF1 / SF2
G80A-EM410RL16GYD2-E	●	R	41	MS 6x16	16	30	D	2.0	2.1	3.6	8.9	FF1 / SF2

1/1

1. For modules with flank cooling (FF), tool presetting must be carried out using the incident light method.
2. Rake face coolant requires no specific presetting method.

SPARE PARTS

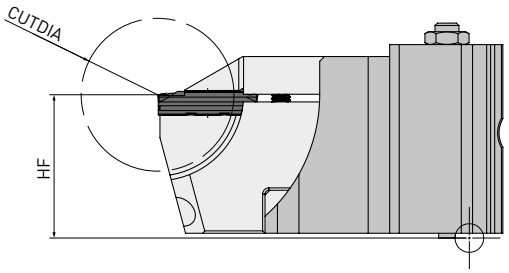
Tool holder	Screw	Wrench
EM41001	TS43 (3.5 Nm)*	TKY15W-E
G80A-EM410RL16GYC2-E	TS406 (3.5 Nm)*	
G80A-EM410RL16GYD2-E		

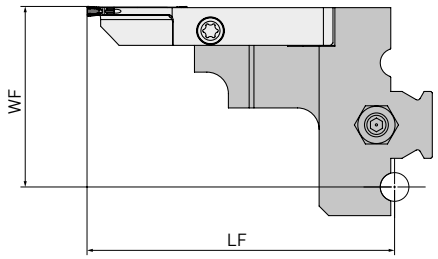
* Recommended to use a torque screwdriver with a Torx 15 bit.

● : Inventory maintained.

G80A

QUICK CHANGE ADAPTERS GWS202





Order number	Stock	Hand	GWS system	Suitable for machine	CUTDIA	LF X-Axis	HF Y-Axis	WF Z-Axis
EM202001	●	L	202	MS 8x26 / MS 6x32	32*	64.4	30	37.8 (cw = 2.0)

1/1

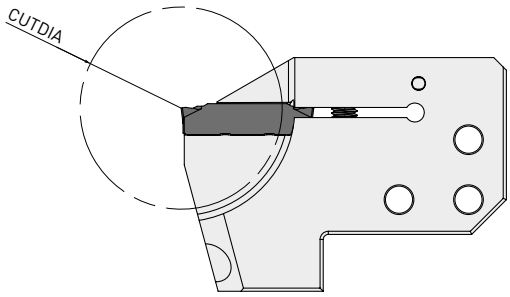
1. Module shown only for dimensional visuilasation.
* Spindle nut diameter max. 66 mm.

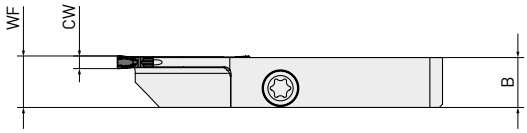
Gültenbodt Innovation and Precision.

● : Inventory maintained.

G80A

MODULE FOR QUICK CHANGE ADAPTER GWS202





Order number	Stock	Hand	GWS system	Suitable for machine	CUTDIA	Seat size	CW	WF	B	IK
G80A-EM202LL32GYD1-E	●	L	41	MS 8x26 / MS 6x32	32	D	2.0	8.15	7.9	SF1

1/1

1. Rake face coolant requires no specific presetting method.

SPARE PARTS

Tool holder		
	Screw	Wrench
EM202001	TS43 (3.5 Nm)*	TKY15W-E
G80A-EM202LL32GYD1-E	TS406 (3.5 Nm)*	

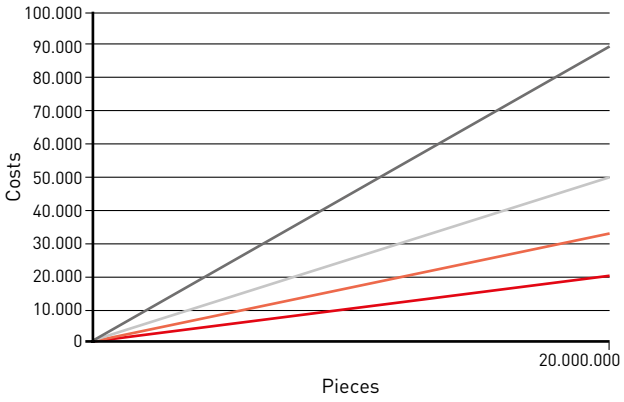
* Recommended to use a torque screwdriver with a Torx 15 bit.

● : Inventory maintained.

G80A

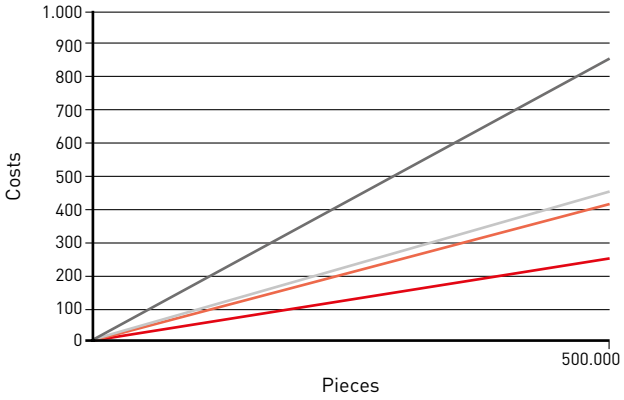
PERFORMANCE COMPARISON 1

Material	NiCr23Fe
Tool	GWS41 – G80A
Vc (m/min)	47
f (mm/rev)	0.02
Lot size	20.000.000
Efficiency increase	Approx. 55.000 €/batch tooling cost reduction
Results	10.000 m less material consumption due to smaller grooving width.



PERFORMANCE COMPARISON 2

Material	100Cr6
Tool	GWS41 – G80A
Vc (m/min)	117
f (mm/rev)	0.03
Lot size	50.000
Efficiency increase	Approx. 430 €/Lot
Results	Positive environmental influence enabled by producing less scrap material.

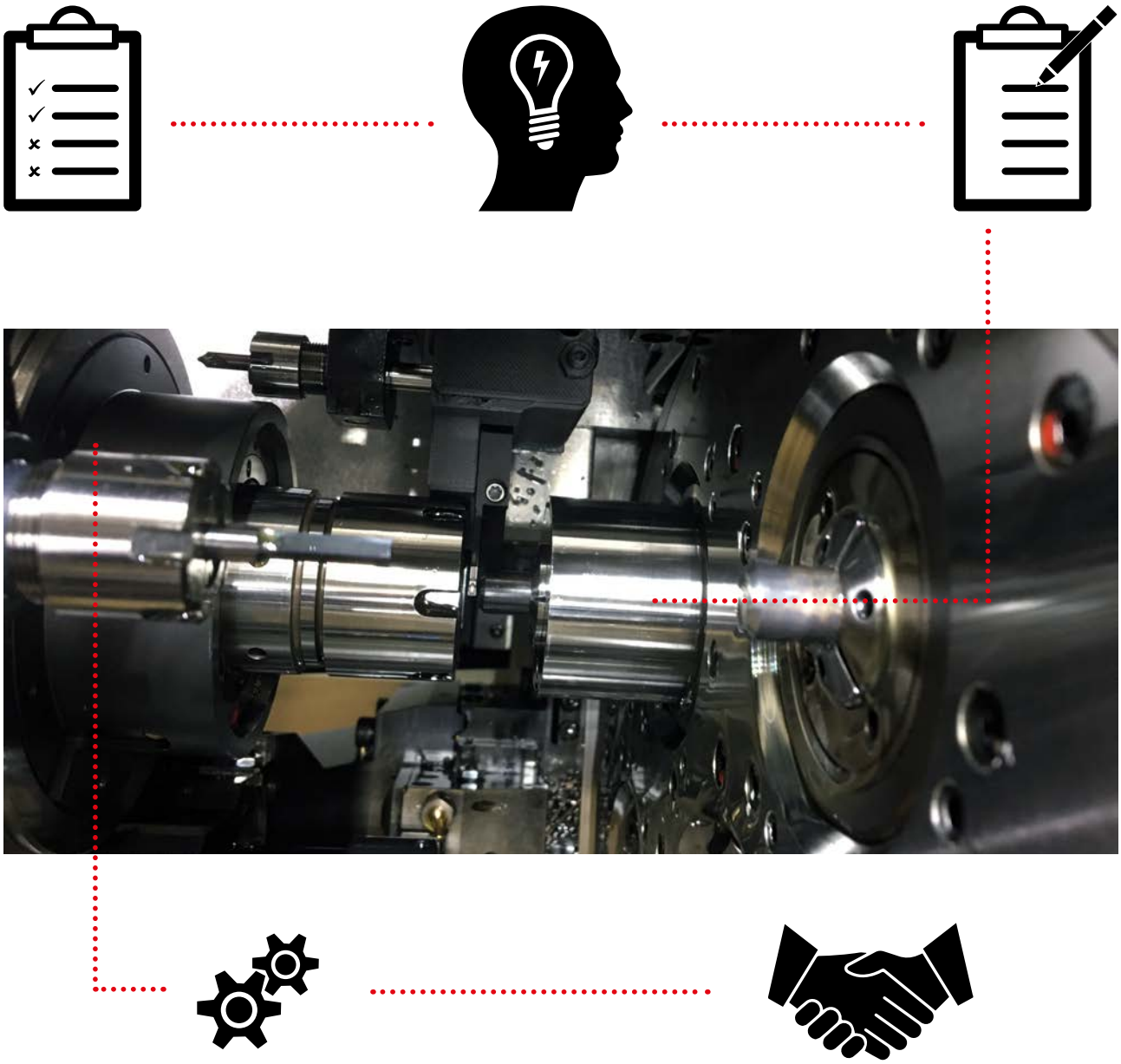


: Mplus tool
: Conventional tool
: Mplus tool including tool change
: Conventional tool including tool change

G80A

SPECIAL SOLUTIONS

Not all types of machines are mentioned in the overview on page 260. Technical support regarding fitment of the G80A type tool or a custom solution can be offered for other types of machines.



Please contact the local Mitsubishi Materials supplier for special analysis of the situation. If a tailored solution is required, collision tests are carried out both using CAD and on site using an additively manufactured tool model before the final tool is produced. After successful testing, a final solution will be offered.

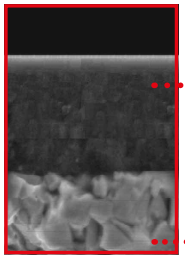
G80A

GY-GROOVING INSERTS

INSERT GRADES

P		M		K		S		N	
NX2525	●								
MY5015	◕			MY5015	◕	MP9015	◕		
VP10RT	◕	VP10RT	◕	VP10RT	◕	MP9025	◕	RT9020	●
VP20RT	✣	VP20RT	✣	VP20RT	✣		✣		◕

MP9000 SERIES



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

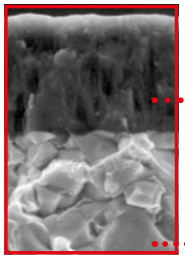
- High Al-rich (Al, Ti)N Single Layer Coating
- Special Cemented Carbide Substrate

VP20RT (1st Recommendation)

PVD coated grade suitable for a wide range of applications. The combination of a special tough cemented carbide substrate with MIRACLE coating provides an excellent balance of wear and fracture resistance.

- MIRACLE coating
- Carbide substrate (HRA90.5)

VP10RT (2nd Recommendation)



PVD coated grade with a cemented carbide substrate harder than VP20RT. For use on difficult-to-cut materials and for extending tool life.

- MIRACLE coating
- Carbide substrate (HRA92.0)

MY5015

CVD coated grade with excellent wear resistance even at high temperatures. Providing longer tool life when machining cast and ductile cast irons.
Also suitable for high speed continuous cutting of steels.

- CVD coating
- Carbide substrate

RT9010

First recommended grade for titanium alloys.

NX2525

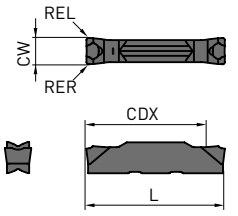
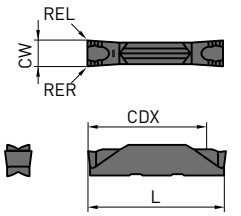
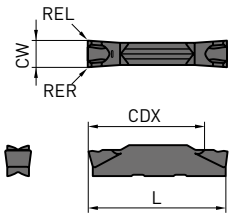
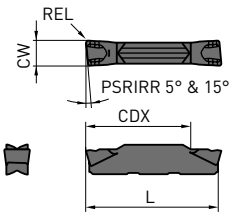
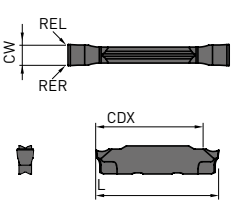
NX2525, a cermet grade for finish machining of steels and for good surface finishes at lower cutting speeds.

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

G80A

A WIDE SELECTION OF INSERTS

PARTING OFF

GU Chipbreaker (For mild steel)	GS Chipbreaker (Low feeds)	GM Chipbreaker (Medium feeds)	R/L05-/R15-GS-GM Breaker (Medium feeds)	GL Breaker (For aluminium alloys)
				
				

Right hand tool holder shown.

GROOVING / CUTTING OFF

Order number	RT9010	VP10RT	VP20RT	MY5015	NX2525	MP9015	MP9025	Seat size	CW	Tolerance	RE R/L	CDX	L
GY2M0200D020N-GU		●	●		●			D	2.00	±0.03	0.2	19.7	20.70
GY2M0150C010N-GS		●	●					C	1.50	±0.03	0.1	13.4	14.70
GY2G0150C003R15-GS		●	●					C	1.50	±0.02	0.03	13.17	15.20
GY2G0150C010R08-GS		●	●					C	1.50	±0.02	0.1	13.17	15.20
GY2G0150C010R15-GS		●	●					C	1.50	±0.02	0.1	13.17	15.20
GY2M0200D020N-GS		●	●		●			D	2.00	±0.03	0.2	18.7	20.70
GY2G0200D003R15-GS		●	●					D	2.00	±0.03	0.03	18.85	21.30
GY2G0200D010R15-GS		●	●					D	2.00	±0.03	0.1	18.85	21.30
GY2G0200D020R08-GS		●	●					D	2.00	±0.03	0.2	18.85	21.30
GY2M0150C020N-GM		●	●		●	●	●	C	1.50	±0.03	0.2	13.9	14.70
GY2M0200D020N-GM		●	●	●	●	●	●	D	2.00	±0.03	0.2	19.4	20.70
GY2M0200D020R05-GM		●	●					D	2.00	±0.03	0.2	19.5	20.80
GY2M0200D020L05-GM		●	●					D	2.00	±0.03	0.2	19.5	20.80
GY1M0200D020L05-GM		★	●					D	2.00	±0.03	0.2	—	20.80
GY1M0200D020N-GM		●	●	●		●	●	D	2.00	±0.03	0.2	—	20.70
GY1M0200D020R05-GM		●	●					D	2.00	±0.03	0.2	—	20.80
GY2G0200D005N-GL	●							D	2.00	±0.02	0.05	19.5	21.05

1/1

● : Inventory maintained.

G80A

RECOMMENDED CUTTING CONDITIONS

	Material	Hardness	Grade	Vc
P	Mild steel	<160HB	VP20RT	160 (100 – 220)
			VP10RT	170 (110 – 230)
			MY5015	220 (140 – 300)
			NX2525	150 (90 – 210)
	Carbon steel Alloy steel	160 – 280HB	VP20RT	130 (80 – 180)
			VP10RT	140 (90 – 190)
			MY5015	180 (110 – 250)
			NX2525	120 (70 – 170)
		≥280HB	VP20RT	100 (60 – 140)
			VP10RT	110 (70 – 150)
			MY5015	150 (90 – 210)
			NX2525	95 (55 – 135)
M	Stainless steel	≤270HB	VP20RT	100 (60 – 140)
			VP10RT	110 (70 – 150)
K	Gray cast iron	Tensile strength ≤300MPa	VP20RT	130 (80 – 180)
			VP10RT	140 (90 – 190)
			MY5015	220 (140 – 300)
	Ductile cast iron	Tensile strength ≤800MPa	VP20RT	100 (60 – 140)
			VP10RT	110 (70 – 150)
			MY5015	150 (90 – 210)
S	Heat resistant alloy Titanium alloy	—	MP9015	70 (40 – 100)
			MP9025	60 (30 – 90)
			VP20RT	45 (30 – 60)
			VP10RT	55 (40 – 70)

1/1

1. **VP20RT** is the first recommended grade for materials other than hardened steel.
2. For VP10RT, VP20RT, MP9015, MP9025 and MY5015, wet cutting is recommended.

RECOMMENDED FEED RATE (MM/REV)

CW	Breaker			
	GU	GS	GM	GL
1.5	—	0.025 – 0.130	0.05 – 0.15	—
2.0	0.03 – 0.08	0.025 – 0.130	0.05 – 0.15	0.02 – 0.08

415SD (MPLUS)

FIRST CHOICE FOR HIGH-FEED MACHINING OF TITANIUM ALLOYS

Interested in more...

MP111

www.mhg-mediastore.net

415SD

FOR HIGH-FEED EFFICIENT MACHINING

HIGH-FEED MILLING CUTTER CONCEPT FOR STABILITY AND HIGH PERFORMANCE

- Unevenly spaced cutting edges reduce vibrations, especially in long overhang applications.
- Fine and extra fine pitch types enable a highly efficient cutting performance.
- Carefully selected steel for the tool body is capable of safely absorbing machining forces. In addition, the nickel coating increases wear and corrosion protection.
- The insert location in the holder combined with the ideal geometry and a precisely positioned coolant outlet achieves maximum stability and machining performance.

CUTTING PERFORMANCE

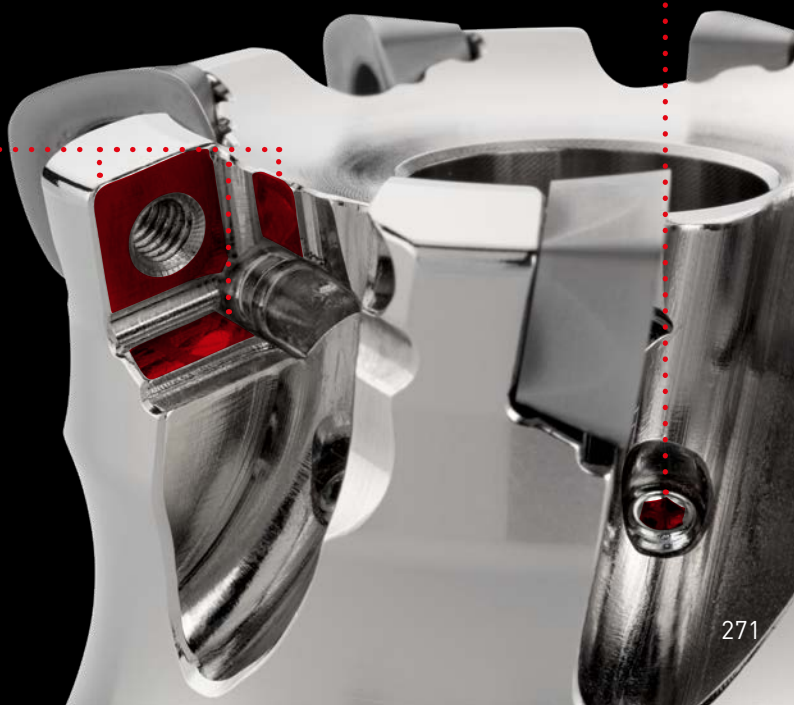
The approach angle of 15° achieves an APMX of 2 mm, which enables a high removal rate but with low radial forces.

TARGETED APPLICATIONS

The use of different diameters and the precise positioning of the coolant nozzles enables perfect chip removal as well as reducing and dissipating the high temperatures that occur at the cutting edge.

SAFE, PRECISE AND RELIABLE

Exact positioning, secure insert clamping with large contact surfaces offers the possibility of high-performance and efficient high-feed machining of stainless steels and heat resistant materials.



415SD

INSERTS FOR HIGH-FEED EFFICIENT MACHINING

THE PVD-COATED, HIGH-PERFORMANCE GRADE MP9130 FOCUSES ON TITANIUM MACHINING

- High-feed face milling including radial, plunge and ramping operations.
- Ideal for machining components that require a long overhang.
- Highly sutiable for low power machines and low rigidity component clamping.

L-BREAKER

Ideal for applications that require low cutting resistance.

M-BREAKER

First recommendation - ideal combination of cutting edge stability and low cutting resistance.

R-BREAKER

High cutting edge stability, for heavy interrupted machining or difficult cutting conditions.

Highest productivity even when applications require low cutting resistance.

- Low power consumption.
- Designed to achieve low radial cutting forces.
- Process reliability and long tool life, especially when machining difficult-to-cut materials.
- Stable and robust 4-edge insert for efficient, high-feed milling.

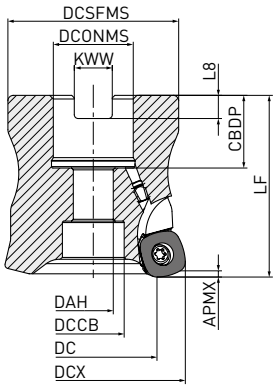
415SD

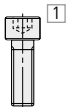
HIGH-FEED CUTTER

P K S

415SD
GAMP: 9°
GAMF: 5° – 6°

1



DCX	Set bolt		Geometry
Ø 50, Ø 52	HSC10035	1	
Ø 63, Ø 66	HSC12035		

Right hand tool holder only.

ARBOR TYPE

Order number	Stock	APMX	DC	DCONMS	DCX	LF	RMPX	WT	ZEFP		Type	
415SD-050A04AR-E	●	2	33.4	22	50	50	3°	0.4	4	●	1	SDMT12
415SD-050A05AR-E	●	2	33.4	22	50	50	3°	0.4	5	●	1	
415SD-052A04AR-E	●	2	35.4	22	52	50	3°	0.4	4	●	1	
415SD-052A06AR-E	●	2	35.4	22	52	50	3°	0.4	6	●	1	
415SD-063X05AR-E	●	2	46.5	27	63	50	2°	0.7	5	●	1	
415SD-063X07AR-E	●	2	46.5	27	63	50	2°	0.7	7	●	1	
415SD-066X05AR-E	●	2	49.4	27	66	50	1.9°	0.7	5	●	1	
415SD-066X07AR-E	●	2	49.4	27	66	50	1.9°	0.7	7	●	1	

1/1

1. Please refer to page 276, for maximum depth of cut (APMX).

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● : Inventory maintained.

415SD

HIGH-FEED CUTTER

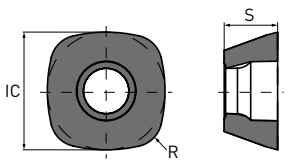
MOUNTING DIMENSIONS

Order number	CBDP	DAH	DCCB	DCONMS	DCSFMS	DCX	KWW	L8	Type
415SD-050A04AR-E	20	11	17	22	47	50	10.4	6.3	1
415SD-050A05AR-E	20	11	17	22	47	50	10.4	6.3	1
415SD-052A04AR-E	20	11	17	22	47	52	10.4	6.3	1
415SD-052A06AR-E	20	11	17	22	47	52	10.4	6.3	1
415SD-063X05AR-E	22	13	19	27	60	63	12.4	7.0	1
415SD-063X07AR-E	22	13	19	27	60	63	12.4	7.0	1
415SD-066X05AR-E	22	13	19	27	60	66	12.4	7.0	1
415SD-066X07AR-E	22	13	19	27	60	66	12.4	7.0	1

1/1

INSERTS

Order number	Class	MP9130	NEW MV1020	NEW MV1030	IC	S	RE	Shape
SDMT125530ZEN-L	L	●	●	●	12.25	5.56	3.0	
SDMT125530ZEN-M	M	●	●	●	12.25	5.56	3.0	
SDMT125530ZSN-R	R	●	●	●	12.25	5.56	3.0	



1/1

● : Inventory maintained.

415SD

HIGH-FEED CUTTER

SPARE PARTS

Tool holder					
	Clamp screw	**Flag wrench**	**Coolant nozzle**	**Standard L wrench**	**Anti-seize lubricant**
415SD	TPS43	TIP15W-E	HSD04004H12	HKY20R	MK1KS

1. Clamp torque (N • m): TPS43 = 3.5

COOLANT NOZZLES ARE AVAILABLE WITH VARYING DIAMETERS FOR ADJUSTING COOLANT PRESSURE

			← Standard →	
	≤ 1 Mpa (≤ 20 l/min.)	**≥ 3 Mpa (≥ 25 l/min.)**	**≥ 5 Mpa (≥ 30 l/min.)**	**≥ 7 Mpa (≥ 50 l/min.)**
Nozzle Dia.	Ø 0.6 mm	Ø 0.8 mm	Ø 1.2 mm	Ø 1.6 mm
Order number	HSD04004H06	HSD04004H08	HSD04004H12	HSD04004H16

415SD

RECOMMENDED CUTTING CONDITIONS

CORRECTION FACTOR BY OVERHANG LENGTH

	DCX	Overhang length	Adjustment value		
			Vc	ap	fz
Arbor type	50 – 66	<2.5xDCX	100%	100%	100%
		3.0xDCX	85%	100%	90%
		4.0xDCX	80%	80%	80%
		5.0xDCX	75%	75%	60%
		6.0xDCX	70%	70%	40%

CUTTING SPEED / WET CUTTING

	Material	Properties	Cutting conditions	Grade	APMX	Vc		
						ae ≤ 0.5 DC	ae ≤ 0.75 DC	ae = DC
S	Titanium alloy	—	● ◐ ✲	MP9130	≤ 1	55 (40 – 70)	50 (35 – 65)	45 (30 – 60)
				MP9130	≤ 2	55 (40 – 70)	50 (35 – 65)	45 (30 – 60)

1/1

NEW

CUTTING SPEED / DRY CUTTING

	Material	Properties	Cutting conditions	Grade	APMX	Vc		
						ae ≤ 0.5 DC	ae ≤ 0.75 DC	ae = DC
P	Mild steel	≤ 180 HB	● ◐ ✲	MV1020	≤ 2	220 (170 – 270)	220 (170 – 270)	220 (170 – 270)
				MV1030	≤ 2	140 (80 – 200)	140 (80 – 200)	140 (80 – 200)
	Carbon steel, Alloy steel	180 – 280 HB	● ◐ ✲	MV1020	≤ 2	200 (150 – 250)	200 (150 – 250)	200 (150 – 250)
				MV1030	≤ 2	120 (60 – 180)	120 (60 – 180)	120 (60 – 180)
		280 – 350 HB		MV1020	≤ 2	150 (100 – 200)	150 (100 – 200)	150 (100 – 200)
				MV1030	≤ 2	90 (30 – 150)	90 (30 – 150)	90 (30 – 150)
K	Ductile cast iron	Tensile strength ≤ 450 MPa	● ◐ ✲	MV1020	≤ 2	200 (150 – 250)	200 (150 – 250)	200 (150 – 250)
				MV1030	≤ 2	140 (80 – 200)	140 (80 – 200)	140 (80 – 200)
		Tensile strength ≤ 800 MPa		MV1020	≤ 2	180 (130 – 230)	180 (130 – 230)	180 (130 – 230)
				MV1030	≤ 2	140 (80 – 200)	140 (80 – 200)	140 (80 – 200)

1/1

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

NEW

415SD

RECOMMENDED CUTTING CONDITIONS

DEPTH OF CUT / FEED PER TOOTH

Material		Properties	Cutting conditions	Coolant	Grade	ae ≤ 0.5 DC			ae ≤ 0.75 DC			ae = DC		
							ap	fz		ap	fz		ap	fz
P	Mild steel	≤ 180 HB	●		MV1020	L	≤ 1	0.9 (0.4 – 1.2)	L	≤ 1	0.8 (0.4 – 1.1)	L	≤ 1	0.8 (0.4 – 1.0)
			●		MV1030	L	≤ 1	0.9 (0.4 – 1.2)	L	≤ 1	0.8 (0.4 – 1.1)	L	≤ 1	0.8 (0.4 – 1.0)
			●		MV1020	L	≤ 2	0.8 (0.4 – 1.2)	L	≤ 2	0.7 (0.4 – 1.1)	L	≤ 2	0.7 (0.4 – 1.0)
			●		MV1030	L	≤ 2	0.8 (0.4 – 1.2)	L	≤ 2	0.7 (0.4 – 1.1)	L	≤ 2	0.7 (0.4 – 1.0)
			◐		MV1020	L	≤ 1	—	L	≤ 1	—	L	≤ 1	—
			◐		MV1030	L	≤ 1	—	L	≤ 1	—	L	≤ 1	—
			◐		MV1020	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—
			◐		MV1030	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—
			●		MV1020	M	≤ 1	1.2 (0.4 – 1.8)	M	≤ 1	1.1 (0.4 – 1.6)	M	≤ 1	1.1 (0.4 – 1.6)
			●		MV1030	M	≤ 1	1.2 (0.4 – 1.8)	M	≤ 1	1.1 (0.4 – 1.6)	M	≤ 1	1.1 (0.4 – 1.6)
			●		MV1020	M	≤ 2	1.1 (0.4 – 1.8)	M	≤ 2	1.0 (0.4 – 1.6)	M	≤ 2	1.0 (0.4 – 1.6)
			●		MV1030	M	≤ 2	1.1 (0.4 – 1.8)	M	≤ 2	1.0 (0.4 – 1.6)	M	≤ 2	1.0 (0.4 – 1.6)
			◐		MV1020	M	≤ 1	1.0 (0.4 – 1.7)	M	≤ 1	1.0 (0.4 – 1.5)	M	≤ 1	1.0 (0.4 – 1.5)
			◐		MV1030	M	≤ 1	1.0 (0.4 – 1.7)	M	≤ 1	1.0 (0.4 – 1.5)	M	≤ 1	1.0 (0.4 – 1.5)
			◐		MV1020	M	≤ 2	0.9 (0.4 – 1.7)	M	≤ 2	0.9 (0.4 – 1.5)	M	≤ 2	0.9 (0.4 – 1.5)
			◐		MV1030	M	≤ 2	0.9 (0.4 – 1.7)	M	≤ 2	0.9 (0.4 – 1.5)	M	≤ 2	0.9 (0.4 – 1.5)
			✲		MV1020	M	≤ 1	1.0 (0.4 – 1.7)	M	≤ 1	1.0 (0.4 – 1.5)	M	≤ 1	1.0 (0.4 – 1.5)
			✲		MV1030	M	≤ 1	1.0 (0.4 – 1.7)	M	≤ 1	1.0 (0.4 – 1.5)	M	≤ 1	1.0 (0.4 – 1.5)
			✲		MV1020	M	≤ 2	0.9 (0.4 – 1.7)	M	≤ 2	0.9 (0.4 – 1.5)	M	≤ 2	0.9 (0.4 – 1.5)
			✲		MV1030	M	≤ 2	0.9 (0.4 – 1.7)	M	≤ 2	0.9 (0.4 – 1.5)	M	≤ 2	0.9 (0.4 – 1.5)
			●		MV1020	R	≤ 1	1.5 (0.4 – 2.1)	R	≤ 1	1.4 (0.4 – 1.9)	R	≤ 1	1.4 (0.4 – 1.9)
			●		MV1030	R	≤ 1	1.5 (0.4 – 2.1)	R	≤ 1	1.4 (0.4 – 1.9)	R	≤ 1	1.4 (0.4 – 1.9)
			●		MV1020	R	≤ 2	1.4 (0.4 – 2.1)	R	≤ 2	1.3 (0.4 – 1.9)	R	≤ 2	1.3 (0.4 – 1.9)
			●		MV1030	R	≤ 2	1.4 (0.4 – 2.1)	R	≤ 2	1.3 (0.4 – 1.9)	R	≤ 2	1.3 (0.4 – 1.9)
			◐		MV1020	R	≤ 1	1.4 (0.4 – 2.0)	R	≤ 1	1.2 (0.4 – 1.8)	R	≤ 1	1.2 (0.4 – 1.7)
			◐		MV1030	R	≤ 1	1.4 (0.4 – 2.0)	R	≤ 1	1.2 (0.4 – 1.8)	R	≤ 1	1.2 (0.4 – 1.7)
			◐		MV1020	R	≤ 2	1.3 (0.4 – 2.0)	R	≤ 2	1.1 (0.4 – 1.8)	R	≤ 2	1.1 (0.4 – 1.7)
			◐		MV1030	R	≤ 2	1.3 (0.4 – 2.0)	R	≤ 2	1.1 (0.4 – 1.8)	R	≤ 2	1.1 (0.4 – 1.7)
			✲		MV1020	R	≤ 1	1.4 (0.4 – 2.0)	R	≤ 1	1.2 (0.4 – 1.8)	R	≤ 1	1.2 (0.4 – 1.7)
			✲		MV1030	R	≤ 1	1.4 (0.4 – 2.0)	R	≤ 1	1.2 (0.4 – 1.8)	R	≤ 1	1.2 (0.4 – 1.7)
			✲		MV1020	R	≤ 2	1.3 (0.4 – 2.0)	R	≤ 2	1.1 (0.4 – 1.8)	R	≤ 2	1.1 (0.4 – 1.7)
			✲		MV1030	R	≤ 2	1.3 (0.4 – 2.0)	R	≤ 2	1.1 (0.4 – 1.8)	R	≤ 2	1.1 (0.4 – 1.7)

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

NEW

415SD – DEPTH OF CUT / FEED PER TOOTH

Material	Properties	Cutting conditions	Coolant	Grade	ae ≤ 0.5 DC			ae ≤ 0.75 DC			ae = DC		
						ap	fz		ap	fz		ap	fz
P	Carbon steel, Alloy steel	180 – 280 HB		MV1020	L	≤ 1	0.7 (0.4 – 1.1)	L	≤ 1	0.7 (0.4 – 1.0)	L	≤ 1	0.7 (0.4 – 1.0)
				MV1030	L	≤ 1	0.7 (0.4 – 1.1)	L	≤ 1	0.7 (0.4 – 1.0)	L	≤ 1	0.7 (0.4 – 1.0)
				MV1020	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—
				MV1030	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—
				MV1020	L	≤ 1	—	L	≤ 1	—	L	≤ 1	—
				MV1030	L	≤ 1	—	L	≤ 1	—	L	≤ 1	—
				MV1020	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—
				MV1030	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—
				MV1020	M	≤ 1	1.0 (0.4 – 1.7)	M	≤ 1	1.0 (0.4 – 1.5)	M	≤ 1	1.0 (0.4 – 1.5)
				MV1030	M	≤ 1	1.0 (0.4 – 1.7)	M	≤ 1	1.0 (0.4 – 1.5)	M	≤ 1	1.0 (0.4 – 1.5)
				MV1020	M	≤ 2	0.9 (0.4 – 1.7)	M	≤ 2	0.9 (0.4 – 1.5)	M	≤ 2	0.9 (0.4 – 1.5)
				MV1030	M	≤ 2	0.9 (0.4 – 1.7)	M	≤ 2	0.9 (0.4 – 1.5)	M	≤ 2	0.9 (0.4 – 1.5)
				MV1020	M	≤ 1	0.9 (0.4 – 1.5)	M	≤ 1	0.8 (0.4 – 1.4)	M	≤ 1	0.8 (0.4 – 1.3)
				MV1030	M	≤ 1	0.9 (0.4 – 1.5)	M	≤ 1	0.8 (0.4 – 1.4)	M	≤ 1	0.8 (0.4 – 1.3)
				MV1020	M	≤ 2	0.8 (0.4 – 1.5)	M	≤ 2	0.7 (0.4 – 1.4)	M	≤ 2	0.7 (0.4 – 1.3)
				MV1030	M	≤ 2	0.8 (0.4 – 1.5)	M	≤ 2	0.7 (0.4 – 1.4)	M	≤ 2	0.7 (0.4 – 1.3)
				MV1020	M	≤ 1	0.9 (0.4 – 1.5)	M	≤ 1	0.8 (0.4 – 1.4)	M	≤ 1	0.8 (0.4 – 1.3)
				MV1030	M	≤ 1	0.9 (0.4 – 1.5)	M	≤ 1	0.8 (0.4 – 1.4)	M	≤ 1	0.8 (0.4 – 1.3)
				MV1020	M	≤ 2	0.8 (0.4 – 1.5)	M	≤ 2	0.7 (0.4 – 1.4)	M	≤ 2	0.7 (0.4 – 1.3)
				MV1030	M	≤ 2	0.8 (0.4 – 1.5)	M	≤ 2	0.7 (0.4 – 1.4)	M	≤ 2	0.7 (0.4 – 1.3)
				MV1020	R	≤ 1	1.4 (0.4 – 2.0)	R	≤ 1	1.2 (1.0 – 1.8)	R	≤ 1	1.2 (0.4 – 1.7)
				MV1030	R	≤ 1	1.4 (0.4 – 2.0)	R	≤ 1	1.2 (1.0 – 1.8)	R	≤ 1	1.2 (0.4 – 1.7)
				MV1020	R	≤ 2	1.3 (0.4 – 2.0)	R	≤ 2	1.1 (1.0 – 1.8)	R	≤ 2	1.1 (0.4 – 1.7)
				MV1030	R	≤ 2	1.3 (0.4 – 2.0)	R	≤ 2	1.1 (1.0 – 1.8)	R	≤ 2	1.1 (0.4 – 1.7)
				MV1020	R	≤ 1	1.2 (0.4 – 1.8)	R	≤ 1	1.1 (0.8 – 1.6)	R	≤ 1	1.1 (0.4 – 1.6)
				MV1030	R	≤ 1	1.2 (0.4 – 1.8)	R	≤ 1	1.1 (0.8 – 1.6)	R	≤ 1	1.1 (0.4 – 1.6)
				MV1020	R	≤ 2	1.1 (0.4 – 1.8)	R	≤ 2	1.0 (0.8 – 1.6)	R	≤ 2	1.0 (0.4 – 1.6)
				MV1030	R	≤ 2	1.1 (0.4 – 1.8)	R	≤ 2	1.0 (0.8 – 1.6)	R	≤ 2	1.0 (0.4 – 1.6)
				MV1020	R	≤ 1	1.2 (0.4 – 1.8)	R	≤ 1	1.1 (0.8 – 1.6)	R	≤ 1	1.1 (0.4 – 1.6)
				MV1030	R	≤ 1	1.2 (0.4 – 1.8)	R	≤ 1	1.1 (0.8 – 1.6)	R	≤ 1	1.1 (0.4 – 1.6)
				MV1020	R	≤ 2	1.1 (0.4 – 1.8)	R	≤ 2	1.0 (0.8 – 1.6)	R	≤ 2	1.0 (0.4 – 1.6)
				MV1030	R	≤ 2	1.1 (0.4 – 1.8)	R	≤ 2	1.0 (0.8 – 1.6)	R	≤ 2	1.0 (0.4 – 1.6)

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

415SD – DEPTH OF CUT / FEED PER TOOTH

Material		Properties	Cutting conditions	Coolant	Grade	ae ≤ 0.5 DC			ae ≤ 0.75 DC			ae = DC		
							ap	fz		ap	fz		ap	fz
P	Carbon steel, Alloy steel	280 – 350 HB	●		MV1020	L	≤ 1	0.6 (0.4 – 0.9)	L	≤ 1	0.6 (0.4 – 0.8)	L	≤ 1	0.6 (0.4 – 0.8)
			●		MV1030	L	≤ 1	0.6 (0.4 – 0.9)	L	≤ 1	0.6 (0.4 – 0.8)	L	≤ 1	0.6 (0.4 – 0.8)
			●		MV1020	L	≤ 2	0.5 (0.4 – 0.9)	L	≤ 2	0.5 (0.4 – 0.8)	L	≤ 2	0.5 (0.4 – 0.8)
			●		MV1030	L	≤ 2	0.5 (0.4 – 0.9)	L	≤ 2	0.5 (0.4 – 0.8)	L	≤ 2	0.5 (0.4 – 0.8)
			◐		MV1020	L	≤ 1	—	L	≤ 1	—	L	≤ 1	—
			◐		MV1030	L	≤ 1	—	L	≤ 1	—	L	≤ 1	—
			◐		MV1020	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—
			◐		MV1030	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—
			●		MV1020	M	≤ 1	0.9 (0.4 – 1.5)	M	≤ 1	0.8 (0.4 – 1.4)	M	≤ 1	0.8 (0.4 – 1.3)
			●		MV1030	M	≤ 1	0.9 (0.4 – 1.5)	M	≤ 1	0.8 (0.4 – 1.4)	M	≤ 1	0.8 (0.4 – 1.3)
			●		MV1020	M	≤ 2	0.8 (0.4 – 1.5)	M	≤ 2	0.7 (0.4 – 1.4)	M	≤ 2	0.7 (0.4 – 1.3)
			●		MV1030	M	≤ 2	0.8 (0.4 – 1.5)	M	≤ 2	0.7 (0.4 – 1.4)	M	≤ 2	0.7 (0.4 – 1.3)
			◐		MV1020	M	≤ 1	0.9 (0.4 – 1.5)	M	≤ 1	0.8 (0.4 – 1.4)	M	≤ 1	0.7 (0.4 – 1.2)
			◐		MV1030	M	≤ 1	0.9 (0.4 – 1.5)	M	≤ 1	0.8 (0.4 – 1.4)	M	≤ 1	0.7 (0.4 – 1.2)
			◐		MV1020	M	≤ 2	0.8 (0.4 – 1.5)	M	≤ 2	0.7 (0.4 – 1.4)	M	≤ 2	0.6 (0.4 – 1.2)
			◐		MV1030	M	≤ 2	0.8 (0.4 – 1.5)	M	≤ 2	0.7 (0.4 – 1.4)	M	≤ 2	0.6 (0.4 – 1.2)
			✲		MV1020	M	≤ 1	0.9 (0.4 – 1.5)	M	≤ 1	0.8 (0.4 – 1.4)	M	≤ 1	0.7 (0.4 – 1.2)
			✲		MV1030	M	≤ 1	0.9 (0.4 – 1.5)	M	≤ 1	0.8 (0.4 – 1.4)	M	≤ 1	0.7 (0.4 – 1.2)
			✲		MV1020	M	≤ 2	0.8 (0.4 – 1.5)	M	≤ 2	0.7 (0.4 – 1.4)	M	≤ 2	0.6 (0.4 – 1.2)
			✲		MV1030	M	≤ 2	0.8 (0.4 – 1.5)	M	≤ 2	0.7 (0.4 – 1.4)	M	≤ 2	0.6 (0.4 – 1.2)
			●		MV1020	R	≤ 1	1.2 (0.4 – 1.8)	R	≤ 1	1.1 (0.4 – 1.6)	R	≤ 1	1.1 (0.8 – 1.6)
			●		MV1030	R	≤ 1	1.2 (0.4 – 1.8)	R	≤ 1	1.1 (0.4 – 1.6)	R	≤ 1	1.1 (0.8 – 1.6)
			●		MV1020	R	≤ 2	1.1 (0.4 – 1.8)	R	≤ 2	1.0 (0.4 – 1.6)	R	≤ 2	1.0 (0.8 – 1.6)
			●		MV1030	R	≤ 2	1.1 (0.4 – 1.8)	R	≤ 2	1.0 (0.4 – 1.6)	R	≤ 2	1.0 (0.8 – 1.6)
			◐		MV1020	R	≤ 1	1.1 (0.4 – 1.8)	R	≤ 1	1.0 (0.4 – 1.6)	R	≤ 1	1.0 (0.4 – 1.5)
			◐		MV1030	R	≤ 1	1.1 (0.4 – 1.8)	R	≤ 1	1.0 (0.4 – 1.6)	R	≤ 1	1.0 (0.4 – 1.5)
			◐		MV1020	R	≤ 2	1.0 (0.4 – 1.8)	R	≤ 2	0.9 (0.4 – 1.6)	R	≤ 2	0.9 (0.4 – 1.5)
			◐		MV1030	R	≤ 2	1.0 (0.4 – 1.8)	R	≤ 2	0.9 (0.4 – 1.6)	R	≤ 2	0.9 (0.4 – 1.5)
			✲		MV1020	R	≤ 1	1.1 (0.4 – 1.8)	R	≤ 1	1.0 (0.4 – 1.6)	R	≤ 1	1.0 (0.4 – 1.5)
			✲		MV1030	R	≤ 1	1.1 (0.4 – 1.8)	R	≤ 1	1.0 (0.4 – 1.6)	R	≤ 1	1.0 (0.4 – 1.5)
			✲		MV1020	R	≤ 2	1.0 (0.4 – 1.8)	R	≤ 2	0.9 (0.4 – 1.6)	R	≤ 2	0.9 (0.4 – 1.5)
			✲		MV1030	R	≤ 2	1.0 (0.4 – 1.8)	R	≤ 2	0.9 (0.4 – 1.6)	R	≤ 2	0.9 (0.4 – 1.5)

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

415SD – DEPTH OF CUT / FEED PER TOOTH

Material		Properties	Cutting conditions	Coolant	Grade	ae ≤ 0.5 DC			ae ≤ 0.75 DC			ae = DC		
							ap	fz		ap	fz		ap	fz
K	Ductile cast iron	Tensile strength ≤ 350 MPa	●		MV1020	L	≤ 1	0.9 (0.4 – 1.2)	L	≤ 1	0.8 (0.4 – 1.1)	L	≤ 1	0.8 (0.4 – 1.1)
			●		MV1030	L	≤ 1	0.9 (0.4 – 1.2)	L	≤ 1	0.8 (0.4 – 1.1)	L	≤ 1	0.8 (0.4 – 1.1)
			●		MV1020	L	≤ 2	0.8 (0.4 – 1.2)	L	≤ 2	0.7 (0.4 – 1.1)	L	≤ 2	0.7 (0.4 – 1.1)
			●		MV1030	L	≤ 2	0.8 (0.4 – 1.2)	L	≤ 2	0.7 (0.4 – 1.1)	L	≤ 2	0.7 (0.4 – 1.1)
			◐		MV1020	L	≤ 1	—	L	≤ 1	—	L	≤ 1	—
			◐		MV1030	L	≤ 1	—	L	≤ 1	—	L	≤ 1	—
			◐		MV1020	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—
			◐		MV1030	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—
			●		MV1020	M	≤ 1	1.2 (0.4 – 1.8)	M	≤ 1	1.1 (0.4 – 1.6)	M	≤ 1	1.1 (0.4 – 1.6)
			●		MV1030	M	≤ 1	1.2 (0.4 – 1.8)	M	≤ 1	1.1 (0.4 – 1.6)	M	≤ 1	1.1 (0.4 – 1.6)
			●		MV1020	M	≤ 2	1.1 (0.4 – 1.8)	M	≤ 2	1.0 (0.4 – 1.6)	M	≤ 2	1.0 (0.4 – 1.6)
			●		MV1030	M	≤ 2	1.1 (0.4 – 1.8)	M	≤ 2	1.0 (0.4 – 1.6)	M	≤ 2	1.0 (0.4 – 1.6)
			◐		MV1020	M	≤ 1	1.1 (0.4 – 1.7)	M	≤ 1	1.0 (0.4 – 1.5)	M	≤ 1	0.9 (0.4 – 1.5)
			◐		MV1030	M	≤ 1	1.1 (0.4 – 1.7)	M	≤ 1	1.0 (0.4 – 1.5)	M	≤ 1	0.9 (0.4 – 1.5)
			◐		MV1020	M	≤ 2	1.0 (0.4 – 1.7)	M	≤ 2	0.9 (0.4 – 1.5)	M	≤ 2	0.8 (0.4 – 1.5)
			◐		MV1030	M	≤ 2	1.0 (0.4 – 1.7)	M	≤ 2	0.9 (0.4 – 1.5)	M	≤ 2	0.8 (0.4 – 1.5)
			✲		MV1020	M	≤ 1	1.1 (0.4 – 1.7)	M	≤ 1	1.0 (0.4 – 1.5)	M	≤ 1	0.9 (0.4 – 1.5)
			✲		MV1030	M	≤ 1	1.1 (0.4 – 1.7)	M	≤ 1	1.0 (0.4 – 1.5)	M	≤ 1	0.9 (0.4 – 1.5)
			✲		MV1020	M	≤ 2	1.0 (0.4 – 1.7)	M	≤ 2	0.9 (0.4 – 1.5)	M	≤ 2	0.8 (0.4 – 1.5)
			✲		MV1030	M	≤ 2	1.0 (0.4 – 1.7)	M	≤ 2	0.9 (0.4 – 1.5)	M	≤ 2	0.8 (0.4 – 1.5)
			●		MV1020	R	≤ 1	1.5 (0.4 – 2.1)	R	≤ 1	1.4 (0.4 – 1.9)	R	≤ 1	1.3 (1.1 – 1.9)
			●		MV1030	R	≤ 1	1.5 (0.4 – 2.1)	R	≤ 1	1.4 (0.4 – 1.9)	R	≤ 1	1.3 (1.1 – 1.9)
			●		MV1020	R	≤ 2	1.4 (0.4 – 2.1)	R	≤ 2	1.3 (0.4 – 1.9)	R	≤ 2	1.2 (1.1 – 1.9)
			●		MV1030	R	≤ 2	1.4 (0.4 – 2.1)	R	≤ 2	1.3 (0.4 – 1.9)	R	≤ 2	1.2 (1.1 – 1.9)
			◐		MV1020	R	≤ 1	1.4 (1.0 – 2.0)	R	≤ 1	1.2 (0.4 – 1.8)	R	≤ 1	1.2 (0.4 – 1.7)
			◐		MV1030	R	≤ 1	1.4 (1.0 – 2.0)	R	≤ 1	1.2 (0.4 – 1.8)	R	≤ 1	1.2 (0.4 – 1.7)
			◐		MV1020	R	≤ 2	1.3 (1.0 – 2.0)	R	≤ 2	1.1 (0.4 – 1.8)	R	≤ 2	1.1 (0.4 – 1.7)
			◐		MV1030	R	≤ 2	1.3 (1.0 – 2.0)	R	≤ 2	1.1 (0.4 – 1.8)	R	≤ 2	1.1 (0.4 – 1.7)
			◐		MV1020	R	≤ 1	1.4 (1.0 – 2.0)	R	≤ 1	1.2 (0.4 – 1.8)	R	≤ 1	1.2 (0.4 – 1.7)
			◐		MV1030	R	≤ 1	1.4 (1.0 – 2.0)	R	≤ 1	1.2 (0.4 – 1.8)	R	≤ 1	1.2 (0.4 – 1.7)
			◐		MV1020	R	≤ 2	1.3 (1.0 – 2.0)	R	≤ 2	1.1 (0.4 – 1.8)	R	≤ 2	1.1 (0.4 – 1.7)
			◐		MV1030	R	≤ 2	1.3 (1.0 – 2.0)	R	≤ 2	1.1 (0.4 – 1.8)	R	≤ 2	1.1 (0.4 – 1.7)

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

415SD – DEPTH OF CUT / FEED PER TOOTH

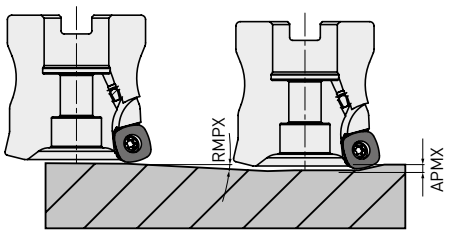
Material		Properties	Cutting conditions	Coolant	Grade	ae ≤ 0.5 DC			ae ≤ 0.75 DC			ae = DC		
							ap	fz		ap	fz		ap	fz
K	Ductile cast iron	Tensile strength ≤ 800 MPa	●		MV1020	L	≤ 1	0.9 (0.4 – 1.2)	L	≤ 1	0.8 (0.4 – 1.1)	L	≤ 1	0.8 (0.4 – 1.1)
			●		MV1030	L	≤ 1	0.9 (0.4 – 1.2)	L	≤ 1	0.8 (0.4 – 1.1)	L	≤ 1	0.8 (0.4 – 1.1)
			●		MV1020	L	≤ 2	0.8 (0.4 – 1.2)	L	≤ 2	0.7 (0.4 – 1.1)	L	≤ 2	0.7 (0.4 – 1.1)
			●		MV1030	L	≤ 2	0.8 (0.4 – 1.2)	L	≤ 2	0.7 (0.4 – 1.1)	L	≤ 2	0.7 (0.4 – 1.1)
			◐		MV1020	L	≤ 1	—	L	≤ 1	—	L	≤ 1	—
			◐		MV1030	L	≤ 1	—	L	≤ 1	—	L	≤ 1	—
			◐		MV1020	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—
			◐		MV1030	L	≤ 2	—	L	≤ 2	—	L	≤ 2	—
			●		MV1020	M	≤ 1	1.2 (0.4 – 1.8)	M	≤ 1	1.1 (0.4 – 1.6)	M	≤ 1	1.1 (0.4 – 1.6)
			●		MV1030	M	≤ 1	1.2 (0.4 – 1.8)	M	≤ 1	1.1 (0.4 – 1.6)	M	≤ 1	1.1 (0.4 – 1.6)
			●		MV1020	M	≤ 2	1.1 (0.4 – 1.8)	M	≤ 2	1.0 (0.4 – 1.6)	M	≤ 2	1.0 (0.4 – 1.6)
			●		MV1030	M	≤ 2	1.1 (0.4 – 1.8)	M	≤ 2	1.0 (0.4 – 1.6)	M	≤ 2	1.0 (0.4 – 1.6)
			◐		MV1020	M	≤ 1	1.1 (0.4 – 1.7)	M	≤ 1	1.0 (0.4 – 1.5)	M	≤ 1	0.9 (0.4 – 1.5)
			◐		MV1030	M	≤ 1	1.1 (0.4 – 1.7)	M	≤ 1	1.0 (0.4 – 1.5)	M	≤ 1	0.9 (0.4 – 1.5)
			◐		MV1020	M	≤ 2	1.0 (0.4 – 1.7)	M	≤ 2	0.9 (0.4 – 1.5)	M	≤ 2	0.8 (0.4 – 1.5)
			◐		MV1030	M	≤ 2	1.0 (0.4 – 1.7)	M	≤ 2	0.9 (0.4 – 1.5)	M	≤ 2	0.8 (0.4 – 1.5)
			✱		MV1020	M	≤ 1	1.1 (0.4 – 1.7)	M	≤ 1	1.0 (0.4 – 1.5)	M	≤ 1	0.9 (0.4 – 1.5)
			✱		MV1030	M	≤ 1	1.1 (0.4 – 1.7)	M	≤ 1	1.0 (0.4 – 1.5)	M	≤ 1	0.9 (0.4 – 1.5)
			✱		MV1020	M	≤ 2	1.0 (0.4 – 1.7)	M	≤ 2	0.9 (0.4 – 1.5)	M	≤ 2	0.8 (0.4 – 1.5)
			✱		MV1030	M	≤ 2	1.0 (0.4 – 1.7)	M	≤ 2	0.9 (0.4 – 1.5)	M	≤ 2	0.8 (0.4 – 1.5)
			●		MV1020	R	≤ 1	1.5 (0.4 – 2.1)	R	≤ 1	1.4 (0.4 – 1.9)	R	≤ 1	1.3 (1.1 – 1.9)
			●		MV1030	R	≤ 1	1.5 (0.4 – 2.1)	R	≤ 1	1.4 (0.4 – 1.9)	R	≤ 1	1.3 (1.1 – 1.9)
			●		MV1020	R	≤ 2	1.4 (0.4 – 2.1)	R	≤ 2	1.3 (0.4 – 1.9)	R	≤ 2	1.2 (1.1 – 1.9)
			●		MV1030	R	≤ 2	1.4 (0.4 – 2.1)	R	≤ 2	1.3 (0.4 – 1.9)	R	≤ 2	1.2 (1.1 – 1.9)
			◐		MV1020	R	≤ 1	1.4 (1.0 – 2.0)	R	≤ 1	1.2 (0.4 – 1.8)	R	≤ 1	1.2 (0.4 – 1.7)
			◐		MV1030	R	≤ 1	1.4 (1.0 – 2.0)	R	≤ 1	1.2 (0.4 – 1.8)	R	≤ 1	1.2 (0.4 – 1.7)
			◐		MV1020	R	≤ 2	1.3 (1.0 – 2.0)	R	≤ 2	1.1 (0.4 – 1.8)	R	≤ 2	1.1 (0.4 – 1.7)
			◐		MV1030	R	≤ 2	1.3 (1.0 – 2.0)	R	≤ 2	1.1 (0.4 – 1.8)	R	≤ 2	1.1 (0.4 – 1.7)
			✱		MV1020	R	≤ 1	1.4 (1.0 – 2.0)	R	≤ 1	1.2 (0.4 – 1.8)	R	≤ 1	1.2 (0.4 – 1.7)
			✱		MV1030	R	≤ 1	1.4 (1.0 – 2.0)	R	≤ 1	1.2 (0.4 – 1.8)	R	≤ 1	1.2 (0.4 – 1.7)
			✱		MV1020	R	≤ 2	1.3 (1.0 – 2.0)	R	≤ 2	1.1 (0.4 – 1.8)	R	≤ 2	1.1 (0.4 – 1.7)
			✱		MV1030	R	≤ 2	1.3 (1.0 – 2.0)	R	≤ 2	1.1 (0.4 – 1.8)	R	≤ 2	1.1 (0.4 – 1.7)
S	Titanium alloy	—	●	💧	MP9130	L	≤ 1	0.7 (0.5 – 0.9)	L	≤ 1	0.6 (0.4 – 0.7)	L	≤ 1	0.5 (0.3 – 0.6)
			●	💧	MP9130	L	≤ 2	0.6 (0.4 – 0.8)	L	≤ 2	0.5 (0.3 – 0.6)	L	≤ 2	0.4 (0.2 – 0.5)
			◐	💧	MP9130	M	≤ 1	0.7 (0.5 – 0.9)	M	≤ 1	0.6 (0.4 – 0.7)	M	≤ 1	0.5 (0.3 – 0.6)
			◐	💧	MP9130	M	≤ 2	0.6 (0.4 – 0.8)	M	≤ 2	0.5 (0.3 – 0.6)	M	≤ 2	0.4 (0.2 – 0.5)
			◐	💧	MP9130	R	≤ 1	0.8 (0.6 – 1.0)	R	≤ 1	0.7 (0.4 – 0.9)	R	≤ 1	0.6 (0.4 – 0.8)
			◐	💧	MP9130	R	≤ 2	0.7 (0.5 – 0.9)	R	≤ 2	0.6 (0.3 – 0.8)	R	≤ 2	0.5 (0.3 – 0.7)
			✱	💧	MP9130	R	≤ 1	0.7 (0.5 – 0.9)	R	≤ 1	0.6 (0.4 – 0.7)	R	≤ 1	0.5 (0.3 – 0.6)
			✱	💧	MP9130	R	≤ 2	0.6 (0.4 – 0.8)	R	≤ 2	0.5 (0.3 – 0.6)	R	≤ 2	0.4 (0.2 – 0.5)

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

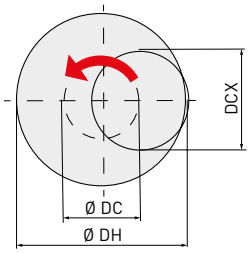
415SD

MAXIMUM CAPACITIES BY MODE

RAMPING



HELICAL DRILLING



- How to derive a locus of the centre of the tool.

$$ØDC = ØDH - DCX$$

ØDC: Locus of the centre of the tool
ØDH: Desired hole diameter
DCX: Cutting Diameter Maximum

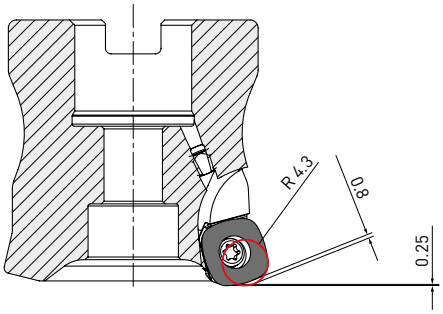
- For the depth of cut per pass, refer to the cutting conditions above for helical drilling.
- Set the machine spindle revolution so that the tool is rotating and cutting in a down cut direction.

- When ramping and helical cutting, please apply a lower feed (60 % of the calculated feed rate or less).
- The long chips generated can disperse, ensure that adequate safety precautions are taken.

Tool holder type	DCX	DC	APMX	Ramping	Helical drilling	
				RMPX	DH	
					Min.	Max.
ARBOR TYPE						
41SD-050A04AR-E	50	33.4	2	3	84	97
41SD-050A05AR-E	50	33.4	2	3	84	97
41SD-052A04AR-E	52	35.4	2	3	88	101
41SD-052A06AR-E	52	35.4	2	3	88	101
41SD-063A05AR-E	63	46.5	2	2	110	123
41SD-063A07AR-E	63	46.5	2	2	110	123
41SD-066A05AR-E	66	49.4	2	1.9	116	129
41SD-066A07AR-E	66	49.4	2	1.9	116	129

NOTE FOR PROGRAMMING

When using 415SD (Mplus), please programme as an RE = 4.3 radius cutter. The approximate uncut portions for the programme are as follows.



SYMBOLS

Recommended cutting conditions

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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