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# PRODUCT NEWS

## 2023

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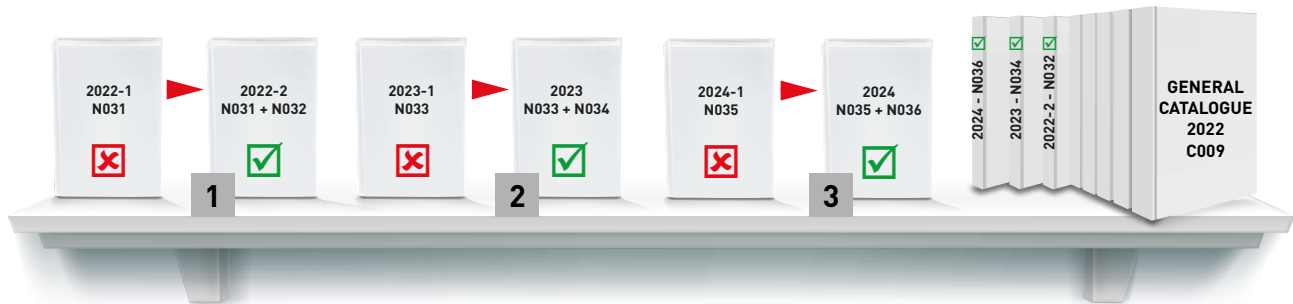
# DIA EDGE



 MITSUBISHI MATERIALS

# NEW CATALOGUE SYSTEM

## HOW TO REPLACE PRODUCT NEWS BOOKS



### NOTES:

- 1 The Product News 2022-1 – N031 has been integrated into Product News 2022-2 – N032.
- 2 The Product News 2023-1 – N033 will be integrated into Product News 2023 – N034.
- 3 The Product News 2024-1 – N035 will be integrated into Product News 2024 – N036.

The yearly Product News catalogues (e.g. N032, N034 etc.) will complement the existing GENERAL CATALOGUE.

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

## TRANSITION FROM THE EXISTING TO THE NEW GENERAL CATALOGUE



### NOTES:

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



**NEW**

# PRODUCT NEWS 2023

## NEW PRODUCTS AND SERIES EXPANSIONS AT A GLANCE

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

## CURRENT, INNOVATIVE, COMPETITIVE

**NOTES:** This Product News 2023 (N034) complements the General Catalogue C009, and the Product News 2022-2 (N032).

It contains all new products and series expansions that have been launched after the release of the N032 book and the C009 catalogue.


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

# INDEX

## TURNING TOOLS

<b>NEW</b>	<b>MC6100 SERIES</b>	6
2023	Expansion of positive ISO turning insert series for various applications ranging from MC6115 for high speed machining through to MC6125 for general applications.	
<b>NEW</b>	<b>GY</b>	26
2023	GY monoblock holder expansion for precision machining of small parts.	
2022-2	1.2 mm GY insert and monoblock holder for precision machining of small parts. 1.5 mm/2.0 mm/2.5 mm/3.0 mm GY inserts with 8° & 15° lead angles.	
<b>NEW</b>	<b>MP/MT9000</b>	46
2023	ISO turning insert for difficult-to-cut materials. Expansion of precision negative ISO turning insert series with FS & LS chipbreakers.	
	<b>MP/MT9000</b>	
2022-1	ISO turning insert for difficult-to-cut materials. MP9025 PVD grade, 7° positive insert expansion for ISO-S turning.	
<b>NEW</b>	<b>MS7025/ MS9025</b>	53
2023	Expansion of the positive ISO turning insert series for small parts machining.	
	<b>MS7025</b>	
2022-2	PVD grade for high precision and stainless steel small parts machining.	
	<b>MC5100 SERIES</b>	67
2023-1	CVD coated grades for machining cast iron. Ideal for high speed through to interrupted cutting.	
	<b>BC8220</b>	
2022-1	PCBN grade for general turning of hardened steels. New BR chipbreaker for excellent chip control when finishing, removing carburized layers, high load machining and hard-soft machining up to 1 mm depth of cut.	
	<b>GW MONOBLOCKHOLDER</b>	
2022-1	GW system expansion with monoblock holder and 2.39 mm width inserts. Different chipbreakers with 5° and 8° leads now available.	

## SOLID MILLING TOOLS

<b>NEW</b>	<b>VFR</b>	82
2023	VFR4MB – Highly efficient finish machining of high hardened materials.	
	<b>VFR</b>	
2022-1	Expansion of VFR2XLB – Ideal for finishing deep pocket applications.	
	<b>MP SERIES</b>	88
2023-1	MP3C – For highly efficient chamfer machining, also providing a long tool life.	

**VQ SERIES**

- 2022-2 VQJCS/VQLCS – New end mill with irregular pitch, chipbreaker flute geometry.  
 2022-1 VQN4/6MVRB – Corner radius end mills to machine Ni-based alloys.

**iMX**

- 2022-2 iMX-C6HV-C – Corner radius type with central coolant hole, 6 flute, irregular helix.



## INDEXABLE MILLING TOOLS

**NEW****FMAX**

- 2023 FMAX-MB – Coarse pitch cutter bodies for highly efficient small parts machining and low rigidity machining conditions.

**95****NEW****WWX SERIES**

- 2023 WWX200 – Insert range expansion with an L-type chipbreaker.  
 2023-1 WWX200 – A new level of versatility.  
 High performance 90° face milling cutter with new smaller size 09, double-sided trigon inserts.  
 WWX400 – Insert range expansion with an M-type chipbreaker.  
 Including large corner radii (RE 1.6/2.0 mm) and also with new wiper type inserts.

**102****AXD**

- 2023-1 AXD4000 – New screw-in type for high speed machining of aluminium and titanium alloys.

**119****WSF406W**

- 2022-2 New M-type chipbreaker and wiper insert.  
 2022-1 Double sided insert with positive geometry for low cutting resistance.  
 High efficiency cutting of cast iron.

**AJX**

- 2022-1 New arbor type with ultra fine pitch.  
 Expansion of the multi-functional milling range.



## DRILLING TOOLS

**NEW****DFAS**

- 2023 Solid carbide flat bottom drills.  
 High efficiency drilling over a wide range of applications.

**130****DSAS**

- 2022-2 New sizes added to the solid carbide drill series with internal coolant holes for HRSA materials.

**MINI DVAS**

- 2022-2 Solid carbide TRISTAR drill series.  
 Fast, reliable and accurate.



## MPLUS TOOLS

**NEW****415SD**

- 2023 First choice for high feed machining of titanium alloys.

**139**

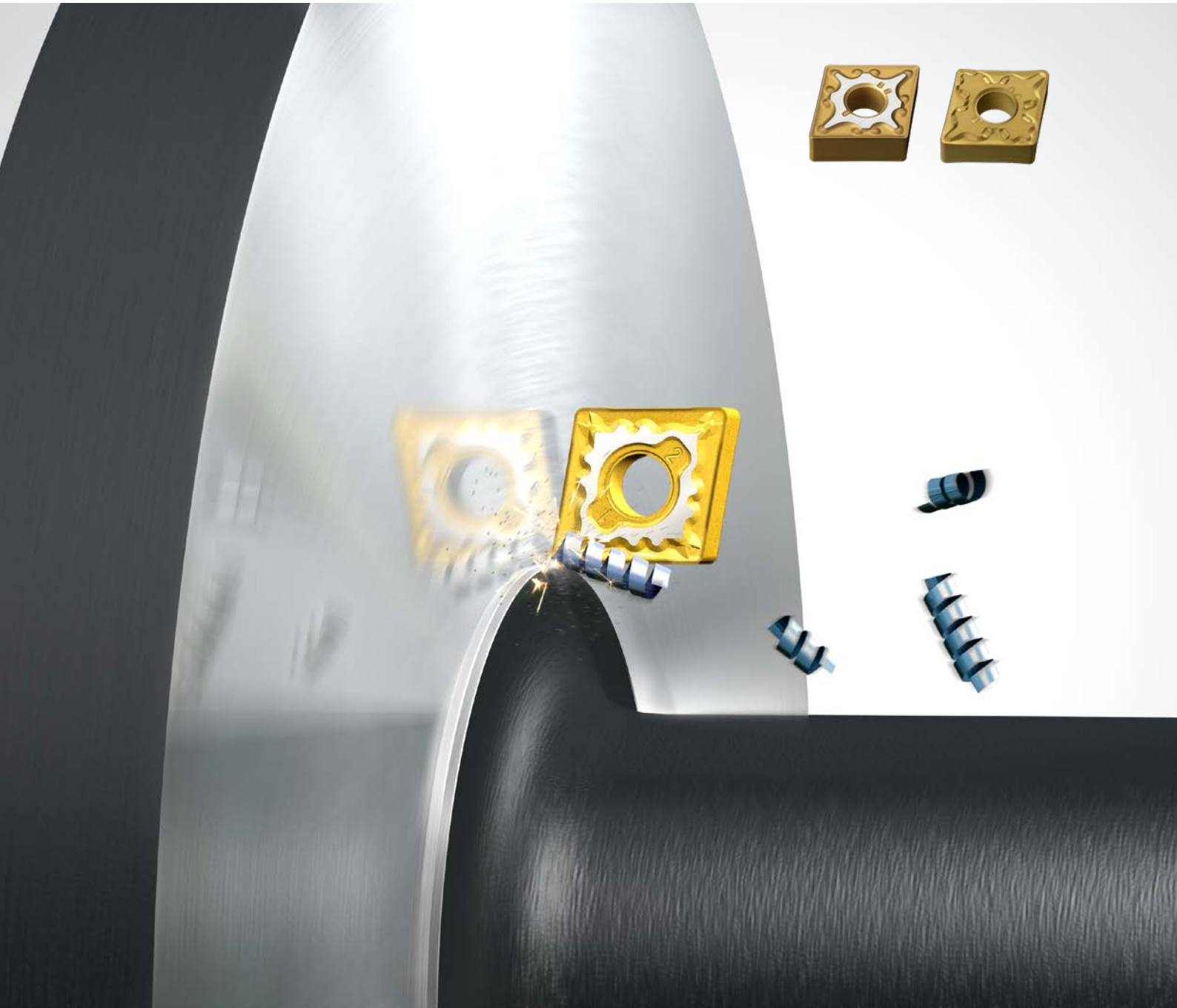
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# MC6100 SERIES

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BRINGING THE ULTIMATE HIGH SPEED  
CUTTING PERFORMANCE

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Interested in more...

**B266**

[www.mhg-mediastore.net](http://www.mhg-mediastore.net)



**DIA EDGE**

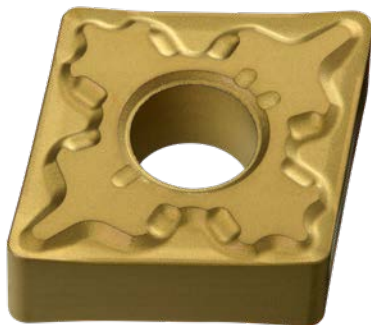
# MC6100 SERIES

## CVD COATED GRADE FOR STEEL TURNING

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

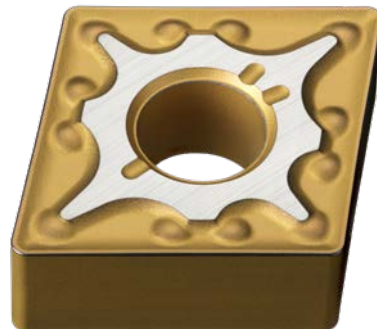
### MC6115

For high speed turning



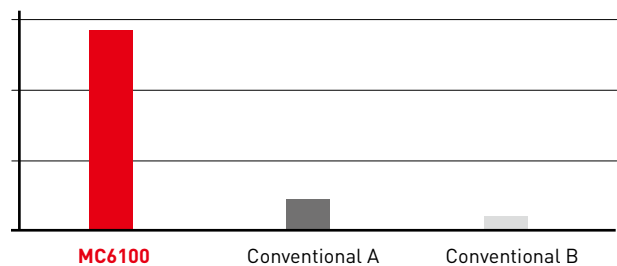
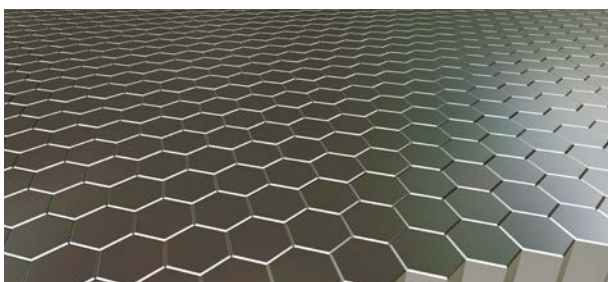
### MC6125

First recommendation for a wide range of applications



### "SUPER" NANO TEXTURE TECHNOLOGY

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



### CRYSTAL ORIENTATION

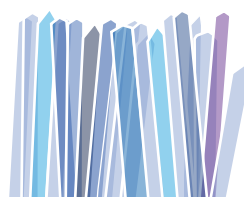
(Image)

The ratio of  $Al_2O_3$  crystal grains with the same orientation



Conventional CVD inserts

Grain size and growth direction are uneven.



Nano Texture

Uniformity of the grain size and growth direction has improved.



„Super“ Nano Texture

Uniformity of the growth direction has drastically improved.



# MC6100 SERIES

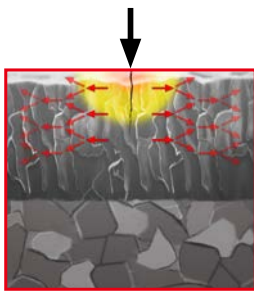
## PROTECTION AGAINST SUDDEN FRACTURING

### STRENGTHENED CHIPPING RESISTANCE

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

### RELAXING THE TENSILE STRESS

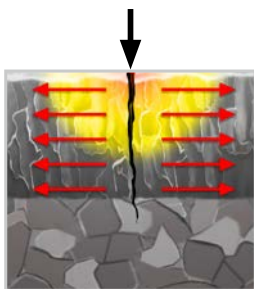
#### Impact stress during machining



Reduced tensile stress

MC6100 Series

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



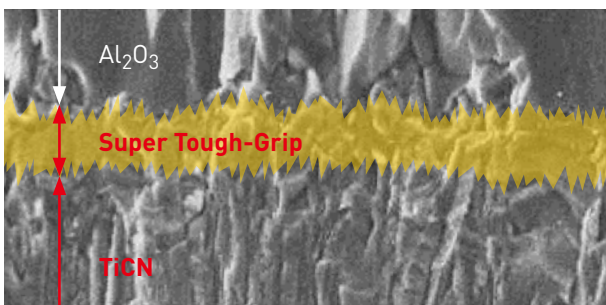
Large tensile stress

Conventional CVD inserts

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

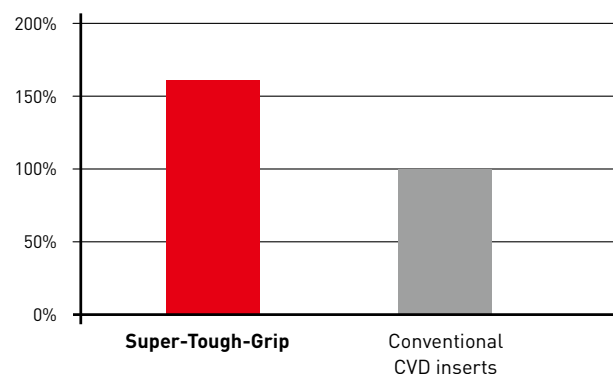
### SUPER-TOUGH-GRIP

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



(Image)

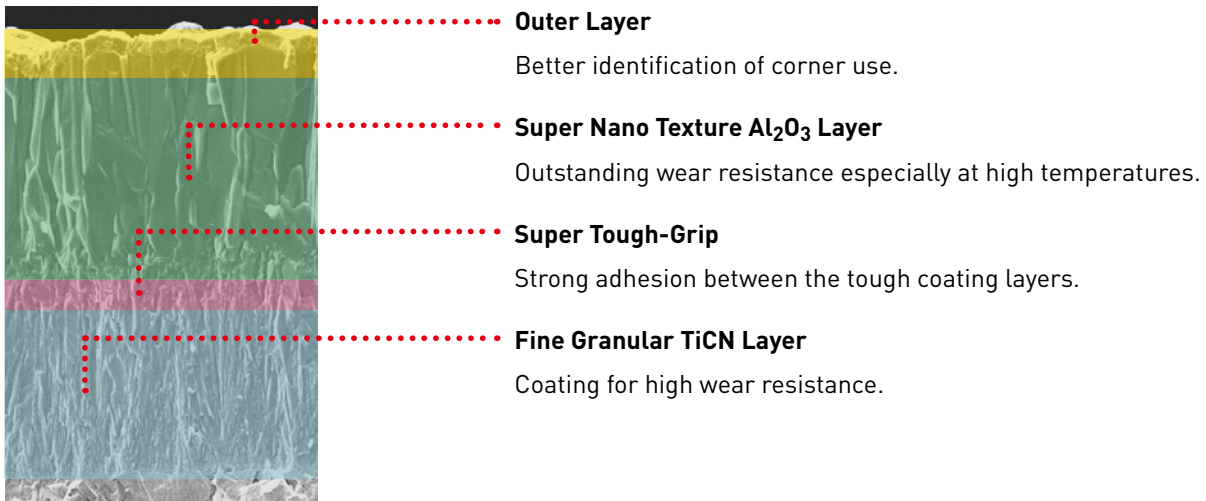
Adhesion strength evaluation\*



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

# MC6115

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



## IMPROVED OUTER COATING (LAYER)

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

## EXAMPLE WHEN MACHINING DIN 20MNCr5

### MACHINING S45C: COMPARISON OF WEAR RESISTANCE

Material	DIN 20MnCr5 170HB
Insert	CNMG120408-MH
Vc (m/min)	200
f (mm/rev)	0.3
ap (mm)	1.5
Cutting mode	Dry cutting

Results

When comparing the high edge strength MH breaker with a conventional low resistance chipbreaker, it shows that MC6115 accomplishes both high welding and wear resistance.

### AFTER 2 MINUTES OF MACHINING CHROME STEEL



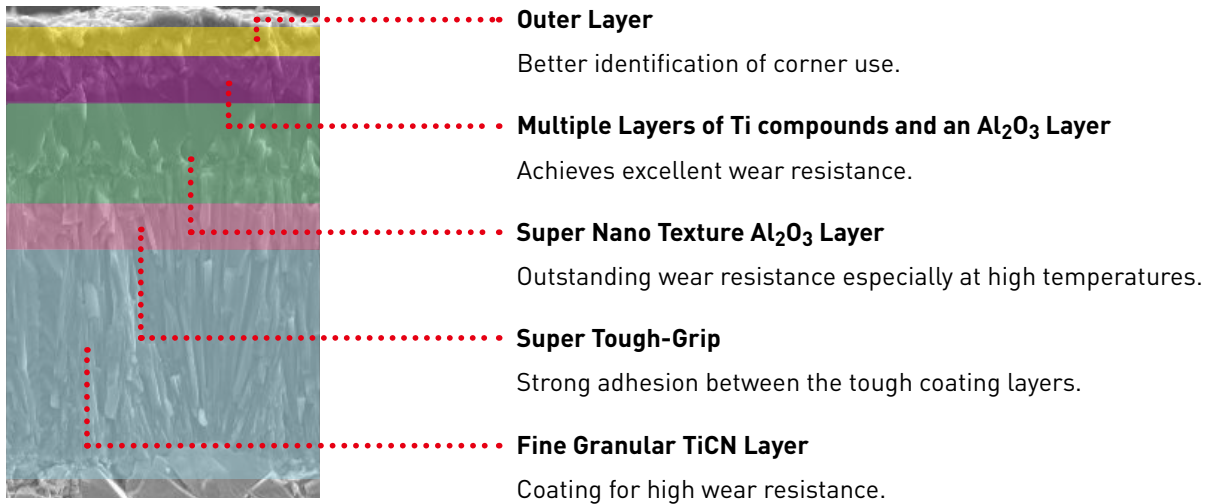
**MC6115**  
**MH Breaker**



Conventional CVD insert

# MC6125

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



## SPECIAL SMOOTH SURFACE TREATMENT

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

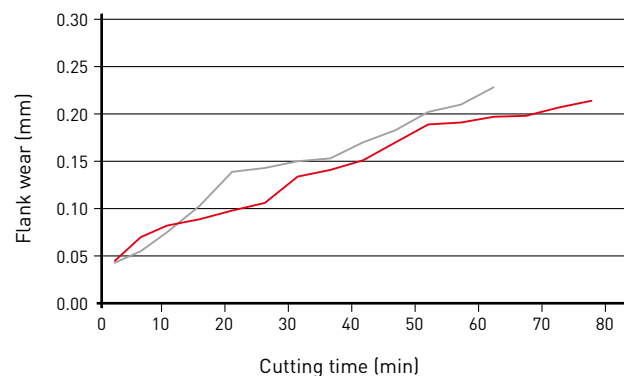
## EXAMPLE WHEN MACHINING C45

### MACHINING S45C: COMPARISON OF WEAR RESISTANCE

Material	C45
Insert	CNMG120408-MH
Vc (m/min)	200
f (mm/rev)	0.3
ap (mm)	1.5
Cutting mode	Wet cutting

Results


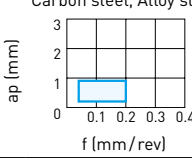
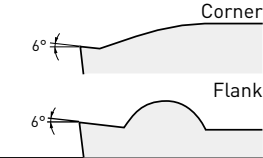

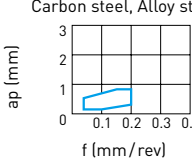
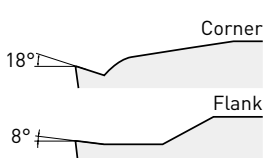

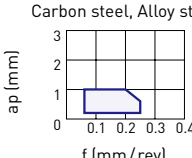
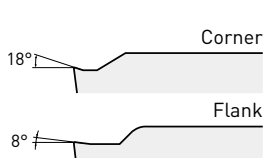

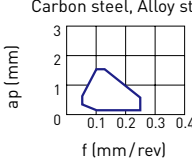
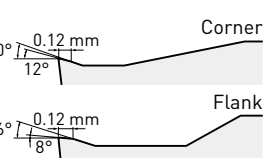

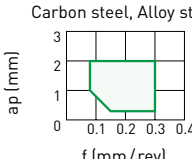
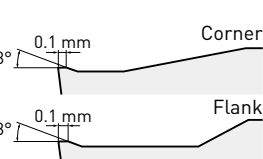

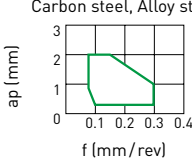
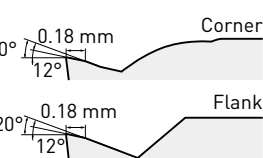

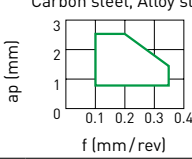
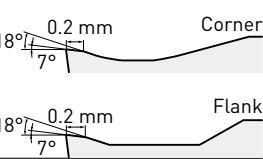

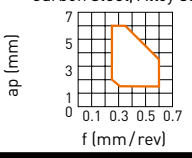
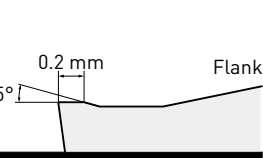

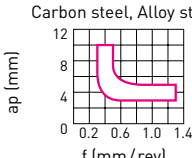
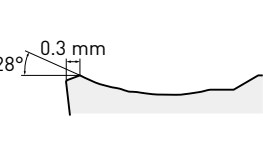
The surface treatment has improved stability and provided longer tool life.



# MC6100 SERIES

## CHIPBREAKER SYSTEM FOR STEEL TURNING



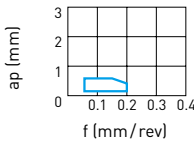
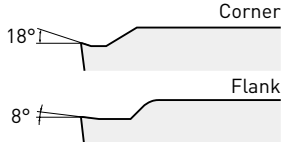
5°, 7° POSITIVE INSERTS

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



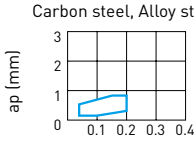


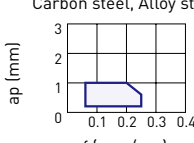
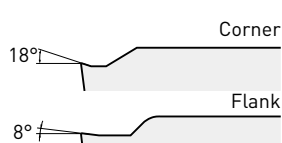

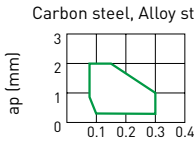
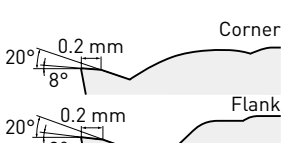

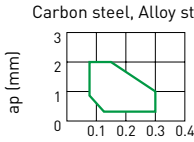


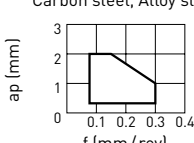
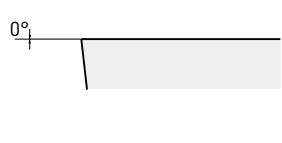
# MC6100 SERIES

## CHIPBREAKER SYSTEM FOR STEEL TURNING

### 7° POSITIVE INSERTS

Tolerance		Features	Cross section geometry	
	<b>FINISH CUTTING</b>			
M		<p><b>ALTERNATIVE CHIPBREAKER FOR LIGHT CUTTING OF CARBON STEEL AND ALLOY STEEL</b></p> <p>Chip control is improved by having a chipbreaker geometry suitable for copying.</p> <p style="text-align: center; border: 1px solid gray; border-radius: 10px; display: inline-block; padding: 2px;">SVX</p>	<p>Carbon steel, Alloy steel</p> 	

### 11° POSITIVE INSERTS

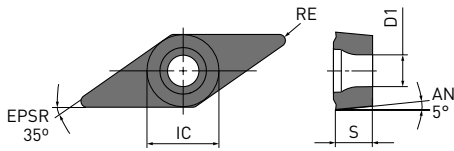
Tolerance		Features	Cross section geometry	
	<b>FINISH CUTTING</b>			
M		<p><b>FIRST RECOMMENDATION FOR FINISHING CARBON STEEL, ALLOY STEEL, MILD STEEL AND STAINLESS STEEL</b></p> <p>Suitable for low depths of cut and low feed rates. Sharp cutting edge and low resistance design achieves excellent cutting performance.</p> <p style="text-align: center; border: 1px solid gray; border-radius: 10px; display: inline-block; padding: 2px;">FV</p>	<p>Carbon steel, Alloy steel</p> 	
<b>LIGHT CUTTING</b>				
M		<p><b>FIRST RECOMMENDATION FOR LIGHT CUTTING OF CARBON STEEL, ALLOY STEEL AND MILD STEEL</b></p> <p>Sharp cutting edge due to a large rake angle. Prevents welding of the insert and controls white turbidity of the surface finish. Chipbreaker protrusion suitable for depth of cut area achieves a wide range of chip control.</p> <p style="text-align: center; border: 1px solid gray; border-radius: 10px; display: inline-block; padding: 2px;">LP</p>	<p>Carbon steel, Alloy steel</p> 	
<b>MEDIUM CUTTING</b>				
M		<p><b>FIRST RECOMMENDATION FOR MEDIUM CUTTING OF CARBON STEEL, ALLOY STEEL, MILD STEEL, STAINLESS STEEL AND CAST IRON</b></p> <p>A positive insert and large rake angle achieves sharp cutting edge performance. Double chipbreaker in the rake face achieve a wide range of chip discharge.</p> <p style="text-align: center; border: 1px solid gray; border-radius: 10px; display: inline-block; padding: 2px;">MV</p>	<p>Carbon steel, Alloy steel</p> 	
M		<p><b>ALTERNATIVE CHIPBREAKER FOR MEDIUM CUTTING OF CARBON STEEL, ALLOY STEEL AND STAINLESS STEEL</b></p> <p>Standard, general purpose chipbreaker.</p> <p style="text-align: center; border: 1px solid gray; border-radius: 10px; display: inline-block; padding: 2px;">Standard</p>	<p>Carbon steel, Alloy steel</p> 	
<b>FOR CAST IRON</b>				
M		<p><b>CHIPBREAKER FOR HEAVY CUTTING OF CAST IRON</b></p> <p>Flat top. Most effective for unstable machining due to its high edge strength.</p> <p style="text-align: center; border: 1px solid gray; border-radius: 10px; display: inline-block; padding: 2px;">Flat Top</p>	<p>Carbon steel, Alloy steel</p> 	

# VBMT, WBMT

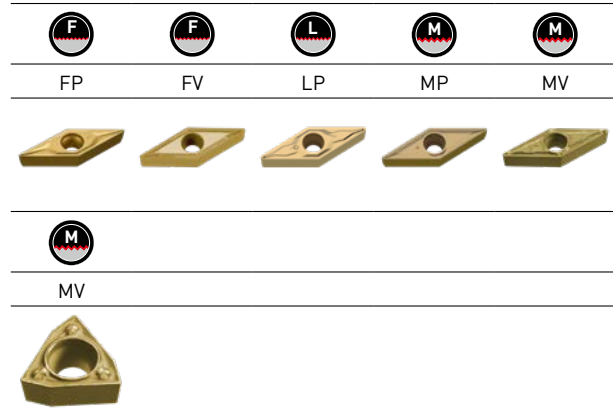
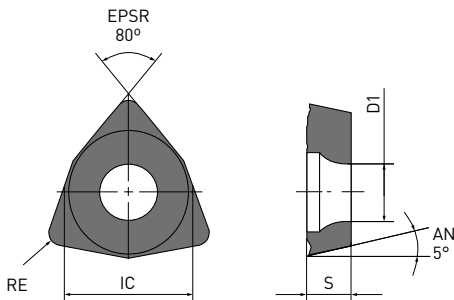
## 5° POSITIVE INSERTS (WITH HOLE)





### M Class

#### VBMT



#### WBMT



Order number	 		MC6115	MC6125	IC	S	RE	D1
	 							
VBMT110302-FP	F		●	●	6.35	3.18	0.2	2.9
VBMT110304-FP	F		●	●	6.35	3.18	0.4	2.9
VBMT110308-FP	F		●	★	6.35	3.18	0.8	2.9
VBMT160404-FP	F		●	●	9.525	4.76	0.4	4.4
VBMT160408-FP	F		●	●	9.525	4.76	0.8	4.4
VBMT110304-FV	F			●	6.35	3.18	0.4	2.9
VBMT110308-FV	F			●	6.35	3.18	0.8	2.9
VBMT160404-FV	F			●	9.525	4.76	0.4	4.4
VBMT160408-FV	F			●	9.525	4.76	0.8	4.4
VBMT110304-LP	L		●	●	6.35	3.18	0.4	2.9
VBMT110308-LP	L		●	●	6.35	3.18	0.8	2.9
VBMT160404-LP	L		●	●	9.525	4.76	0.4	4.4
VBMT160408-LP	L		●	●	9.525	4.76	0.8	4.4
VBMT160404-MP	M		●	●	9.525	4.76	0.4	4.4
VBMT160408-MP	M		●	●	9.525	4.76	0.8	4.4
VBMT110304-MV	M			●	6.35	3.18	0.4	2.9
VBMT110308-MV	M			●	6.35	3.18	0.8	2.9
VBMT160404-MV	M			●	9.525	4.76	0.4	4.4
VBMT160408-MV	M			★	9.525	4.76	0.8	4.4
WBMTL30202L-MV	M			★	4.76	2.38	0.2	2.3
WBMTL30202R-MV	M			●	4.76	2.38	0.2	2.3
WBMTL30204L-MV	M			★	4.76	2.38	0.4	2.3
WBMTL30204R-MV	M			★	4.76	2.38	0.4	2.3

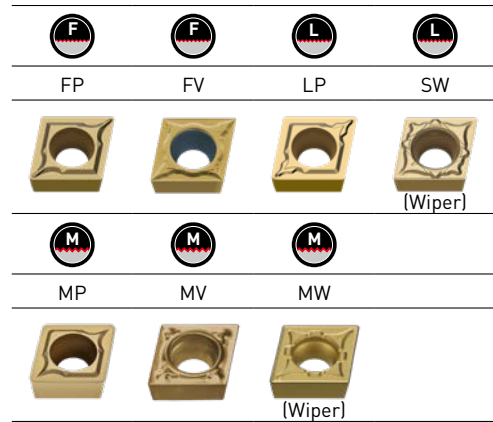
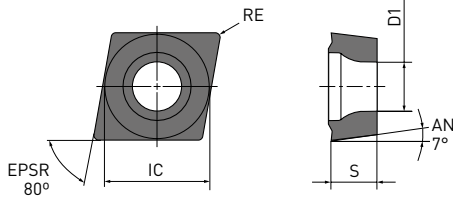
(10 inserts in one case)



# CCMT

## 7° POSITIVE INSERTS (WITH HOLE)

### M Class

### CCMT




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

(10 inserts in one case)



## CCMT - 7° POSITIVE INSERTS (WITH HOLE)

Order number			MC6115	MC6125	IC	S	RE	D1
	M	R						
CCMT060202-MP	M		●	●	6.35	2.38	0.2	2.8
CCMT060204-MP	M		●	●	6.35	2.38	0.4	2.8
CCMT060208-MP	M		●	●	6.35	2.38	0.8	2.8
CCMT080302-MP	M		★	★	7.94	3.18	0.2	3.4
CCMT080304-MP	M		●	★	7.94	3.18	0.4	3.4
CCMT080308-MP	M		●	★	7.94	3.18	0.8	3.4
CCMT09T302-MP	M		●	●	9.525	3.97	0.2	4.4
CCMT09T304-MP	M		●	●	9.525	3.97	0.4	4.4
CCMT09T308-MP	M		●	●	9.525	3.97	0.8	4.4
CCMT120404-MP	M		●	●	12.7	4.76	0.4	5.5
CCMT120408-MP	M		●	●	12.7	4.76	0.8	5.5
CCMT120412-MP	M		●	●	12.7	4.76	1.2	5.5
CCMH060202-MV	M			●	6.35	2.38	0.2	2.8
CCMH060204-MV	M			●	6.35	2.38	0.4	2.8
CCMT060204-MW	M		●	●	6.35	2.38	0.4	2.8
CCMT060208-MW	M		●	●	6.35	2.38	0.8	2.8
CCMT09T304-MW	M		●	●	9.525	3.97	0.4	4.4
CCMT09T308-MW	M		●	●	9.525	3.97	0.8	4.4
CCMT120404-MW	M		●	●	12.7	4.76	0.4	5.5
CCMT120408-MW	M		●	●	12.7	4.76	0.8	5.5

(10 inserts in one case)



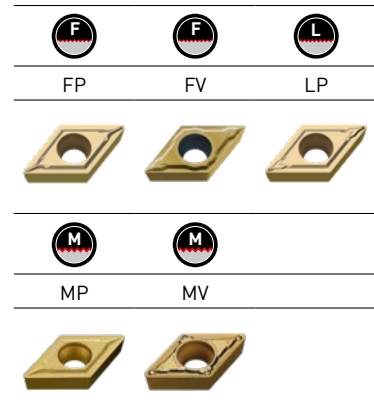
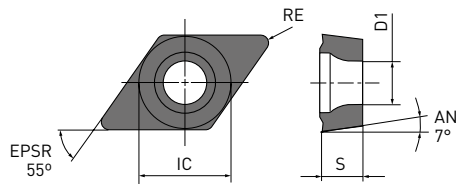




# DCMT

## 7° POSITIVE INSERTS (WITH HOLE)

### M Class

### DCMT



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

(10 inserts in one case)

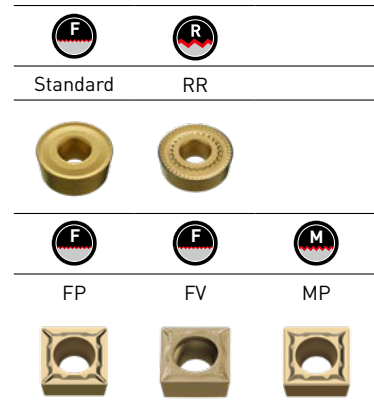
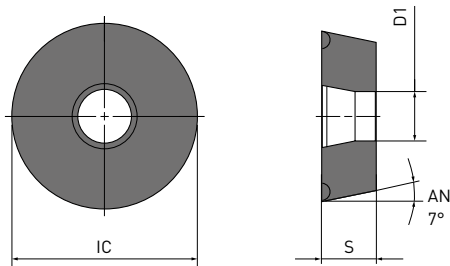


# RCMT, RCMX, SCMT

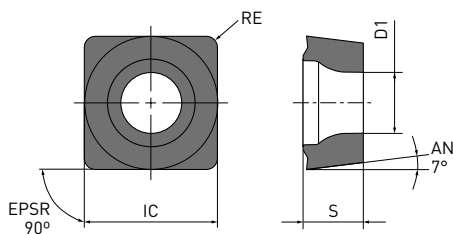
## 7° POSITIVE INSERTS (WITH HOLE)



### M Class

#### RCMT, RCMX



#### SCMT



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

[10 inserts in one case]

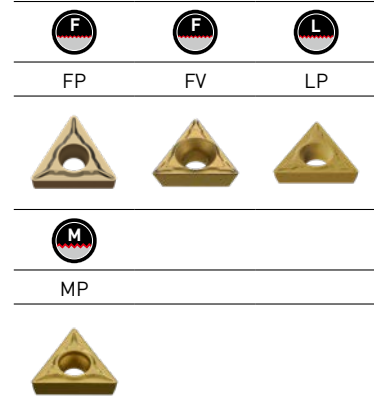
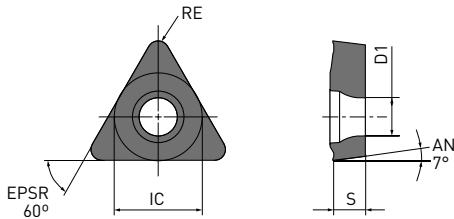




# TCMT

## 7° POSITIVE INSERTS (WITH HOLE)

M Class

TCMT



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

[10 inserts in one case]

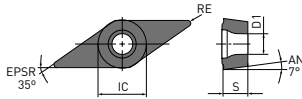


# VCMT, WCMT, XCMT

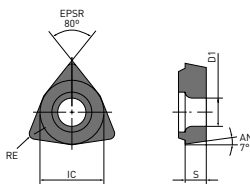
## 7° POSITIVE INSERTS (WITH HOLE)

### M Class

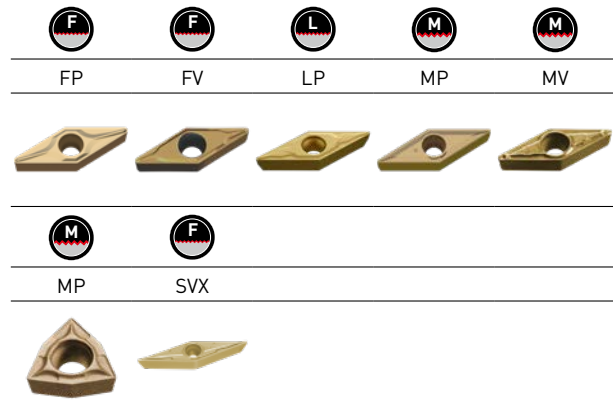
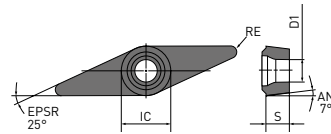
#### VCMT





#### WCMT



#### XCMT



Order number	 		MC6115	MC6125	IC	S	RE	D1
	F	L						
VCMT110302-FP	F		●	●	6.35	3.18	0.2	2.8
VCMT110304-FP	F		●	●	6.35	3.18	0.4	2.8
VCMT160404-FP	F		●	●	9.525	4.76	0.4	4.4
VCMT160408-FP	F		●	●	9.525	4.76	0.8	4.4
VCMT080202-FV	F			●	4.76	2.38	0.2	2.4
VCMT080204-FV	F			●	4.76	2.38	0.4	2.4
VCMT160404-FV	F		●	●	9.525	4.76	0.4	4.4
VCMT160408-FV	F		●	●	9.525	4.76	0.8	4.4
VCMT080202-LP	L			★	4.76	2.38	0.2	2.4
VCMT080204-LP	L			●	4.76	2.38	0.4	2.4
VCMT110304-LP	L		●	●	6.35	3.18	0.4	2.8
VCMT110308-LP	L		●	●	6.35	3.18	0.8	2.8
VCMT160404-LP	L		●	●	9.525	4.76	0.4	4.4
VCMT160408-LP	L		●	●	9.525	4.76	0.8	4.4
VCMT110304-MP	M		●	●	6.35	3.18	0.4	2.8
VCMT160404-MP	M		●	●	9.525	4.76	0.4	4.4
VCMT160408-MP	M		●	●	9.525	4.76	0.8	4.4
VCMT160412-MP	M		●	★	9.525	4.76	1.2	4.4
VCMT080202-MV	M			★	4.76	2.38	0.2	2.4
VCMT080204-MV	M			●	4.76	2.38	0.4	2.4
WCMT020102-MP	M		★	★	3.97	1.59	0.2	2.3
WCMT020104-MP	M		★	★	3.97	1.59	0.4	2.3
WCMT040202-MP	M		★	★	6.35	2.38	0.2	2.8
WCMT040204-MP	M		★	★	6.35	2.38	0.4	2.8
WCMT040208-MP	M			★	6.35	2.38	0.8	2.8
WCMT06T304-MP	M		★	★	9.525	3.97	0.4	4.4
WCMT06T308-MP	M		★	★	9.525	3.97	0.8	4.4
WCMTL30202-MP	M		★	★	4.76	2.38	0.2	2.3
WCMTL30204-MP	M		★	★	4.76	2.38	0.4	2.3
XCMT150304-SVX	F			●	6.35	3.18	0.4	2.8
XCMT150308-SVX	F			●	6.35	3.18	0.8	2.8

(10 inserts in one case)

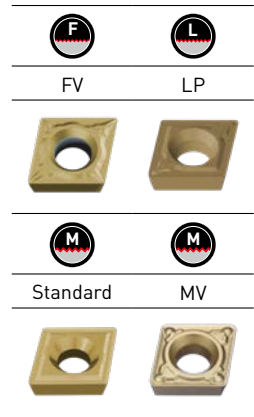
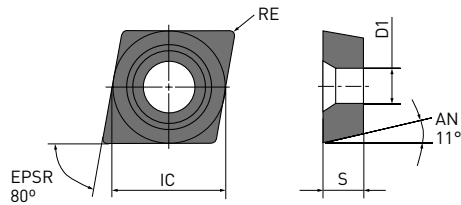


# CPMH

## 11° POSITIVE INSERTS (WITH HOLE)

M Class

CPMH



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

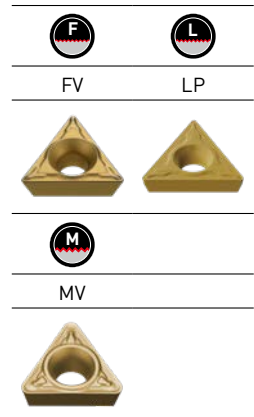
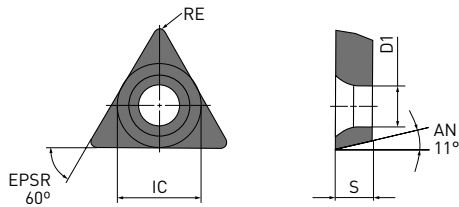
(10 inserts in one case)



# TPMH

## 11° POSITIVE INSERTS (WITH HOLE)

**M Class**

**TPMH**



Order number	 		MC6115	MC6125	IC	S	RE	D1
	F	L						
TPMH080202-FV	F			★	4.76	2.38	0.2	2.4
TPMH080204-FV	F			★	4.76	2.38	0.4	2.4
TPMH090202-FV	F			★	5.56	2.38	0.2	2.9
TPMH090204-FV	F			●	5.56	2.38	0.4	2.9
TPMH110302-FV	F			★	6.35	3.18	0.2	3.4
TPMH110304-FV	F			●	6.35	3.18	0.4	3.4
TPMH110308-FV	F			●	6.35	3.18	0.8	3.4
TPMH160302-FV	F			●	9.525	3.18	0.2	4.4
TPMH160304-FV	F			★	9.525	3.18	0.4	4.4
TPMH160308-FV	F			●	9.525	3.18	0.8	4.4
TPMH080202-LP		L		●	4.76	2.38	0.2	2.4
TPMH080204-LP		L		●	4.76	2.38	0.4	2.4
TPMH090202-LP		L		★	5.56	2.38	0.2	2.9
TPMH090204-LP		L		●	5.56	2.38	0.4	2.9
TPMH110302-LP		L		★	6.35	3.18	0.2	3.4
TPMH110304-LP		L		●	6.35	3.18	0.4	3.4
TPMH110308-LP		L		★	6.35	3.18	0.8	3.4
TPMH160302-LP		L		★	9.525	3.18	0.2	4.4
TPMH160304-LP		L		★	9.525	3.18	0.4	4.4
TPMH160308-LP		L		★	9.525	3.18	0.8	4.4
TPMH080202-MV	M			●	4.76	2.38	0.2	2.4
TPMH080204-MV	M			●	4.76	2.38	0.4	2.4
TPMH090202-MV	M			●	5.56	2.38	0.2	2.9
TPMH090204-MV	M			●	5.56	2.38	0.4	2.9
TPMH090208-MV	M			●	5.56	2.38	0.8	2.9
TPMH110302-MV	M			●	6.35	3.18	0.2	3.4
TPMH110304-MV	M			●	6.35	3.18	0.4	3.4
TPMH110308-MV	M			●	6.35	3.18	0.8	3.4
TPMH160304-MV	M			●	9.525	3.18	0.4	4.4
TPMH160308-MV	M			★	9.525	3.18	0.8	4.4

(10 inserts in one case)

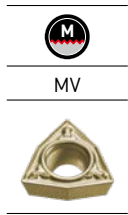
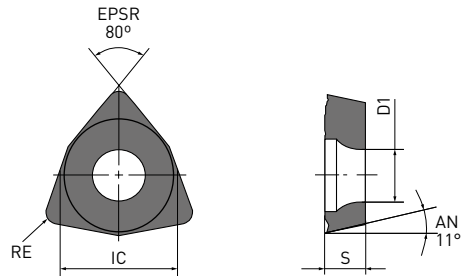




# WPMT

## 11° POSITIVE INSERTS (WITH HOLE)

M Class

WPMT



Order number	 		MC6115	MC6125	IC	S	RE	D1
	M	M						
WPMT040202-MV	M			●	6.35	2.38	0.2	2.8
WPMT040204-MV	M			★	6.35	2.38	0.4	2.8
WPMT060304-MV	M			★	9.525	3.18	0.4	4.4
WPMT060308-MV	M			●	9.525	3.18	0.8	4.4

[10 inserts in one case]

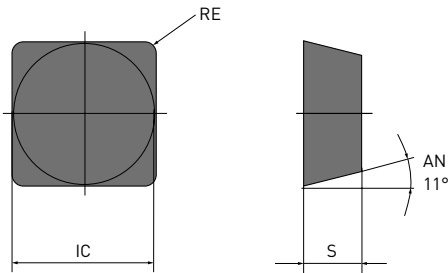


# SPMR, SPMN, TPMR, TPMN

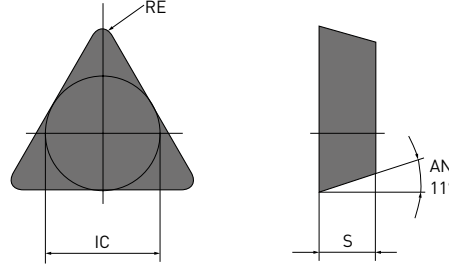
## 11° POSITIVE INSERTS (WITHOUT HOLE)



M Class

SPMR, SPMN



TPMR, TPMN



Order number	 	MC6115	MC6125	IC	S	RE	D1
SPMR090304	L	★	★	9.525	3.18	0.4	-
SPMR090308	L	●	★	9.525	3.18	0.8	-
SPMR120304	L	●	★	12.7	3.18	0.4	-
SPMR120308	L	●	★	12.7	3.18	0.8	-
SPMN090308	—	★		9.525	3.18	0.8	-
SPMN120304	—	★		12.7	3.18	0.4	-
SPMN120308	—	●		12.7	3.18	0.8	-
SPMN120312	—	●		12.7	3.18	1.2	-
TPMR110304	L	●	★	6.35	3.18	0.4	-
TPMR110308	L	●	★	6.35	3.18	0.8	-
TPMR160304	L	●	★	9.525	3.18	0.4	-
TPMR160308	L	●	★	9.525	3.18	0.8	-
TPMR160312	L	●	★	9.525	3.18	1.2	-
TPMN110304	—	●		6.35	3.18	0.4	-
TPMN110308	—	★		6.35	3.18	0.8	-
TPMN160304	—	●		9.525	3.18	0.4	-
TPMN160308	—	●		9.525	3.18	0.8	-
TPMN160312	—	★		9.525	3.18	1.2	-
TPMN220404	—	★		12.7	4.76	0.4	-
TPMN220408	—	★		12.7	4.76	0.8	-
TPMN220412	—	★		12.7	4.76	1.2	-

(10 inserts in one case)







# MC6100 SERIES

## RECOMMENDED CUTTING CONDITIONS



5° 7° POSITIVE INSERTS (FOR EXTERNAL TURNING)

Material	Properties	Conditions			Grade		Vc	f	ap
Mild steel	≤180HB	●	F	MC6115	FP	295-570	0.04-0.20	0.20-0.90	
		●	F	MC6115	FV	295-570	0.04-0.20	0.20-0.90	
		●	L	MC6115	LP	295-570	0.06-0.25	0.20-1.00	
		●	L	MC6115	SW	295-570	0.06-0.24	0.20-1.50	
		●	M	MC6115	MP	245-475	0.08-0.30	0.30-2.00	
		●	M	MC6115	MV	245-475	0.08-0.30	0.30-2.00	
		●	M	MC6115	MW	245-475	0.10-0.35	0.80-2.50	
		⚡	F	MC6125	FP	320-505	0.04-0.20	0.20-0.90	
		⚡	F	MC6125	FV	320-505	0.04-0.20	0.20-0.90	
		⚡	L	MC6125	LP	320-505	0.06-0.25	0.20-1.00	
		⚡	L	MC6125	SV	320-505	0.06-0.25	0.20-1.00	
		⚡	L	MC6125	SW	320-505	0.06-0.24	0.20-1.50	
		⚡	M	MC6125	MP	270-420	0.08-0.30	0.30-2.00	
		⚡	M	MC6125	MV	270-420	0.08-0.30	0.30-2.00	
		⚡	M	MC6125	MW	270-420	0.10-0.35	0.80-2.50	
		Carbon and alloy steels	180-280HB	●	F	MC6115	FP	220-420	0.04-0.20
●	F			MC6115	FV	220-420	0.04-0.20	0.20-0.90	
●	L			MC6115	LP	220-420	0.06-0.25	0.20-1.00	
●	L			MC6115	SW	220-420	0.06-0.24	0.20-1.50	
●	M			MC6125	MP	200-310	0.08-0.30	0.30-2.00	
●	M			MC6115	MP	180-350	0.08-0.30	0.30-2.00	
●	M			MC6125	MV	200-310	0.08-0.30	0.30-2.00	
●	M			MC6115	MV	180-350	0.08-0.30	0.30-2.00	
●	M			MC6115	MW	180-350	0.10-0.35	0.80-2.50	
⚡	F			MC6125	FP	240-370	0.04-0.20	0.20-0.90	
⚡	F			MC6125	FV	240-370	0.04-0.20	0.20-0.90	
⚡	L			MC6125	LP	240-370	0.06-0.25	0.20-1.00	
⚡	L			MC6125	SV	240-370	0.06-0.25	0.20-1.00	
⚡	L			MC6125	SW	240-370	0.06-0.24	0.20-1.50	
⚡	M			MC6125	MP	200-310	0.08-0.30	0.30-2.00	
⚡	M			MC6125	MV	200-310	0.08-0.30	0.30-2.00	
⚡	M	MC6125	MW	200-310	0.10-0.35	0.80-2.50			
Carbon and alloy steels	280-350HB	●	F	MC6115	FP	155-295	0.04-0.20	0.20-0.90	
		●	F	MC6115	FV	155-295	0.04-0.20	0.20-0.90	
		●	L	MC6115	LP	155-295	0.06-0.25	0.20-1.00	
		●	M	MC6115	MP	130-245	0.08-0.30	0.30-2.00	
		●	M	MC6115	MV	130-245	0.08-0.30	0.30-2.00	
		⚡	F	MC6125	FP	170-265	0.04-0.20	0.20-0.90	
		⚡	F	MC6125	FV	170-265	0.04-0.20	0.20-0.90	
		⚡	L	MC6125	LP	170-265	0.06-0.25	0.20-1.00	
		⚡	M	MC6125	MP	140-220	0.08-0.30	0.30-2.00	
		⚡	M	MC6125	MV	140-220	0.08-0.30	0.30-2.00	

# MC6100 SERIES

## RECOMMENDED CUTTING CONDITIONS

### 11° POSITIVE INSERTS (FOR EXTERNAL TURNING)

Material	Properties	Conditions			Grade		Vc	f	ap
Mild steel	≤180HB	●	F	MC6125	FV	320-505	0.04-0.20	0.20-0.90	
		●	L	MC6125	LP	320-505	0.06-0.25	0.20-1.00	
		●	L	MC6115	R-Std	245-475	0.08-0.30	0.30-2.00	
		●	M	MC6125	MV	270-420	0.08-0.30	0.30-2.00	
		●	M	MC6115	MV	245-475	0.08-0.30	0.30-2.00	
		●	M	MC6125	R-Std	270-420	0.08-0.30	0.30-2.00	
		⚡	L	MC6125	LP	320-505	0.06-0.25	0.20-1.00	
		⚡	L	MC6125	R-Std	270-420	0.08-0.30	0.30-2.00	
		⚡	M	MC6125	MV	270-420	0.08-0.30	0.30-2.00	
		⚡	M	MC6125	R-Std	270-420	0.08-0.30	0.30-2.00	
Carbon and alloy steels	180-280HB	●	F	MC6125	FV	240-370	0.04-0.20	0.20-0.90	
		●	L	MC6125	LP	240-370	0.06-0.25	0.20-1.00	
		●	L	MC6115	R-Std	180-350	0.08-0.30	0.30-2.00	
		●	L	MC6125	R-Std	200-310	0.08-0.30	0.30-2.00	
		●	M	MC6125	MV	200-310	0.08-0.30	0.30-2.00	
		●	M	MC6115	R-Std	180-350	0.08-0.30	0.30-2.00	
		●	M	MC6125	R-Std	200-310	0.08-0.30	0.30-2.00	
		⚡	L	MC6125	LP	240-370	0.06-0.25	0.20-1.00	
		⚡	L	MC6125	R-Std	200-310	0.08-0.30	0.30-2.00	
		⚡	M	MC6125	MV	200-310	0.08-0.30	0.30-2.00	
⚡	M	MC6125	R-Std	200-310	0.08-0.30	0.30-2.00			

1. Recommended cutting conditions for 5°/7°/11° positive inserts are provided as a guideline only. Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.
2. Please use the QR code for a pamphlet of the recommended conditions for the XCMT profile holder insert.



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# GY GROOVING SERIES

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A WIDE SELECTION OF HOLDERS AND INSERTS  
AVAILABLE FOR DIVERSE GROOVING APPLICATIONS

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**NEW**



Interested in more...

**B140**

[www.mhg-mediastore.net](http://www.mhg-mediastore.net)

**DIA**  **EDGE**

# GY GROOVING SERIES

## A WIDE SELECTION OF INSERTS

### CUTTING OFF



**GU Chipbreaker** (For mild steel)   
 **GS Chipbreaker** (Low feeds)   
 **GM Chipbreaker** (Medium feeds)   
 **R/L05-GM Breaker** (Medium feeds)   
 **R08-GS Breaker** (Low feeds)   
 **R15-GS Breaker** (Low feeds)   
 **GL Breaker** (For aluminium alloys)

### GROOVING



**GU Chipbreaker** (For mild steel)   
 **GS Chipbreaker** (Low feeds)   
 **GM Chipbreaker** (Medium feeds)   
 **GFGS** (For hardened materials)   
 **GL Breaker** (For aluminium alloys)

### FOR MULTIFUNCTIONAL GROOVING



**MF Chipbreaker** (G class)   
 **MS Chipbreaker** (Low feeds)   
 **MM Chipbreaker** (Medium feeds)

### COPYING / RECESSING



**BM Chipbreaker** (Medium feeds)

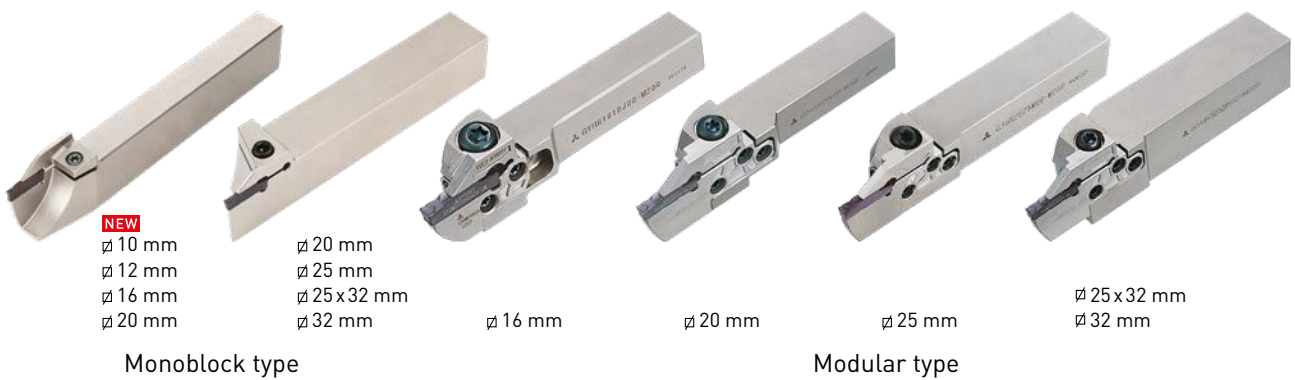
Breaker	RT9010	RT9020	VP10RT	VP20RT	MY6015	NX2525	BC8110	MP9015	MP9025
<b>GU Breaker</b>			✓	✓		✓			
<b>GS Breaker</b>	✓	✓	✓	✓		✓			
<b>GM Breaker</b>			✓	✓	✓	✓		✓	✓
<b>GL Breaker</b>	✓								
<b>MF Breaker</b>	✓		✓	✓		✓			
<b>MS Breaker</b>			✓	✓	✓	✓			
<b>MM Breaker</b>			✓	✓	✓	✓		✓	✓
<b>BM Breaker</b>			✓	✓	✓	✓		✓	✓
<b>Blank Insert</b>	✓	✓				✓			
<b>GFGS Honing (PCBN)</b>							✓		

# GY GROOVING SERIES

A WIDE SELECTION OF HOLDERS AND INSERTS  
AVAILABLE FOR DIVERSE GROOVING APPLICATIONS

## EXTERNAL • FACE HOLDERS

Corresponding blades to a variety of modular holders with different shank sizes.



Various depths of groove possible with a single tool using different modular blades.

Various sizes of face grooves from a wide array of modular blades.



External grooving

Face grooving

## INTERNAL HOLDERS

A wide range of holders available from minimum diameter of ∅25 mm.

Short shank types are stock standard.

Monoblock type

Modular type

Monoblock type

Modular type

Min. cutting diameter  
∅25, ∅32



Min. cutting diameter  
∅40, ∅50,  
∅60, ∅70



Short

Standard

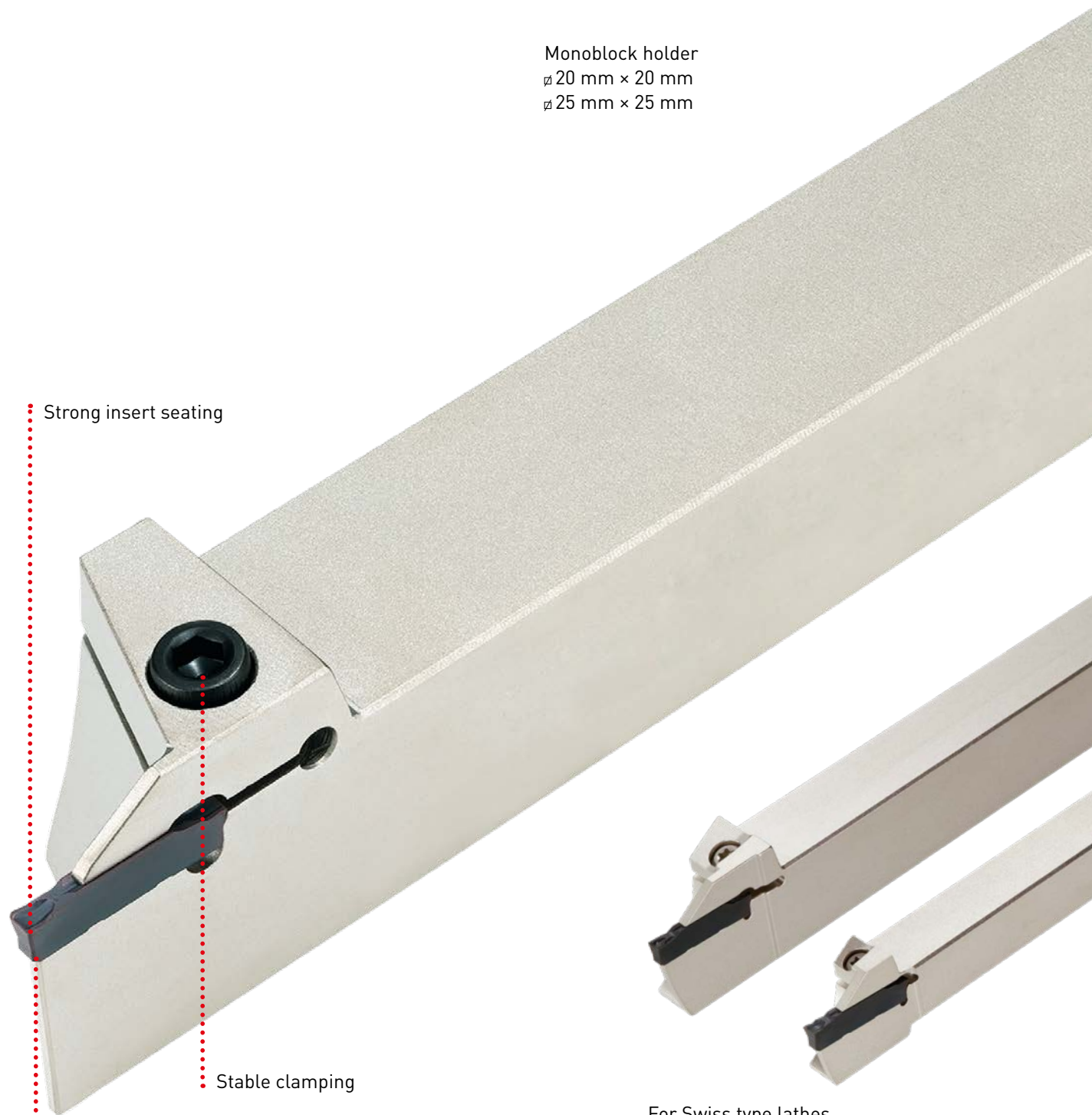
Short

Standard

# GY GROOVING SERIES

## MONOBLOCK HOLDERS FOR EXTERNAL GROOVING AND FOR SWISS TYPE LATHE MACHINES

Monoblock holder  
∅ 20 mm × 20 mm  
∅ 25 mm × 25 mm



Strong insert seating

Stable clamping

2 corner insert

Insert width 2.0–8.0 mm

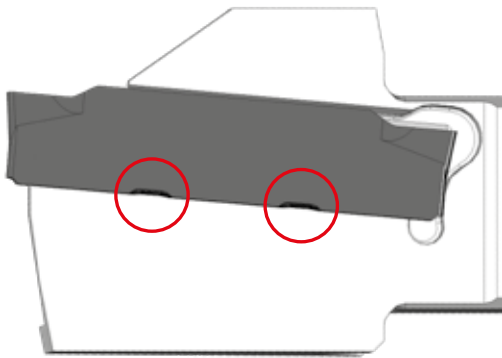
For Swiss type lathes

# GY GROOVING SERIES

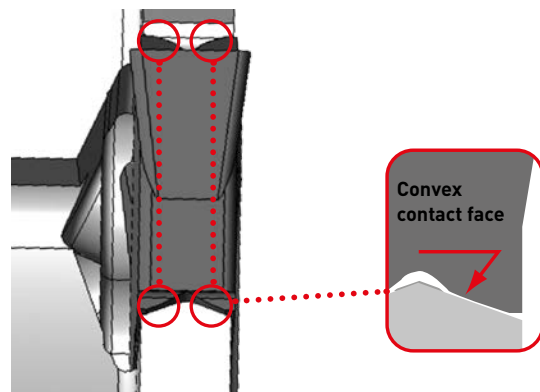
## INNOVATIVE CLAMPING SYSTEM FOR SWISS TYPE LATHES ENSURES RELIABLE GROOVING

### HIGHLY RELIABLE INSERT CLAMP

The safety key locks the insert and prevents movement.



The convex geometry ensures high precision clamping.

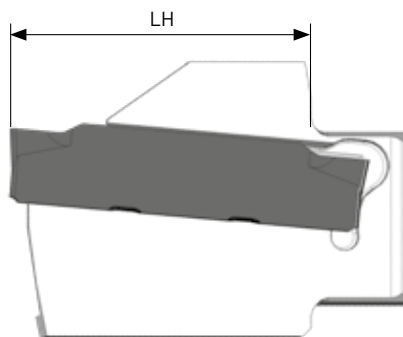


## MONOBLOCKHOLDER FOR SWISS TYPE AUTOMATIC LATHES

The new geometry with greatly improved rigidity suppresses vibrations and dimensional changes thereby solves common cutting off problems.

### OVERHANG LENGTH COMPATIBLE WITH SWISS TYPE AUTOMATIC LATHES

Head length corresponding to the maximum machining diameter of CNC Swiss type automatic lathes and turret machines.

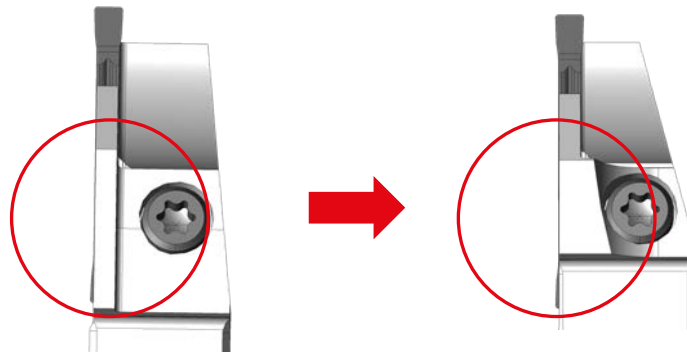


# GY GROOVING SERIES

## FEATURES OF THE HIGH-RIGIDITY HOLDER FOR SWISS TYPE LATHES

### STRONG CLAMP BRIDGE

The strong design of the clamp bridge suppresses chatter and vibration.



### THICKER TOOL BASE

Tool deflection caused by cutting resistance is greatly reduced.



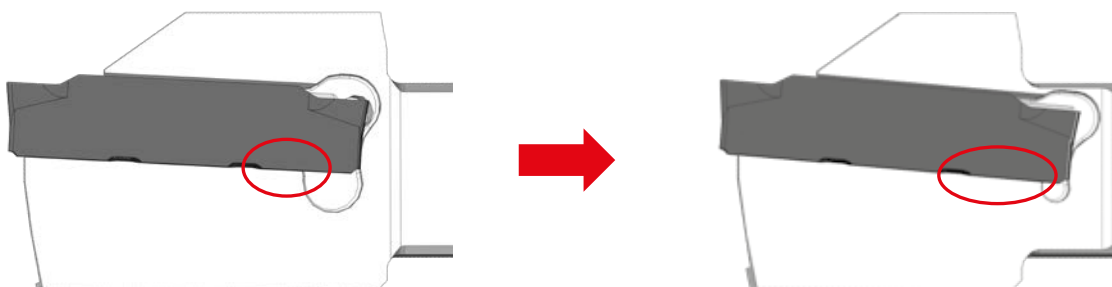
Analysis by simulation  
Deflection measurement: 0.044 mm

Analysis by simulation  
Deflection measurement: 0.013 mm

Analysis by simulation

### STRENGTHENING OF THE INSERT CLAMP

The seating face of the insert becomes wider reducing the deformation of the workpiece material.





# GY GROOVING SERIES

## NEW LINE-UP

### LOW RESISTANCE/ LOW FEED BREAKER

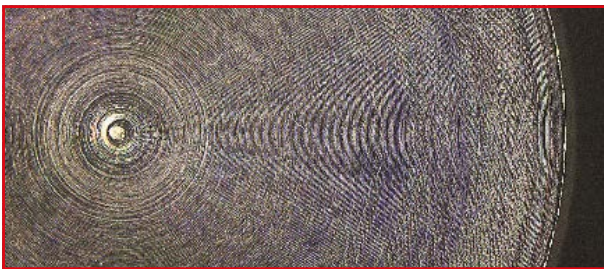
#### GS Breaker for lead angle 8° and 15°

By improving dimensional accuracy, the amount of remaining centre pip is reduced and good surface finishes are achieved.

### CUTTING PERFORMANCE

#### SUS304 Comparison of cutting off and remaining material

Complete cutting off



**GY**  
GS breaker



Remaining pip in the centre:  $\varnothing$  0.49 mm, Rz: 0.009 mm

Not completely cut off

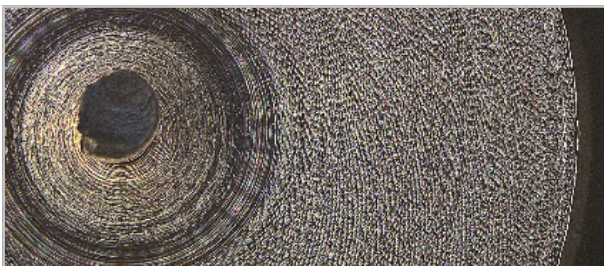


Conventional A



Remaining pip in the centre:  $\varnothing$  0.58 mm, Rz: 0.043 mm

Not completely cut off



Conventional B



Remaining pip in the centre:  $\varnothing$  1.42 mm, Rz: 0.015 mm

Material	SUS304 $\varnothing$ 16mm
Tool	CW = 2 mm Lead Angle 15°
Vc (m/min)	100
f (mm/rev)	0.03
Cutting mode	Wet cutting

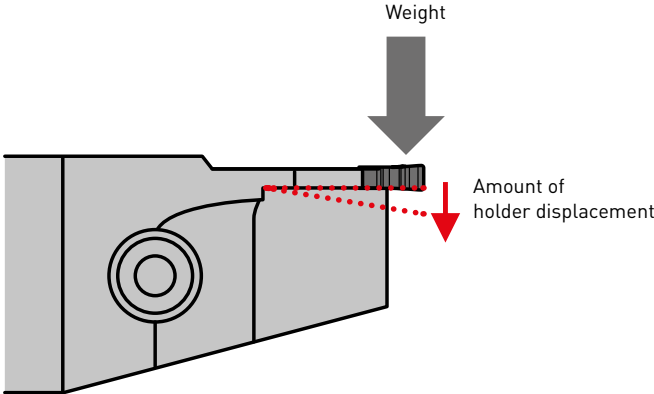
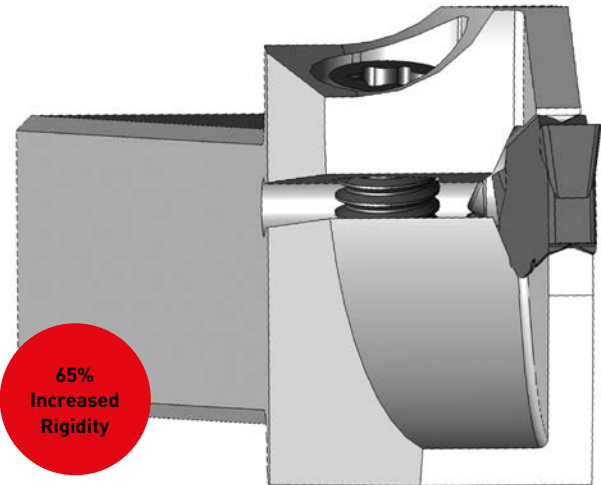
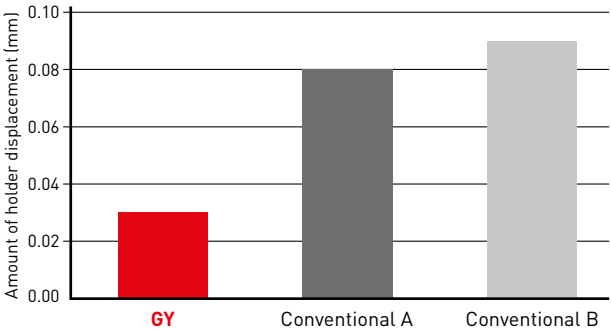
# GY GROOVING SERIES

## CUTTING PERFORMANCE FOR SWISS TYPE LATHES

### TOOL HOLDER DEFLECTION COMPARISON

The high rigidity of the tool reduces chatter and vibration thereby improving the component surface finish and also reduces the remaining pip in the centre.

#### GY holder



# GY GROOVING SERIES

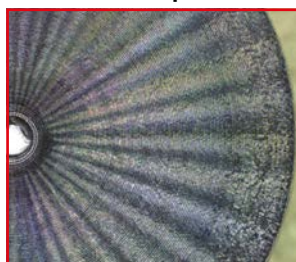
## CUTTING PERFORMANCE FOR SWISS TYPE LATHES

### SURFACE FINISH COMPARISON WHEN CUTTING OFF: 1.4301 X5CRN118-9

The high-rigidity holder suppresses vibration and tool deflection, improving the finished surface.

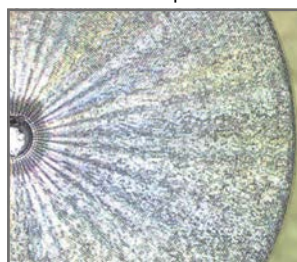
#### GY Holder

Rz 1.8  $\mu\text{m}$



**GY**

Rz 5.6  $\mu\text{m}$



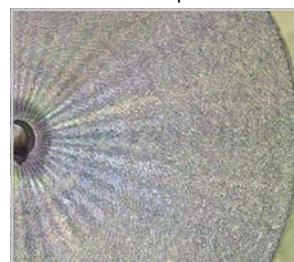
Conventional A

Rz 4.1  $\mu\text{m}$



Conventional B

Rz 5.7  $\mu\text{m}$



Conventional C

Material	1.4301 $\varnothing$ 25mm
Tool	CW = 2 mm RE = 0.2 mm 16 x 16
Vc (m/min)	120
f (mm/rev)	0.10
Cutting mode	Wet cutting

Excellent  
surface  
finish

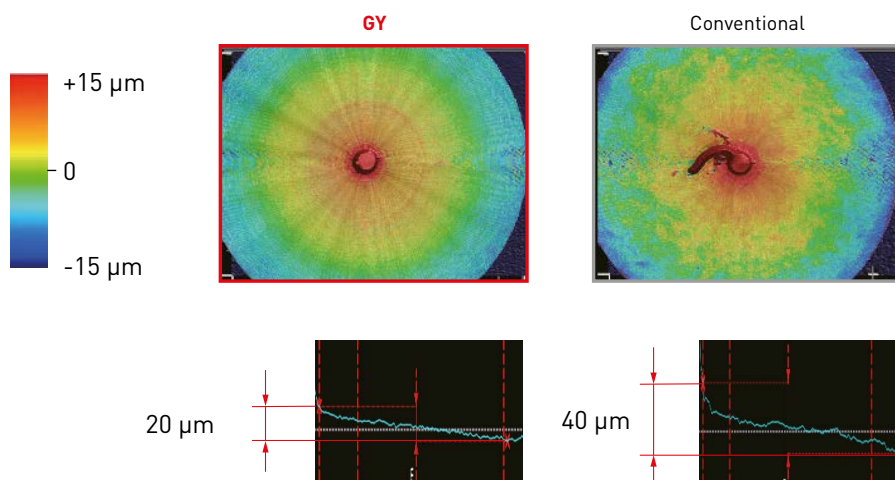
# GY GROOVING SERIES

## CUTTING PERFORMANCE FOR SWISS TYPE LATHES

### COMPARISON OF THE ACCURACY OF THE WORKPIECE WHEN CUTTING OFF: 1.4301 X5CRNI18-9

#### GY Holder

Height difference colour

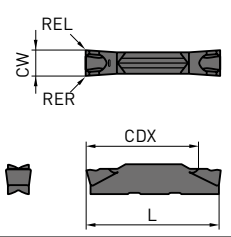
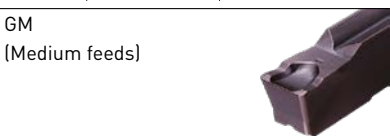
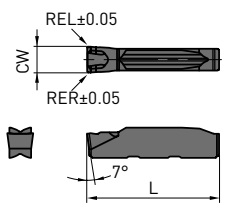
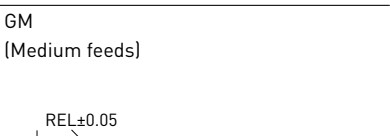
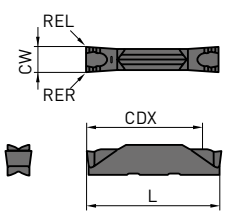
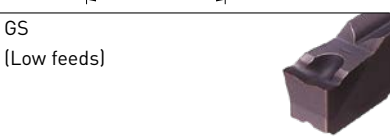
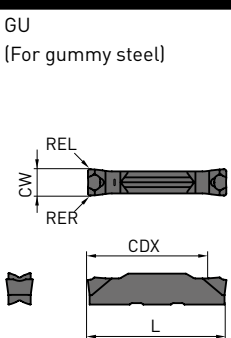


Displacement reduced by 50% compared to conventional products

Material	1.4301 Ø25mm
Tool	CW = 2 mm RE = 0.2 mm 16 x 16
Vc (m/min)	120
f (mm/rev)	0.10
Cutting mode	Wet cutting

# INSERTS

Order number	RT9010	RT9020	VP10RT	VP20RT	MY5015	NX2525	BC8110	MP9015	MP9025	Seat size	CW	Tolerance	RE R/L	CDX	L	Geometry
<b>GROOVING / CUTTING OFF</b>																
GY2M0200D020N-GU			●	●	●					D	2.00	±0.03	0.2	19.7	20.70	GU
GY2M0239E020N-GU			●	●	●					E	2.39	±0.03	0.2	19.8	20.70	(For gummy steel)
GY2M0250E020N-GU			●	●	●					E	2.50	±0.03	0.2	19.5	20.70	
GY2M0300F030N-GU			●	●	●					F	3.00	±0.03	0.3	19.3	20.70	
GY2M0318F030N-GU			●	●	●					F	3.18	±0.03	0.3	19.3	20.70	
GY2M0400G030N-GU			●	●	●					G	4.00	±0.04	0.3	24.2	25.65	
GY2M0475H040N-GU			●	●	●					H	4.75	±0.04	0.4	24.2	25.65	
GY2M0500H040N-GU			●	●	●					H	5.00	±0.04	0.4	24.2	25.65	
GY2M0600J040N-GU			●	●	●					J	6.00	±0.04	0.4	24.2	25.65	
GY2M0635J040N-GU			●	●	●					J	6.35	±0.04	0.4	24.2	25.65	
GY2M0120B010N-GS			●	●						B	1.20	±0.03	0.1	12.2	14.70	GS
GY2M0150C010N-GS			●	●						C	1.50	±0.03	0.1	13.4	14.70	(Low feeds)
GY2M0200D020N-GS			●	●	●					D	2.00	±0.03	0.2	18.7	20.70	
GY2M0239E020N-GS			●	●	●					E	2.39	±0.03	0.2	18.5	20.70	
GY2M0250E020N-GS			●	●	●					E	2.50	±0.03	0.2	18.5	20.70	
GY2M0300F020N-GS			●	●	●					F	3.00	±0.03	0.2	18.5	20.70	
GY2M0318F020N-GS			●	●	●					F	3.18	±0.03	0.2	18.5	20.70	
GY2M0400G020N-GS			●	●	●					G	4.00	±0.04	0.2	23.9	25.65	
GY2M0475H030N-GS			●	●	●					H	4.75	±0.04	0.3	23.9	25.65	
GY2M0500H030N-GS			●	●	●					H	5.00	±0.04	0.3	24.0	25.65	
GY2M0600J030N-GS			●	●	●					J	6.00	±0.04	0.3	24.1	25.65	
GY2M0635J030N-GS			●	●	●					J	6.35	±0.04	0.3	24.1	25.65	
GY2M0800K030N-GS			●	●						K	8.00	±0.04	0.3	29.1	30.50	
GY1M0200D020N-GM			●	●	●		●	●		D	2.00	±0.03	0.2	-	20.70	GM
GY1M0250E020N-GM			●	●	★		●	●		E	2.50	±0.03	0.2	-	20.70	(Medium feeds)
GY1M0300F030N-GM			●	●	●		●	●		F	3.00	±0.03	0.3	-	20.70	
GY1M0400G030N-GM			●	●	●		●	●		G	4.00	±0.04	0.3	-	25.65	
GY1M0500H040N-GM			●	●	●		●	●		H	5.00	±0.04	0.4	-	25.65	
GY2M0150C020N-GM			●	●	●		●	●		C	1.50	±0.03	0.2	13.9	14.70	GM
GY2M0200D020N-GM			●	●	●		●	●		D	2.00	±0.03	0.2	19.4	20.70	(Medium feeds)
GY2M0239E020N-GM			●	●	●		●	●		E	2.39	±0.03	0.2	19.4	20.70	
GY2M0250E020N-GM			●	●	●		●	●		E	2.50	±0.03	0.2	19.4	20.70	
GY2M0300F030N-GM			●	●	●		●	●		F	3.00	±0.03	0.3	19.4	20.70	
GY2M0318F030N-GM			●	●	●		●	●		F	3.18	±0.03	0.3	19.4	20.70	
GY2M0400G030N-GM			●	●	●		●	●		G	4.00	±0.04	0.3	24.4	25.65	
GY2M0475H040N-GM			●	●	●		●	●		H	4.75	±0.04	0.4	24.3	25.65	
GY2M0500H040N-GM			●	●	●		●	●		H	5.00	±0.04	0.4	24.3	25.65	
GY2M0600J040N-GM			●	●	●		●	●		J	6.00	±0.04	0.4	24.3	25.65	
GY2M0635J040N-GM			●	●	●		●	●		J	6.35	±0.04	0.4	24.3	25.65	
GY2M0800K050N-GM			●	●	●		●	●		K	8.00	±0.04	0.5	29.3	30.50	



# INSERTS

Order number	RT9010	RT9020	VP10RT	VP20RT	MY5015	NX2525	BC8110	MP9015	MP9025	Seat size	CW	Tolerance	RE R/L	CDX	L	Geometry
<b>GROOVING / CUTTING OFF</b>																
GY2G0200D005N-GL	●									D	2.00	±0.02	0.05	19.5	21.05	GL Breaker
GY2G0250E005N-GL	●									E	2.50	±0.02	0.05	19.1	21.05	(For aluminium alloys)
GY2G0300F005N-GL	●									F	3.00	±0.02	0.05	18.9	21.05	
<b>CUTTING OFF</b>																
GY1M0200D020R05-GM	●	●								D	2.00	±0.03	0.2	-	20.80	R/L05-GM Breaker
GY1M0200D020L05-GM	★	●								D	2.00	±0.03	0.2	-	20.80	
GY1M0300F030R05-GM	●	●								F	3.00	±0.03	0.3	-	20.85	
GY1M0300F030L05-GM	●	●								F	3.00	±0.03	0.3	-	20.85	
<i>Left hand insert shown.</i>																
GY2M0200D020R05-GM	●	●								D	2.00	±0.03	0.2	19.5	20.80	R/L05-GM Breaker
GY2M0200D020L05-GM	●	●								D	2.00	±0.03	0.2	19.5	20.80	
GY2M0250E020R05-GM	●	●								E	2.50	±0.03	0.2	19.5	20.825	
GY2M0250E020L05-GM	●	●								E	2.50	±0.03	0.2	19.5	20.825	
GY2M0300F030R05-GM	●	●								F	3.00	±0.03	0.3	19.5	20.85	
GY2M0300F030L05-GM	●	●								F	3.00	±0.03	0.3	19.5	20.85	
GY2M0400G030R05-GM	●	●								G	4.00	±0.04	0.3	24.5	25.85	
GY2M0400G030L05-GM	●	●								G	4.00	±0.04	0.3	24.5	25.85	
GY2M0500H040R05-GM	●	●								H	5.00	±0.04	0.4	24.5	25.95	
GY2M0500H040L05-GM	●	●								H	5.00	±0.04	0.4	24.5	25.95	
GY2M0120B010R05-GS	★	★								B	1.20	±0.03	0.1	12.22	14.70	R/L05-GS Breaker (Low feeds)
GY2G0150C010R08-GS	●	●								C	1.50	±0.02	0.1	13.17	15.20	R08-GS Breaker (Low feeds)
GY2G0200D020R08-GS	●	●								D	2.00	±0.03	0.2	18.85	21.30	
GY2G0250E020R08-GS	●	●								E	2.50	±0.03	0.2	19.04	21.50	
GY2G0300F020R08-GS	●	●								F	3.00	±0.03	0.2	18.62	21.50	
GY2G0150C003R15-GS	●	●								C	1.50	±0.02	0.03	13.17	15.20	R15-GS Breaker (Low feeds)
GY2G0150C010R15-GS	●	●								C	1.50	±0.02	0.1	13.17	15.20	
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	
GY2G0250E003R15-GS	●	●								E	2.50	±0.03	0.03	19.04	21.50	
GY2G0250E020R15-GS	●	●								E	2.50	±0.03	0.2	19.04	21.50	
GY2G0300F003R15-GS	●	●								F	3.00	±0.03	0.03	18.62	21.50	
GY2G0300F020R15-GS	●	●								F	3.00	±0.03	0.2	18.62	21.50	

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

# INSERTS

Order number	RT9010	RT9020	VP10RT	VP20RT	MY5015	NX2525	BC8110	MP9015	MP9025	Seat size	CW	Tolerance	RE R/L	CDX	L	LE	Geometry	
<b>GROOVING</b>																		
GY1G0200D020N-GFGS							●			D	2.00	±0.03	0.2	—	20.70	2.7	(For hardened material)	
GY1G0239E020N-GFGS							●			E	2.39	±0.03	0.2	—	20.70	2.7		
GY1G0250E020N-GFGS							●			E	2.50	±0.03	0.2	—	20.70	2.7		
GY1G0300F020N-GFGS							●			F	3.00	±0.03	0.2	—	20.70	2.7		
GY1G0318F020N-GFGS							●			F	3.18	±0.03	0.2	—	20.70	2.7		
GY1G0400G020N-GFGS							●			G	4.00	±0.03	0.2	—	25.65	2.7		
GY1G0475H020N-GFGS							●			H	4.75	±0.03	0.2	—	25.65	2.7		
GY1G0500H020N-GFGS							●			H	5.00	±0.03	0.2	—	25.65	2.7		
GY1G0600J020N-GFGS							●			J	6.00	±0.03	0.2	—	25.65	2.7		
<b>MULTIFUNCTIONAL GROOVING</b>																		
GY2G0200D020N-MF	●		●	●	●					D	2.00	±0.02	0.2	19.5	21.05	—	MF	
GY2G0224D015N-MF*1	●		●	●	●					D	2.24	±0.02	0.15	19.8	21.05	—	(Finishing)	
GY2G0239E020N-MF	★		★	★	★					E	2.39	±0.02	0.2	19.2	21.05	—		
GY2G0250E020N-MF	●		●	●	●					E	2.50	±0.02	0.2	19.4	21.05	—		
GY2G0274E020N-MF*1	●		●	●	●					E	2.74	±0.02	0.2	19.7	21.05	—		
GY2G0300F020N-MF	●		●	●	●					F	3.00	±0.02	0.2	19.5	21.05	—		
GY2G0300F040N-MF	●		●	●	●					F	3.00	±0.02	0.4	19.3	21.05	—		
GY2G0318F020N-MF	★		★	★	★					F	3.18	±0.02	0.2	19.5	21.05	—		
GY2G0318F040N-MF	★		★	★	★					F	3.18	±0.02	0.4	19.3	21.05	—		
GY2G0324F020N-MF*1	●		●	●	●					F	3.24	±0.02	0.2	19.5	21.05	—		
GY2G0400G020N-MF	●		●	●	●					G	4.00	±0.02	0.2	24.9	25.95	—		
GY2G0400G040N-MF	●		●	●	●					G	4.00	±0.02	0.4	24.7	25.95	—		
GY2G0400G080N-MF	●		●	●	●					G	4.00	±0.02	0.8	24.3	25.95	—		
GY2G0424G020N-MF*1	●		●	●	●					G	4.24	±0.02	0.2	24.9	25.95	—		
GY2G0475H020N-MF	★		★	★	★					H	4.75	±0.02	0.2	24.4	25.95	—		
GY2G0475H040N-MF	★		★	★	★					H	4.75	±0.02	0.4	24.2	25.95	—		
GY2G0475H080N-MF	★		★	★	★					H	4.75	±0.02	0.8	23.8	25.95	—		
GY2G0500H020N-MF	●		●	●	●					H	5.00	±0.02	0.2	24.4	25.95	—		
GY2G0500H040N-MF	●		●	●	●					H	5.00	±0.02	0.4	24.2	25.95	—		
GY2G0500H080N-MF	●		●	●	●					H	5.00	±0.02	0.8	23.8	25.95	—		
GY2G0524H020N-MF*1	●		●	●	●					H	5.24	±0.02	0.2	24.4	25.95	—		
GY2G0600J020N-MF	●		●	●	●					J	6.00	±0.02	0.2	24.4	25.95	—		
GY2G0600J040N-MF	●		●	●	●					J	6.00	±0.02	0.4	24.2	25.95	—		
GY2G0600J080N-MF	●		●	●	●					J	6.00	±0.02	0.8	23.8	25.95	—		
GY2G0631J020N-MF*1	●		●	●	●					J	6.31	±0.02	0.2	24.4	25.95	—		
GY2G0635J020N-MF	★		★	★	★					J	6.35	±0.02	0.2	24.4	25.95	—		
GY2G0635J040N-MF	★		★	★	★					J	6.35	±0.02	0.4	24.2	25.95	—		
GY2G0635J080N-MF	★		★	★	★					J	6.35	±0.02	0.8	23.8	25.95	—		
<b>MS (Low feeds)</b>																		
GY2M0200D020N-MS			●	●	●	●				D	2.00	±0.03	0.2	19.1	20.70	—	MS	
GY2M0250E020N-MS			●	●	●	●				E	2.50	±0.03	0.2	19.1	20.70	—	(Low feeds)	
GY2M0300F020N-MS			●	●	●	●				F	3.00	±0.03	0.2	19.2	20.70	—		
GY2M0300F040N-MS			●	●	●	●				F	3.00	±0.03	0.4	18.9	20.70	—		
GY2M0400G020N-MS			●	●	●	●				G	4.00	±0.04	0.2	24.2	25.65	—		
GY2M0400G040N-MS			●	●	●	●				G	4.00	±0.04	0.4	23.9	25.65	—		
GY2M0500H040N-MS			●	●	●	●				H	5.00	±0.04	0.4	23.9	25.65	—		
GY2M0500H080N-MS			●	●	●	●				H	5.00	±0.04	0.8	23.5	25.65	—		
GY2M0600J040N-MS			●	●	●	●				J	6.00	±0.04	0.4	23.9	25.65	—		
GY2M0600J080N-MS			●	●	●	●				J	6.00	±0.04	0.8	23.5	25.65	—		
GY2M0800K080N-MS			●	●	●					K	8.00	±0.04	0.8	28.5	30.50	—		

\*1 Groove width corresponding to the circlip.

# INSERTS

Order number	RT9010	RT9020	VP10RT	VP20RT	MY5015	NX2525	BC8110	MP9015	MP9025	Seat size	CW	Tolerance	RE R/L	CDX	L	Geometry	
<b>MULTIFUNCTIONAL GROOVING</b>																	
GY2M0200D020N-MM			●	●	●	●		●	●	D	2.00	±0.03	0.2	19.1	20.70	MM Breaker (Medium feeds)	
GY2M0250E020N-MM			●	●	●	●		●	●	E	2.50	±0.03	0.2	19.1	20.70		
GY2M0300F020N-MM			●	●	●	●		●	●	F	3.00	±0.03	0.2	19.1	20.70		
GY2M0300F040N-MM			●	●	●	●		●	●	F	3.00	±0.03	0.4	18.9	20.70		
GY2M0300F080N-MM			●	●	●	●		●	●	F	3.00	±0.03	0.8	18.5	20.70		
GY2M0400G020N-MM			●	●	●	●		●	●	G	4.00	±0.04	0.2	24.1	25.65		
GY2M0400G040N-MM			●	●	●	●		●	●	G	4.00	±0.04	0.4	23.9	25.65		
GY2M0400G080N-MM			●	●	●	●		●	●	G	4.00	±0.04	0.8	23.5	25.65		
GY2M0500H040N-MM			●	●	●	●		●	●	H	5.00	±0.04	0.4	23.9	25.65		
GY2M0500H080N-MM			●	●	●	●		●	●	H	5.00	±0.04	0.8	23.5	25.65		
GY2M0600J040N-MM			●	●	●	●		●	●	J	6.00	±0.04	0.4	23.9	25.65		
GY2M0600J080N-MM			●	●	●	●		●	●	J	6.00	±0.04	0.8	23.5	25.65		
GY2M0800K080N-MM			●	●	●	●		●	●	K	8.00	±0.04	0.8	28.5	30.50		
GY2M0800K120N-MM			●	●	●	●		●	●	K	8.00	±0.04	1.2	28.1	30.50		
<b>COPYING / FOR RECESSING</b>																	
GY2M0200D100N-BM			●	●	●	●		●	●	D	2.00	±0.03	1.00	19.5	20.90	BM Breaker	
GY2M0250E125N-BM			●	●	●	●		●	●	E	2.50	±0.03	1.25	19.3	20.90		
GY2M0300F150N-BM			●	●	●	●		●	●	F	3.00	±0.03	1.50	19.0	20.90		
GY2M0318F159N-BM			●	●	●	●		●	●	F	3.18	±0.03	1.59	18.9	20.90		
GY2M0400G200N-BM			●	●	●	●		●	●	G	4.00	±0.04	2.00	23.4	25.80		
GY2M0475H238N-BM			●	●	●	●		●	●	H	4.75	±0.04	2.38	22.9	25.80		
GY2M0500H250N-BM			●	●	●	●		●	●	H	5.00	±0.04	2.50	22.8	25.80		
GY2M0600J300N-BM			●	●	●	●		●	●	J	6.00	±0.04	3.00	22.5	25.90		
GY2M0635J318N-BM			●	●	●	●		●	●	J	6.35	±0.04	3.18	22.3	25.90		
GY2M0800K400N-BM			●	●	●	●		●	●	K	8.00	±0.04	4.00	26.5	30.80		
<b>BLANK</b>																	
GY2B0220D020N	●	●				●				D	2.20	±0.10	0.2	—	21.05	Flat top	
GY2B0250D020N	●	●				●				D	2.55	±0.10	0.2	—	21.28		
GY2B0270E020N	●	●				●				E	2.70	±0.10	0.2	—	21.05		
GY2B0300E020N	●	●				●				E	3.05	±0.10	0.2	—	21.28		
GY2B0340F020N	●	●				●				F	3.40	±0.10	0.2	—	21.05		
GY2B0360F020N	●	●				●				F	3.65	±0.10	0.2	—	21.28		
GY2B0420G020N	●	●				●				G	4.20	±0.10	0.2	—	26.00		
GY2B0460G020N	●	●				●				G	4.65	±0.10	0.2	—	26.18		
GY2B0520H020N	●	●				●				H	5.20	±0.10	0.2	—	26.00		
GY2B0560H020N	●	●				●				H	5.65	±0.10	0.2	—	26.18		
GY2B0655J020N	●	●				●				J	6.55	±0.10	0.2	—	26.00		
GY2B0680J020N	●	●				●				J	6.85	±0.10	0.2	—	26.18		
GY2B0880K020N	●	●				●				K	8.85	±0.10	0.2	—	30.88		
GY1B0220D020N	●	●				●				D	2.20	±0.10	0.2	—	21.07	1 Edge type	
GY1B0270E020N	●	●				●				E	2.70	±0.10	0.2	—	21.10		
GY1B0340F020N	●	●				●				F	3.40	±0.10	0.2	—	21.00		
GY1B0420G020N	●	●				●				G	4.20	±0.10	0.2	—	25.86		
GY1B0520H020N	●	●				●				H	5.20	±0.10	0.2	—	25.90		
GY1B0655J020N	●	●				●				J	6.55	±0.10	0.2	—	25.90		
<b>2 Edge type</b>																	
GY2B0420G020N	●	●				●				G	4.20	±0.10	0.2	—	26.00		2 Edge type
GY2B0460G020N	●	●				●				G	4.65	±0.10	0.2	—	26.18		
GY2B0520H020N	●	●				●				H	5.20	±0.10	0.2	—	26.00		2 Edge type
GY2B0560H020N	●	●				●				H	5.65	±0.10	0.2	—	26.18		
GY2B0655J020N	●	●				●				J	6.55	±0.10	0.2	—	26.00	2 Edge type	
GY2B0680J020N	●	●				●				J	6.85	±0.10	0.2	—	26.18		
GY2B0880K020N	●	●				●				K	8.85	±0.10	0.2	—	30.88	2 Edge type	
GY1B0220D020N	●	●				●				D	2.20	±0.10	0.2	—	21.07		
GY1B0270E020N	●	●				●				E	2.70	±0.10	0.2	—	21.10	1 Edge type	
GY1B0340F020N	●	●				●				F	3.40	±0.10	0.2	—	21.00		
GY1B0420G020N	●	●				●				G	4.20	±0.10	0.2	—	25.86	1 Edge type	
GY1B0520H020N	●	●				●				H	5.20	±0.10	0.2	—	25.90		
GY1B0655J020N	●	●				●				J	6.55	±0.10	0.2	—	25.90		

\*2 Blank inserts to be ground by the customer.



# GY GROOVING SERIES

## EXTERNAL FOR SWISS TYPE LATHES

### INSERT SELECTION

Seat size    Insert type

B	GY○○0120B○○○○○-Breaker shown below
C	GY○○0150C○○○○○-Breaker shown below
D	GY○○0200/0224D○○○○○-Breaker shown below
E	GY○○0239/0250/0274E○○○○○-Breaker shown below
F	GY○○0300/0318/0324F○○○○○-Breaker shown below

#### For multifunctional grooving breaker

Seat size	CW	MF	MS	MM	BM
		(Finish)	(Low)	(Medium)	(Copying)
					Ball shape
D	2.00	●	●	●	●
	2.24	●			
	2.39	●			
E	2.50	●	●	●	●
	2.74	●			
	3.00				●
F	RE 0.2	●	●	●	
	RE 0.4	●	●	●	
	RE 0.8			●	
	3.18				●
	RE 0.2	●			
	RE 0.4	●			
	3.24	●			

#### For cutting off breaker

Seat size	CW	05-GS	08-GS	15-GS	05-GM
		(Low)	(Low)	(Low)	(Medium)
		R	R	R	R/L
B	1.20	★			
C	1.50		●	●	
D	2.00		●	●	
E	2.39		●	●	●
	2.50				
F	3.00		●	●	●
	3.18		●	●	●

#### For grooving/cutting off breaker

Seat size	CW	GU	GS	GM	GL	GFGS
		(For gummy steel)	(Low)	(Medium)	(Aluminium)	(Hardened steel)
		Neutral	Neutral	Neutral	Neutral	Neutral
B	1.20		●			
C	1.50		●	●		
D	2.00	●	●	●	●	●
	2.39	●	●	●		●
	2.50	●	●	●	●	●
F	3.00	●	●	●	●	●
	3.18	●	●	●		●

### CORRECT USE OF GY SERIES GS BREAKER

#### First recommendation

Reduction of cutting resistance

Lead angle PSIRR = 0°    →    Lead angle PSIRR = 8°    →    Lead angle PSIRR = 15°

Improved fracture resistance

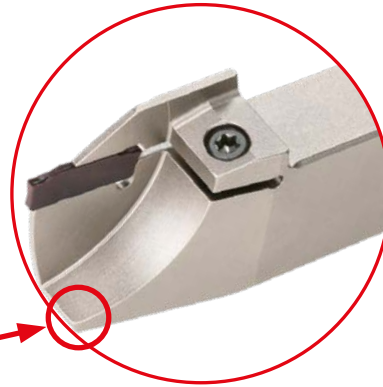
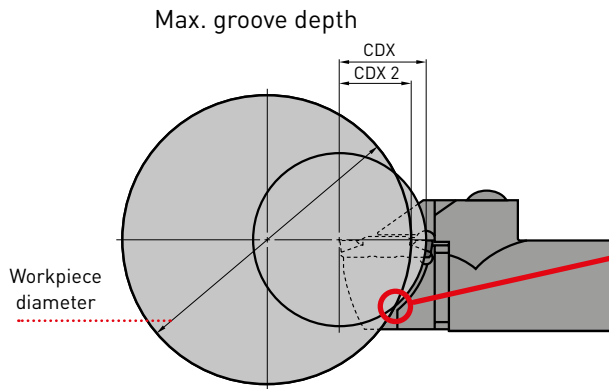
Reduction of burrs and core residue

Improved fracture resistance

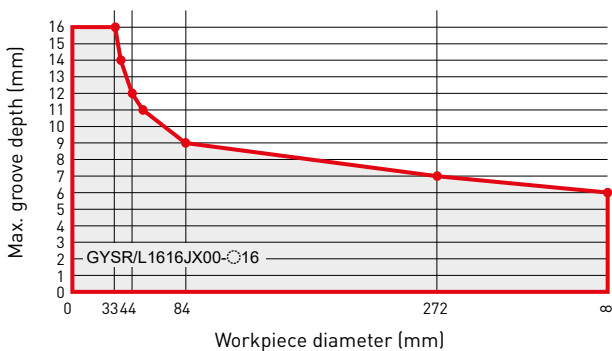
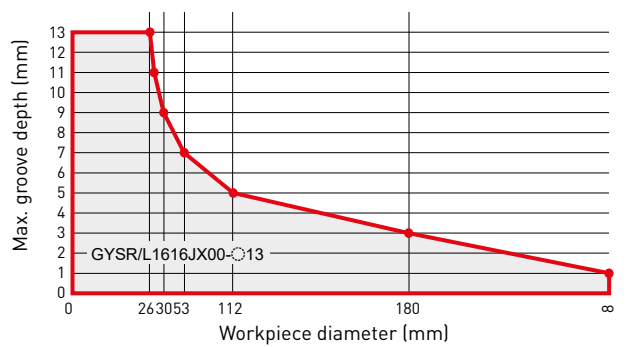
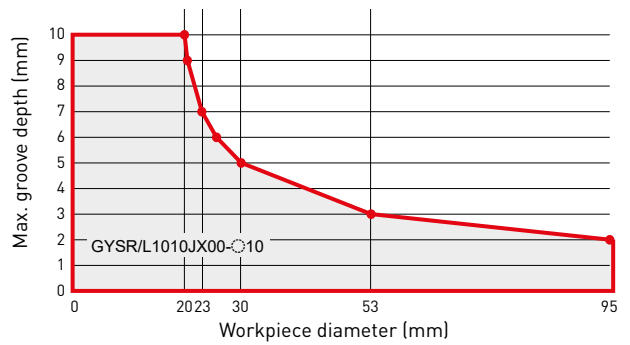
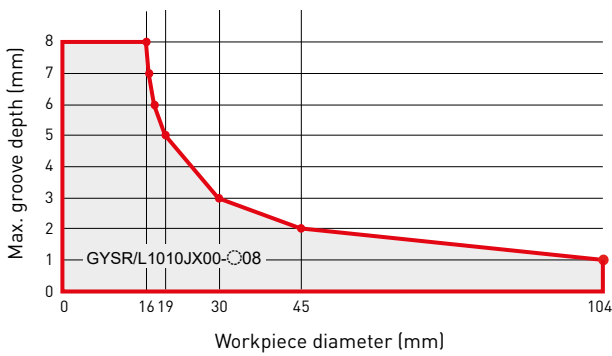
# GY GROOVING SERIES

## LIMITATION OF THE MAXIMUM GROOVE DEPTH FOR EXTERNAL SWISS TYPE LATHES

In the case of monoblock type holder for Swiss type lathes.  
The maximum groove depth is limited by the workpiece diameter.

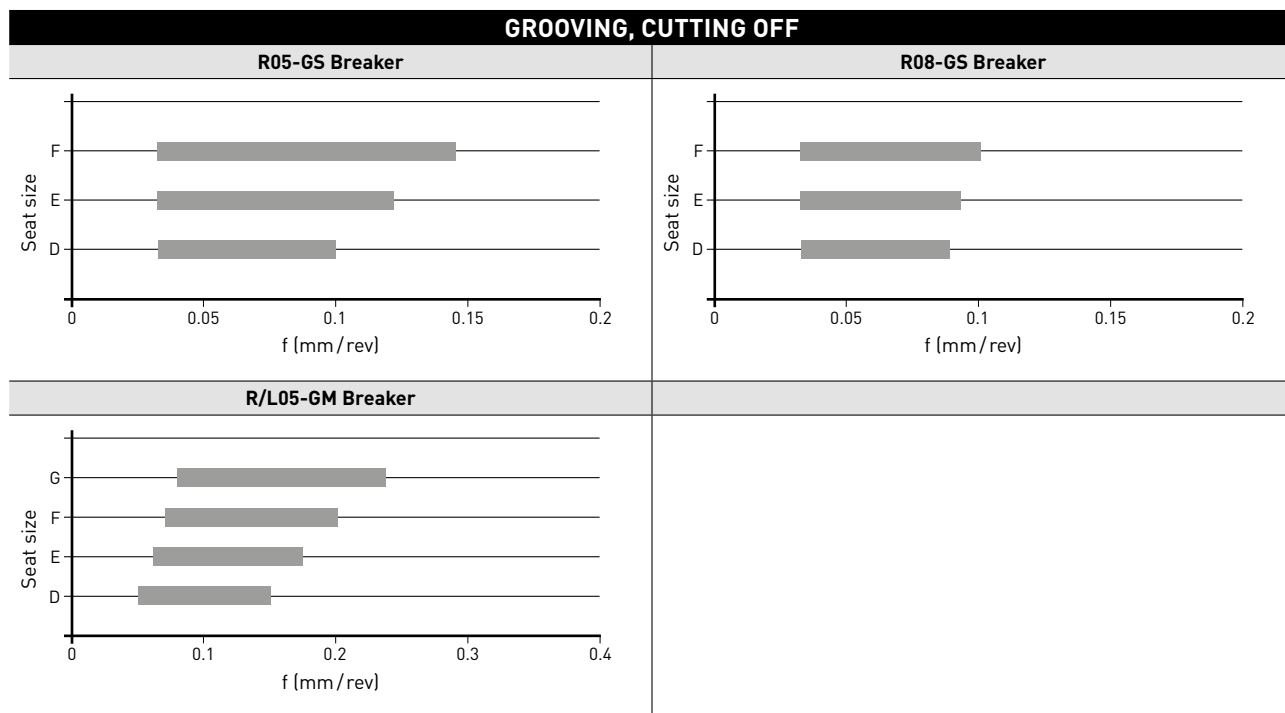


Due to interference, the maximum groove depth is limited by the workpiece diameter.



# GY GROOVING SERIES

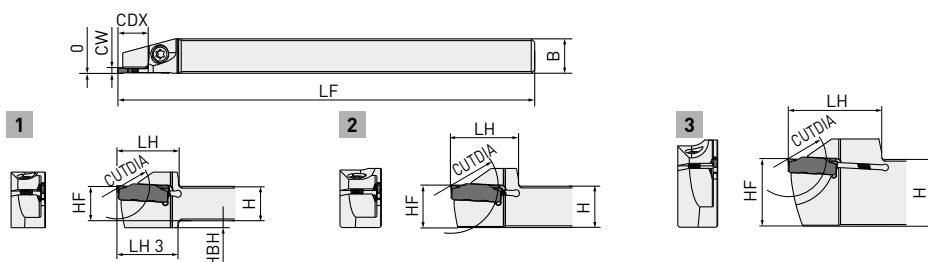
## CUTTING OFF FEED PER REVOLUTION



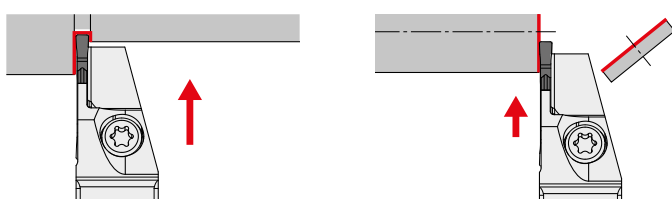
Chipbreaker	PSIPR	Hand	f (mm/rev)			
			Seat size D	Seat size E	Seat size F	Seat size G
R05-GS	5°	R	0.03-0.10	0.03-0.12	0.03-0.14	—
R08-GS	8°	R	0.03-0.08	0.03-0.09	0.03-0.10	—
R05-GM	5°	R/L	0.05-0.15	0.06-0.17	0.07-0.20	0.08-0.23

# GY GROOVING SERIES

## EXTERNAL FOR SWISS TYPE LATHES



Right hand tool holder shown.



Order number	Seat size	CW	CDX*2	CUTDIA	Hand	Stock	H	B	LF	LH	LH3	HF*1	HBH	Fig.
GYSR1010JX00-B08	B	1.20	8	16	R	●	10	10	120	17.5	17.5	10	2	1
GYSL1010JX00-B08					L	●	10	10	120	17.5	17.5	10	2	1
GYSR1212JX00-B08					R	●	12	12	120	19.5	—	12	—	2
GYSL1212JX00-B08					L	●	12	12	120	19.5	—	12	—	2
GYSR1212JX00-B12			R	●	12	12	120	19.5	19.5	12	2	1		
GYSL1212JX00-B12			L	●	12	12	120	19.5	19.5	12	2	1		
GYSR1616JX00-B08			R	●	16	16	120	25.0	—	16	—	2		
GYSL1616JX00-B08			L	●	16	16	120	25.0	—	16	—	2		
GYSR1616JX00-B13			R	●	16	16	120	25.0	—	16	—	2		
GYSL1616JX00-B13			L	●	16	16	120	25.0	—	16	—	2		
<b>NEW</b> GYSR1010JX00-C08	C	1.50	8	16	R	●	10	10	120	17.5	17.5	10	2	1
<b>NEW</b> GYSL1010JX00-C08					L	●	10	10	120	17.5	17.5	10	2	1
<b>NEW</b> GYSR1212JX00-C08					R	●	12	12	120	19.5	—	12	—	2
<b>NEW</b> GYSL1212JX00-C08					L	●	12	12	120	19.5	—	12	—	2
<b>NEW</b> GYSR1212JX00-C12			R	●	12	12	120	19.5	19.5	12	2	1		
<b>NEW</b> GYSL1212JX00-C12			L	●	12	12	120	19.5	19.5	12	2	1		
<b>NEW</b> GYSR1616JX00-C13			R	●	16	16	120	25.0	—	16	—	2		
<b>NEW</b> GYSL1616JX00-C13			L	●	16	16	120	25.0	—	16	—	2		
<b>NEW</b> GYSR2012JX00-C13			R	★	20	12	120	28.0	—	20	—	3		
<b>NEW</b> GYSL2012JX00-C13			L	★	20	12	120	28.0	—	20	—	3		
<b>NEW</b> GYSR1010JX00-D10	D	2.00	10	20	R	★	10	10	120	17.5	17.5	10	2	1
<b>NEW</b> GYSL1010JX00-D10					L	★	10	10	120	17.5	17.5	10	2	1
<b>NEW</b> GYSR1212JX00-D12			R	●	12	12	120	19.5	19.5	12	2	1		
<b>NEW</b> GYSL1212JX00-D12			L	●	12	12	120	19.5	19.5	12	2	1		
<b>NEW</b> GYSR1616JX00-D13			R	●	16	16	120	25	—	16	—	2		
<b>NEW</b> GYSL1616JX00-D13			L	●	16	16	120	25	—	16	—	2		
<b>NEW</b> GYSR1616JX00-D16			R	★	16	16	120	28	—	16	—	2		
<b>NEW</b> GYSL1616JX00-D16			L	●	16	16	120	28	—	16	—	2		

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

**EXTERNAL FOR SWISS TYPE LATHES**

Order number	Seat size	CW	CDX*2	CUTDIA	Hand	Stock	H	B	LF	LH	LH3	HF*1	HBH	Fig.	
NEW GYSR1915K00-D17	D	2.24	17	34	R	★	19.05	15.875	125	28	—	19.05	—	3	
NEW GYSL1915K00-D17					L	★	19.05	15.875	125	28	—	19.05	—	3	
NEW GYSR2012JX00-D17					R	★	20	12	120	28	—	20	—	3	
NEW GYSL2012JX00-D17					L	★	20	12	120	28	—	20	—	3	
NEW GYSR2020K00-D17					R	★	20	20	125	35	—	20	—	2	
NEW GYSL2020K00-D17					L	★	20	20	125	35	—	20	—	2	
NEW GYSR2525M00-D17					R	★	25	25	150	40	—	25	—	2	
NEW GYSL2525M00-D17					L	★	25	25	150	40	—	25	—	2	
NEW GYSR1010JX00-E10	E	2.39	10	20	R	★	10	10	120	17.5	17.5	10	2	1	
NEW GYSL1010JX00-E10					L	★	10	10	120	17.5	17.5	10	2	1	
NEW GYSR1212JX00-E12			12	24	R	★	12	12	120	19.5	19.5	12	2	1	
NEW GYSL1212JX00-E12					L	★	12	12	120	19.5	19.5	12	2	1	
NEW GYSR1616JX00-E13			13	26	R	★	16	16	120	25	—	16	—	2	
NEW GYSL1616JX00-E13					L	★	16	16	120	25	—	16	—	2	
NEW GYSR1616JX00-E16			16	32	R	★	16	16	120	28	—	16	—	2	
NEW GYSL1616JX00-E16					L	★	16	16	120	28	—	16	—	2	
NEW GYSR1915K00-E17			2.50	17	34	R	★	19.05	15.875	125	28	—	19.05	—	3
NEW GYSL1915K00-E17						L	★	19.05	15.875	125	28	—	19.05	—	3
NEW GYSR2012JX00-E17			2.74	17	34	R	★	20	12	120	28	—	20	—	3
NEW GYSL2012JX00-E17						L	★	20	12	120	28	—	20	—	3
NEW GYSR2020K00-E17						R	★	20	20	125	35	—	20	—	2
NEW GYSL2020K00-E17						L	★	20	20	125	35	—	20	—	2
NEW GYSR2525M00-E17						R	★	25	25	150	40	—	25	—	2
NEW GYSL2525M00-E17						L	★	25	25	150	40	—	25	—	2
NEW GYSR1212JX00-F12	3.00	12	24	R	★	12	12	120	19.5	19.5	12	2	1		
NEW GYSL1212JX00-F12				L	●	12	12	120	19.5	19.5	12	2	1		
NEW GYSR1616JX00-F13		13	26	R	★	16	16	120	25	—	16	—	2		
NEW GYSL1616JX00-F13				L	★	16	16	120	25	—	16	—	2		
NEW GYSR1616JX00-F16	3.18	16	32	R	●	16	16	120	28	—	16	—	2		
NEW GYSL1616JX00-F16				L	★	16	16	120	28	—	16	—	2		
NEW GYSR1915K00-F17	3.24	17	34	R	★	19.05	15.875	125	28	—	19.05	—	3		
NEW GYSL1915K00-F17				L	★	19.05	15.875	125	28	—	19.05	—	3		
NEW GYSR2012JX00-F17				R	★	20	12	120	28	—	20	—	3		
NEW GYSL2012JX00-F17				L	★	20	12	120	28	—	20	—	3		

\*1 Dimensions shown are when the gauge insert is used. If other insert geometries are used then LF, LH, and WF values may vary.

\*2 The maximum groove depth is limited by the workpiece diameter.



# GY GROOVING SERIES FOR EXTERNAL SWISS TYPE LATHES

## RECOMMENDED CUTTING CONDITIONS

### CUTTING SPEED (FOR EXTERNAL GROOVING AND CUTTING OFF)

Material	Hardness	Grade	Vc
P Mild steel Carbon steel Alloy steel	<160HB	VP20RT	155 (100-220)
		VP10RT	170 (110-230)
		NX2525	150 ( 90-210)
	160-280HB	VP20RT	120 ( 80-180)
		VP10RT	140 ( 90-190)
		MY5015	180 (110-250)
		NX2525	120 ( 70-170)
		VP20RT	100 ( 60-140)
		VP10RT	110 ( 70-150)
≥280HB	MY5015	150 ( 90-210)	
	NX2525	95 ( 55-135)	
	VP20RT	100 ( 60-140)	
M Stainless steel	≤270HB	VP10RT	110 ( 70-150)
		VP20RT	120 ( 80-180)
K Gray cast iron Ductile cast iron	Tensile strength ≤300MPa	VP10RT	140 ( 90-190)
		MY5015	120 (140-300)
		VP20RT	100 ( 60-140)
	Tensile strength ≤800MPa	VP10RT	110 ( 70-150)
		MY5015	150 ( 90-210)
		RT9010	250 (200-500)
N Aluminium alloy (A6061, 7075) Aluminium alloy (AC4B) Aluminium alloy (ADC12, A390)	Content Si<5 %	RT9010	250 (200-500)
	Content 5 %≤Si≤10 %	RT9010	250 (200-500)
	Content Si>10 %	RT9010	150 (100-200)
S Heat resistant alloy Titanium alloy	—	MP9015	70 ( 40-100)
		MP9025	60 ( 30- 90)
		VP20RT	45 ( 30- 60)
		VP10RT	55 ( 40- 70)
		RT9010	55 ( 40- 70)
H Hardened steel	≥50HRC	BC8110	100 ( 80-120)

1. For VP10RT, VP20RT, MP9015, MP9025 and MY5015, wet cutting is recommended.

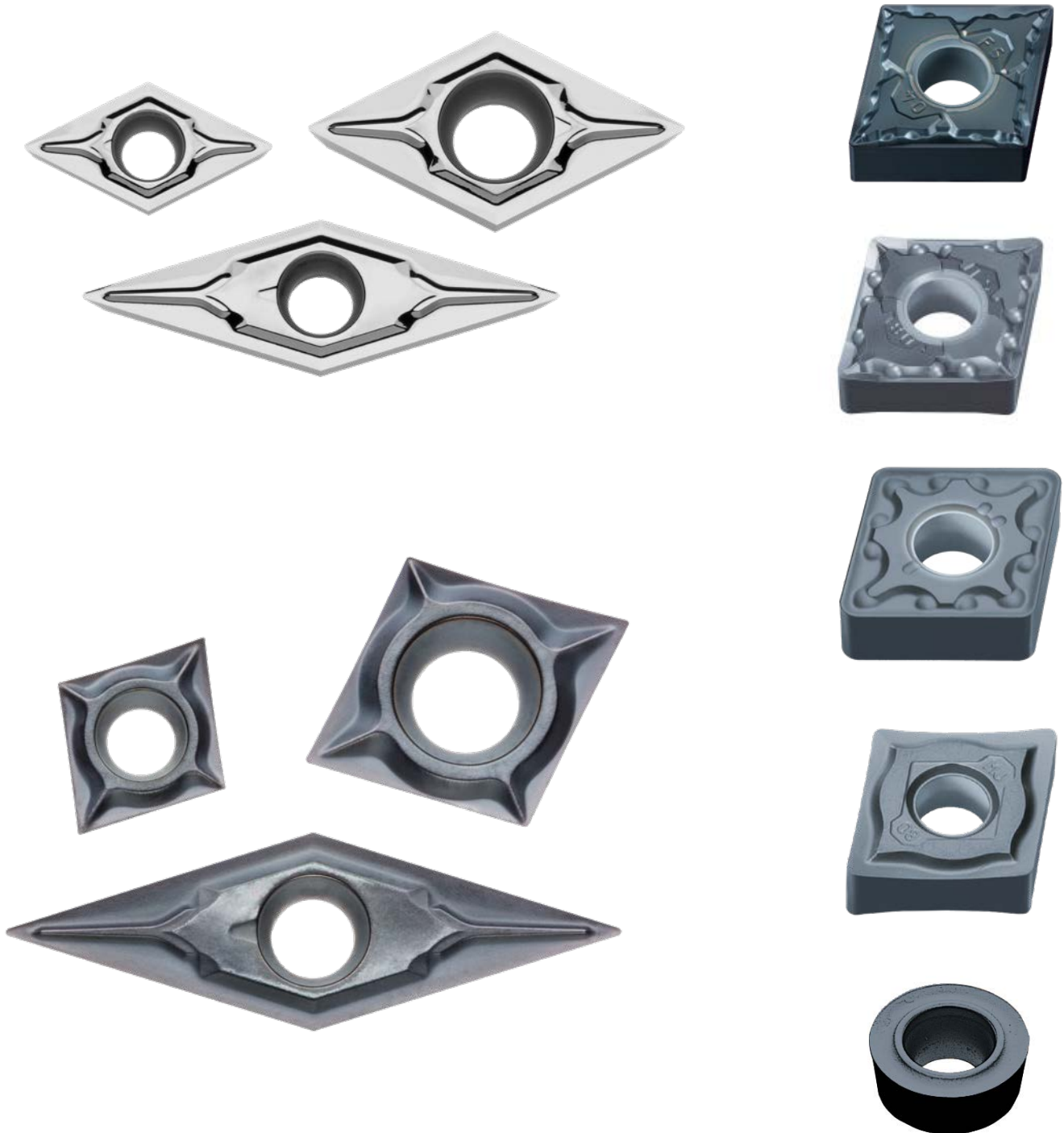
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# MP / MT9000

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ISO TURNING INSERTS  
FOR DIFFICULT TO CUT MATERIALS

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Interested in more...

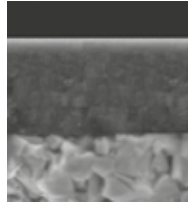
**B214**

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# MP9005 / MP9015 / MP9025

## PVD COATED CARBIDE GRADE

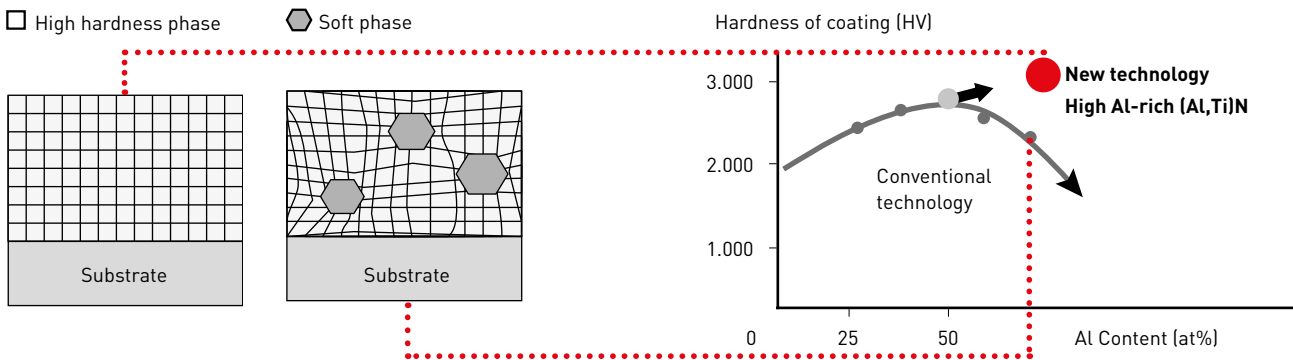


..... High Al-rich (Al,Ti)N single layer coating technology

..... Special cemented carbide substrate

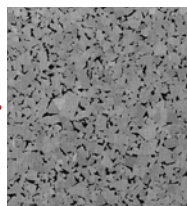
### HIGH AL AND CONVENTIONAL COATING COMPARISON

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



# MT9005 / MT9015

## CARBIDE GRADE (NON COATED)



MT9015

ISO	Grade	Concept	Application
S	S05	<b>MP9005/MP9005</b> High quality hard grade focusing on wear resistance	Heat resistant alloy Finish-medium cutting
		<b>MP9015</b> First recommendation for general applications	Heat resistant alloy Medium-rough cutting
	S15	<b>MP9025</b> Prevents severe damage for increased stability	Heat resistant alloy Interrupted - Light-rough cutting
		<b>MT9015</b> New cemented carbide with sharp cutting edge, excellent wear and fracture resistance	Titanium alloy General cutting

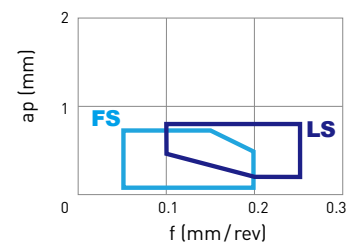
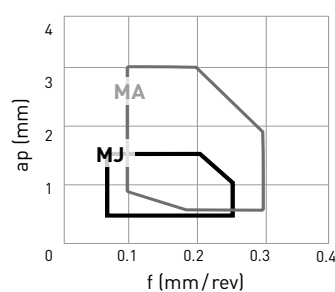
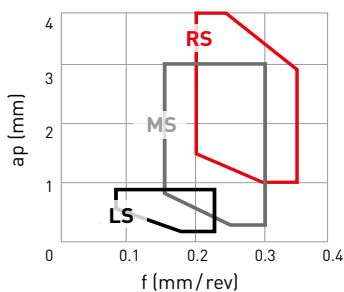
ISO	PVD	
S	S01	MP9005, MT9005
	S10	MP9015, MT9015
	S20	MP9025
	S30	



# CHIPBREAKER SYSTEM – NEGATIVE INSERTS/ PRECISION NEGATIVE INSERTS

Tolerance	Features	Cross section geometry
<b>FINISHING</b>		
M	<p><b>FS</b> <span style="color: red; font-weight: bold;">NEW</span></p> <p><i>PRECISION negative inserts</i>  <b>FIRST RECOMMENDATION FOR FINISHING DIFFICULT TO CUT MATERIALS</b>                      Excellent chip breaking even at very small depths of cut.                      The large rake angle and precision grade enables excellent sharpness.</p>	<p>Nose: 25°, 0.22                      Flank: 25°, 0.44</p>
<b>LIGHT CUTTING</b>		
M	<p><b>LS</b> <span style="color: red; font-weight: bold;">NEW</span></p> <p><i>Negative inserts / PRECISION negative inserts</i>  <b>FIRST RECOMMENDATION FOR LIGHT CUTTING OF DIFFICULT TO CUT MATERIALS</b>                      Enhanced chip disposal for depths of cut smaller than the corner radius.</p>	<p>Nose: 20°, 0.4                      Flank: 20°, 0.6</p>
M	<p><b>MJ</b></p> <p><i>Negative inserts</i>  <b>FIRST RECOMMENDATION FOR LIGHT CUTTING OF DIFFICULT TO CUT MATERIALS</b>                      Double sided chipbreaker and a single sided chipbreaker (D type, V type).                      The sharp edge produces a good surface finish.                      Ideal for heat-resistant and titanium alloys.                      The curved edge allows smooth chip discharge.</p>	<p>Nose: 13°                      Flank: 9°</p>
<b>MEDIUM CUTTING</b>		
M	<p><b>MS</b></p> <p><i>Negative inserts</i>  <b>FIRST RECOMMENDATION FOR MEDIUM CUTTING OF DIFFICULT TO CUT MATERIALS</b>                      Double sided chipbreaker.                      The sharp edge provides superior performance.</p>	<p>Nose: 25°, 15°, 0.5                      Flank: 25°, 15°, 0.5</p>
M	<p><b>MA</b></p> <p><i>Negative inserts</i>  <b>MULTI-ASSIST CHIPBREAKER FOR MEDIUM CUTTING OF DIFFICULT TO CUT MATERIALS</b>                      Double sided chipbreaker.                      Positive land provides a sharp cutting action.</p>	<p>Nose: 22°, 6°, 0.2                      Flank: 22°, 6°, 0.2</p>
<b>ROUGHING</b>		
M	<p><b>RS</b></p> <p><i>Negative inserts</i>  <b>FIRST RECOMMENDATION FOR ROUGH CUTTING OF DIFFICULT TO CUT MATERIALS</b>                      During low speed cutting the positive land controls chip welding and abrasion at the depth of cut line.</p>	<p>Nose: 20°, 10°, 0.2                      Flank: 20°, 0.2</p>

## CHIP CONTROL RANGE



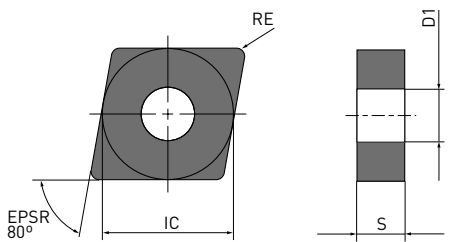
# CNGG, DNGG

## NEGATIVE INSERTS (WITH HOLE)

**S**

**G Class**

**CNGG**



**CHIPBREAKER IDENTIFICATION**

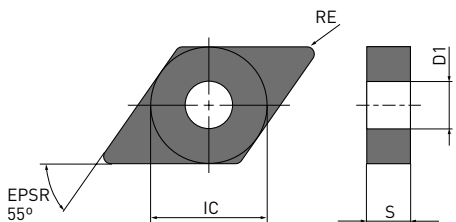
**APPLICATION**





LS

FS

**DNGG**



Order number	 	MP9005	MP9015	MP9025	MT9015	IC	S	RE	D1
CNGG1204V5-FS	F	●	●		★	12.7	4.76	0.05	5.16
CNGG120401-FS	F	●	●	●	★	12.7	4.76	0.1	5.16
CNGG120402-FS	F	●	●	●	★	12.7	4.76	0.2	5.16
CNGG120404-FS	F	●	●	●	★	12.7	4.76	0.4	5.16
CNGG120408-FS	F	●	●	●	★	12.7	4.76	0.8	5.16
CNGG120402-LS	L	●	●	●	★	12.7	4.76	0.2	5.16
CNGG120404-LS	L	●	●	●	★	12.7	4.76	0.4	5.16
CNGG120408-LS	L	●	●	●	★	12.7	4.76	0.8	5.16
DNGG150402-FS	F	●	●	●	★	12.7	4.76	0.2	5.16
DNGG150404-FS	F	●	●	●	★	12.7	4.76	0.4	5.16
DNGG150408-FS	F	●	●	●	★	12.7	4.76	0.8	5.16
DNGG150604-FS	F	●	●	●	★	12.7	6.35	0.4	5.16
DNGG150608-FS	F	●	●	●	★	12.7	6.35	0.8	5.16
DNGG150402-LS	L	●	●	●	★	12.7	4.76	0.2	5.16
DNGG150404-LS	L	●	●	●	★	12.7	4.76	0.4	5.16
DNGG150408-LS	L	●	●	●	★	12.7	4.76	0.8	5.16
DNGG150604-LS	L	●	●	●	★	12.7	6.35	0.4	5.16
DNGG150608-LS	L	●	●	●	★	12.7	6.35	0.8	5.16

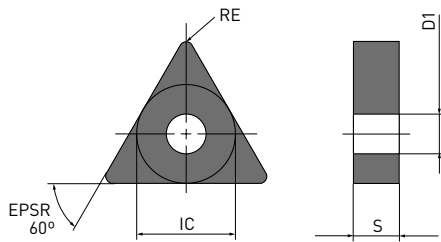
# TNGG, VNGG

## NEGATIVE INSERTS (WITH HOLE)

**S**

### G Class

#### TNGG



#### CHIPBREAKER IDENTIFICATION

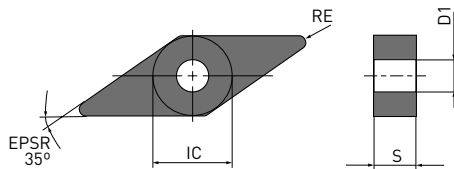
#### APPLICATION





LS

FS

#### VNGG





Order number	 	MP9005	MP9015	MP9025	MT9015	IC	S	RE	D1
TNGG160402-FS	F	●	●	●	★	9.525	4.76	0.2	3.81
TNGG160404-FS	F	●	●	●	★	9.525	4.76	0.4	3.81
TNGG160408-FS	F	●	●	●	★	9.525	4.76	0.8	3.81
TNGG160402-LS	L	●	●	●	★	9.525	4.76	0.2	3.81
TNGG160404-LS	L	●	●	●	★	9.525	4.76	0.4	3.81
TNGG160408-LS	L	●	●	●	★	9.525	4.76	0.8	3.81
VNGG1604V5-FS	F	●	●		★	9.525	4.76	0.05	3.81
VNGG160401-FS	F	●	●	●	★	9.525	4.76	0.1	3.81
VNGG160402-FS	F	●	●	●	★	9.525	4.76	0.2	3.81
VNGG160404-FS	F	●	●	●	★	9.525	4.76	0.4	3.81
VNGG160408-FS	F	●	●	●	★	9.525	4.76	0.8	3.81
VNGG160402-LS	L	●	●	●	★	9.525	4.76	0.2	3.81
VNGG160404-LS	L	●	●	●	★	9.525	4.76	0.4	3.81
VNGG160408-LS	L	●	●	●	★	9.525	4.76	0.8	3.81



# MP / MT9000

## RECOMMENDED CUTTING CONDITIONS



### NEGATIVE INSERTS

Material	Conditions			Grade	Vc	f	ap
M Precipitation hardening stainless steels (DIN X5CrNiCuNb17-4)	●	L	LS	MP9005	125 – 175	0.10 – 0.25	0.2 – 0.8
		M	MS	MP9005	115 – 160	0.10 – 0.25	0.5 – 4.0
		R	RS	MP9015	105 – 150	0.20 – 0.35	1.0 – 4.0
	●	L	LS	MP9015	120 – 165	0.10 – 0.25	0.2 – 0.8
		M	MS	MP9015	110 – 150	0.10 – 0.25	0.5 – 4.0
		R	RS	MP9015	100 – 140	0.20 – 0.35	1.0 – 4.0
	✱	L	LS	MP9025	80 – 95	0.10 – 0.25	0.2 – 0.8
		M	MS	MP9025	75 – 90	0.16 – 0.50	0.5 – 4.0
		R	RS	MP9025	70 – 85	0.20 – 0.35	1.0 – 4.0
S Titanium alloy (Ti-6Al-4V)	●	L	LS	MT9015	40 – 85	0.10 – 0.25	0.2 – 0.8
		M	MS	MT9015	40 – 80	0.10 – 0.25	0.5 – 4.0
		R	RS	MT9015	35 – 75	0.20 – 0.35	1.0 – 4.0
	●	L	LS	MT9015	40 – 85	0.10 – 0.25	0.2 – 0.8
		M	MS	MT9015	40 – 80	0.10 – 0.25	0.5 – 4.0
		R	RS	MT9015	35 – 75	0.20 – 0.35	1.0 – 4.0
S Ni-based heat-resistant alloy (Inconel <sup>®</sup> 718, Hastelloy <sup>®</sup> , WASPALLOY <sup>®</sup> )	●	L	LS	MP9005	30 – 110	0.10 – 0.25	0.2 – 0.8
		M	MS	MP9005	30 – 100	0.10 – 0.25	0.5 – 4.0
		R	RS	MP9015	20 – 75	0.20 – 0.35	1.0 – 4.0
	●	L	LS	MP9015	25 – 85	0.10 – 0.25	0.2 – 0.8
		M	MS	MP9015	25 – 80	0.10 – 0.25	0.5 – 4.0
		R	RS	MP9015	20 – 75	0.20 – 0.35	1.0 – 4.0
S Cobalt base alloy (Tribaloy <sup>®</sup> , Stellite <sup>®</sup> )	✱	L	LS	MP9025	20 – 30	0.10 – 0.25	0.2 – 0.8
		M	MS	MP9025	20 – 30	0.10 – 0.25	0.5 – 4.0
		R	RS	MP9025	20 – 30	0.20 – 0.35	1.0 – 4.0

1. When cutting conditions are unstable, please refer to page 48 for the recommended chipbreaker and grade.
2. Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.
3. MC7015, MC7025 and MP7035 grade are also recommended for precipitation hardening stainless steels.

**NEW**

### PRECISION NEGATIVE INSERTS

Material	Conditions			Grade	Vc	f	ap
S Titanium alloy (Ti-6Al-4V)	●	F	FS	MT9015	45 – 95	0.05 – 0.20	0.1 – 0.7
		L	LS	MT9015	40 – 85	0.10 – 0.25	0.2 – 0.8
		F	FS	MT9015	45 – 95	0.05 – 0.20	0.1 – 0.7
	●	L	LS	MT9015	40 – 85	0.10 – 0.25	0.2 – 0.8
		F	FS	MT9015	45 – 95	0.05 – 0.20	0.1 – 0.7
		L	LS	MT9015	40 – 85	0.10 – 0.25	0.2 – 0.8
S Ni-based heat-resistant alloy (Inconel <sup>®</sup> 718, Hastelloy <sup>®</sup> , WASPALLOY <sup>®</sup> )	●	F	FS	MP9005	60 – 120	0.05 – 0.20	0.1 – 0.7
		L	LS	MP9005	55 – 110	0.10 – 0.25	0.2 – 0.8
		F	FS	MP9015	45 – 95	0.05 – 0.20	0.1 – 0.7
	●	L	LS	MP9015	40 – 85	0.10 – 0.25	0.2 – 0.8
		F	FS	MP9025	35 – 50	0.05 – 0.20	0.1 – 0.7
		L	LS	MP9025	30 – 45	0.10 – 0.25	0.2 – 0.8

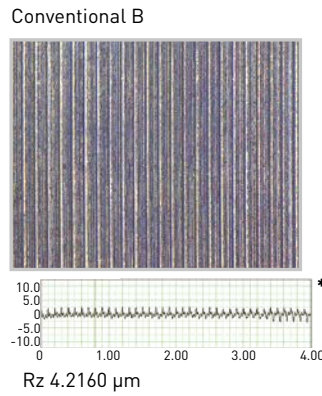
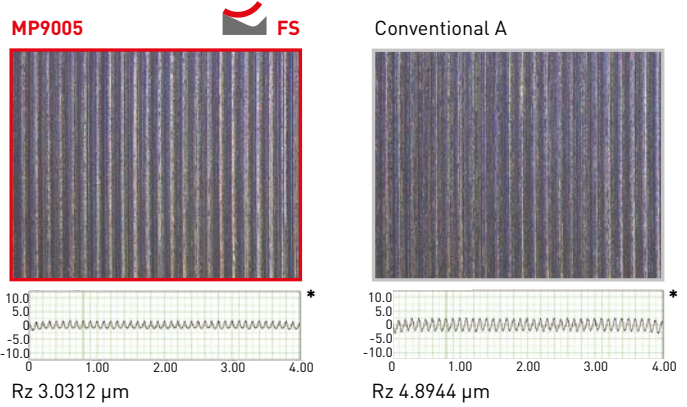
Cutting conditions: ●: Stable cutting ●: General cutting ✱: Unstable cutting

# CUTTING PERFORMANCE

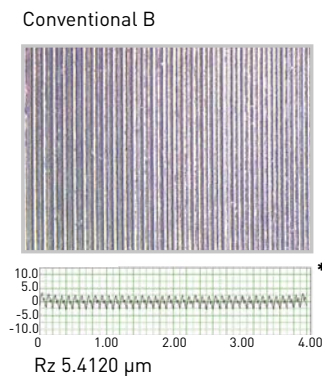
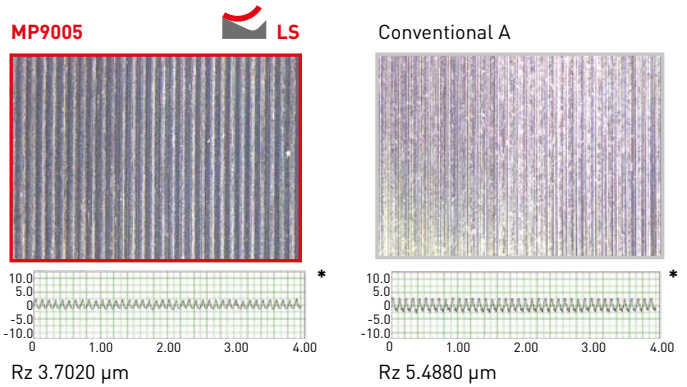
## COMPARISON OF FINISHED SURFACE OF INCONEL® 718

Excellent machining and chip breaking abilities provide good surface finishes.

Material	Inconel® 718
Insert	CNGG120404
Vc (m/min)	50
f (mm/rev)	0.1
ap (mm)	0.2
Cutting mode	Wet cutting



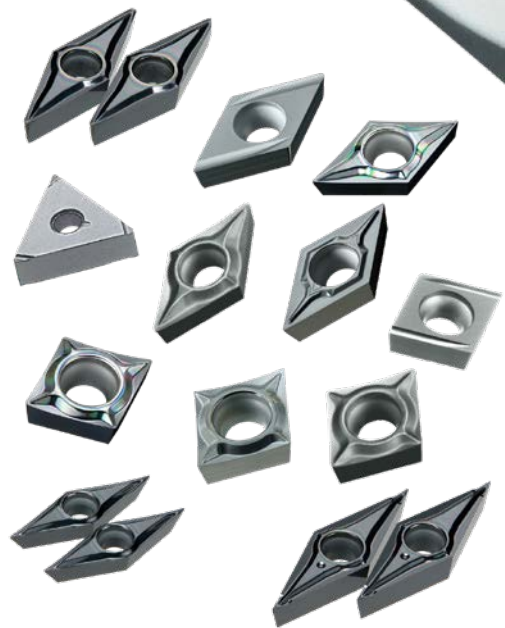
Material	Inconel® 718
Insert	CNGG120404
Vc (m/min)	50
f (mm/rev)	0.1
ap (mm)	0.5
Cutting mode	Wet cutting



\* Roughness curve  
Vertical scale: x 2.000.00  
Horizontal scale: x 50.00

# MS6015 / MS7025 / MS9025

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



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**DIA**  **EDGE**

# MS6015 / MS7025 / MS9025

## TRANSFORMATION OF MACHINING ON SWISS TYPE AUTOMATIC LATHES



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

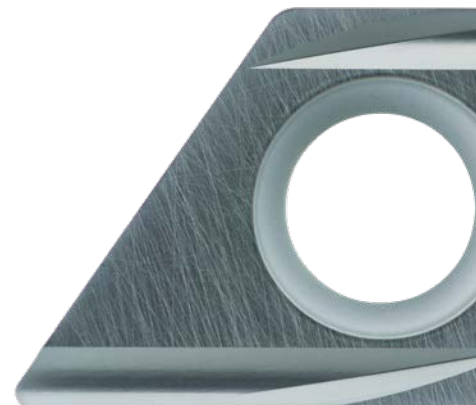
### **DUE TO CHANGES IN MATERIALS AND COMPONENT GEOMETRIES, VARIOUS PROBLEMS HAVE ARISEN THAT NEED SOLUTIONS:**

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



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

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

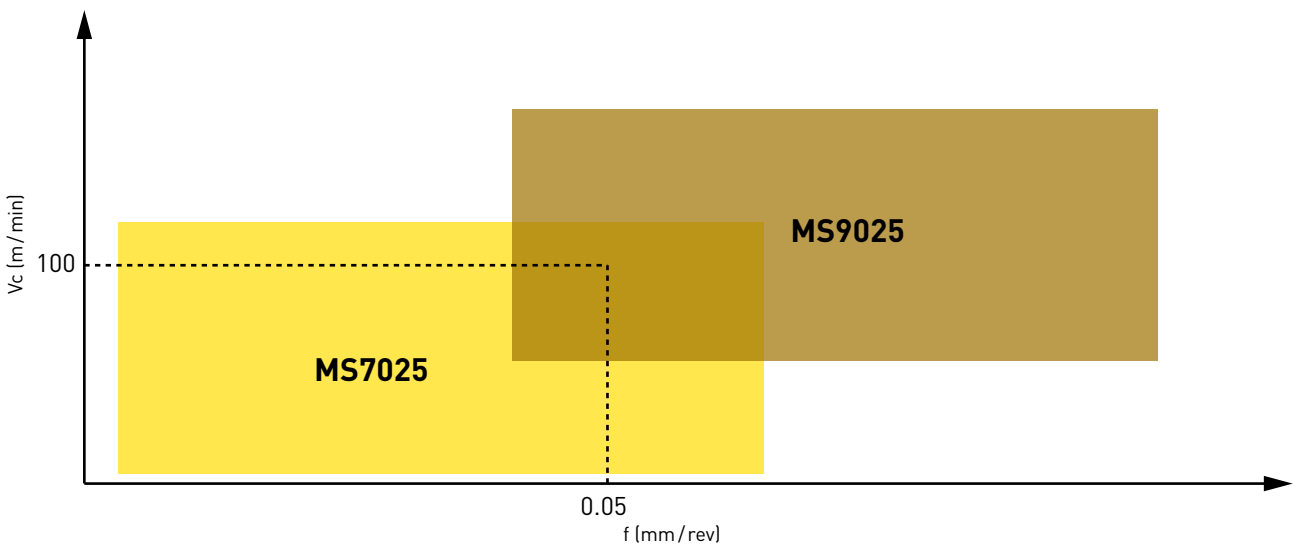


# MS6015 / MS7025 / MS9025

## APPLICATION RANGE

Material	Cutting mode	Grade	P	PVD
P Steels	Continuous cutting ↑ ↓ Interrupted cutting	Low		
		Medium		MS6015
		High		MS7025
		MS6015		
		MS7025		
Material	Cutting mode	Grade	M	PVD
M Stainless steel	Continuous cutting ↑ ↓ Interrupted cutting	Low		
		Medium		MS7025
		High		MS9025
		MS7025		
		MS9025		
Material	Cutting mode	Grade	S	PVD
S Titanium alloy (HRSA)	Continuous cutting ↑ ↓ Interrupted cutting	Low		
		Medium		MS9025
		High		
		MS9025		

### CORRECT AREA OF USE WHEN MACHINING STAINLESS STEEL





# MS6015 / MS7025 / MS9025

## IDEAL INSERTS FOR TURNING SMALL PARTS

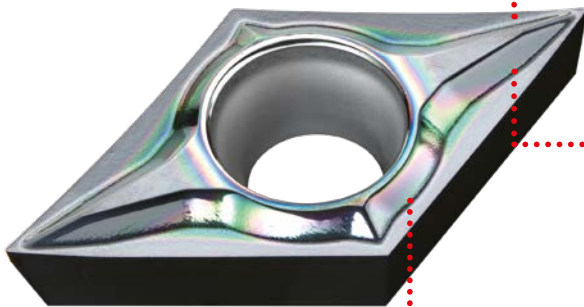
Set the corner radius to a minus tolerance.

Order number	DCGT11T302 M R-SN		02M R 0.2 mm (R 0.15 – R 0.20 mm)
	DCGT11T304 M -SMG		04M R 0.4 mm (R 0.35 – R 0.40 mm)

### NEW BREAKER SYSTEM FOR FRONT TURNING

#### FS-P Breaker

For Micro-Low Depth of Cut



#### Curved Cutting Edge

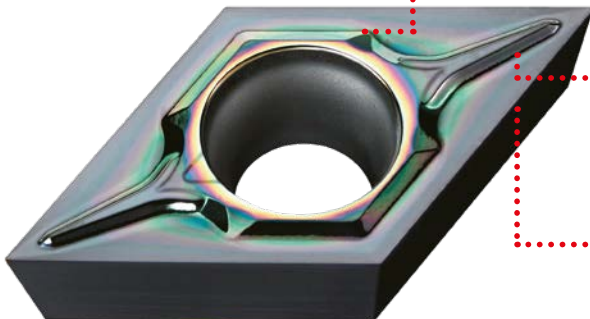
The curved cutting edge reduces cutting resistance and enables smooth chip evacuation. It also enables good initial entry to the workpiece and resists vibration and oscillation during machining.

#### High Breaker Wall

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

#### LS-P Breaker

For Medium to High Depth of Cut



#### Polishing (Mirror-Surface)

Welding resistance and chip evacuation are greatly improved.

#### Large Pocket

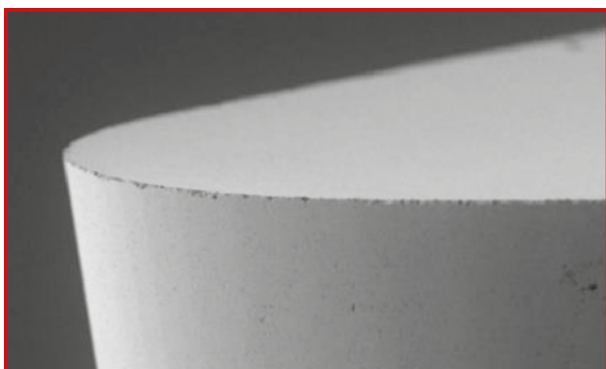
The large pocket enhances chip evacuation during high depths of cut and suppresses chip clogging.

#### Parallel Cutting Edge

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

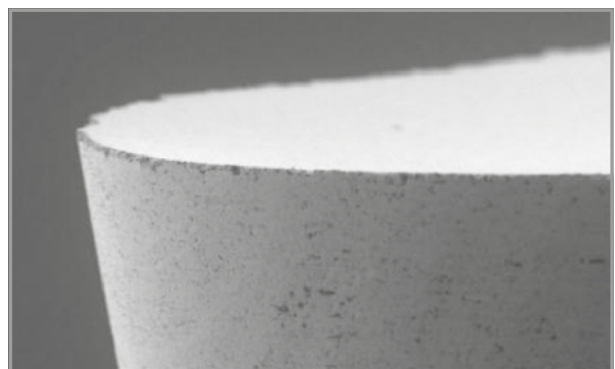
### EXTREMELY HIGH QUALITY CUTTING EDGE

Technology that provides superior dimensional stability and reduces burrs.



MS7025 / MS9025

Rz = 0.14 μm



Conventional

Rz = 0.61 μm

# MS9025

## NEW TECHNOLOGY – CONTROLLED VIBRATION OF THE CUTTING TOOL

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

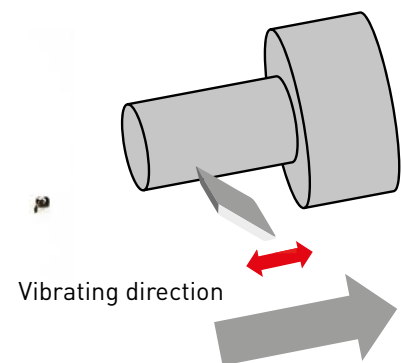
Without controlled vibration



With controlled vibration frequency = 0.75/rev



With controlled vibration frequency = 1.25/rev



Challenges of controlled vibration machining:

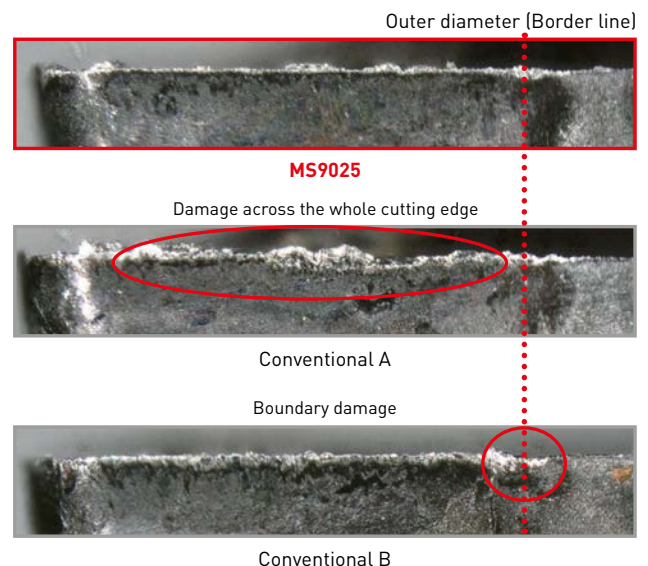
Compared to standard machining there is a greater chance of chipping due to the extra stress on the cutting edge and also because of the consequences of work hardening.

### BENEFITS OF USING MS9025 FOR CONTROLLED VIBRATION MACHINING


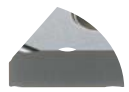
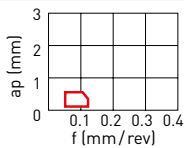

1. Excellent fracture resistance due to the inherent toughness of the base material.
2. Effectively suppresses boundary wear damage during machining of difficult-to-cut materials. This is achieved by the optimised cemented carbide grain size that increases thermal conductivity and heating of the cutting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

#### After 500 passes at 15 m per pass



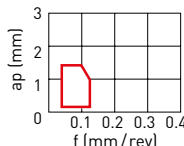
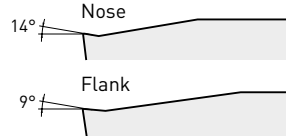
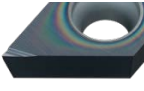
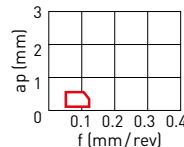

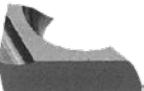
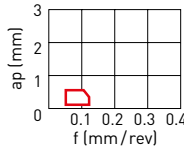


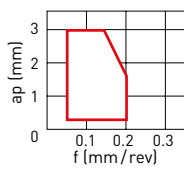
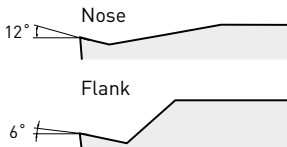

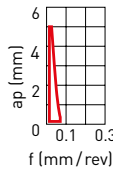


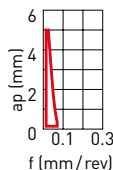


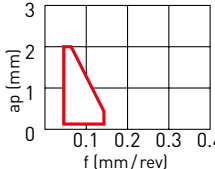
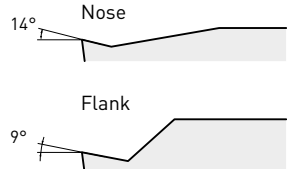
Workpiece material	DIN X5CrNi18-10 (1.4301)
Insert	DCGT11T302M
Vc (m/min)	100
f (mm/rev)	0.08
ap (mm)	1.0
The number of vibration	D = 1.25/rev
Cutting mode	External Continuous cutting Wet cutting (Oil)



# BREAKER SYSTEM – NEGATIVE INSERTS

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

# BREAKER SYSTEM – POSITIVE INSERTS

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

# MS6015 / MS7025 / MS9025

## 5° POSITIVE INSERTS (WITH HOLE)

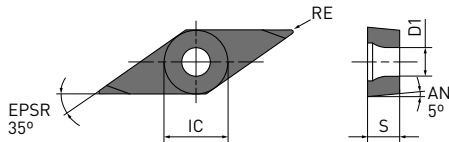
**P** **M** **S**

**G Class**

**VBGT**



FS-P



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

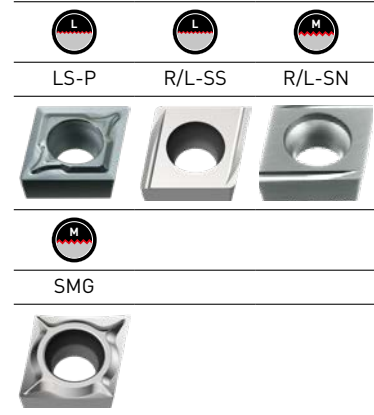
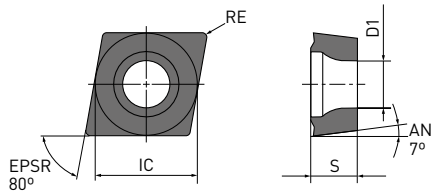
# MS6015 / MS7025 / MS9025



## 7° POSITIVE INSERTS (WITH HOLE)



G Class

CCGH/CCGT



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

\* Nominal Value (Max.)



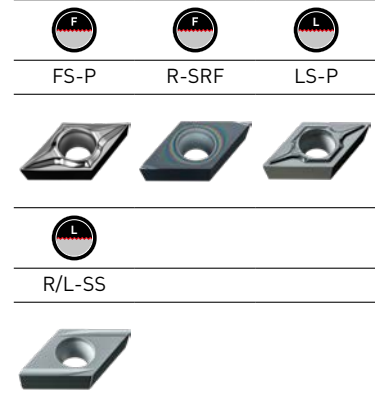
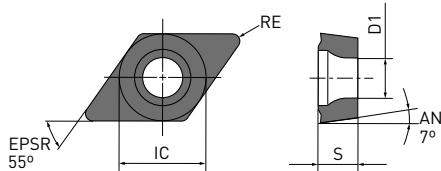
# MS6015 / MS7025 / MS9025



## 7° POSITIVE INSERTS (WITH HOLE)

**P** **M** **S**

**G Class**

**DCGT**



Order number	 	MS6015	MS7025	MS9025	IC	S	RE*	D1
DCGT070201M-FS-P	F		●	●	6.35	2.38	0.1	2.8
DCGT070202M-FS-P	F		●	●	6.35	2.38	0.2	2.8
DCGT070204M-FS-P	F		●	●	6.35	2.38	0.4	2.8
DCGT11T301M-FS-P	F		●	●	9.525	3.97	0.1	4.4
DCGT11T302M-FS-P	F		●	●	9.525	3.97	0.2	4.4
DCGT11T304M-FS-P	F		●	●	9.525	3.97	0.4	4.4
DCGT11T301MR-SRF	F		●	●	9.525	3.97	0.1	4.4
DCGT11T302MR-SRF	F		●	●	9.525	3.97	0.2	4.4
DCGT11T304MR-SRF	F		●	●	9.525	3.97	0.4	4.4
<b>NEW</b> DCGT0702V5M-LS-P	L			●	6.35	2.38	0.05	2.8
DCGT070201M-LS-P	L	●	●	●	6.35	2.38	0.1	2.8
DCGT070202M-LS-P	L	●	●	●	6.35	2.38	0.2	2.8
DCGT070204M-LS-P	L	●	●	●	6.35	2.38	0.4	2.8
DCGT11T301M-LS-P	L	●	●	●	9.525	3.97	0.1	4.4
DCGT11T302M-LS-P	L	●	●	●	9.525	3.97	0.2	4.4
DCGT11T304M-LS-P	L	●	●	●	9.525	3.97	0.4	4.4
DCGT070201MR-SS	L	●			6.35	2.38	0.1	2.8
DCGT070201ML-SS	L	●			6.35	2.38	0.1	2.8
DCGT070202MR-SS	L	●			6.35	2.38	0.2	2.8
DCGT070202ML-SS	L	●			6.35	2.38	0.2	2.8
DCGT11T301MR-SS	L	●			9.525	3.97	0.1	4.4
DCGT11T301ML-SS	L	●			9.525	3.97	0.1	4.4
DCGT11T302MR-SS	L	●			9.525	3.97	0.2	4.4
DCGT11T302ML-SS	L	●			9.525	3.97	0.2	4.4
DCGT11T304MR-SS	L	●			9.525	3.97	0.4	4.4
DCGT11T304ML-SS	L	●			9.525	3.97	0.4	4.4

\* Nominal Value (Max.)



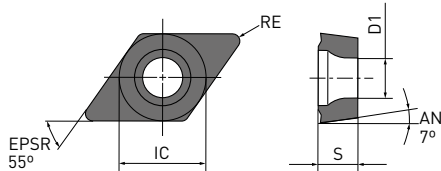
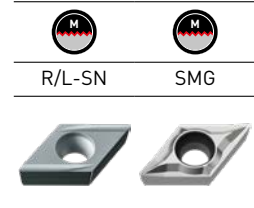
# MS6015 / MS7025 / MS9025

## 7° POSITIVE INSERTS (WITH HOLE)



G Class

DCGT



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

\* Nominal Value (Max.)



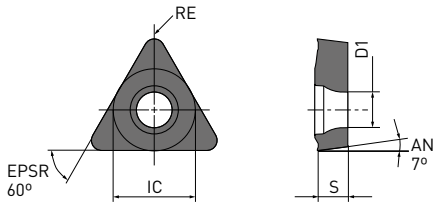
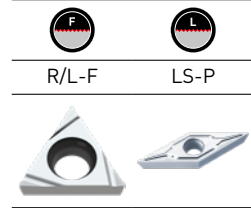
# MS6015 / MS7025 / MS9025

## 7° POSITIVE INSERTS (WITH HOLE)

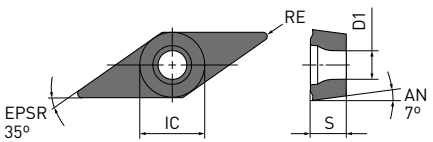
**P** **M** **S**

**G Class**

**TCGT**



**VCGT**



Order number		MS6015	MS7025	NEW MS9025	IC	S	RE*	D1
TCGT060101MR-F	F	●			3.97	1.59	0.1	2.3
TCGT060101ML-F	F	●			3.97	1.59	0.1	2.3
TCGT060102MR-F	F	●			3.97	1.59	0.2	2.3
TCGT060102ML-F	F	●			3.97	1.59	0.2	2.3
TCGT060104MR-F	F	●			3.97	1.59	0.4	2.3
TCGT060104ML-F	F	●			3.97	1.59	0.4	2.3
NEW VCGT110301M-FS-P	F			●	6.35	3.18	0.1	2.8
NEW VCGT110302M-FS-P	F			●	6.35	3.18	0.2	2.8
NEW VCGT110304M-FS-P	F			●	6.35	3.18	0.4	2.8
NEW VCGT110301M-LS-P	L		●	●	6.35	3.18	0.1	2.8
NEW VCGT110302M-LS-P	L		●	●	6.35	3.18	0.2	2.8
NEW VCGT110304M-LS-P	L		●	●	6.35	3.18	0.4	2.8
NEW VCGT130301M-LS-P	L			●	7.94	3.18	0.1	3.4
NEW VCGT130302M-LS-P	L			●	7.94	3.18	0.2	3.4
NEW VCGT130304M-LS-P	L			●	7.94	3.18	0.4	3.4

\* Nominal Value (Max.)





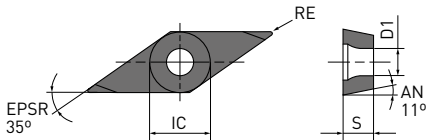
# MS6015 / MS7025 / MS9025

## 11° POSITIVE INSERTS (WITH HOLE)

**P** **M** **S**

**G Class**

**VPGT**





Order number		MS6015	MS7025	MS9025	IC	S	RE	D1
VPGT080201M-FS-P	F			●	4.76	2.38	0.1	2.42
VPGT080202M-FS-P	F			●	4.76	2.38	0.2	2.42
VPGT110301M-FS-P	F			●	6.35	3.18	0.1	2.85
VPGT110302M-FS-P	F			●	6.35	3.18	0.2	2.85















# MS6015 / MS7025 / MS9025

## RECOMMENDED CUTTING CONDITIONS

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

# MS6015 / MS7025 / MS9025

## RECOMMENDED CUTTING CONDITIONS

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

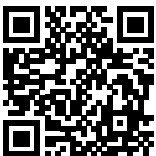
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# MC5100 SERIES

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

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Interested in more...

**B269**

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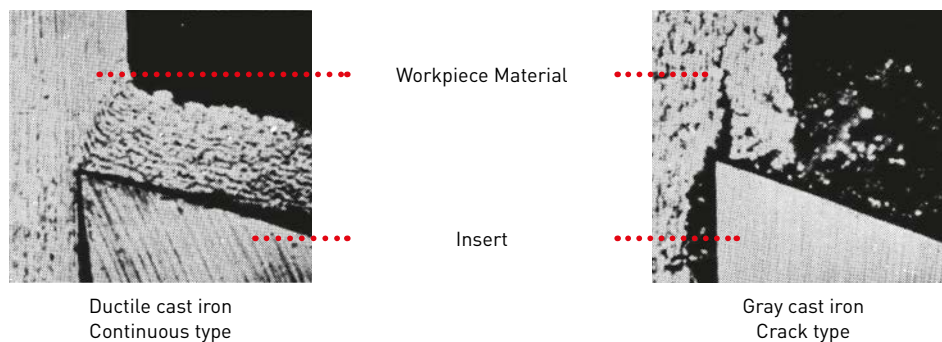
# MC5100 SERIES

## CVD COATED GRADES FOR CAST IRON TURNING

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

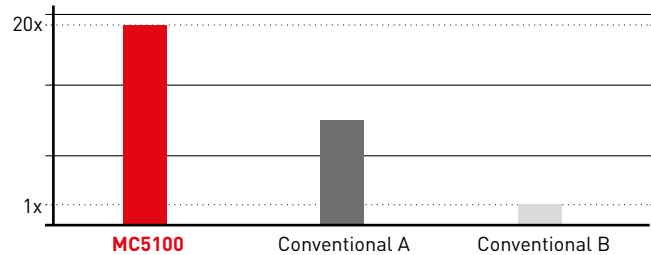
The process of casting iron enables complex geometries to be formed in the component that is produced. Different types of cast irons produce different chips when machined and can cause various types of damage to an insert. The complex shapes produced in castings also creates challenges because contact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

### CHIP MORPHOLOGY OF CAST IRON



### "SUPER" NANO TEXTURE TECHNOLOGY

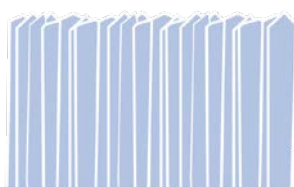
The standard Nano Texture Technology has been improved and developed to be an industry leading standard for crystal growth of Al<sub>2</sub>O<sub>3</sub> coatings. This Super Nano Texture Technology increases tool life and wear resistance due to the fine, dense crystal growth process.



The ratio of Al<sub>2</sub>O<sub>3</sub> crystal grains with the same orientation

### CRYSTAL ORIENTATION

(Image)



"Super" Nano Texture

Uniformity of the growth direction has drastically improved.



Nano Texture

Uniformity of the grain size and growth direction has improved.

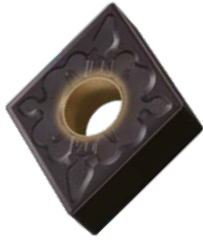


Conventional CVD inserts

Grain size and growth direction are uneven.

# MC5100 SERIES

## CVD COATED GRADES FOR CAST IRON TURNING



### MC5105

#### FOR HIGH SPEED CUTTING OF GRAY CAST IRON

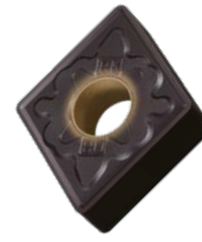
Provides outstanding wear resistance when turning gray cast iron at up to 1000 m/min cutting speeds.



### MC5115

#### FIRST RECOMMENDED GRADE FOR DUCTILE CAST IRON

Prevents abnormal cutting edge damage and displays excellent wear and fracture resistance when machining ductile cast iron.



### MC5125

#### FOR HEAVY INTERRUPTED CUTTING OF DUCTILE CAST IRON

Demonstrates excellent fracture resistance that can withstand heavy interrupted cutting of high strength ductile cast iron.

### TOUGH AND SUB GRIP LAYERS FOR DUCTILE CAST IRON GRADES

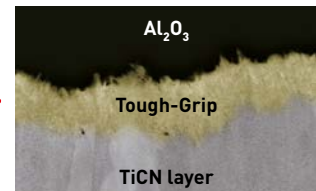
The extra strength of the adhesion between the coating layers (1.3 times stronger) suppresses peeling during machining of ductile cast iron.

Adhesion is 1.3 times\* greater!



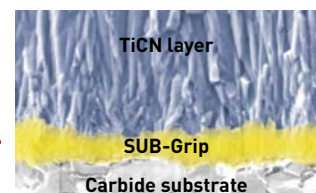
#### TOUGH-GRIP

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



#### SUB-GRIP

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



\*Compared with conventional grades from Mitsubishi Materials.

### FROM THE DEVELOPERS

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

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

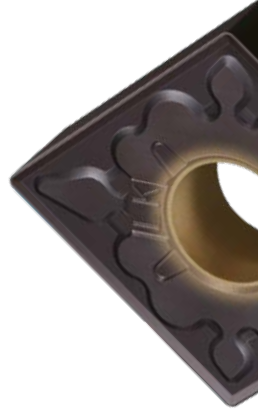
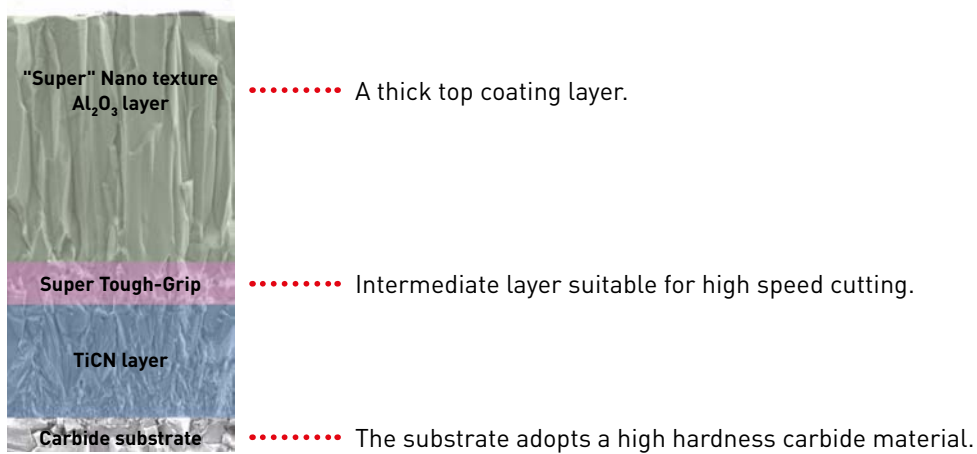
The MC5100 series has been expanded to include grades that are optimal for each type of cast iron turning. These grades will become an indispensable tool for customers that machine cast iron materials.

# MC5100 SERIES

## MC5105

### FOR HIGH SPEED CUTTING OF GRAY CAST IRON

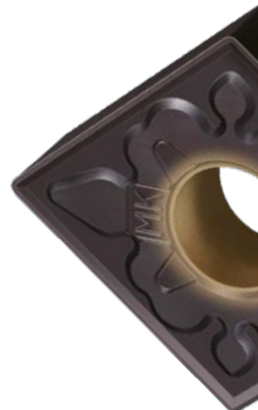
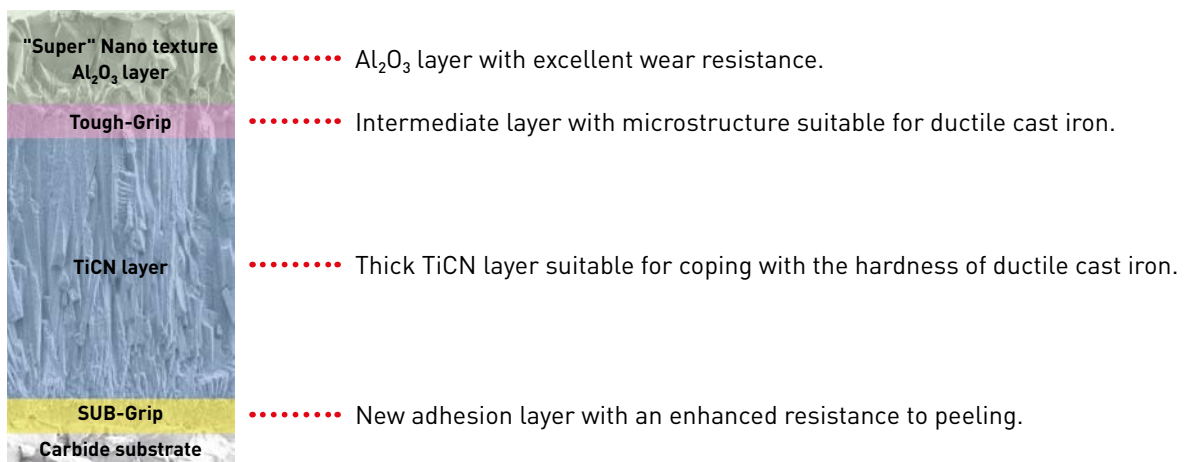
Harder and with outstanding wear resistance



## MC5115

### FIRST RECOMMENDED GRADE FOR DUCTILE CAST IRON

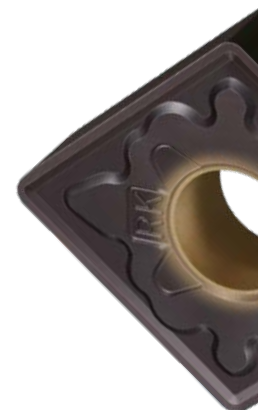
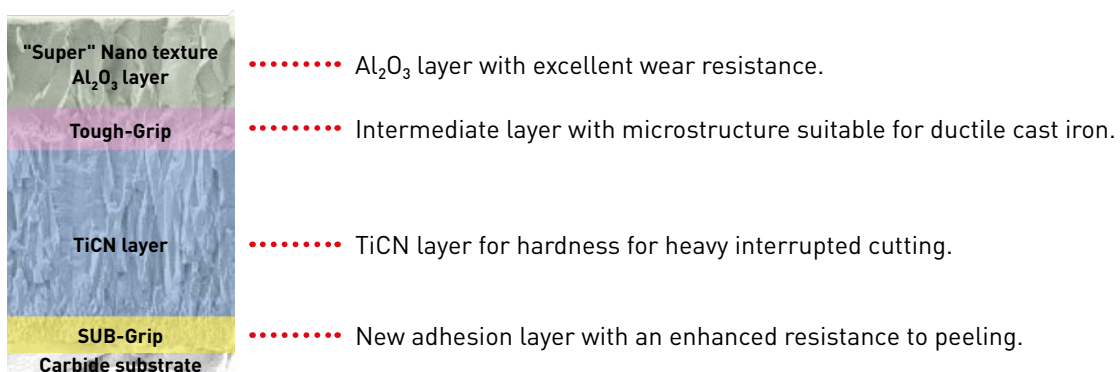
Excellent durability and resistance to impacts



## MC5125

### FOR HEAVY INTERRUPTED CUTTING OF DUCTILE CAST IRON

Excellent stability and fracture resistance



# MC5100 SERIES

## WAY TO SELECT MC5100 SERIES

### GRAY CAST IRON

MC5105 is the first recommendation for high speed machining of gray cast iron.

Select a suitable chipbreaker to optimise tool life and reduce wear.

MC5115 is also capable of reliable machining at speeds of 100 – 300 m/min and for unstable cutting conditions.

#### HIGH SPEED CUTTING 200 – 1000 M/MIN

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

In case of fracture

#### CUTTING SPEED 100 – 300 M/MIN

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

In case of fracture

### DUCTILE CAST IRON

MC5115 is the first recommendation for ductile cast iron, including high strength ductile cast iron.

In order to prevent breakage and wear, select a suitable chipbreaker.

MC5125 is also effective for heavy, interrupted and unstable cutting conditions.

#### FIRST RECOMMENDATION

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

In case of fracture

↑  
In case of wear

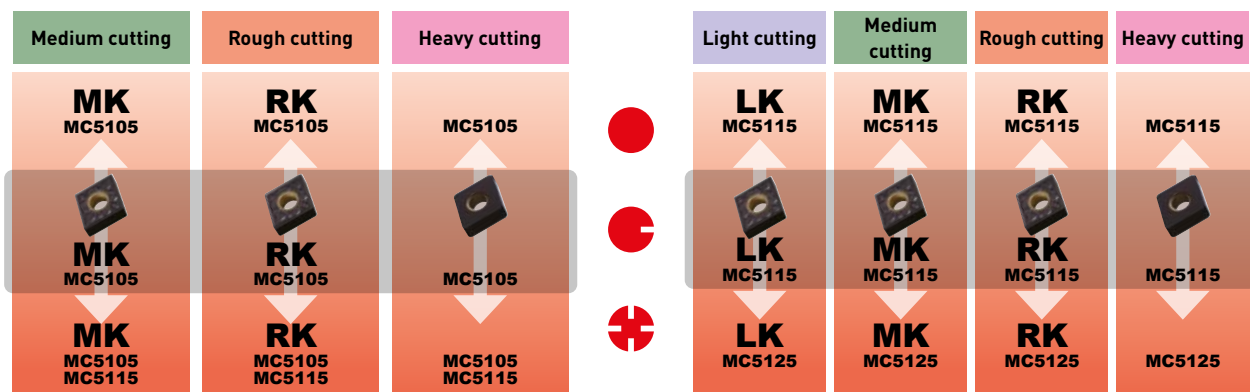
#### HEAVY, INTERRUPTED CUTTING

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

In case of wear

### GRAY CAST IRON

### DUCTILE CAST IRON





# MC5100 SERIES

## CHIPBREAKER SYSTEM FOR CAST IRON TURNING

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

### SELECT A CHIPBREAKER ACCORDING TO THE MACHINING CONDITIONS

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

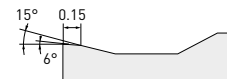
Focus on cutting edge sharpness

#### NEGATIVE INSERTS



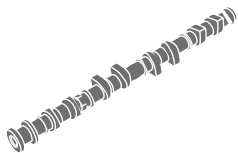
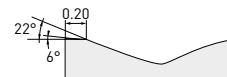
##### LK breaker

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



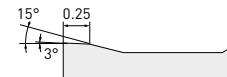
##### MA breaker

Positive land provides a sharp cutting edge.



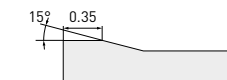
##### MK breaker

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



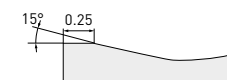
##### RK breaker

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



##### GK breaker

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



##### Flat top

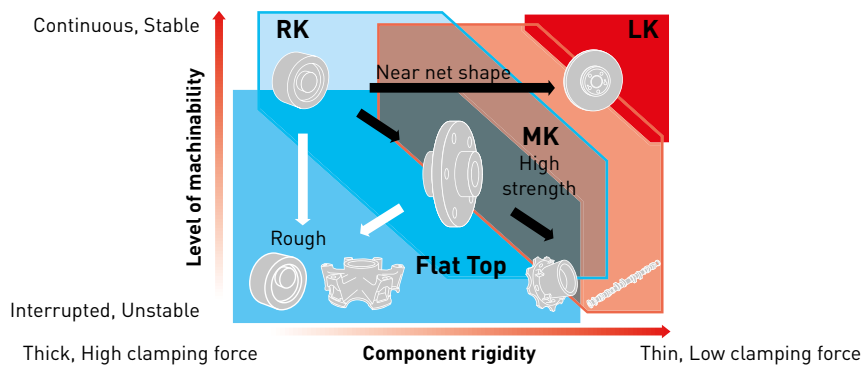
Flat top focusing on high edge strength.



Focus on cutting edge strength

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

### APPLICATION MAP FOR CAST IRON







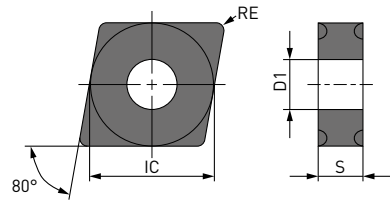




# CNMG, CNMA

## NEGATIVE INSERTS (WITH HOLE)

**K**

**M-Class**

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





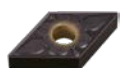
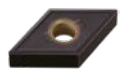


[10 inserts in one case]

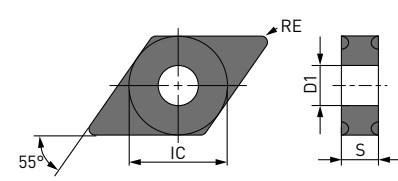
# DNMG, DNMA

## NEGATIVE INSERTS (WITH HOLE)

**K**

M-Class

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



[10 inserts in one case]








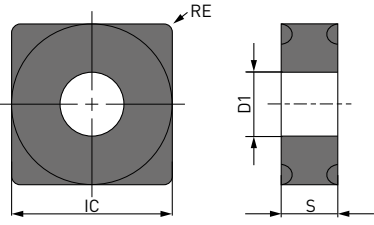





# SNMG, SNMA

## NEGATIVE INSERTS (WITH HOLE)

**K**

M-Class

Order number		MC5105	MC5115	MC5125	IC	S	RE	D1		Geometry
SNMG120408-LK	L		●	★	12.7	4.76	0.8	5.16		
SNMG120412-LK	L		●	★	12.7	4.76	1.2	5.16		
SNMG120404-MA	M		●	★	12.7	4.76	0.4	5.16		
SNMG120408-MA	M		●	★	12.7	4.76	0.8	5.16		
SNMG120412-MA	M		●	★	12.7	4.76	1.2	5.16		
SNMG120416-MA	M		●	★	12.7	4.76	1.6	5.16		
SNMG150612-MA	M		●	●	15.875	6.35	1.2	6.35		
SNMG120408-MK	M	●	●	★	12.7	4.76	0.8	5.16		
SNMG120412-MK	M	●	●	★	12.7	4.76	1.2	5.16		
SNMG120416-MK	M	★	●	★	12.7	4.76	1.6	5.16		
SNMG150612-MK	M	★	●	★	15.875	6.35	1.2	6.35		
SNMG150616-MK	M	★	●	★	15.875	6.35	1.6	6.35		
SNMG190612-MK	M	★			19.05	6.35	1.2	7.93		
SNMG190616-MK	M	★			19.05	6.35	1.6	7.93		
SNMG120404-GK	M		●	★	12.7	4.76	0.4	5.16		
SNMG120408-GK	M		●	●	12.7	4.76	0.8	5.16		
SNMG120412-GK	M		●	●	12.7	4.76	1.2	5.16		
SNMG120416-GK	M		●	★	12.7	4.76	1.6	5.16		
SNMG150612-GK	M		●	★	15.875	6.35	1.2	6.35		
SNMG120408-RK	R	●	●	★	12.7	4.76	0.8	5.16		
SNMG120412-RK	R	●	●	●	12.7	4.76	1.2	5.16		
SNMG120416-RK	R	●	●	★	12.7	4.76	1.6	5.16		
SNMG150612-RK	R	★	●	★	15.875	6.35	1.2	6.35		
SNMG150616-RK	R	★	●	★	15.875	6.35	1.6	6.35		
SNMG190612-RK	R	★			19.05	6.35	1.2	7.93		
SNMG190616-RK	R	★			19.05	6.35	1.6	7.93		
SNMA090308	R	★	★	★	9.525	3.18	0.8	3.81		
SNMA120408	R	●	●	★	12.7	4.76	0.8	5.16		
SNMA120412	R	●	●	●	12.7	4.76	1.2	5.16		
SNMA120416	R	●	●	●	12.7	4.76	1.6	5.16		
SNMA150612	R	●	●	★	15.875	6.35	1.2	6.35		
SNMA150616	R	●	●	●	15.875	6.35	1.6	6.35		
SNMA190612	R	●			19.05	6.35	1.2	7.93		
SNMA190616	R	●			19.05	6.35	1.6	7.93		

[10 inserts in one case]


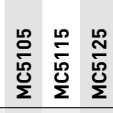




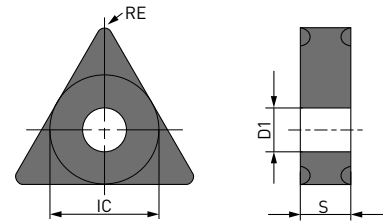
# TNMG, TNMA

## NEGATIVE INSERTS (WITH HOLE)

K

### M-Class

Order number			IC	S	RE	D1		Geometry
TNMG160404-LK	L	● ★	9.525	4.76	0.4	3.81		
TNMG160408-LK	L	● ★	9.525	4.76	0.8	3.81		
TNMG160412-LK	L	● ★	9.525	4.76	1.2	3.81		
TNMG160404-MA	M	● ★	9.525	4.76	0.4	3.81		
TNMG160408-MA	M	● ●	9.525	4.76	0.8	3.81		
TNMG160412-MA	M	● ●	9.525	4.76	1.2	3.81		
TNMG160416-MA	M	● ★	9.525	4.76	1.6	3.81		
TNMG220408-MA	M	★ ★	12.7	4.76	0.8	5.16		
TNMG220412-MA	M	★ ★	12.7	4.76	1.2	5.16		
TNMG220416-MA	M	● ●	12.7	4.76	1.6	5.16		
TNMG160404-MK	M	● ● ★	9.525	4.76	0.4	3.81		
TNMG160408-MK	M	● ● ●	9.525	4.76	0.8	3.81		
TNMG160412-MK	M	● ● ★	9.525	4.76	1.2	3.81		
TNMG220408-MK	M	★ ● ★	12.7	4.76	0.8	5.16		
TNMG220412-MK	M	★ ★ ★	12.7	4.76	1.2	5.16		
TNMG220416-MK	M	★ ★ ★	12.7	4.76	1.6	5.16		
TNMG160404-GK	M	● ★	9.525	4.76	0.4	3.81		
TNMG160408-GK	M	● ●	9.525	4.76	0.8	3.81		
TNMG160412-GK	M	● ★	9.525	4.76	1.2	3.81		
TNMG160416-GK	M	● ★	9.525	4.76	1.6	3.81		
TNMG220408-GK	M	● ★	12.7	4.76	0.8	5.16		
TNMG220412-GK	M	★ ★	12.7	4.76	1.2	5.16		
TNMG160408-RK	R	● ● ●	9.525	4.76	0.8	3.81		
TNMG160412-RK	R	● ● ●	9.525	4.76	1.2	3.81		
TNMG160416-RK	R	● ● ★	9.525	4.76	1.6	3.81		
TNMG220408-RK	R	● ● ★	12.7	4.76	0.8	5.16		
TNMG220412-RK	R	● ● ★	12.7	4.76	1.2	5.16		
TNMG220416-RK	R	● ● ★	12.7	4.76	1.6	5.16		
TNMA160404	R	● ● ★	9.525	4.76	0.4	3.81		
TNMA160408	R	● ● ●	9.525	4.76	0.8	3.81		
TNMA160412	R	● ● ●	9.525	4.76	1.2	3.81		
TNMA160416	R	● ● ●	9.525	4.76	1.6	3.81		
TNMA160420	R	★ ★ ★	9.525	4.76	2.0	3.81		
TNMA220408	R	● ● ★	12.7	4.76	0.8	5.16		
TNMA220412	R	● ● ★	12.7	4.76	1.2	5.16		
TNMA220416	R	● ● ●	12.7	4.76	1.6	5.16		






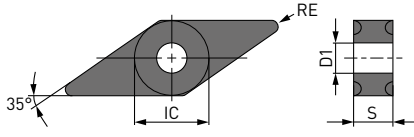












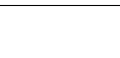
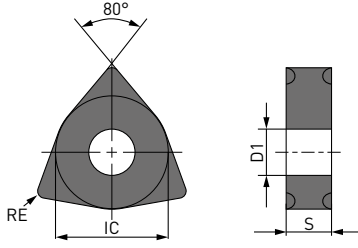











[10 inserts in one case]

# VNMG, WNMG, WNMA

## NEGATIVE INSERTS (WITH HOLE)

**K**

M-Class

Order number				IC	S	RE	D1		Geometry	
	MC5105	MC5115	MC5125							
VNMG160404-LK	L	●	★	9.525	4.76	0.4	3.81			
VNMG160408-LK	L	●	★	9.525	4.76	0.8	3.81			
VNMG160404-MA	M	●	★	9.525	4.76	0.4	3.81			
VNMG160408-MA	M	●	★	9.525	4.76	0.8	3.81			
VNMG160404-MK	M	●	●	★	9.525	4.76	0.4	3.81		
VNMG160408-MK	M	●	●	●	9.525	4.76	0.8	3.81		
VNMG160412-MK	M	●	●	●	9.525	4.76	1.2	3.81		
VNMG160404-GK	M	●	●	★	9.525	4.76	0.4	3.81		
VNMG160408-GK	M	●	●	★	9.525	4.76	0.8	3.81		
VNMG160412-GK	M	●	●	★	9.525	4.76	1.2	3.81		
VNMA160404	R	★	●	★	9.525	4.76	0.4	3.81		
VNMA160408	R	★	●	●	9.525	4.76	0.8	3.81		
VNMA160412	R	★	●	★	9.525	4.76	1.2	3.81		
WNMG080404-LK	L	●	●	★	12.7	4.76	0.4	5.16		
WNMG080408-LK	L	●	●	★	12.7	4.76	0.8	5.16		
WNMG080412-LK	L	●	●	★	12.7	4.76	1.2	5.16		
WNMG060408-MA	M	●	●	●	9.525	4.76	0.8	3.81		
WNMG060412-MA	M	●	●	★	9.525	4.76	1.2	3.81		
WNMG080404-MA	M	●	●	★	12.7	4.76	0.4	5.16		
WNMG080408-MA	M	●	●	●	12.7	4.76	0.8	5.16		
WNMG080412-MA	M	●	●	●	12.7	4.76	1.2	5.16		
WNMG080416-MA	M	●	●	★	12.7	4.76	1.6	5.16		
WNMG080404-MK	M	●	●	★	12.7	4.76	0.4	5.16		
WNMG080408-MK	M	●	●	●	12.7	4.76	0.8	5.16		
WNMG080412-MK	M	●	●	●	12.7	4.76	1.2	5.16		
WNMG080416-MK	M	★	●	★	12.7	4.76	1.6	5.16		
WNMG060404-GK	M	●	●	★	9.525	4.76	0.4	3.81		
WNMG060408-GK	M	●	●	★	9.525	4.76	0.8	3.81		
WNMG080404-GK	M	●	●	★	12.7	4.76	0.4	5.16		
WNMG080408-GK	M	●	●	●	12.7	4.76	0.8	5.16		
WNMG080412-GK	M	●	●	●	12.7	4.76	1.2	5.16		
WNMG080416-GK	M	●	●	★	12.7	4.76	1.6	5.16		
WNMG080408-RK	R	●	●	●	12.7	4.76	0.8	5.16		
WNMG080412-RK	R	●	●	●	12.7	4.76	1.2	5.16		
WNMG080416-RK	R	●	●	●	12.7	4.76	1.6	5.16		
WNMA060408	R	★	●	★	9.525	4.76	0.8	3.81		
WNMA060412	R	★	●	★	9.525	4.76	1.2	3.81		
WNMA080404	R	●	●	★	12.7	4.76	0.4	5.16		
WNMA080408	R	●	●	●	12.7	4.76	0.8	5.16		
WNMA080412	R	●	●	●	12.7	4.76	1.2	5.16		
WNMA080416	R	●	●	★	12.7	4.76	1.6	5.16		




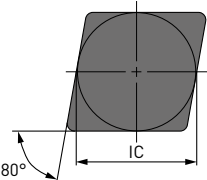
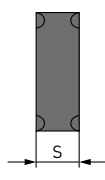

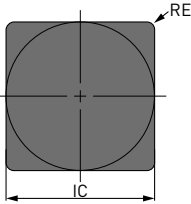
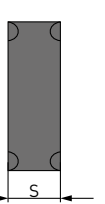

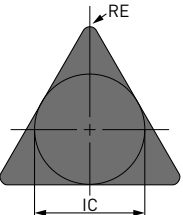
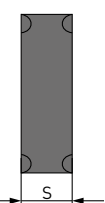
(10 inserts in one case)

# CNMN, SNMN, TNMN

## NEGATIVE INSERTS (WITHOUT HOLE)




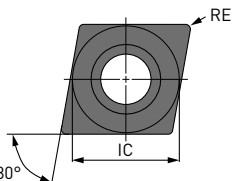
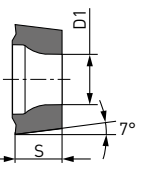
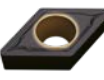
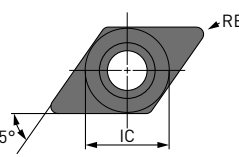
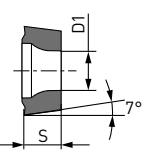
**K**

M-Class

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

# CCMT, DCMT

## 7° POSITIVE INSERTS (WITH HOLE)

Order number				MC5105	MC5115	MC5125	IC	S	RE	D1		Geometry
	L	M	R									
CCMT060204-MK	M	●	●	●	6.35	2.38	0.4	2.8	  			
CCMT060208-MK	M	●	★	●	6.35	2.38	0.8	2.8				
CCMT09T304-MK	M	●	●	●	9.525	3.97	0.4	4.4				
CCMT09T308-MK	M	●	●	●	9.525	3.97	0.8	4.4				
CCMT120404-MK	M	●	★	●	12.7	4.76	0.4	5.5				
CCMT120408-MK	M	●	●	●	12.7	4.76	0.8	5.5				
CCMT120412-MK	M	●	★	●	12.7	4.76	1.2	5.5				
DCMT070204-MK	M	●	★	●	6.35	2.38	0.4	2.8				
DCMT070208-MK	M	●	★	●	6.35	2.38	0.8	2.8				
DCMT11T304-MK	M	●	●	●	9.525	3.97	0.4	4.4				
DCMT11T308-MK	M	●	●	●	9.525	3.97	0.8	4.4				
DCMT150404-MK	M	●	★	●	12.7	4.76	0.4	5.5	  			
DCMT150408-MK	M	●	★	●	12.7	4.76	0.8	5.5				


(10 inserts in one case)

# MC5100 SERIES

## RECOMMENDED CUTTING CONDITIONS

### NEGATIVE INSERTS (FOR EXTERNAL TURNING)

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

Cutting range		f	ap
Light cutting	LK	0.10-0.50	0.50-2.50
Medium cutting	MK	0.20-0.55	0.50-4.00
Medium cutting	MA	0.20-0.50	0.30-4.00
Medium cutting	GK	0.25-0.60	1.50-5.00
Rough cutting	RK	0.20-0.60	1.50-6.00
Cast iron cutting	Flat	0.20-0.60	2.50-6.00

### 7° POSITIVE INSERTS (FOR EXTERNAL TURNING)

Material	Hardness	Cutting conditions	Grade	Vc
K Ductile cast iron	< 450MPa	●	MC5115	170-320
		●	MC5115	130-250
		⊕	MC5125	60-130
	< 800MPa	●	MC5115	125-240
		●	MC5115	105-200
		⊕	MC5125	55-115

Cutting range	Chipbreaker	f	ap
Medium cutting	MK	0.08-0.30	0.30-2.00



# APPLICATION EXAMPLES

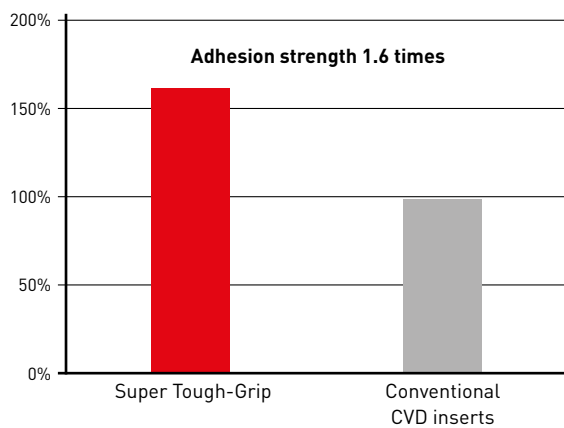
## MC5105

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

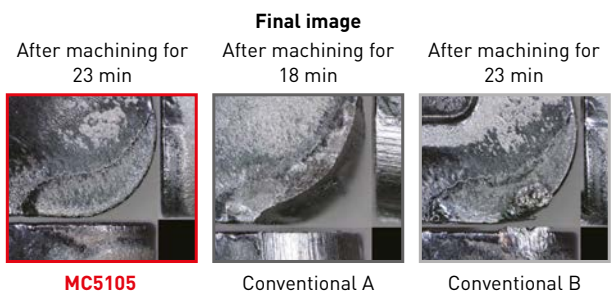
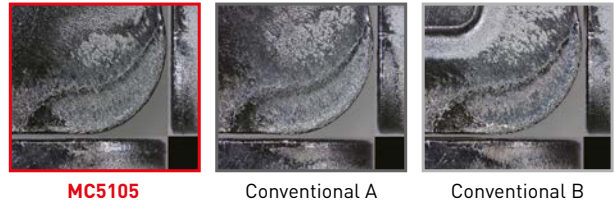
**Adhesion strength evaluation:**

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

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



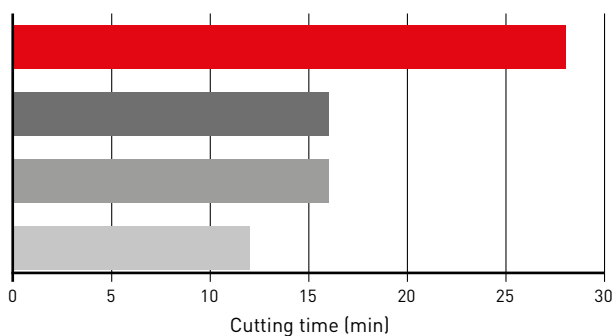
After machining for 4 minutes



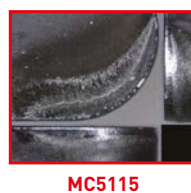
## MC5115

### COMPARISON OF WEAR RESISTANCE DURING CONTINUOUS CUTTING OF DIN GGG70

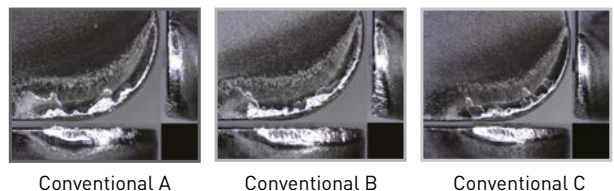
Material	DIN GGG70
Tool	CNMA120412
Vc (m/min)	250
f (mm/rev.)	0.3
ap (mm)	2.0
Coolant	Wet cutting



After machining for 16 min



After machining for 12 min

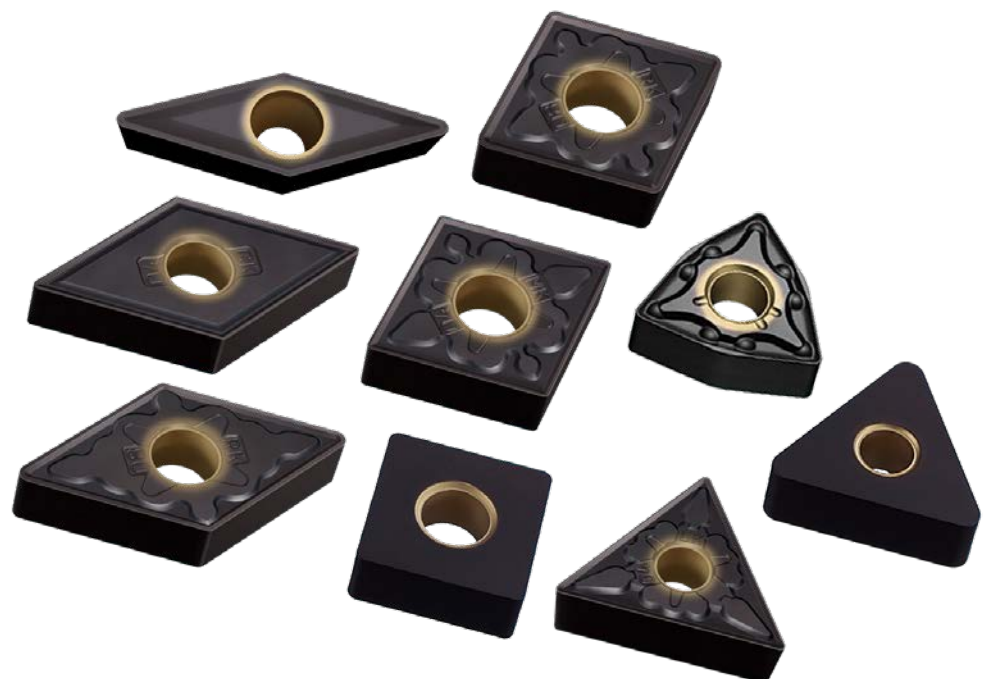
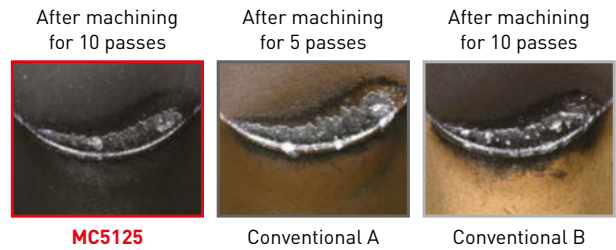
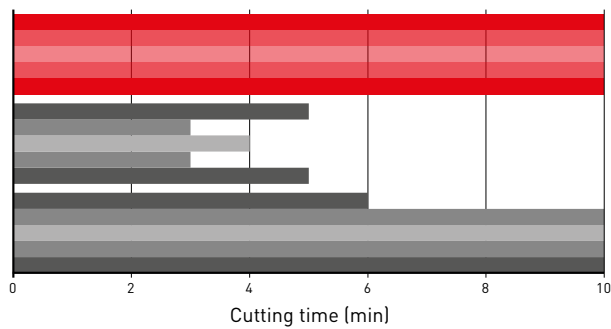


# APPLICATION EXAMPLES

## MC5125

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

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



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# VFR

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NEXT GENERATION END MILL SERIES  
FOR MACHINING HIGH HARDNESS STEELS

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Interested in more...

**B231**

[www.mhg-mediastore.net](http://www.mhg-mediastore.net)



**DIA EDGE**

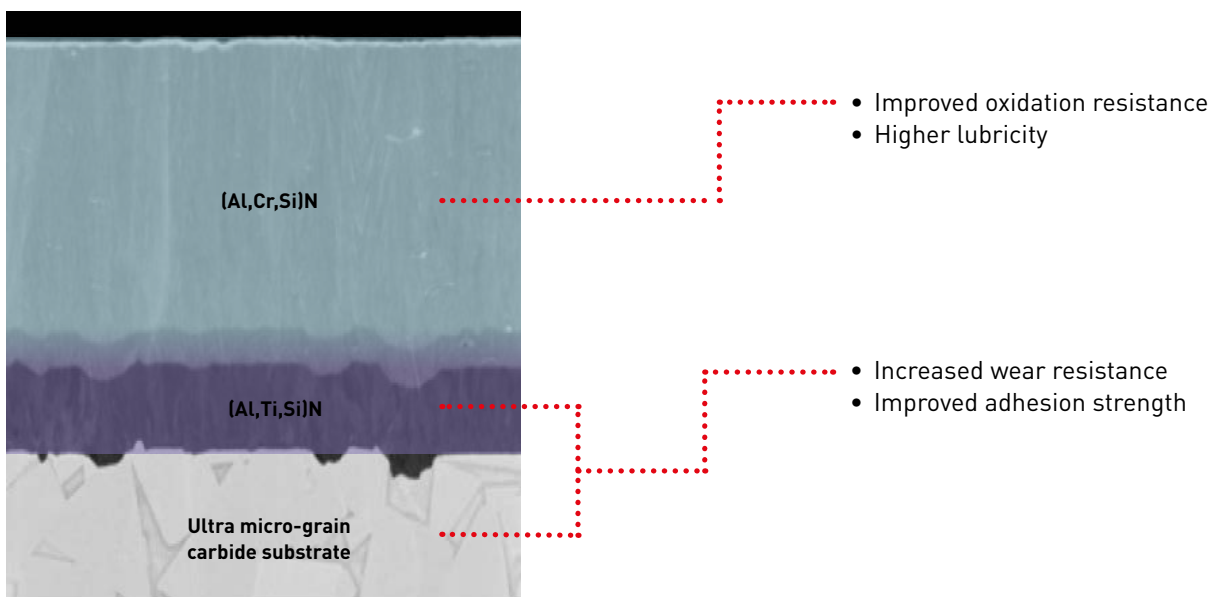


# VFR

## END MILL SERIES FOR MILLING HIGH HARDNESS STEELS

### NEW COATING TECHNOLOGY

Newly developed (AlCrSi)N multi-layer PVD coating offers higher oxidation resistance and better lubricity, together with improved wear resistance and adhesion strength. Ideal for milling extremely hard materials up to 70 HRC.



# VFR4MB

## HIGHER EFFICIENCIES FROM INCREASED FEED RATES WHEN FINISH MACHINING

SHORTER MACHINING TIMES WHILE MAINTAINING GOOD SURFACE FINISHES

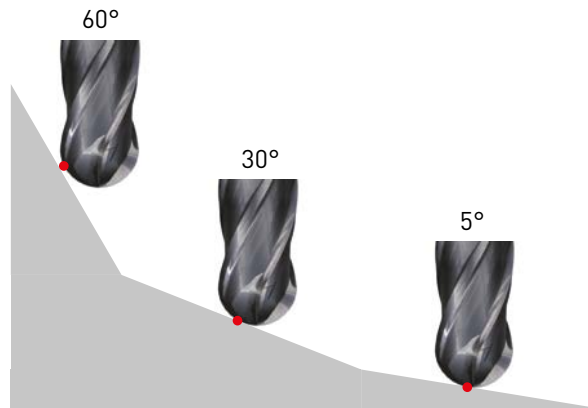


### VERSATILE 4 FLUTE DESIGN

All 4 flutes extend from the centre to the periphery. This enables high feeds at any cutting angle and negates the need to calculate different machining conditions.

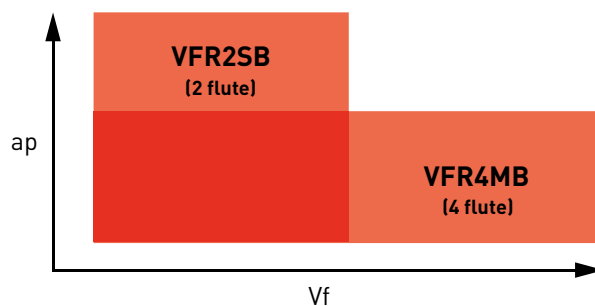


### ANGLE OF INCLINATION



### CORRECT USE OF 2 AND 4 FLUTE GEOMETRIES

2 flute geometries usually have a larger chip pocket and are better for rough machining at greater depths of cut that produce a larger volume of chips. 4-flute geometries can increase efficiency and reduce wear when used for finishing at small depths of cut. Additionally, using a 4-flute geometry is advantageous when machining harder materials at reduced depths of cut.

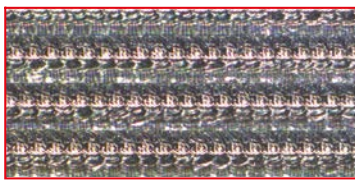


# VFR4MB

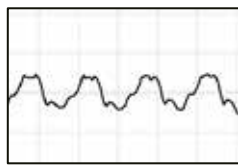
## CUTTING PERFORMANCE

### COMPARISON OF THE SURFACE FINISH - MACHINING HS 6-5-3 (62HRC)

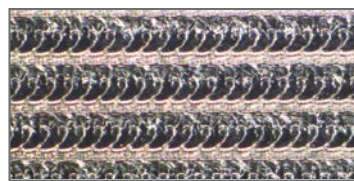
The 4-flute type is superior for high efficiency machining, but when used at the same feed rate as a 2 flute type, the quality of the finished surface can be improved.



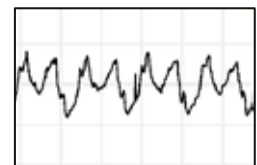
**VFR4MB**



Ra: 0.27 / Rz: 1.01



2-Flute conventional product

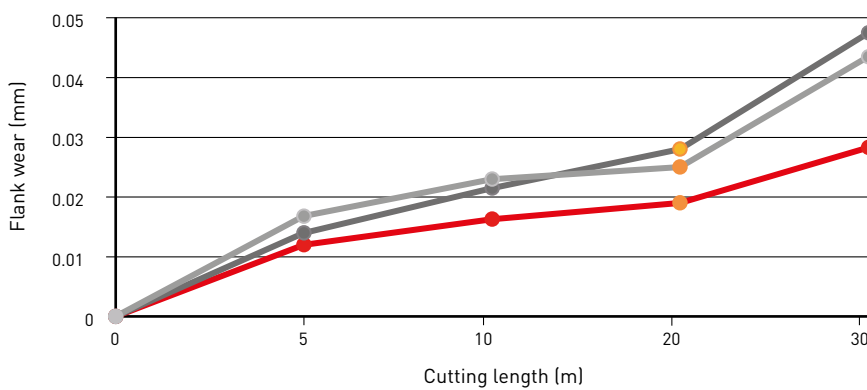


Ra: 0.32 / Rz: 1.62

Material	HS 6-5-3 (62HRC)
Tool	VFR4MBR0400 / DC=8 mm
n (min <sup>-1</sup> )	12000
f (mm/min)	3600
ap (mm)	0.2
ae (mm)	0.8
Overhang length (mm)	20
Cutting mode	Air blow Down(climb) cut

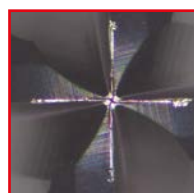
### COMPARISON OF WEAR RESISTANCE SURFACE - MACHINING PMHS7-7-7-11 (69HRC)

IMPACT MIRACLE REVOLUTION end mills demonstrate excellent wear resistance even when machining high hardness workpiece materials.

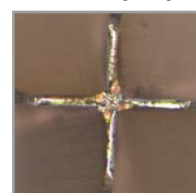


Material	PMHS7-7-7-11 (69HRC)
Tool	VFR4MBR0100 / DC=2mm
n (min <sup>-1</sup> )	16000
f (mm/min)	1200
ap (mm)	0.06
ae (mm)	0.2
Overhang length (mm)	17
Cutting mode	Air blow Down(climb) cut
Machine	Vertical MC

Taken after a cutting length of 20 m



**VFR4MB**



Conventional A



Conventional B

# VFR4MB

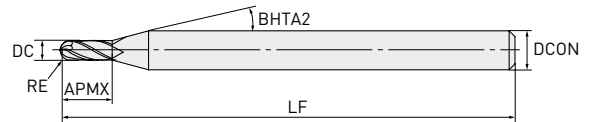


## BALL NOSE, MEDIUM CUT LENGTH, 4 FLUTE

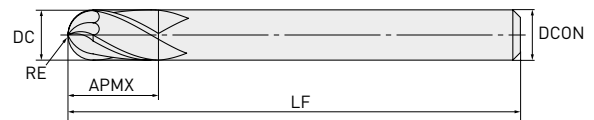
H



1



2



RE

±0.010



DCON = 6    8 ≤ DCON ≤ 10    DCON = 12

0	0	0
- 0.008	- 0.009	- 0.011

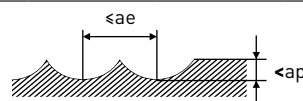
- The 4 flute geometry with a cutting edge extending to the centre achieves a long tool life and enables high efficiency machining.

Order number	Stock	RE	DC	APMX	LF	BHTA2	DCON	ZEFP	Type
VFR4MBR0050	●	0.5	1	2.5	50	15	6	4	1
VFR4MBR0100	●	1	2	6	60	15	6	4	1
VFR4MBR0150	●	1.5	3	8	70	15	6	4	1
VFR4MBR0200	●	2	4	8	70	15	6	4	1
VFR4MBR0250	●	2.5	5	12	80	15	6	4	1
VFR4MBR0300	●	3	6	12	80	—	6	4	2
VFR4MBR0400	●	4	8	14	90	—	8	4	2
VFR4MBR0500	●	5	10	18	100	—	10	4	2
VFR4MBR0600	●	6	12	22	110	—	12	4	2

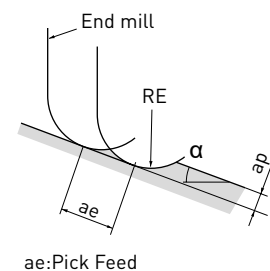
# VFR4MB

## RECOMMENDED CUTTING CONDITIONS

Material	RE	$\alpha \leq 15^\circ$		$\alpha > 15^\circ$		ap	ae
		n	f	n	f		
Hardened steel (45-55 HRC)	0.5	40000	8000	40000	3800	0.06	0.10
	1.0	40000	9600	40000	5600	0.11	0.20
	1.5	40000	12000	32000	5600	0.13	0.30
	2.0	32000	11000	24000	4700	0.15	0.40
	2.5	25000	9000	19000	3800	0.20	0.50
	3.0	21000	8400	15000	3400	0.25	0.60
	4.0	16000	6400	12000	2600	0.30	0.80
	5.0	13000	5200	9600	2200	0.50	1.00
	6.0	9000	3600	7200	1700	0.50	1.20
H Hardened steel (55-65 HRC)	0.5	40000	5600	40000	3100	0.05	0.10
	1.0	40000	8000	28000	3100	0.10	0.20
	1.5	32000	7700	19000	2900	0.12	0.30
	2.0	24000	6200	14000	2500	0.13	0.40
	2.5	19000	5300	12000	2200	0.15	0.50
	3.0	16000	4800	9600	2000	0.20	0.60
	4.0	12000	3600	7200	1600	0.20	0.80
	5.0	10000	3200	5800	1300	0.20	1.00
	6.0	7000	2200	4300	940	0.30	1.20
Hardened steel (65-70 HRC)	0.5	40000	4700	32000	1700	0.03	0.10
	1.0	24000	5000	16000	1200	0.06	0.20
	1.5	16000	4200	11000	1100	0.07	0.30
	2.0	12000	3100	8000	1000	0.08	0.40
	2.5	9600	2700	6000	780	0.08	0.50
	3.0	8000	2300	5000	780	0.09	0.60
	4.0	6000	1900	4000	620	0.09	0.80
	5.0	4800	1500	3000	550	0.10	1.00
	6.0	3600	1100	2200	400	0.10	1.20



1. If the depth of cut is shallow, the revolution and feed rate can be increased.  
Please reduce the feed rate when the surface finish is important.
2. If the rigidity of the machine or the workpiece materials installation is very low, or chattering and noise are generated, please adjust the revolution, feed rate and depth of cut accordingly.
3.  $\alpha$  is the inclination angle of the machined surface.





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# MS PLUS

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SOLID CARBIDE END MILL SERIES

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Interested in more...

**B205**

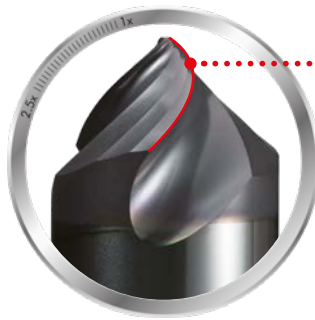
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# MP3C

## CHAMFER CUTTER, 3 FLUTE

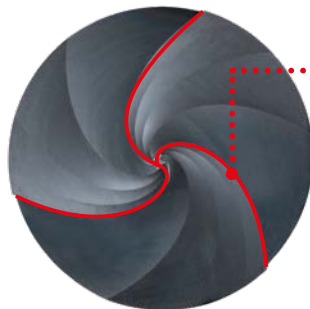
Long tool life cutter for highly efficient chamfer machining.



### SHARP HELIX FLUTE

The optimum helix angle provides great sharpness and suppresses the occurrence of burrs.

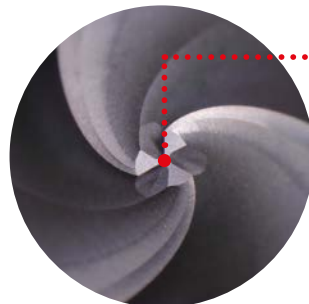
The chamfer angle is 45°.



### SPECIFICATIONS OF 3-FLUTES

High feed machining with an excellent balance between versatility and chip evacuation is achieved by adopting the 3-flute design.

High efficiency machining is realised.



### END CUTTING EDGE

The end cutting edge can also be used for V-groove machining.

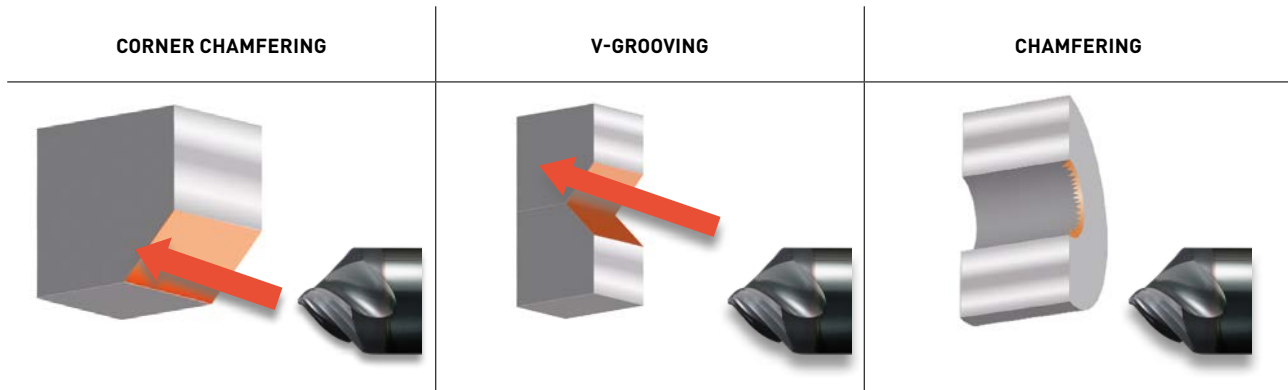


V-groove machining

# MP3C

## HIGHLY EFFECTIVE FOR CHAMFER MACHINING




The 3-flute geometry achieves high feed and extended tool life and the effects of the helical flutes suppress the occurrence of burrs when chamfer machining.



1. DLE and GKCD type drills are recommended for centering.

Material	JIS S55C
Tool (mm)	DC = $\varnothing 6$
Vc (m/min)	100
n (min <sup>-1</sup> )	5300
fz (mm/t.)	0.03
ap (mm)	1.2
Overhang length (mm)	18
Cutting mode	Air blow

### COMPARISON OF BURRS AFTER CHAMFERING WHEN MACHINING S55C MATERIAL

<b>MP3C</b> 3-helical flutes		Good surface finish
Conventional cutter 4-straight flutes		Burrs occur
Conventional cutter 2-straight flutes		Burrs occur

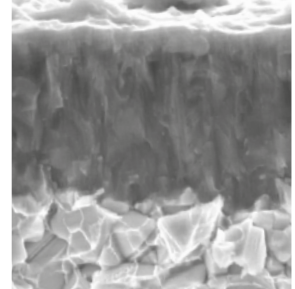
# MS PLUS

## SOLID CARBIDE END MILL SERIES FOR GENERAL MACHINING



### (Al,Ti,Cr)N MULTI-LAYER COATING (MS PLUS)

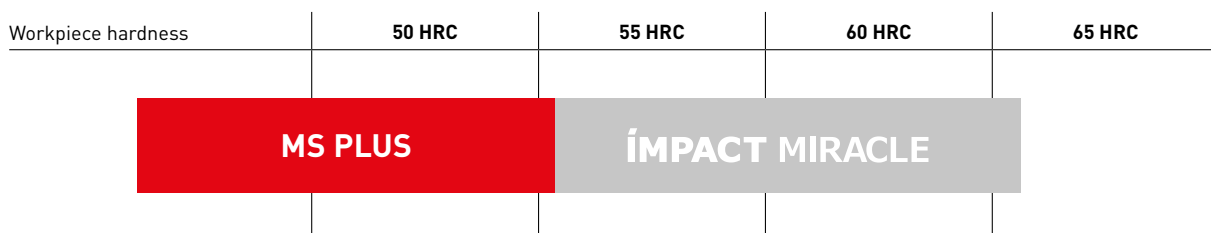
An original coating technology enables multi-layering of (Al,Ti)N and (Al,Cr)N. Providing the ability to machine a wide range of workpiece materials.



### PROPERTIES OF (Al,Ti,Cr)N MULTI-LAYER COATING (MS PLUS)

	(Al,Ti,Cr)N multilayer	(Al,Ti)N	(Al,Cr)N
Hardness (HV)	3200	2800	3100
Oxidation temperature (r)	1100	800	1100
Adhesion (N)	100	80	80

## APPLICATION RANGE



**MS PLUS PROVIDES LONG TOOL LIFE ON MATERIALS UP TO 55 HRC.**

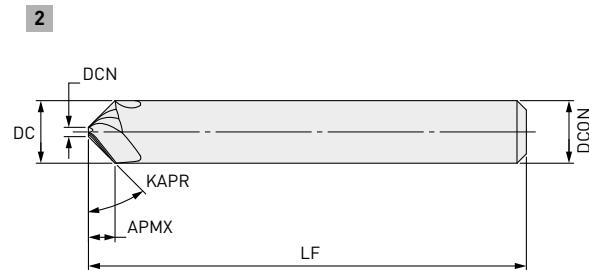
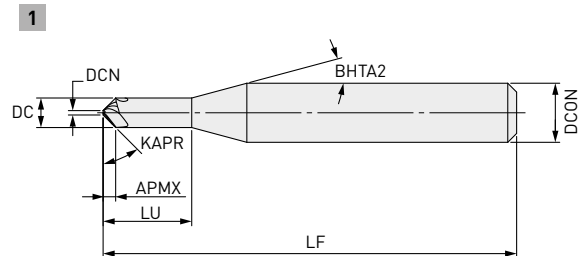
For steels harder than 55 HRC, IMPACT MIRACLE end mills are recommended.

# MP3C



## CHAMFER CUTTER, 3 FLUTE

P M S H



DCN

± 0.03



DCON=6    8&lt;DCON&lt;=10    DCON=12

0	0	0
-0.008	-0.009	-0.011

- The optimum helix angle provides great sharpness and suppresses the occurrence of burrs.
- High feed machining is achieved by adopting 3 flutes.

Order number	Stock	DC	APMX	LU	LF	DCON	ZEFP	DCN	Type
MP3CD0200	●	2	0.85	6	50	6	3	0.3	1
MP3CD0400	●	4	1.85	12	50	6	3	0.3	1
MP3CD0600	●	6	2.85	—	50	6	3	0.3	2
MP3CD0800	●	8	3.8	—	60	8	3	0.4	2
MP3CD1000	●	10	4.75	—	70	10	3	0.5	2
MP3CD1200	●	12	5.75	—	75	12	3	0.5	2

# MP3C

## RECOMMENDED CUTTING CONDITIONS

### CORNER AND HOLE CHAMFERING

Material	DC	Vc	n	Vf	Corner chamfering	Hole chamfering	
					ap		
P Carbon steel, Ductile cast iron, Non-alloy steel (C≥0.55%)	2	100	16000	1400	≤ 0.6	≤ 0.4	
	4	100	8000	720	≤ 1.2	≤ 0.8	
	6	100	5300	480	≤ 1.8	≤ 1.2	
	8	100	4000	360	≤ 2.4	≤ 1.6	
	10	100	3200	290	≤ 2.5	≤ 2.0	
	12	100	2700	240	≤ 2.5	≤ 2.4	
	Alloy steel (325HB) (38–45HRC)	2	70	11000	890	≤ 0.6	≤ 0.4
		4	70	5600	450	≤ 1.2	≤ 0.8
		6	70	3700	300	≤ 1.8	≤ 1.2
		8	70	2800	230	≤ 2.4	≤ 1.6
		10	70	2200	180	≤ 2.5	≤ 2.0
		12	70	1900	150	≤ 2.5	≤ 2.4
M Austenitic stainless, Titanium alloy	2	60	9500	680	≤ 0.6	≤ 0.4	
	4	60	4800	350	≤ 1.2	≤ 0.8	
	6	60	3200	230	≤ 1.8	≤ 1.2	
	8	60	2400	170	≤ 2.4	≤ 1.6	
	S	10	60	1900	140	≤ 2.5	≤ 2.0
		12	60	1600	120	≤ 2.5	≤ 2.4
H Hardened steel (45–55HRC)	2	50	8000	480	≤ 0.6	≤ 0.4	
	4	50	4000	240	≤ 1.2	≤ 0.8	
	6	50	2700	160	≤ 1.8	≤ 1.2	
	8	50	2000	120	≤ 2.4	≤ 1.6	
	10	50	1600	96	≤ 2.5	≤ 2.0	
	12	50	1300	78	≤ 2.5	≤ 2.4	

1. For austenitic stainless steel the use of water-soluble coolant is effective.
2. The revolution and feed rate can be increased with a smaller depth of cut.
3. Vibration may occur if the rigidity of machine or workpiece material is low.  
In this case, please reduce the revolution and feed rate proportionately.

**MP3C****V-GROOVING**

Material		DC	Vc	n	Vf	ap
P	Carbon steel, Ductile cast iron, Non-alloy steel (C>0.55%)	2	80	13000	940	≤ 1.4
		4	80	6400	460	≤ 2.8
		6	80	4200	300	≤ 4.2
		8	80	3200	230	≤ 5.6
		10	80	2500	180	≤ 7.0
		12	80	2100	150	≤ 8.4
	Alloy steel (325HB) (38-45HRC)	2	60	9500	620	≤ 1.4
		4	60	4800	310	≤ 2.8
		6	60	3200	210	≤ 4.2
		8	60	2400	160	≤ 5.6
		10	60	1900	120	≤ 7.0
		12	60	1600	100	≤ 8.4
M S	Austenitic stainless, Titanium alloy	2	50	8000	460	≤ 1.4
		4	50	4000	230	≤ 2.8
		6	50	2700	160	≤ 4.2
		8	50	2000	120	≤ 5.6
		10	50	1600	92	≤ 7.0
H	Hardened steel (45-55HRC)	12	50	1300	75	≤ 8.4
		2	40	6400	310	≤ 1.4
		4	40	3200	150	≤ 2.8
		6	40	2100	100	≤ 4.2
		8	40	1600	77	≤ 5.6
		10	40	1300	62	≤ 7.0
		12	40	1100	53	≤ 8.4

1. For austenitic stainless steel the use of water-soluble coolant is effective.
2. The revolution and feed rate can be increased with a smaller depth of cut.
3. Vibration may occur if the rigidity of machine or workpiece material is low.  
In this case, please reduce the revolution and feed rate proportionately.

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# FMAX

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FEED MAXIMUM

MILLING CUTTER FOR ULTRA EFFICIENT,  
HIGH ACCURACY FINISHING

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# FMAX

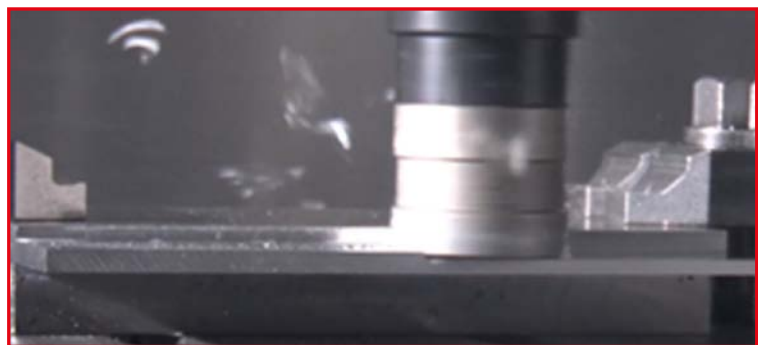
## CLASSIFICATION

Series	Use	Specification	DCON MS	Minimum			Maximum		
				DC	ZEFP	WT	DC	ZEFP	WT
FMAX	High feed finish milling cutter	Light weight, High rigidity body	mm	—	—	—	160	16	3.30
		Alloy steel and aluminium body	mm	80	14	1.08	125	24	3.39
FMAX-LW	High feed finish milling cutter	Light weight, High rigidity body	mm	100	10	1.06	125	14	1.44
	Compact and smaller machining centres	Alloy steel and aluminium body	mm		16	1.11		20	1.48
FMAX-40/50/63	High feed finish milling cutter	Alloy steel body	mm	40	4	0.24	63	10	0.67
	Small Diameter		mm		6	0.23		12	0.66
<b>NEW</b> FMAX-MB	For Low Rigidity Conditions	Coarse pitch type	mm	50	4	0.38	125	6	3.81

**NEW**

## FMAX-MB

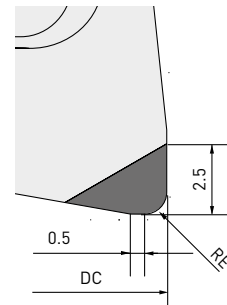
By reducing the number of teeth, finishing can be easily performed even if the machine or work material is not rigid. Tool installation costs can also be reduced while maintaining the existing insert mounting and cutting edge adjustment functions.



# INSERTS FOR SPECIAL APPLICATIONS

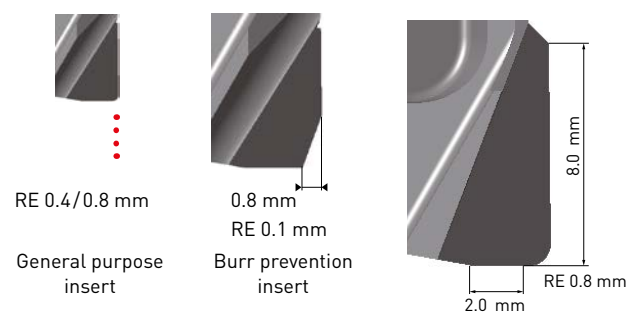
## GENERAL PURPOSE INSERTS

CBN inserts for gray cast iron reduce the length of the wiper edge and provide excellent surface finishes with low cutting forces. These inserts are disposable and therefore economical because they don't require re-grinding.



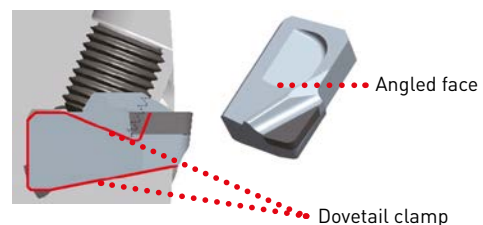
## LONG EDGE INSERTS

The long edge insert is capable of finish cutting castings with a gate. This makes it possible to reduce the number of cutter passes, thereby shortening cycle times.



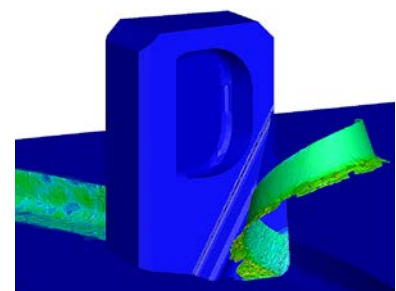
## DESIGNED FOR HIGH SPEEDS

Anti-fly dovetail clamping mechanism.



## IDEAL CHIP DISPOSAL

The body protector on the rake face forms chip shapes that are ideal for efficient dispersal. Internal coolant also aids this process. The body is compatible with all through centre coolant arbors.



Graphical representation



### BENEFITS

- Light weight, High rigidity body
- Designed for high speeds
- PCD grade for machining aluminium alloys
- New CBN grade for grey cast iron machining
- High precision

# FMAX-MB

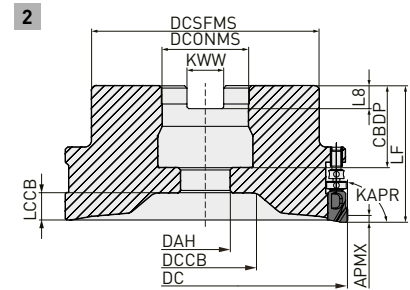
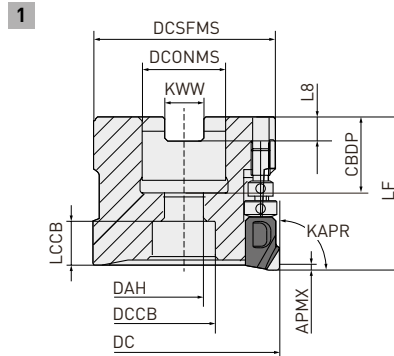


## FOR LOW RIGIDITY CONDITIONS

**K** **N**



Coarse pitch type



Right hand tool holder only

### ARBOR TYPE

Order number	Stock	DC	DCONMS	LF	RPMX	WT	ZEFP*		Type
FMAX-050A04R	●	50	22	40	30000	0.38	4	○	1
FMAX-063A04R	●	63	22	40	30000	0.70	4	○	1
FMAX-080B04RMB	●	80	27	45	24500	1.12	4	○	2
FMAX-100B04RMB	●	100	32	50	22000	2.00	4	○	2
FMAX-125B06RMB	●	125	40	60	19600	3.81	6	○	2













\* For the maximum depth of cut (APMX), please refer to the recommended cutting conditions (ap).



### MOUNTING DIMENSIONS

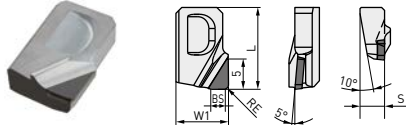
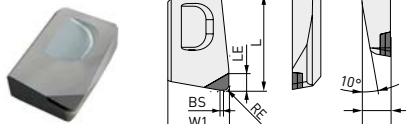
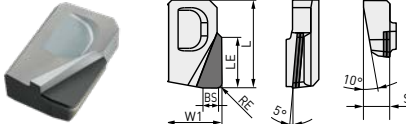
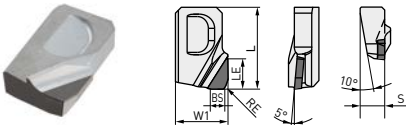
Order number	CBDP	DAH	DCCB	DCFSMS	KWW	LCCB	L8	Type
FMAX-050A04R	20	11	17	47	10.4	12	6.3	1
FMAX-063A04R	20	11	17	60	10.4	12	6.3	1
FMAX-080B04RMB	24	13	30	55	12.4	11	7	2
FMAX-100B04RMB	32	17	39	75	14.4	10	8	2
FMAX-125B06RMB	36	22	45	100	16.4	12	9	2

# SPARE PARTS

Tool holder number						
	Insert clamp screw	Micro adjustment nut	Fine pitch adjustment screw	Cutter clamp bolt	Wrench	Adjustment pin
FMAX-040 	TSS04505S	KSN2 KSN3	KSS2	HSC08030H	TKY10T	RKY25S
FMAX-050 				HSC10030H		
FMAX-063 				HSC10030H		
FMAX-080 				HSCX12030H		
FMAX-100 				HSCX16035H		
FMAX-125 				HSCX20035H		

1. Clamp torque TSS04505S = 3.5 Nm
2. Please refer to the manual included for instructions how to seat the insert and adjust the run out.






# INSERTS

Order number	MD2030	MD220	MB4120	L	LE	W1	S	BS	RE	Figure
GOER1404PXFR2	●	●		14.0	5.0	9.0	4.2	2.0	0.4	 <p>General purpose</p>
GOER1408PXFR2	●	●		14.0	5.0	9.0	4.2	2.0	0.8	
NP-GOEN1404PXSR05			★	14.0	2.5	9.0	4.2	0.5	0.4	 <p>General purpose</p>
NP-GOEN1408PXSR05			★	14.0	2.5	9.0	4.2	0.5	0.8	
GOER1408PXFR2-8		★		14.0	8.0	9.0	4.2	2.0	0.8	 <p>Long cutting edge</p>
GOER1401ZXFR2	●			14.0	5.0	9.0	4.2	2.0	0.1	
										 <p>Burr prevention</p>

1. If general-purpose inserts (RE = 0.4 mm, 0.8 mm) and burr prevention inserts are used together, they will not be able to achieve full performance.
2. Inserts of the same geometry should be used for all teeth.

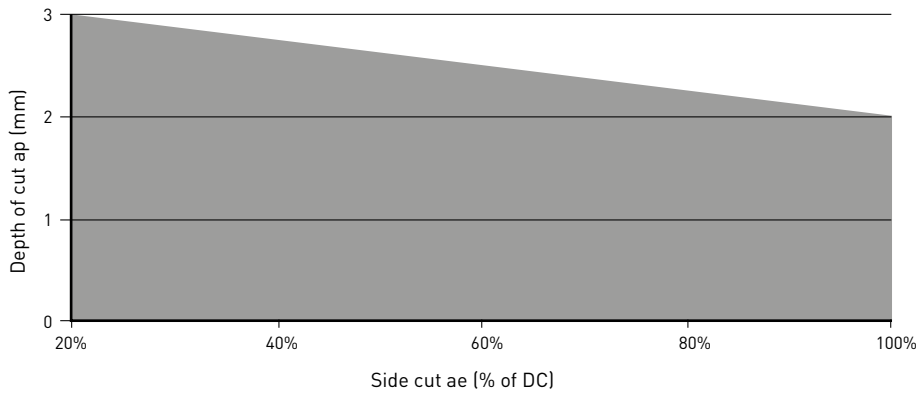
# FMAX

## RECOMMENDED CUTTING CONDITIONS

Material	Properties	Grade	Vc	ae	ap	fz	Cutting mode
K Gray cast iron	≤350MPa	MB4120	1000 (700–1300)	≤0.8 DC	≤0.5	0.07 (0.05–0.15)	
				≤0.2 DC	≤3.0 (0.5–3.0)		
	Si < 5 %	MD2030 MD220	2500 (2000–3000)	≤0.5 DC	≤2.5 (0.5–2.5)	0.08 (0.05–0.2)	
				≤0.8 DC	≤2.0 (0.5–2.0)		
N Aluminium alloy	5 % ≤ Si ≤ 10 %	MD2030 MD220	2500 (2000–3000)	≤0.2 DC	≤3.0 (0.5–3.0)	0.08 (0.05–0.2)	
				≤0.5 DC	≤2.5 (0.5–2.5)		
	10% < Si < 15 %	MD220 MD2030	600 (400–800)	≤0.8 DC	≤2.0 (0.5–2.0)	0.08 (0.05–0.2)	
				≤0.2 DC	≤3.0 (0.5–3.0)		
Si ≥ 15 %	MD220 MD2030	600 (400–800)	≤0.5 DC	≤2.5 (0.5–2.5)	0.08 (0.05–0.2)		
			≤0.8 DC	≤2.0 (0.5–2.0)			

1. Please adjust the depth of cut ap depending on the width of cut ae.
2. When using the long edge insert, please select the conditions depending on depths of cut [ap] excluding the depth of the gate.

## EFFECTIVE CHIP DISPOSAL RANGE

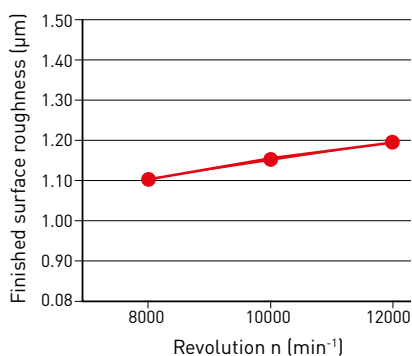


## FINISHED SURFACE ROUGHNESS (RZ) CHART IN RELATION TO REVOLUTION

Cutter body	FMAX-125B24R
Insert (Grade)	GOER1408PXFR2 (MD2030)
Workpiece	ADC12 cylinder head
n (min <sup>-1</sup> )	8.000 – 12.000
Vc (m/min)	3.140 – 4.710
fz (mm/tooth)	0.08
Vf (mm/min)	15.360 – 23.040
ap (mm)	2.0
ae (mm)	68 x 3 passes
Cutting mode	Internal through coolant 4 MPa
Machine	Horizontal machining centre

### Results

The FMAX cutter offered a smooth finishing operation with predictable wear and no burrs. Even at high revolutions the FMAX cutter achieves a top quality surface finish.



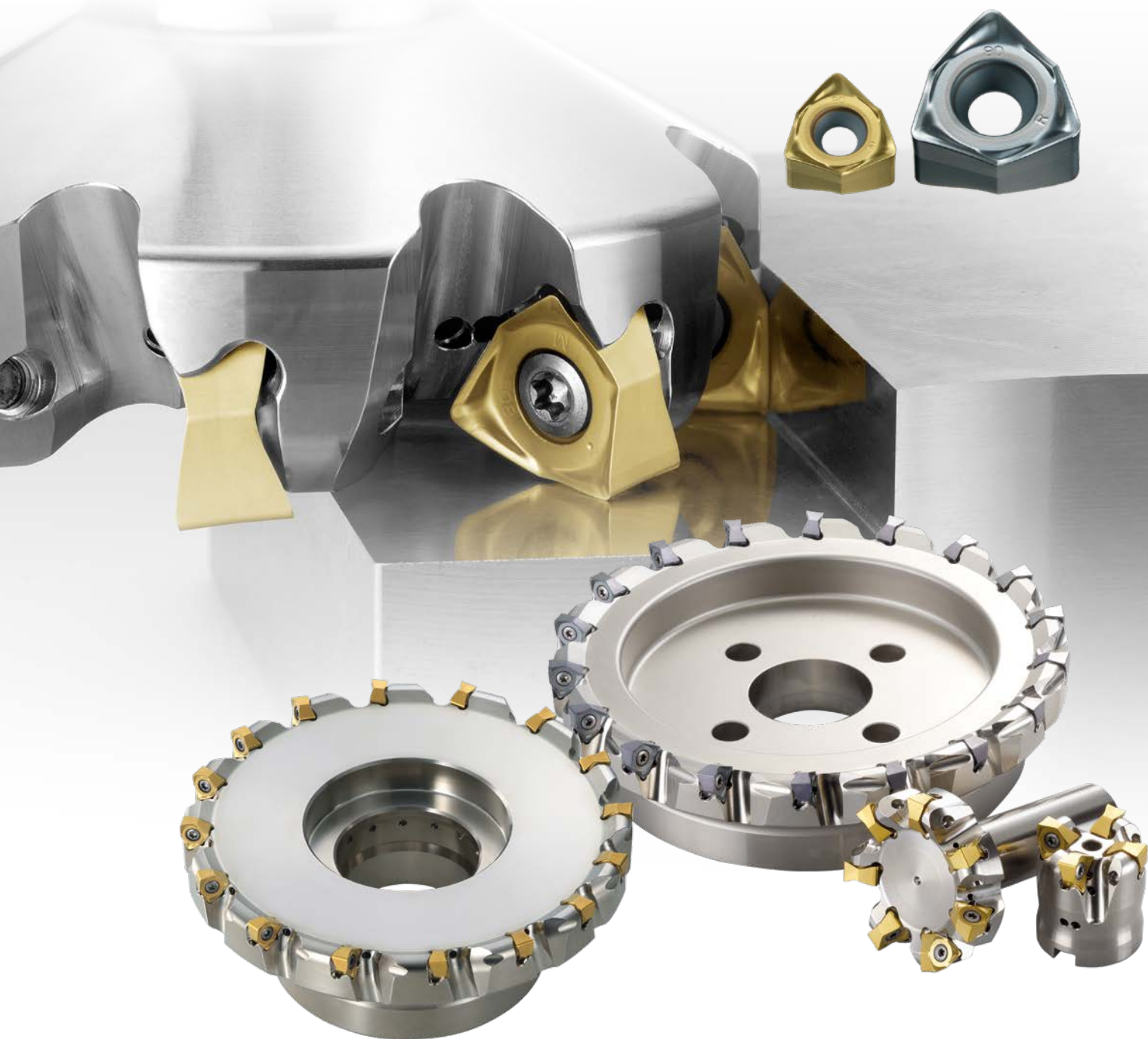
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# WWX SERIES

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A NEW LEVEL OF VERSATILITY

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The logo for DIA EDGE, featuring a stylized 'X' shape formed by two overlapping triangles, one red and one grey, positioned to the left of the text. The text 'DIA' is in white, followed by a red diamond shape, and 'EDGE' is in white. The entire logo is set against a black background.

**DIA EDGE**

# 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



### FEATURES

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



# WWX SERIES

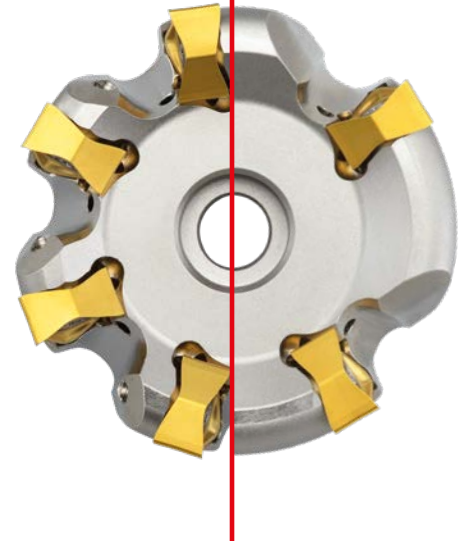
## UNIQUE PROPERTIES

### CHOICE AND AVAILABILITY

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

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

Extra fine pitch      Coarse pitch



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

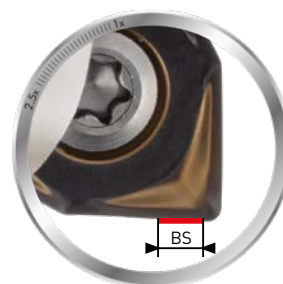
Clever positioning of the insert generates extremely low cutting resistance and helps to generate accurate 90° walls under all machining conditions.

### LOW CUTTING FORCE

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

### LARGE RADIUS OF MINOR CUTTING EDGE

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



# WWX SERIES

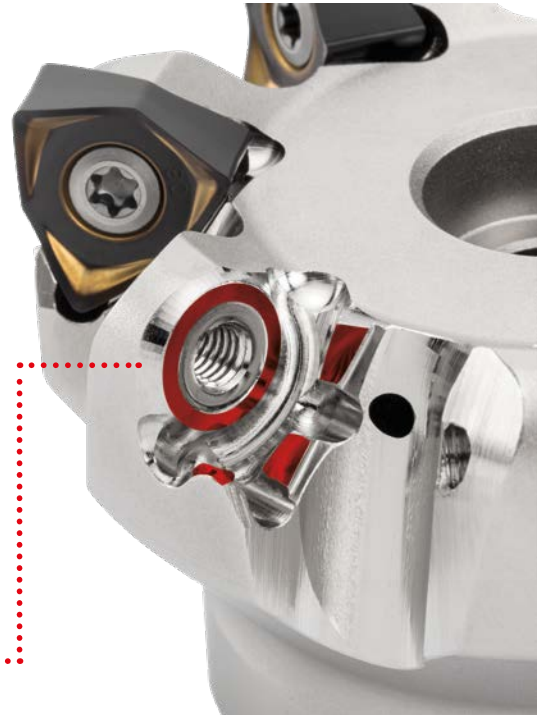
## INSERTS

### PRECISE INSERT POSITIONING IN COMBINATION WITH STRONG INSERT CLAMPING

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



Strong **X** geometry



### SHOULDER AND WALL MACHINING WITHOUT CHIP INTERFERENCE

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

#### WWX200 / WWX400



Conventional



# WWX SERIES

## GRADES AND CHIPBREAKERS

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

		<p><b>L-BREAKER</b> Recommended for machining that requires reduced cutting loads, or for machining HRSA materials.</p>
		<p><b>M-BREAKER</b> Outstanding balance of cutting edge sharpness and stability. First choice all-rounder, suitable for a variety of materials and applications.</p>
		<p><b>R-BREAKER</b> First recommendation for interrupted cutting conditions.</p>

## GRADES FOR MACHINING A WIDE RANGE OF MATERIALS

P	M	K	N	S	H
P10	M10	K10	N10	S10	H10
P20	M20	K20	N20	S20	H20
P30	M30	K30	N30	S30	H30
P40	M40	K40	N40	S40	H40

**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.

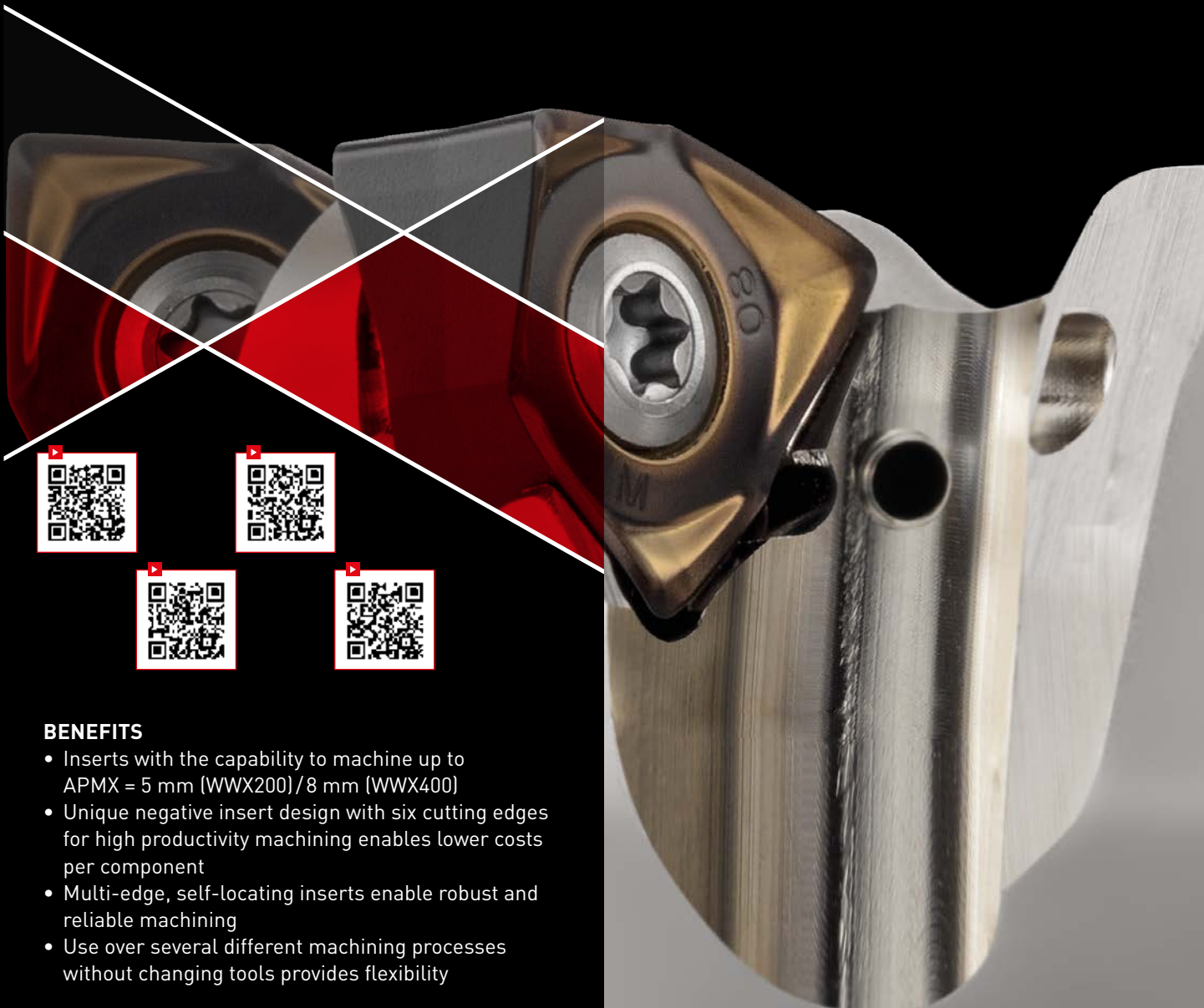
**TF15**

For general milling of aluminium.

**VP15TF**

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

# NEW LEVEL OF VERSATILITY



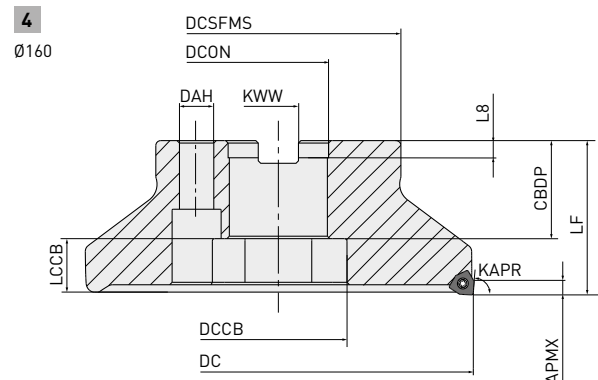
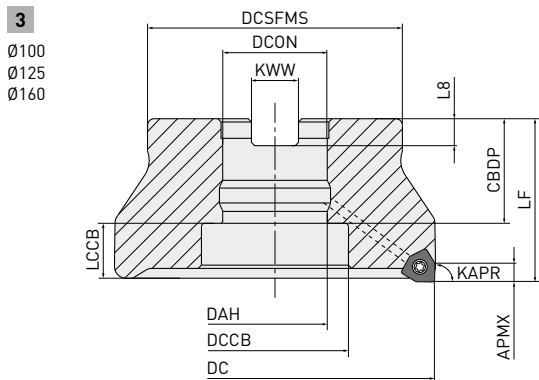
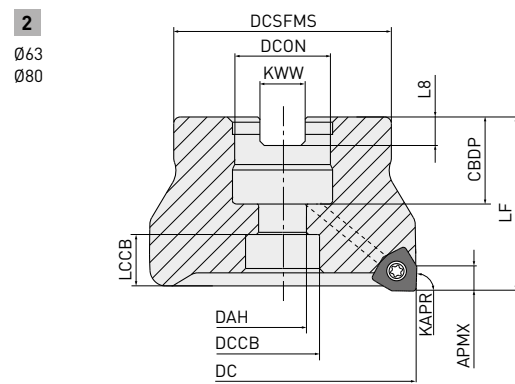
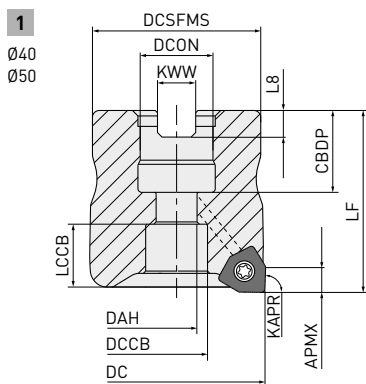
## **BENEFITS**

- 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

# WWX200



## 90° FACE MILLING CUTTER




Right hand tool holder only.

### ARBOR TYPE

Order number	Stock	APMX	DC	DCON	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

## WWX200 – 90° FACE MILLING CUTTER – ARBOR TYPE

Order number	Stock	APMX	DC	DCON	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

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 111, when ordering.
5. Please use a set bolt of the FMC type on the cutter body from 40 to 100 in diameter [DC].
6. Please use a set bolt of the FMA type on the cutter body from 125 to 160 in diameter [DC].

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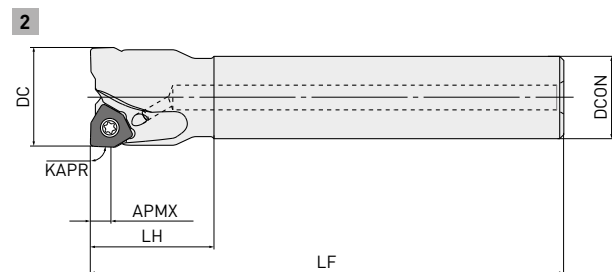
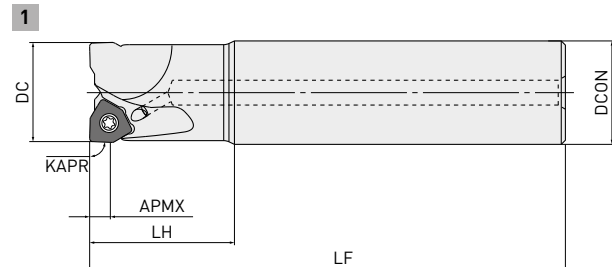
## MOUNTING DIMENSIONS

Order number	CBDP	DAH	DCCB	DCON	DCSFS	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

# WWX200



## 90° FACE MILLING CUTTER



Right hand tool holder only.

### SHANK TYPE

Order number	Stock	APMX	DC	DCON	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
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
WWX200R3203SA32S	●	5	32	32	125	26200	0.7	45	3	○	1
WWX200R3203SA32L	●	5	32	32	190	26200	1.0	90	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




# 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	Order number									
WWX200-040A <sup>○</sup> AR	HSC08025H	—	1	13	M8x1.25	33	8	5	—	—	
WWX200-050A <sup>○</sup> AR	HSC10030H	HSC10035	1	16	M10x1.5	40 (45)	10	6	—	—	
WWX200-063A <sup>○</sup> AR	HSC10030H	HSC10035	1	16	M10x1.5	40 (45)	10	6	—	—	
WWX200-080A <sup>○</sup> AR	HSC12035H	HSC12035	1	18	M12x1.75	47	12	10	—	—	
WWX200-100B <sup>○</sup> AR	MBA16033H	—	2	40	M16x2	43	10	14	6	23	
WWX200-125B <sup>○</sup> AR	MBA20040H	—	2	50	M20x2.5	54	14	17	6	27	
WWX200-160C <sup>○</sup> NR	—	—	2	50	M20x2.5	54	14	17	6	27	

1. Internal coolant is necessary with the set bolt.

## SPARE PARTS

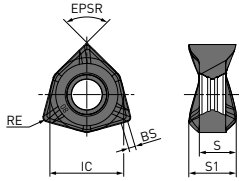
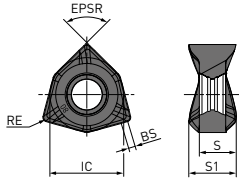
Tool holder type	 *		
	Clamp screw	Wrench (Insert)	Anti-seize lubricant
WWX200 Arbor type	TPS3R	TIP10D	MK1KS
WWX200 Shank type			

\* Clamp torque (N • m): TPS3R = 2.0



# WWX200

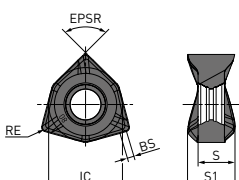
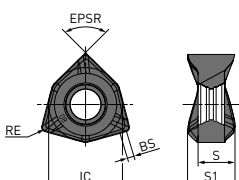
## INSERTS

Class	Honing	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	TF15	MC5020	IC	S	S1	BS	RE	Geometry
P	Steel	●	●				★								<p><b>Cutting conditions :</b>                      ●: Stable cutting ●: General cutting                      ★: Unstable cutting</p> <p><b>Honing:</b>                      E: Round F: Sharp edge S: Chamfer + round                      T: Chamfer Z: Stable</p> <p><b>Geometry</b>                      Right hand insert only.</p> 
M	Stainless steel			●			●			9.0	4.5	5.3	1.3	0.4	
K	Cast iron						★			9.0	4.5	5.3	1.3	0.8	
N	Non-ferrous material							●		9.0	5.3	6.1	1.6	0.4	
S	Heat resistant alloy, Titanium alloy				●	●				9.0	5.3	6.1	1.2	0.8	
H	Hardened steel	●						●		9.0	5.3	6.1	1.2	0.8	
<b>NEW</b>	6NGU0906040PNFR-L	G	F					●		9.0	4.5	5.3	1.3	0.4	
<b>NEW</b>	6NGU0906080PNFR-L	G	F					●		9.0	4.5	5.3	1.3	0.8	
	6NNU0906040PNER-M	M	E	●	●	●	●	●	●	9.0	5.3	6.1	1.6	0.4	
	6NNU0906080PNER-M	M	E	●	●	●	●	●	●	9.0	5.3	6.1	1.2	0.8	
	6NNU0906080PNER-R	M	E	●	●	●	●	●	●	9.0	5.3	6.1	1.2	0.8	
	6NNU0906080PNER-R	M	E	●	●	●	●	●	●	9.0	5.3	6.1	1.2	0.8	

(10 inserts in one case)

# WWX400

## INSERTS

Class	Honing	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	TF15	MC5020	IC	S	S1	BS	RE	Geometry
P	Steel	●	●				★								<p><b>Cutting conditions :</b>                      ●: Stable cutting ●: General cutting                      ★: Unstable cutting</p> <p><b>Honing:</b>                      E: Round F: Sharp edge S: Chamfer + round                      T: Chamfer Z: Stable</p> <p><b>Geometry</b>                      Right hand insert only.</p> 
M	Stainless steel			●			●			14	7	9	1.7	0.4	
K	Cast iron						★			14	7	9	1.3	0.8	
N	Non-ferrous material							●		14	7	9	1.7	0.4	
S	Heat resistant alloy, Titanium alloy				●	●				14	7	9	0.5	1.6	
H	Hardened steel	●						●		14	6.3	—	6.5	—	
	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	
	6NNU1409040PNER-M	M	E	●	●	●	●	●	●	14	7	9	1.7	0.4	
	6NNU1409080PNER-M	M	E	●	●	●	●	●	●	14	7	9	1.3	0.8	
	6NNU1409160PNER-M	M	E	●	●	●	●	●	●	14	7	9	0.5	1.6	
	6NNU1409200PNER-M	M	E	●	●	●	●	●	●	14	7	9	0.5	2.0	
	6NNU1409080PNER-R	M	E	●	●	●	●	●	●	14	7	9	1.3	0.8	
	6NNU1409160PNER-R	M	E	●	●	●	●	●	●	14	7	9	0.5	1.6	
	6NNU1409200PNER-R	M	E	●	●	●	●	●	●	14	7	9	0.5	2.0	
	2NGU1406ZNER6C-M	G	E	●				●	●	14	6.3	—	6.5	—	

(10 inserts in one case)

# WWX200 / 400

## RECOMMENDED CUTTING CONDITIONS

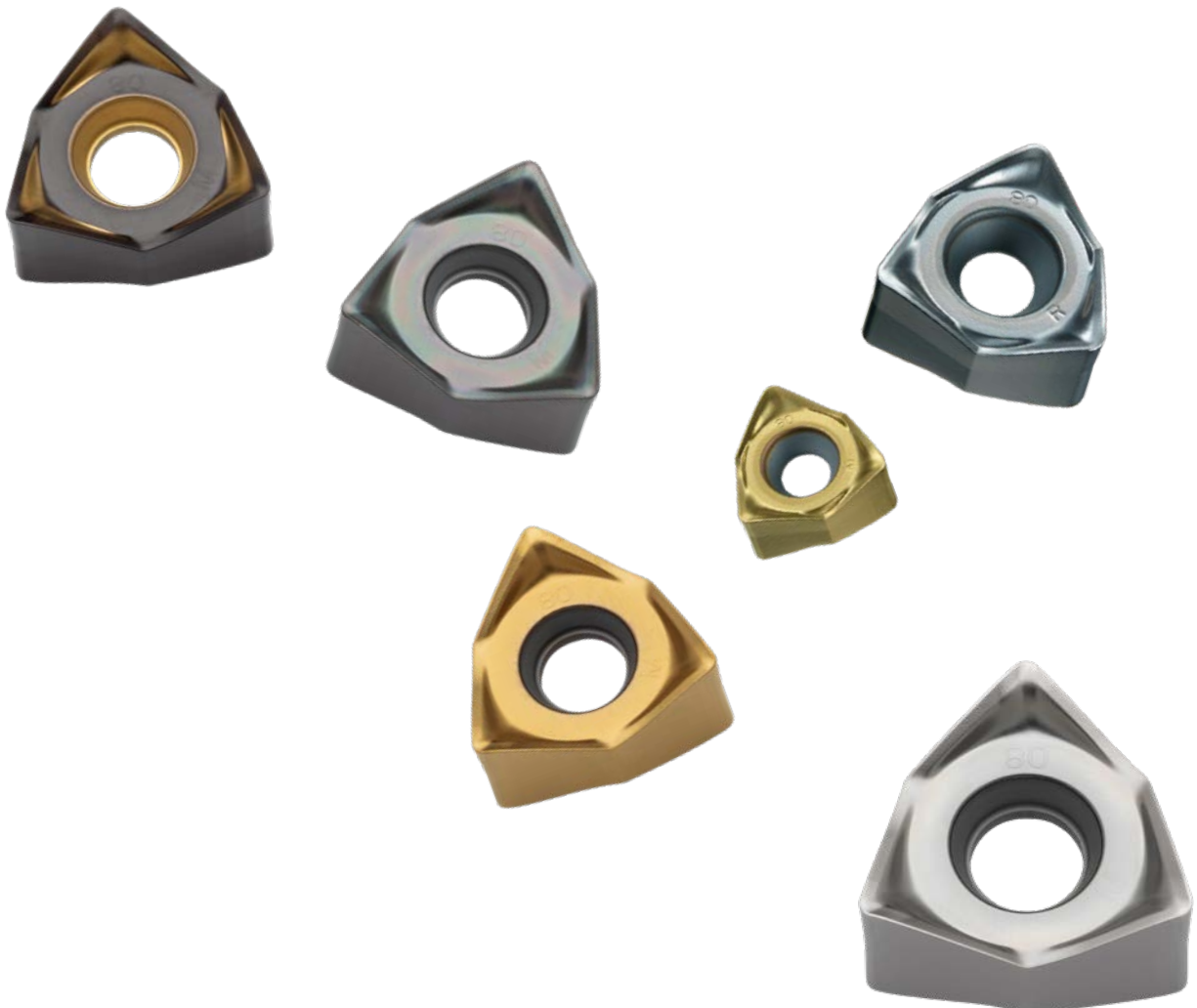
### CUTTING SPEED / DRY CUTTING

Material	Properties	Cutting conditions	Grade	Vc			
				ae ≤ 0.5 DC	ae ≤ 0.8 DC	ae = DC	
P Mild steel	≤180HB	●	MP6120	240 (200–280)	220 (180–260)	200 (160–240)	
		●	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	●	MP6120	210 (170–250)	190 (150–230)	170 (130–210)
			●	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	●	MP6120	200 (160–240)	180 (140–220)	160 (120–200)	
		●	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	●	MP7130	180 (160–200)	160 (140–180)	–	
		●	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)	–	
		●	MP7130	170 (150–190)	150 (130–170)	–	
	>200HB	●	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)	–	
		●	MP7130	180 (160–200)	160 (140–180)	–	
		●	MP7130	170 (150–190)	150 (130–170)	–	
Ferritic and martensitic Stainless steel	≤200HB	●	VP15TF	170 (150–190)	150 (130–170)	–	
		✘	MP7130	150 (130–170)	130 (110–150)	–	
		✘	VP15TF	150 (130–170)	130 (110–150)	–	
		●	MP7130	160 (140–180)	140 (120–160)	–	
Duplex stainless steel	≤280HB	●	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)	–	
		●	MP7130	140 (120–160)	–	–	
Precipitation hardening Stainless steel	<450HB	●	MP7130	130 (110–150)	–	–	
		●	VP15TF	130 (110–150)	–	–	
		✘	MP7130	110 ( 90–130)	–	–	
		✘	VP15TF	110 ( 90–130)	–	–	

# WWX200 / 400

## CUTTING SPEED / DRY CUTTING

Material	Properties	Cutting conditions	Grade	Vc		
				ae ≤ 0.5 DC	ae ≤ 0.8 DC	ae = DC
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)
K Ductile cast iron	≤450MPa	●	MC5020	220 (180–260)	200 (160–240)	180 (140–220)
		●	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	●	MC5020	180 (140–220)	160 (120–200)	140 (100–180)
		●	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)	—	—



# 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	● MP6120	150 (140-160)	130 (120-140)	120 (110-130)
			● 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	● MP6120	150 (140-160)	130 (120-140)	120 (110-130)
			● 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	● MP6120	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)	—
		>200HB	✚ VP15TF	100 ( 90-110)	80 ( 70- 90)	—
			● MP7130	130 (120-140)	110 (100-120)	—
			● MP7130	120 (110-130)	100 ( 90-110)	—
			● VP15TF	120 (110-130)	100 ( 90-110)	—
	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)	—
Duplex stainless steel	≤280HB	✚ VP15TF	100 ( 90-110)	80 ( 70- 90)	—	
		● MP7130	120 (110-130)	100 ( 90-110)	—	
		● MP7130	110 (100-120)	90 ( 80-100)	—	
		● VP15TF	110 (100-120)	90 ( 80-100)	—	
Precipitation hardening Stainless steel	<450HB	✚ MP7130	90 ( 80-100)	70 ( 60- 80)	—	
		✚ VP15TF	90 ( 80-100)	70 ( 60- 80)	—	
		● MP7130	120 (110-130)	—	—	
		● MP7130	110 (100-120)	—	—	
			● VP15TF	110 (100-120)	—	—
			✚ MP7130	90 ( 80-100)	—	—
			✚ VP15TF	90 ( 80-100)	—	—

# WWX200 / 400

## CUTTING SPEED / WET CUTTING

Material	Properties	Cutting conditions	Grade	Vc		
				ae ≤ 0.5 DC	ae ≤ 0.8 DC	ae = DC
K	Gray cast iron	≤350MPa	● 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)
K	Ductile cast iron	≤450MPa	● 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)
K	Ductile cast iron	≤800MPa	● MC5020	160 (150-170)	140(130-150)	120 (110-130)
			● 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)	—	—
H	Hardened steel	40 - 55HRC	● VP15TF	50 ( 30- 70)	—	—
			● MP6120	40 ( 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 %.

# WWX200



















































## RECOMMENDED CUTTING CONDITIONS

### DEPTH OF CUT / FEED PER TOOTH

Material	Properties	Cutting conditions	Coolant	Grade	ae ≤ 0.5 DC			ae ≤ 0.8 DC			ae = DC					
							[ap fz]			[ap fz]			[ap fz]			
Mild steel	≤180HB	●	✗	MP6120	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 2.0	0.13	[0.10–0.15]
		●	✗	MP6130	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 2.0	0.13	[0.10–0.15]
		●	✗	MP6130	R	≤ 3.0	0.16	[0.10–0.20]	R	≤ 3.0	0.16	[0.10–0.20]	—	—	—	
		✚	✗	MP6130	R	≤ 3.0	0.13	[0.10–0.15]	R	≤ 3.0	0.13	[0.10–0.15]	M	≤ 2.0	0.13	[0.10–0.15]
		✚	✗	VP15TF	R	≤ 3.0	0.13	[0.10–0.15]	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	●	✗	MP6120	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 2.0	0.13	[0.10–0.15]
		●	✗	MP6130	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 2.0	0.13	[0.10–0.15]
		●	✗	MP6130	R	≤ 3.0	0.16	[0.10–0.20]	R	≤ 3.0	0.16	[0.10–0.20]	—	—	—	
		✚	✗	MP6130	R	≤ 3.0	0.13	[0.10–0.15]	R	≤ 3.0	0.13	[0.10–0.15]	M	≤ 2.0	0.13	[0.10–0.15]
		✚	✗	VP15TF	R	≤ 3.0	0.13	[0.10–0.15]	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	●	✗	MP6120	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 2.0	0.13	[0.10–0.15]
		●	✗	MP6130	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 2.0	0.13	[0.10–0.15]
		●	✗	MP6130	R	≤ 3.0	0.16	[0.10–0.20]	R	≤ 3.0	0.16	[0.10–0.20]	—	—	—	
		✚	✗	MP6130	R	≤ 3.0	0.13	[0.10–0.15]	R	≤ 3.0	0.13	[0.10–0.15]	M	≤ 2.0	0.13	[0.10–0.15]
		✚	✗	VP15TF	R	≤ 3.0	0.13	[0.10–0.15]	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]	—	—	—	—	—	—		

# WWX200

## DEPTH OF CUT / FEED PER TOOTH

Material	Properties	Cutting conditions	Coolant	Grade	ae ≤ 0.5 DC			ae ≤ 0.8 DC			ae = DC					
																
M	Austenitic stainless steel	≤200HB	   	MP7130	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	—	—	—	
				VP15TF	M	≤ 3.0	0.16	[0.10–0.20]	M	≤ 3.0	0.16	[0.10–0.20]	—	—	—	
				MP7130	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	—	—	—	
				VP15TF	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	—	—	—	
		>200HB	  	MP7130	M	≤ 2.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	—	—	—	
				MP7130	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	—	—	—	
				MP7130	M	≤ 2.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	—	—	—	
				MP7130	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	—	—	—	
	VP15TF			M	≤ 2.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	—	—	—		
	VP15TF			M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	—	—	—		
	Ferritic and martensitic Stainless steel	≤200HB	   	MP7130	M	≤ 3.0	0.13	[0.10–0.15]	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]	—	—	—	
≤280HB		  	MP7130	M	≤ 2.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	—	—	—		
			MP7130	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	—	—	—		
			VP15TF	M	≤ 2.0	0.16	[0.10–0.20]	M	≤ 3.0	0.16	[0.10–0.20]	—	—	—		
			VP15TF	M	≤ 3.0	0.16	[0.10–0.20]	M	≤ 3.0	0.16	[0.10–0.20]	—	—	—		
Duplex stainless steel	≤280HB	   	MP7130	M	≤ 2.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	—	—	—		
			MP7130	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	—	—	—		
			VP15TF	M	≤ 2.0	0.16	[0.10–0.20]	M	≤ 3.0	0.16	[0.10–0.20]	—	—	—		
			VP15TF	M	≤ 3.0	0.16	[0.10–0.20]	M	≤ 3.0	0.16	[0.10–0.20]	—	—	—		
			MP7130	M	≤ 2.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	—	—	—		
			VP15TF	M	≤ 2.0	0.13	[0.10–0.15]	M	≤ 3.0	0.16	[0.10–0.20]	—	—	—		
Precipitation Hardening stainless steel	<450HB	   	MP7130	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	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 2.0	0.13	[0.10–0.15]
				VP15TF	R	≤ 3.0	0.16	[0.10–0.20]	R	≤ 3.0	0.16	[0.10–0.20]	—	—	—	
				MC5020	R	≤ 3.0	0.13	[0.10–0.15]	R	≤ 3.0	0.13	[0.10–0.15]	R	≤ 2.0	0.13	[0.10–0.15]
				VP15TF	R	≤ 3.0	0.13	[0.10–0.15]	R	≤ 3.0	0.13	[0.10–0.15]	R	≤ 2.0	0.13	[0.10–0.15]
	Ductile cast iron	≤800MPa	   	MC5020	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 3.0	0.13	[0.10–0.15]	M	≤ 2.0	0.13	[0.10–0.15]
				VP15TF	R	≤ 3.0	0.16	[0.10–0.20]	R	≤ 3.0	0.16	[0.10–0.20]	—	—	—	
N	Aluminium alloy	Si<5%	   	TF15	L	≤ 2.0	0.13	[0.10–0.15]	L	≤ 2.0	0.13	[0.10–0.15]	L	≤ 2.0	0.13	[0.10–0.15]
				TF15	L	≤ 3.0	0.13	[0.10–0.15]	L	≤ 3.0	0.13	[0.10–0.15]	—	—	—	
S	Titanium alloy	—	  	MP9120	M	≤ 2.0	0.10	[0.05–0.13]	—	—	—	—	—	—		
				MP9130	M	≤ 2.0	0.10	[0.05–0.13]	—	—	—	—	—	—		
	Heat resistant alloy	—	  	MP9120	M	≤ 2.0	0.10	[0.05–0.13]	—	—	—	—	—	—		
				MP9130	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	R	≤ 2.0	0.05	[0.05–0.10]	—	—	—	—	—	—		
				MP6120	R	≤ 2.0	0.05	[0.05–0.10]	—	—	—	—	—	—		

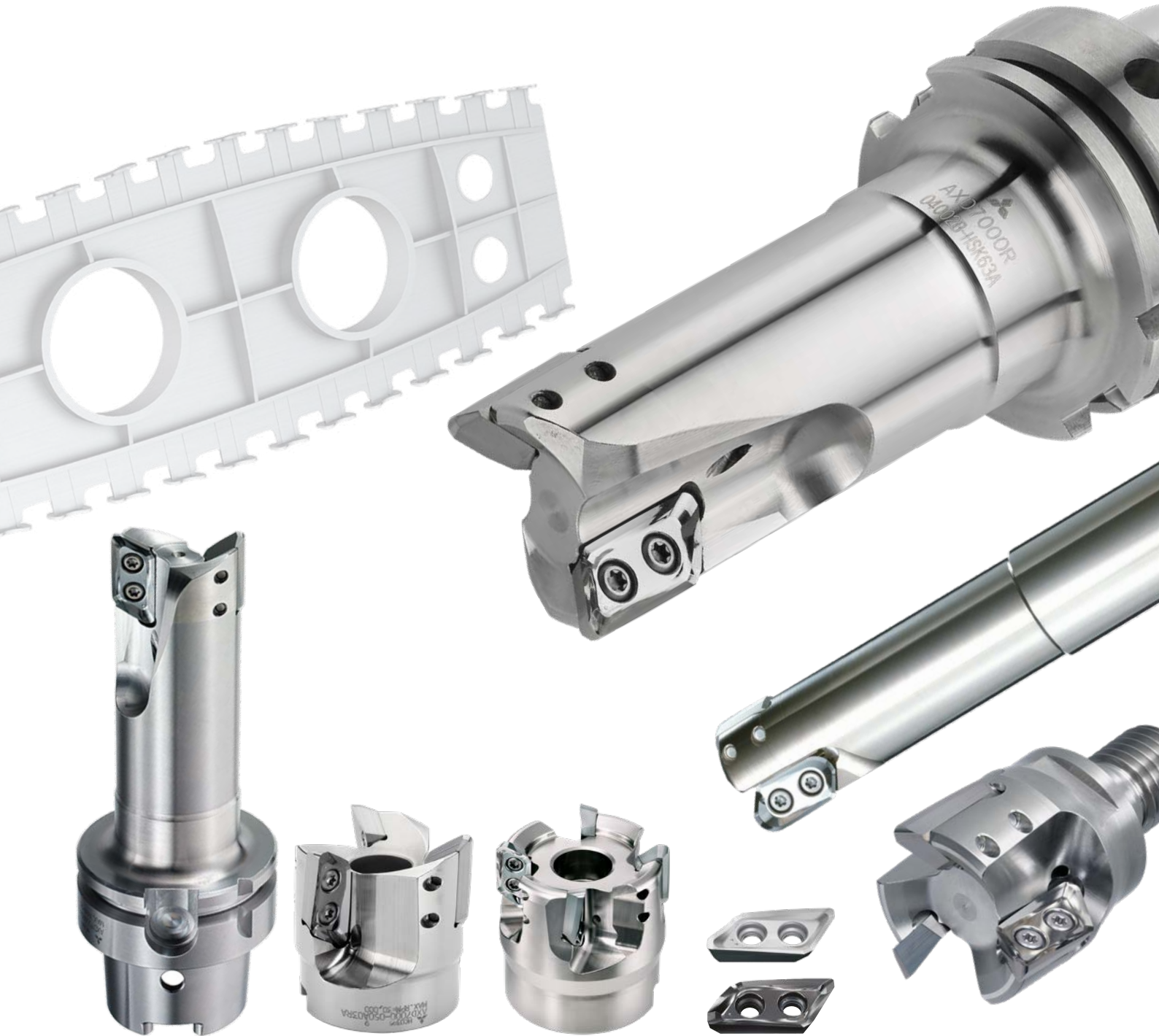
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FOR HIGH SPEED MACHINING OF ALUMINIUM  
AND TITANIUM ALLOYS

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**DIA EDGE**



# AXD4000



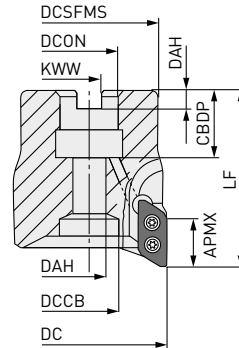
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**N** **S**



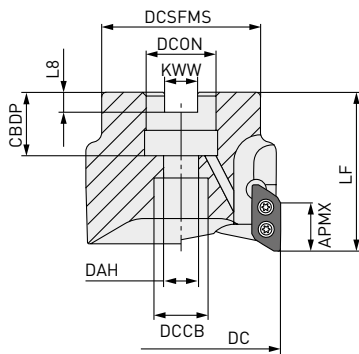
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 A.R :+14°-15°  
 R.R :+21°-+26°  
  
 T :+21°-+26°  
 I :+14°-+15°

**1**  
Ø40



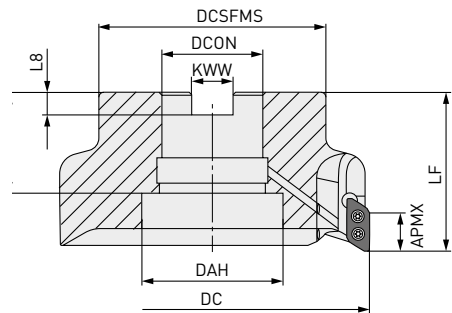
**2**

Ø50  
 Ø63  
 Ø80  
 Ø100



**3**

Ø125



Right hand tool holder only.

DC	Set bolt	Geometry	
Ø40	HFF08043H	1	
Ø50, Ø63	HSC10030H		
Ø80	12035H		2
Ø100	16040H		3
Ø125	MBA20040H	3	

Order number	Stock	APMX	DC	DCON	LF	RPMX	WT	ZEPF	Type	RE
<b>A TYPE</b>										
AXD4000-040A02RA	★	15.5	40	16	50	41000	0.3	2	1	
AXD4000-040A03RA	●	15.5	40	16	50	41000	0.3	3	1	
AXD4000-050A02RA	★	15.5	50	22	50	35000	0.4	2	2	
AXD4000-050A04RA	●	15.5	50	22	50	35000	0.4	4	2	
AXD4000A-050A04RD	●	15.5	50	22	50	34000	0.4	4	2	0.4
AXD4000-063A05RA	●	15.5	63	22	50	30000	0.6	5	2	3.2
AXD4000-080A05RA	●	15.5	80	27	50	27000	1.0	5	2	
AXD4000-100A06RA	●	15.5	100	32	63	23000	2.0	6	2	
AXD4000-125B07RA	●	15.5	125	40	63	20000	2.8	7	3	

## AXD4000 – ARBOR TYPE

Order number	Stock	APMX	DC	DCON	LF	RPMX	WT	ZEFP	Type	RE
<b>B TYPE</b>										
AXD4000-40A02RB	★	14.8	40	16	50	41000	0.3	2	1	4.0 – 5.0
AXD4000-40A03RB	●	14.8	40	16	50	41000	0.3	3	1	
AXD4000-50A02RB	★	14.8	50	22	50	35000	0.4	2	2	
AXD4000-50A04RB	●	14.8	50	22	50	35000	0.4	4	2	
AXD4000A-050A04RE	●	14.8	50	22	50	34000	0.4	4	2	
AXD4000-63A05RB	●	14.8	63	22	50	30000	0.6	5	2	
AXD4000-80A05RB	●	14.8	80	27	50	27000	1.0	5	2	
AXD4000-100A06RB	●	14.8	100	32	63	23000	2.0	6	2	
AXD4000-125B07RB	●	14.8	125	40	63	20000	2.8	7	3	

1. The maximum allowable spindle speeds 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. Note for inserts with a corner radius of 1.6 and above, as the corner radius increases the LF dimension decreases.
4. Clamp screws are important parts from the viewpoint of safety. Use clamp screws with the correct part number.  
If the spindle speed is equal to or higher than the values shown in Table 2, it is recommended to replace the clamp screws with new ones when changing inserts.



## MOUNTING DIMENSIONS

Order number	CBDP	DAH	DCSFMS	KWW	L8	DCCB
<b>A TYPE</b>						
AXD4000-040A02RA	18	8.5	34	8.4	5.6	12
AXD4000-040A03RA	18	8.5	34	8.4	5.6	12
AXD4000-050A02RA	20	11	45	10.4	6.3	17
AXD4000-050A04RA	20	11	45	10.4	6.3	17
AXD4000A-050A04RD	20	11	45	10.4	6.6	17
AXD4000-063A05RA	20	11	50	10.4	6.3	17
AXD4000-080A05RA	23	13	60	12.4	7	20
AXD4000-100A06RA	26	17	78	14.4	8	26
AXD4000-125B07RA	40	56	90	16.4	9	—
<b>B TYPE</b>						
AXD4000-40A02RB	18	8.5	34	8.4	5.6	12
AXD4000-40A03RB	18	8.5	34	8.4	5.6	12
AXD4000-50A02RB	20	11	45	10.4	6.3	17
AXD4000-50A04RB	20	11	45	10.4	6.3	17
AXD4000A-050A04RE	20	11	45	10.4	6.3	17
AXD4000-63A05RB	20	11	50	10.4	6.3	17
AXD4000-80A05RB	23	13	60	12.4	7	20
AXD4000-100A06RB	26	17	78	14.4	8	26
AXD4000-125B07RB	40	56	90	16.4	9	—

# AXD4000



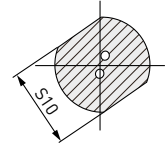
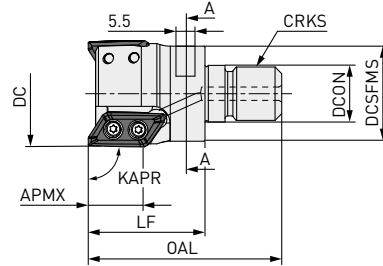
## SCREW-IN TYPE

N

S



1



A-A Section

Right hand tool holder only.

Order number	Stock	APMX	DC	DCON	LF	OAL	RPMX	WT	ZEFP	Type	RE
<b>A TYPE</b>											
AXD4000R252AM1228A	●	15.0	25	12.5	28	50	49000	0.06	2	1	
AXD4000R282AM1228A	●	15.0	28	12.5	28	50	48500	0.07	2	1	
AXD4000R322AM1635A	●	15.0	32	17.0	35	58	48000	0.15	2	1	0.4-3.2
AXD4000R353AM1635A	●	15.0	35	17.0	35	58	41000	0.15	3	1	
AXD4000R403AM1635A	●	15.0	40	17.0	35	58	38000	0.18	3	1	
<b>B TYPE</b>											
AXD4000R252AM1228B	●	14.8	25	12.5	28	50	49000	0.06	2	1	
AXD4000R282AM1228B	●	14.8	28	12.5	28	50	48500	0.07	2	1	
AXD4000R322AM1635B	●	14.8	32	17.0	35	58	48000	0.15	2	1	4.0-5.0
AXD4000R353AM1635B	●	14.8	35	17.0	35	58	41000	0.15	3	1	
AXD4000R403AM1635B	●	14.8	40	17.0	35	58	38000	0.18	3	1	

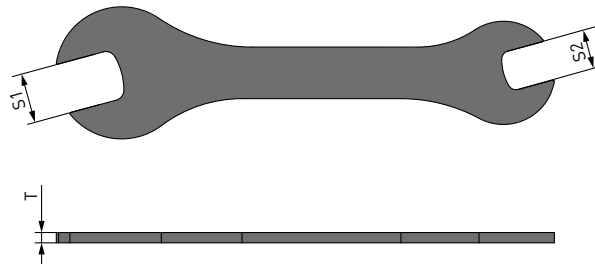
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## MOUNTING DIMENSIONS

Order number	CRKS	S10	DCON	DCSFMS
<b>A TYPE</b>				
AXD4000R252AM1228A	M12	19	12.5	23.5
AXD4000R282AM1228A	M12	19	12.5	23.5
AXD4000R322AM1635A	M16	24	17.0	28.5
AXD4000R353AM1635A	M16	24	17.0	28.5
AXD4000R403AM1635A	M16	24	17.0	28.5
<b>B TYPE</b>				
AXD4000R252AM1228B	M12	19	12.5	23.5
AXD4000R282AM1228B	M12	19	12.5	23.5
AXD4000R322AM1635B	M16	24	17.0	28.5
AXD4000R353AM1635B	M16	24	17.0	28.5
AXD4000R403AM1635B	M16	24	17.0	28.5

# AXD4000

## PARTS SOLD SEPARATELY ARBOR MOUNTING SPANNER



Order number	S1*	S2*	T
AKY1924050A	24	19	5

\* Clamp Torque (N • m) : 19 = 80, 24 = 90

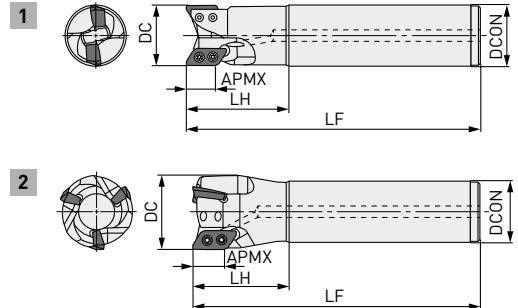
1. Due to the structure of the head, it may not be possible to use a commercially available spanner to attach the arbor.  
It is recommended to use the dedicated spanner.

# AXD4000



## SHANK TYPE

N S



Right hand tool holder only.

Order number	Stock	APMX	DC	DCON	LF	LH	RPMX	ZEFP	Type	RE
<b>A TYPE</b>										
AXD4000R201SA20SA	●	15.5	20	20	110	35	15000	1	1	
AXD4000R252SA25SA	●	15.5	25	25	125	50	49000	2	1	
AXD4000R252SA25LA	●	15.5	25	25	170	80	49000	2	1	
AXD4000R282SA25SA	●	15.5	28	25	125	50	48500	2	2	
AXD4000R282SA25ELA	●	15.5	28	25	220	50	48500	2	2	
AXD4000R322SA32SA	●	15.5	32	32	150	50	48000	2	1	0.4
AXD4000R322SA32LA	●	15.5	32	32	200	80	48000	2	1	3.2
AXD4000R352SA32SA	●	15.5	35	32	150	50	45000	2	2	
AXD4000R352SA32ELA	●	15.5	35	32	250	50	45000	2	2	
AXD4000R403SA32SA	●	15.5	40	32	150	50	41000	3	2	
AXD4000R403SA42SA	●	15.5	40	42	170	80	41000	3	1	
AXD4000R403SA32ELA	●	15.5	40	32	250	50	41000	3	2	
<b>B TYPE</b>										
AXD4000R201SA20SB	●	14.8	20	20	110	35	15000	1	1	
AXD4000R252SA25SB	●	14.8	25	25	125	50	49000	2	1	
AXD4000R252SA25LB	●	14.8	25	25	170	80	49000	2	1	
AXD4000R282SA25SB	●	14.8	28	25	125	50	48500	2	2	
AXD4000R282SA25ELB	●	14.8	28	25	220	50	48500	2	2	
AXD4000R322SA32SB	●	14.8	32	32	150	50	48000	2	1	4.0
AXD4000R322SA32LB	●	14.8	32	32	200	80	48000	2	1	5.0
AXD4000R352SA32SB	●	14.8	35	32	150	50	45000	2	2	
AXD4000R352SA32ELB	●	14.8	35	32	250	50	45000	2	2	
AXD4000R403SA32SB	●	14.8	40	32	150	50	41000	3	2	
AXD4000R403SA42SB	●	14.8	40	42	170	80	41000	3	1	
AXD4000R403SA32ELB	●	14.8	40	32	250	50	41000	3	2	

1. The maximum allowable revolutions are set to ensure tool and insert stability.

2. When using the tool at high spindle speeds, ensure that the tool and chuck are correctly balanced.



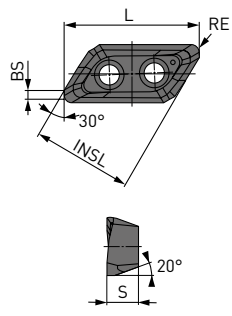

3. Note for inserts with a corner radius of 1.6 and above, as the corner radius increases the LF and LH dimensions decrease.



# AXD4000

## INSERTS




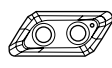
**N** Aluminium alloy ✦ ● ● **Cutting conditions:**  
**S** Titanium alloy ✦ ● ● ● ✦ **Legend:** ●: Stable cutting ●: General cutting ✦: Unstable cutting  
 Honing: F: Sharp E: Round

Order number	Class	Honing	Coated		Carbide		L	INSL	S	BS	RE	Shape	Geometry
			LC15TF	MP9120	MT2010	TF15							
XDGX175004PDFR-GL	G	F	★			●	23.0	17.5	5	1.7	0.4		
XDGX175008PDFR-GL	G	F	★			●	23.0	17.5	5	1.3	0.8		
XDGX175012PDFR-GL	G	F	★			★	23.0	17.5	5	0.9	1.2		
XDGX175016PDFR-GL	G	F	★			●	22.0	17.5	5	1.4	1.6		
XDGX175020PDFR-GL	G	F	★			●	22.0	17.5	5	1.0	2.0		
XDGX175024PDFR-GL	G	F	★			★	22.0	17.5	5	0.6	2.4		
XDGX175030PDFR-GL	G	F	★			●	21.1	17.5	5	0.8	3.0		
XDGX175032PDFR-GL	G	F	★			★	21.1	17.5	5	0.6	3.2		
XDGX175040PDFR-GL	G	F	★			●	20.0	17.5	5	0.8	4.0		
XDGX175050PDFR-GL	G	F	★			●	19.4	17.5	5	0.4	5.0		
XDGX175004PDER-GM	G	E		●			23.0	17.5	5	1.7	0.4		
XDGX175008PDER-GM	G	E		●			23.0	17.5	5	1.3	0.8		
XDGX175012PDER-GM	G	E		●			23.0	17.5	5	0.9	1.2		
XDGX175016PDER-GM	G	E		●			22.0	17.5	5	1.4	1.6		
XDGX175020PDER-GM	G	E		●			22.0	17.5	5	1.0	2.0		
XDGX175024PDER-GM	G	E		●			22.0	17.5	5	0.6	2.4		
XDGX175030PDER-GM	G	E		●			21.1	17.5	5	0.8	3.0		
XDGX175032PDER-GM	G	E		●			21.1	17.5	5	0.6	3.2		
XDGX175040PDER-GM	G	E		●			20.0	17.5	5	0.5	4.0		
XDGX175050PDER-GM	G	E		●			19.4	17.5	5	0.4	5.0		
XDGX175004PDFR-GM	G	F			●	●	23.0	17.5	5	1.7	0.4		
XDGX175008PDFR-GM	G	F			●	●	23.0	17.5	5	1.3	0.8		
XDGX175012PDFR-GM	G	F			★	●	23.0	17.5	5	0.9	1.2		
XDGX175016PDFR-GM	G	F			●	●	22.0	17.5	5	1.4	1.6		
XDGX175020PDFR-GM	G	F			●	●	22.0	17.5	5	1.0	2.0		
XDGX175024PDFR-GM	G	F			★	●	22.0	17.5	5	0.6	2.4		
XDGX175030PDFR-GM	G	F			●	●	21.1	17.5	5	0.8	3.0		
XDGX175032PDFR-GM	G	F			★	●	21.1	17.5	5	0.6	3.2		
XDGX175040PDFR-GM	G	F			●	●	20.0	17.5	5	0.5	4.0		
XDGX175050PDFR-GM	G	F			●	●	19.4	17.5	5	0.4	5.0		



## SPARE PARTS

### ARBOR TYPE / SCREW-IN TYPE / SHANK TYPE

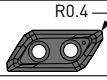
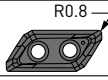
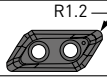
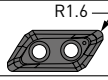
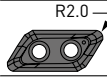
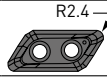
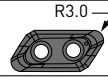
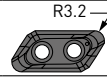
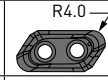
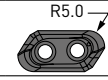
Tool holder type	 *			
	Clamp screw	Wrench	Anti-seize lubricant	Insert
AXD4000R201SA20SA	TS3SBS	TKY08D	MK1KS	XDGX1750○○ PDR-○○
AXD4000R201SA20SB				
A TYPE	TS3SB	TKY08D	MK1KS	XDGX1750○○ PDR-○○
B TYPE				
AXD4000A	TPS3SB			

\* Clamp Torque (N • m) : TS3SB(S)=1.5, TPS3SB = 3.0

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


# AXD4000

## HOLDER AND INSERT CORNER RADIUS COMBINATION


	A Type holder								B Type holder	
	AXD4000-○○○○○○○○A AXD4000R○○○○○○○○A								AXD4000-○○○○○○○○B AXD4000R○○○○○○○○B	
Applicable insert corner R (RE)										
	XDGX 175004PD-R-○	XDGX 175008PD-R-○	XDGX 175012PD-R-○	XDGX 175016PD-R-○	XDGX 175020PD-R-○	XDGX 175024PD-R-○	XDGX 175030PD-R-○	XDGX 175032PD-R-○	XDGX 175040PD-R-○	XDGX 175050PD-R-○

1. Note there is no compatibility between an insert for an A type holder and for a B type holder.

## RECOMMENDED CUTTING CONDITIONS


Material	Properties	Grade		Vc	ae	ap	fz					
							DC					
							Ø20	Ø25-Ø28	Ø32-Ø35	Ø40	Ø50-Ø125	
Aluminium alloy [A6061, A7075]	Si<5%	TF15 LC15TF	GL	1000 (200-3000)	<0.25 DC	<5	<0.05	<0.25	<0.25	<0.25	<0.25	
						<10	<0.05	<0.2	<0.2	<0.2	<0.2	
						<14.5	<0.05	<0.15	<0.15	<0.15	<0.15	
						<0.5 DC	<5	<0.05	<0.25	<0.25	<0.25	<0.25
						<10	—	<0.2	<0.2	<0.2	<0.2	
						<14.5	—	<0.15	<0.15	<0.15	<0.15	
						<0.75 DC	<5	<0.05	<0.25	<0.25	<0.25	<0.25
						<10	—	<0.2	<0.2	<0.2	<0.2	
						<14.5	—	<0.15	<0.15	<0.15	<0.15	
						DC	<5	<0.05	<0.25	<0.25	<0.25	<0.25
						<10	—	—	—	—	—	
						<14.5	—	—	—	—	—	
Aluminium alloy [A6061, A7075]	Si<5%	TF15 MP9120	GM	1000 (200-3000)	<0.25 DC	<5	<0.05	<0.35	<0.35	<0.4	<0.4	
						<10	<0.05	<0.3	<0.3	<0.35	<0.35	
						<14.5	<0.05	<0.25	<0.25	<0.3	<0.3	
						<0.5 DC	<5	<0.05	<0.35	<0.35	<0.35	<0.4
						<10	—	<0.3	<0.3	<0.3	<0.35	
						<14.5	—	<0.2	<0.25	<0.25	<0.3	
						<0.75 DC	<5	<0.05	<0.3	<0.3	<0.3	<0.35
						<10	—	<0.25	<0.25	<0.25	<0.3	
						<14.5	—	<0.2	<0.2	<0.2	<0.25	
						DC	<5	<0.05	<0.25	<0.25	<0.3	<0.35
						<10	—	—	—	—	—	
						<14.5	—	—	—	—	—	
Aluminium alloy [AC4B] Aluminium alloy [ADC12, A390]	5%≤Si≤10% Si>10%	MP9120	GM	200 (200-3000)	<0.25 DC	<5	<0.05	<0.35	<0.35	<0.4	<0.4	
						<10	<0.05	<0.3	<0.3	<0.35	<0.35	
						<14.5	<0.05	<0.25	<0.25	<0.3	<0.3	
						<0.5 DC	<5	<0.05	<0.35	<0.35	<0.35	<0.4
						<10	—	<0.3	<0.3	<0.3	<0.35	
						<14.5	—	<0.2	<0.25	<0.25	<0.3	
						<0.75 DC	<5	<0.05	<0.3	<0.3	<0.3	<0.35
						<10	—	<0.25	<0.25	<0.25	<0.3	
						<14.5	—	<0.2	<0.2	<0.2	<0.25	
						DC	<5	<0.05	<0.25	<0.25	<0.3	<0.35
						<10	—	—	—	—	—	
						<14.5	—	—	—	—	—	

# AXD4000

Material	Properties	Grade		Vc	ae	ap	fz						
							DC						
							Ø20	Ø25-Ø28	Ø32-Ø35	Ø40	Ø50-Ø125		
S Titanium alloy (Ti6Al4V)		MP9120	GM	40 (30-60)			<0.25 DC	<5	<0.05	<0.1	<0.1	<0.1	<0.1
								<10	<0.05	<0.1	<0.1	<0.1	<0.1
								<14.5	<0.05	<0.1	<0.1	<0.1	<0.1
							<0.5 DC	<5	<0.05	<0.08	<0.1	<0.1	<0.1
								<10	—	<0.08	<0.1	<0.1	<0.1
								<14.5	—	<0.08	<0.1	<0.1	<0.1
							<0.75 DC	<5	<0.05	<0.05	<0.08	<0.1	<0.1
								<10	—	<0.05	<0.08	<0.1	<0.1
								<14.5	—	<0.05	<0.08	<0.1	<0.1
							DC	<5	<0.05	<0.05	<0.05	<0.05	<0.05
								<10	—	—	—	—	—
								<14.5	—	—	—	—	—

- The cutting conditions above are determined based on high workpiece and machine rigidity, where no vibration occurred. If vibration occurs, make adjustments according to the machining conditions.
- Note, vibration may occur in the following conditions.
  - When using long tool overhang.
  - When pocket machining corner radii.
  - When the workpiece is not rigid or has poor clamping rigidity or when the machine rigidity is low, vibrations can occur easily. If so, reduce cutting conditions such as width and depth of cut and feed per tooth.

# AXD4000A

Material	Properties	Grade		Vc	ae	ap	fz			
							DC			
							Ø50			
N Aluminium alloy (A7050, A7075, A2024, A6061)	Si<5%	MT2010 TF15 MP9120	GM	4000 (200-5000)			≤5	≤ 0.35		
							≤0.5 D1	≤10	≤ 0.30	
								≤14.5	≤ 0.25	
								≤5	≤ 0.30	
		TF15 LC15TF	GL	4000 (200-5000)				≤0.75 D1	≤10	≤ 0.25
									≤14.5	≤ 0.20
								D1	≤5	≤ 0.30
									≤5	≤ 0.20
D1		≤0.75 D1		4000 (200-5000)			≤10	≤ 0.15		
							≤14.5	≤ 0.10		
						D1	≤5	≤ 0.20		

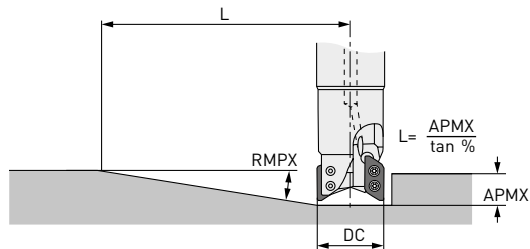
- The above cutting conditions are determined based on high workpiece materials and machine rigidity, where no vibration occurred. If vibrations occur make adjustments according to the machining conditions.
- Note, vibrations may occur in the following conditions.
  - When using a long tool overhang.
  - When pocket machining corner radii.
  - When the workpiece material has poor clamping rigidity or when the machine rigidity or workpiece material rigidity is low, vibrations can occur easily, if so, reduce cutting conditions such as width and depth of cut and feed per tooth.



# AXD4000

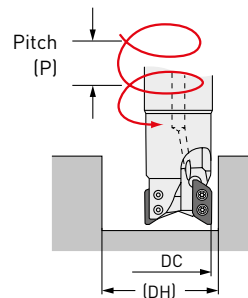
## RAMPING/HELICAL MILLING

**1** Ramping

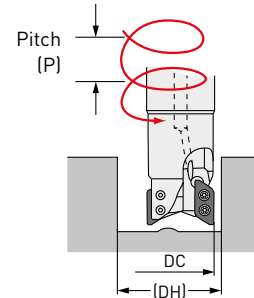


**2** Helical milling

**2.1** Blind holes, Flat bottom



**2.2** Through holes



DC	RE	<b>1</b>		<b>2.1</b>				<b>2.2</b>	
		RMPX	L*1	DH max.	P max.	DH min.	P max.	DH min.	P max.
<b>A TYPE</b>									
20	0.4-1.2	20.7	42	37.1 *2	14	36.1	14	22	2
	1.6-2.4	19.9	43	34.7 *3	13	34.6	13	22	2
	3.0-3.2	18.9	46	33.1 *4	12	33.3	12	22	1
25	0.4-1.2	23.1	37	47.1 *2	14	46	14	32	8
	1.6-2.4	22.0	39	44.7 *3	13	44.4	13	32	8
	3.0-3.2	18.7	46	43.1 *4	12	43	12	32	7
28	0.4-1.2	19.2	45	53.1 *2	14	52	14	36	8
	1.6-2.4	18.5	47	50.7 *3	13	50.4	13	36	8
	3.0-3.2	16.7	52	49.1 *4	12	48.9	12	36	7
32	0.4-1.2	15.4	57	61.1 *2	14	59.9	14	46	11
	1.6-2.4	14.7	60	58.7 *3	13	58.3	13	46	11
	3.0-3.2	13.8	64	57.1 *4	12	56.8	12	46	10
35	0.4-1.2	13.4	66	67.1 *2	14	65.8	14	50	11
	1.6-2.4	12.7	69	64.7 *3	13	64.3	13	50	10
	3.0-3.2	11.8	75	63.1 *4	12	62.8	12	50	9
40	0.4-1.2	11.1	80	76.7 *2	14	75.9	14	62	13
	1.6-2.4	10.4	85	74.3 *3	13	74.2	13	62	12
	3.0-3.2	9.7	91	72.7 *4	12	72.7	12	62	11
50	0.4-1.2	8.2	108	96.7 *2	14	95.6	14	81	14
	1.6-2.4	7.6	117	94.3 *3	13	94	13	81	13
	3.0-3.2	6.9	129	92.7 *4	12	92.4	12	81	11
63	0.4-1.2	6.1	146	122.7 *2	14	121.6	14	107	14
	1.6-2.4	5.6	159	120.3 *3	13	119.9	13	107	13
	3.0-3.2	5.2	171	118.7 *4	12	118.4	12	107	12
80	0.4-1.2	4.6	193	156.7 *2	14	155.6	14	141	14
	1.6-2.4	4.2	212	154.3 *3	13	153.9	13	141	13
	3.0-3.2	3.8	234	152.7 *4	12	152.4	12	141	12
100	0.4-1.2	3.5	254	196.7 *2	14	195.5	14	181	14
	1.6-2.4	3.2	278	194.3 *3	13	193.9	13	181	13
	3.0-3.2	2.9	306	192.7 *4	12	192.3	12	181	12
125	0.4-1.2	2.7	329	246.7 *2	14	245.5	14	231	14
	1.6-2.4	2.5	356	244.3 *3	13	243.8	13	231	13
	3.0-3.2	2.3	386	242.7 *4	12	242.3	12	231	12

## AXD4000 – RAMPING / HELICAL MILLING

DC	RE	1		2.1				2.2	
		RMPX	L*1	DH max.	P max.	DH min.	P max.	DH min.	P max.
<b>B TYPE</b>									
20	4	17.5	47	31.5	10	31.8	10	22	1
	5	16.6	71	29.5	6	31.1	7	22	1
25	4	15.1	55	41.5	10	41.4	10	32	5
	5	13.7	61	39.5	9	40.6	9	32	5
28	4	14.1	59	47.5	10	47.2	10	36	6
	5	13	65	45.5	9	46.4	9	36	5
32	4	12.7	66	55.5	10	55.1	10	46	9
	5	12	70	53.5	9	54.3	9	46	8
35	4	10.8	78	61.5	10	61	10	50	8
	5	10.2	83	59.5	9	60.2	9	50	8
40	4	8.8	96	71.1	10	70.9	10	62	10
	5	8.2	103	69.1	9	70.1	9	62	9
50	4	6.3	135	91.1	10	90.6	10	81	10
	5	5.8	146	89.1	9	89.8	9	81	9
63	4	4.6	184	117.1	10	116.6	10	107	10
	5	4.2	202	115.1	9	115.7	9	107	9
80	4	3.4	250	151.1	10	150.5	10	141	10
	5	3.1	274	149.1	9	149.6	9	141	9
100	4	2.6	326	191.1	10	190.5	10	181	10
	5	2.4	354	189.1	9	189.6	9	181	9
125	4	2	424	241.1	10	240.5	10	231	10
	5	1.8	471	239.1	9	239.6	9	231	9

1. The recommended ramping feed is 0.05 mm/tooth or under.

\*1 Using the maximum ramping angle, the distance to reach the maximum depth of cut is as follows:

$L = (\text{maximum depth of cut APMX} / \tan \%)$ . Maximum depth of cut A type is 15.5 mm, B type is 14.8 mm.

\*2 Corner radius of 1.2 mm. For other corner radii, use the following formula.

$\{(DC) - (RE) - 0.25\} \times 2$

\*3 Corner radius of 2.4 mm. For other corner radii, use the following formula.

$\{(DC) - (RE) - 0.25\} \times 2$

\*4 Corner radius of 3.2 mm. For other corner radii, use the following formula.

$\{(DC) - (RE) - 0.25\} \times 2$

## MAX. DRILLING DEPTH

	RE	DC					
		Ø20	Ø25	Ø28	Ø32	Ø35	Ø40-Ø125
A type	0.4	5.3	5.2	5.2	5.2	5.3	5.3
	0.8	5.3	5.2	5.2	5.2	5.3	5.3
	1.2	5.3	5.2	5.2	5.2	5.3	5.3
	1.6	4.8	4.6	4.7	4.7	4.9	4.8
	2.0	4.8	4.6	4.7	4.7	4.9	4.8
	2.4	4.8	4.6	4.7	4.7	4.9	4.8
	3.0	4.3	3.7	4.2	4.2	4.4	4.4
	3.2	4.3	3.7	4.2	4.2	4.4	4.4
B type	4.0	3.7	2.7	3.7	3.6	3.8	3.8
	5.0	3.4	2.3	3.3	3.3	3.5	3.5

**NEW**

# DFAS

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



**NEW**



Interested in more...

**B233**

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# DFAS

## FOR MACHINING STAINLESS STEEL AND TITANIUM



### OPTIMISED CHIP CONTROL AND LOAD REDUCTION

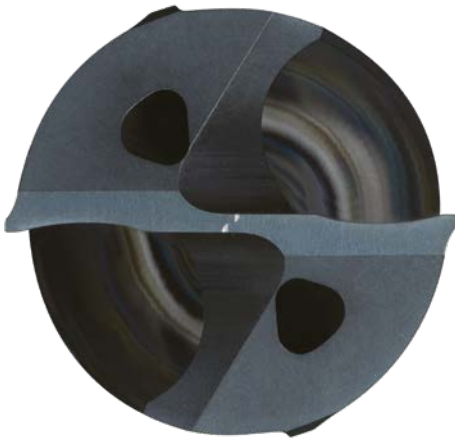
The thinned centre cutting edge generates a low resistance and thereby creates an optimum chip geometry for a smoother chip flow.

### 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 of the cutting edge, and by adopting a sharp cutting edge over the cutting edge, burrs are suppressed.



DFAS



Conventional

## COATED GRADE DP102A

DP102A is a PVD coated cemented carbide grade specialized 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



Al-Cr-N Based PVD Coating

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

100 holes



DFAS



Conventional

500 holes



DFAS



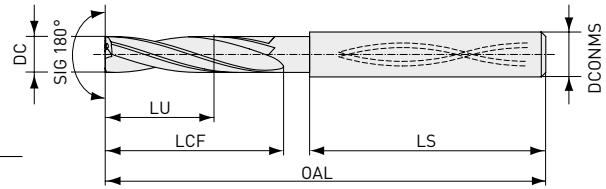
Conventional

# DFAS



## SOLID CARBIDE FLAT BOTTOM DRILLS

**P M K N**



	DC=3	3 < DC<6	6 < DC<10	10 < DC<14
	0 - 0.014	0 - 0.018	0 - 0.022	0 - 0.027
	4 < DCON<6	6 < DCON<10	10 < DCON<14	
	0 - 0.008	0 - 0.009	0 - 0.011	

Order number	DP102A	DC	L/D	LU	LCF	LS	OAL	DCON
DFAS0300X03S040	●	3.0	3	9.0	14	39.0	55	4
DFAS0310X03S040	★	3.1	3	9.3	16	37.0	55	4
DFAS0320X03S040	★	3.2	3	9.6	16	37.0	55	4
DFAS0330X03S040	●	3.3	3	9.9	16	37.0	55	4
DFAS0340X03S040	★	3.4	3	10.2	16	37.0	55	4
DFAS0350X03S040	●	3.5	3	10.5	16	37.0	55	4
DFAS0360X03S040	★	3.6	3	10.8	18	35.0	55	4
DFAS0370X03S040	★	3.7	3	11.1	18	35.0	55	4
DFAS0380X03S040	★	3.8	3	11.4	18	35.0	55	4
DFAS0390X03S040	★	3.9	3	11.7	18	35.0	55	4
DFAS0400X03S040	●	4.0	3	12.0	18	35.0	55	4
DFAS0410X03S050	★	4.1	3	12.3	20	40.0	62	5
DFAS0420X03S050	●	4.2	3	12.6	20	40.0	62	5
DFAS0430X03S050	★	4.3	3	12.9	20	40.0	62	5
DFAS0440X03S050	★	4.4	3	13.2	20	40.0	62	5
DFAS0450X03S050	●	4.5	3	13.5	20	40.0	62	5
DFAS0460X03S050	★	4.6	3	13.8	23	37.0	62	5
DFAS0470X03S050	★	4.7	3	14.1	23	37.0	62	5
DFAS0480X03S050	★	4.8	3	14.4	23	37.0	62	5
DFAS0490X03S050	★	4.9	3	14.7	23	37.0	62	5
DFAS0500X03S050	●	5.0	3	15.0	23	37.0	62	5
DFAS0510X03S060	★	5.1	3	15.3	25	39.0	66	6
DFAS0520X03S060	★	5.2	3	15.6	25	39.0	66	6
DFAS0530X03S060	●	5.3	3	15.9	25	39.0	66	6
DFAS0540X03S060	★	5.4	3	16.2	25	39.0	66	6
DFAS0550X03S060	●	5.5	3	16.5	25	39.0	66	6
DFAS0560X03S060	★	5.6	3	16.8	27	37.0	66	6
DFAS0570X03S060	★	5.7	3	17.1	27	37.0	66	6
DFAS0580X03S060	★	5.8	3	17.4	27	37.0	66	6
DFAS0590X03S060	★	5.9	3	17.7	27	37.0	66	6
DFAS0600X03S060	●	6.0	3	18.0	27	37.0	66	6

## DFAS - SOLID CARBIDE FLAT BOTTOM DRILLS

Order number	DP102A	DC	L/D	LU	LCF	LS	OAL	DCON
DFAS0610X03S070	★	6.1	3	18.3	29	44.0	75	7
DFAS0620X03S070	★	6.2	3	18.6	29	44.0	75	7
DFAS0630X03S070	★	6.3	3	18.9	29	44.0	75	7
DFAS0640X03S070	★	6.4	3	19.2	29	44.0	75	7
DFAS0650X03S070	●	6.5	3	19.5	29	44.0	75	7
DFAS0660X03S070	★	6.6	3	19.8	32	41.0	75	7
DFAS0670X03S070	★	6.7	3	20.1	32	41.0	75	7
DFAS0680X03S070	●	6.8	3	20.4	32	41.0	75	7
DFAS0690X03S070	★	6.9	3	20.7	32	41.0	75	7
DFAS0700X03S070	●	7.0	3	21.0	32	41.0	75	7
DFAS0710X03S080	★	7.1	3	21.3	34	44.0	80	8
DFAS0720X03S080	★	7.2	3	21.6	34	44.0	80	8
DFAS0730X03S080	★	7.3	3	21.9	34	44.0	80	8
DFAS0740X03S080	★	7.4	3	22.2	34	44.0	80	8
DFAS0750X03S080	●	7.5	3	22.5	34	44.0	80	8
DFAS0760X03S080	★	7.6	3	22.8	36	42.0	80	8
DFAS0770X03S080	★	7.7	3	23.1	36	42.0	80	8
DFAS0780X03S080	★	7.8	3	23.4	36	42.0	80	8
DFAS0790X03S080	★	7.9	3	23.7	36	42.0	80	8
DFAS0800X03S080	●	8.0	3	24.0	36	42.0	80	8
DFAS0810X03S090	★	8.1	3	24.3	38	45.0	85	9
DFAS0820X03S090	●	8.2	3	24.6	38	45.0	85	9
DFAS0830X03S090	★	8.3	3	24.9	38	45.0	85	9
DFAS0840X03S090	★	8.4	3	25.2	38	45.0	85	9
DFAS0850X03S090	●	8.5	3	25.5	38	45.0	85	9
DFAS0860X03S090	★	8.6	3	25.8	41	42.0	85	9
DFAS0870X03S090	★	8.7	3	26.1	41	42.0	85	9
DFAS0880X03S090	●	8.8	3	26.4	41	42.0	85	9
DFAS0890X03S090	★	8.9	3	26.7	41	42.0	85	9
DFAS0900X03S090	●	9.0	3	27.0	41	42.0	85	9
DFAS0910X03S100	★	9.1	3	27.3	43	45.0	90	10
DFAS0920X03S100	★	9.2	3	27.6	43	45.0	90	10
DFAS0930X03S100	★	9.3	3	27.9	43	45.0	90	10
DFAS0940X03S100	★	9.4	3	28.2	43	45.0	90	10
DFAS0950X03S100	●	9.5	3	28.5	43	45.0	90	10
DFAS0960X03S100	★	9.6	3	28.8	45	43.0	90	10
DFAS0970X03S100	●	9.7	3	29.1	45	43.0	90	10
DFAS0980X03S100	★	9.8	3	29.4	45	43.0	90	10
DFAS0990X03S100	★	9.9	3	29.7	45	43.0	90	10
DFAS1000X03S100	●	10.0	3	30.0	45	43.0	90	10
DFAS1010X03S110	★	10.1	3	30.3	47	52.0	101	11
DFAS1020X03S110	●	10.2	3	30.6	47	52.0	101	11
DFAS1030X03S110	★	10.3	3	30.9	47	52.0	101	11
DFAS1040X03S110	★	10.4	3	31.2	47	52.0	101	11
DFAS1050X03S110	●	10.5	3	31.5	47	52.0	101	11
DFAS1060X03S110	★	10.6	3	31.8	50	49.0	101	11
DFAS1070X03S110	★	10.7	3	32.1	50	49.0	101	11
DFAS1080X03S110	★	10.8	3	32.4	50	49.0	101	11
DFAS1090X03S110	★	10.9	3	32.7	50	49.0	101	11
DFAS1100X03S110	●	11.0	3	33.0	50	49.0	101	11

**DFAS – SOLID CARBIDE FLAT BOTTOM DRILLS**

Order number	DP102A	DC	L/D	LU	LCF	LS	OAL	DCON
DFAS1110X03S120	★	11.1	3	33.3	52	51.0	105	12
DFAS1120X03S120	★	11.2	3	33.6	52	51.0	105	12
DFAS1130X03S120	★	11.3	3	33.9	52	51.0	105	12
DFAS1140X03S120	★	11.4	3	34.2	52	51.0	105	12
DFAS1150X03S120	●	11.5	3	34.5	52	51.0	105	12
DFAS1160X03S120	★	11.6	3	34.8	54	49.0	105	12
DFAS1170X03S120	★	11.7	3	35.1	54	49.0	105	12
DFAS1180X03S120	★	11.8	3	35.4	54	49.0	105	12
DFAS1190X03S120	★	11.9	3	35.7	54	49.0	105	12
DFAS1200X03S120	●	12.0	3	36.0	54	49.0	105	12
DFAS1250X03S130	★	12.5	3	37.5	56	52.0	110	13
DFAS1300X03S130	●	13.0	3	39.0	59	49.0	110	13
DFAS1350X03S140	★	13.5	3	40.5	61	51.0	114	14
DFAS1400X03S140	●	14.0	3	42.0	63	49.0	114	14

## DFAS

## RECOMMENDED CUTTING CONDITIONS

Material	DC	L/D	n	$\alpha = 0^\circ$ fr (Min. - Max.) (mm/rev.)
Mild steels (<180HB) C10E etc.	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)
Carbon steels, Alloy steels (180–280HB) DIN Ck45, 41CrMo4 etc.	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)
Carbon steels, Alloy steels (280–350HB) DIN 40CrNiMoA etc.	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 (0.015–0.055)
	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)
Austenitic stainless steels (<200HB) DIN X5CrNi189, X5CrNiMo1810 etc.	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)	

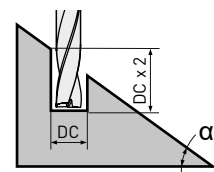


## DFAS

## RECOMMENDED CUTTING CONDITIONS

Material	DC	L/D	n	$\alpha = 0^\circ$ fr (Min. - Max.) (mm/rev.)
Gray cast irons (<350MPa) DIN GG30 etc.	0.75	$\leq 2$	23300	0.030 (0.010–0.050)
	1.0	$\leq 2$	17500	0.030 (0.010–0.050)
	1.5	$\leq 2$	12200	0.035 (0.015–0.055)
	2.0	$\leq 2$	9500	0.040 (0.020–0.060)
	2.5	$\leq 2$	7900	0.050 (0.030–0.070)
	3.0	$\leq 2$	7900	0.060 (0.040–0.080)
	4.0	$\leq 2$	5900	0.030 (0.020–0.040)
	5.0	$\leq 2$	4700	0.040 (0.030–0.050)
	6.0	$\leq 2$	3900	0.050 (0.040–0.060)
	8.0	$\leq 2$	2900	0.060 (0.050–0.080)
	10.0	$\leq 2$	2300	0.080 (0.060–0.100)
	12.0	$\leq 2$	1900	0.100 (0.080–0.120)
	16.0	$\leq 2$	1400	0.120 (0.100–0.150)
	20.0	$\leq 2$	1100	0.150 (0.120–0.200)
Ductile cast irons (<450MPa) DIN GGG40.3 etc.	0.75	$\leq 2$	16900	0.010 (0.005–0.015)
	1.0	$\leq 2$	12700	0.010 (0.005–0.015)
	1.5	$\leq 2$	10000	0.020 (0.010–0.030)
	2.0	$\leq 2$	8700	0.030 (0.015–0.045)
	2.5	$\leq 2$	7300	0.045 (0.025–0.065)
	3.0	$\leq 2$	6800	0.050 (0.040–0.060)
	4.0	$\leq 2$	5500	0.030 (0.020–0.040)
	5.0	$\leq 2$	4400	0.040 (0.030–0.050)
	6.0	$\leq 2$	3700	0.050 (0.040–0.060)
	8.0	$\leq 2$	2700	0.060 (0.050–0.080)
	10.0	$\leq 2$	2200	0.080 (0.060–0.100)
	12.0	$\leq 2$	1800	0.100 (0.080–0.120)
	16.0	$\leq 2$	1300	0.120 (0.100–0.150)
	20.0	$\leq 2$	1100	0.150 (0.120–0.200)
Aluminium alloys (Si<5 %) JIS A6061, A7075 etc.	0.75	$\leq 2$	42400	0.020 (0.010–0.030)
	1.0	$\leq 2$	31800	0.020 (0.010–0.030)
	1.5	$\leq 2$	21200	0.020 (0.010–0.030)
	2.0	$\leq 2$	17500	0.050 (0.030–0.070)
	2.5	$\leq 2$	14000	0.060 (0.040–0.090)
	3.0	$\leq 2$	11600	0.060 (0.040–0.090)
	4.0	$\leq 2$	8700	0.080 (0.060–0.100)
	5.0	$\leq 2$	7000	0.100 (0.080–0.130)
	6.0	$\leq 2$	5800	0.130 (0.100–0.160)
	8.0	$\leq 2$	4300	0.160 (0.130–0.200)
	10.0	$\leq 2$	3500	0.200 (0.160–0.240)
	12.0	$\leq 2$	2900	0.240 (0.200–0.280)
	16.0	$\leq 2$	2100	0.280 (0.240–0.320)
	20.0	$\leq 2$	1700	0.320 (0.280–0.360)
Titanium alloy (Ti-6Al-4V, Ti-5Al-5V-5Mo-3Cr)	3.0	$\leq 3$	3710	0.030 (0.010–0.050)
	4.0	$\leq 3$	2790	0.040 (0.010–0.070)
	5.0	$\leq 3$	2230	0.050 (0.020–0.080)
	6.0	$\leq 3$	1860	0.060 (0.020–0.100)
	7.0	$\leq 3$	1590	0.070 (0.020–0.120)
	8.0	$\leq 3$	1390	0.080 (0.030–0.130)
	9.0	$\leq 3$	1240	0.090 (0.030–0.150)
	10.0	$\leq 3$	1110	0.100 (0.030–0.170)
	11.0	$\leq 3$	1010	0.110 (0.040–0.180)
	12.0	$\leq 3$	930	0.120 (0.040–0.200)
	13.0	$\leq 3$	860	0.130 (0.040–0.220)
	14.0	$\leq 3$	800	0.140 (0.050–0.230)

1. The recommended hole depth is DCx2. This should be the depth from the uppermost surface of the work material when machining on angled surfaces. [Refer to diagram]
2. The table above assumes drilling on a flat surface. For drilling on angled surfaces, adjust the feed rate accordingly. When the inclination angle  $\alpha$  is  $30^\circ$  or less, as a guide adjust the feed rate to 70 % or lower and when the inclination angle  $\alpha$  is greater than  $30^\circ$  adjust the feed rate to 50 % or lower.
3. This tool is for hole drilling only. It cannot be used for cross-feed or helical machining.

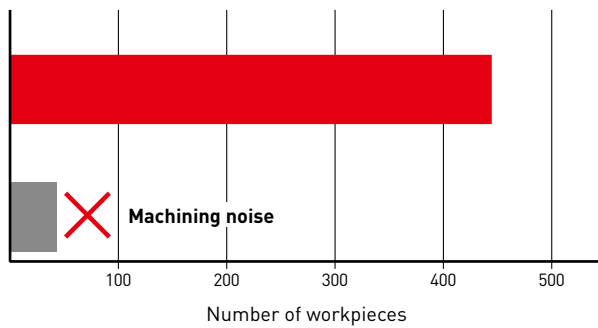
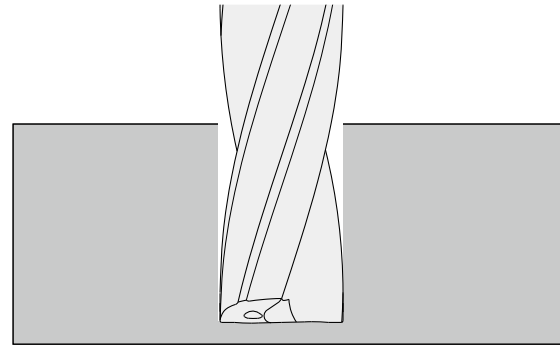


# APPLICATION EXAMPLE

Material	DIN 1.1213 / Cf 53
Tool/Drill	DFAS0800X03S080
Component	Machine parts
Vc (m/min)	100
fr (mm/rev.)	0.12
L/D (mm)	4.5
Cutting mode	Wet cutting
Coolant	Internal coolant (Water-soluble)
Machine	MC

**Results**

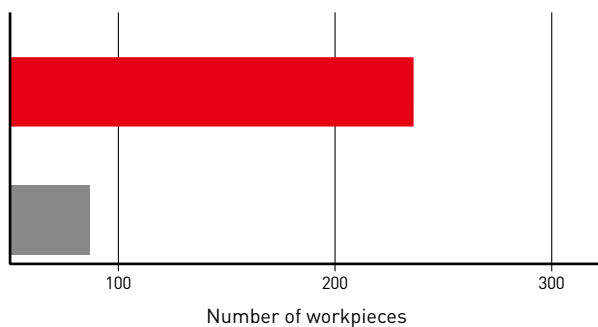
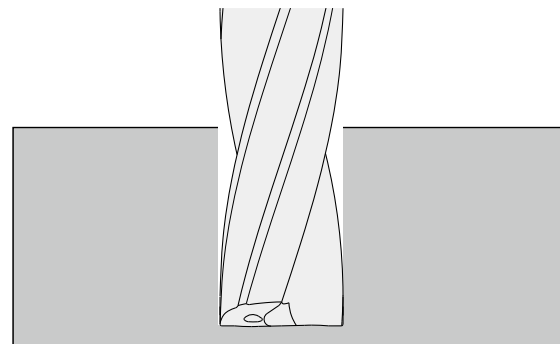
Cutting noise was reduced and the number of holes drilled was increased by 700 % when compared to a conventional product. The quality of the machined surface finish was also improved.



Material	DIN 1.0038 / St 37-2
Tool/Drill	DFAS1100X03S110
Component	Machine parts
Vc (m/min)	104
fr (mm/rev.)	0.12
L/D (mm)	27
Cutting mode	Wet cutting
Coolant	Internal coolant (Water-soluble)
Machine	MC

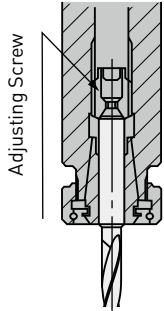
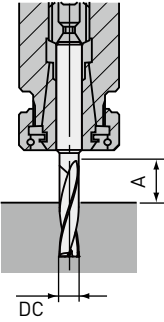
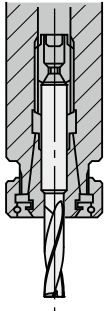
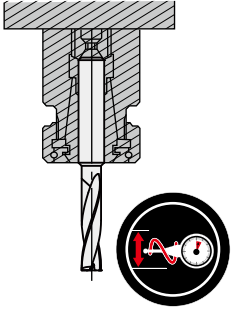
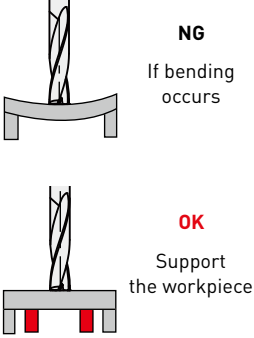
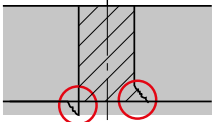
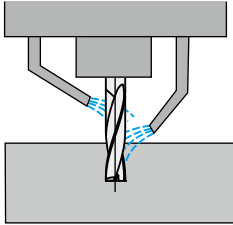
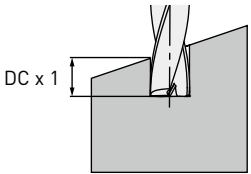
**Results**

Cutting noise was reduced and the number of holes drilled was increased by 300 % when compared to a conventional product. The quality of the machined surface finish was also improved.



■ DFAS    ■ Conventional

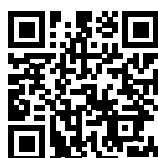
# OPERATIONAL GUIDANCE

Drill holding	Drill length	Drill installation	Installation tolerance
 <p data-bbox="167 831 456 880">Thrust bearing type collet chuck holds the drill securely.</p>	 <p data-bbox="580 842 691 869"><math>A &gt; DC \times 1.5</math></p>	 <p data-bbox="1026 696 1054 719">NG</p> <p data-bbox="836 842 1078 869">Do not clamp on the flutes.</p>	 <p data-bbox="1198 842 1366 869">Run-out &lt; 0.03mm</p>
Thin workpiece	Burring and workpiece chipping	Coolant method (MFE)	Inclined face drilling
 <p data-bbox="336 1081 368 1104">NG</p> <p data-bbox="304 1122 395 1167">If bending occurs</p> <p data-bbox="336 1267 368 1290">OK</p> <p data-bbox="288 1308 416 1352">Support the workpiece</p>	 <p data-bbox="485 1496 788 1570">Lower the feed rate by 50 % at the end of through cutting. Add a chamfer.</p>	 <p data-bbox="815 1509 1102 1554">Two coolant positions, at the end and at the centre are ideal.</p>	 <p data-bbox="1171 1196 1230 1218">DC x 1</p> <p data-bbox="1129 1447 1437 1621">When machining a deep hole into an inclined surface, use MFE drill (L/D=2) as a drill for a guide hole. Set the drill depth at approx. DC x 1 to obtain an accurate guide hole.</p>

**NEW**

# 415SD (MPLUS)

FIRST CHOICE FOR HIGH-FEED MACHINING OF  
TITANIUM ALLOYS



Interested in more...

**MP111**

[www.mhg-mediastore.net](http://www.mhg-mediastore.net)

# 415SD (MPLUS)

## 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

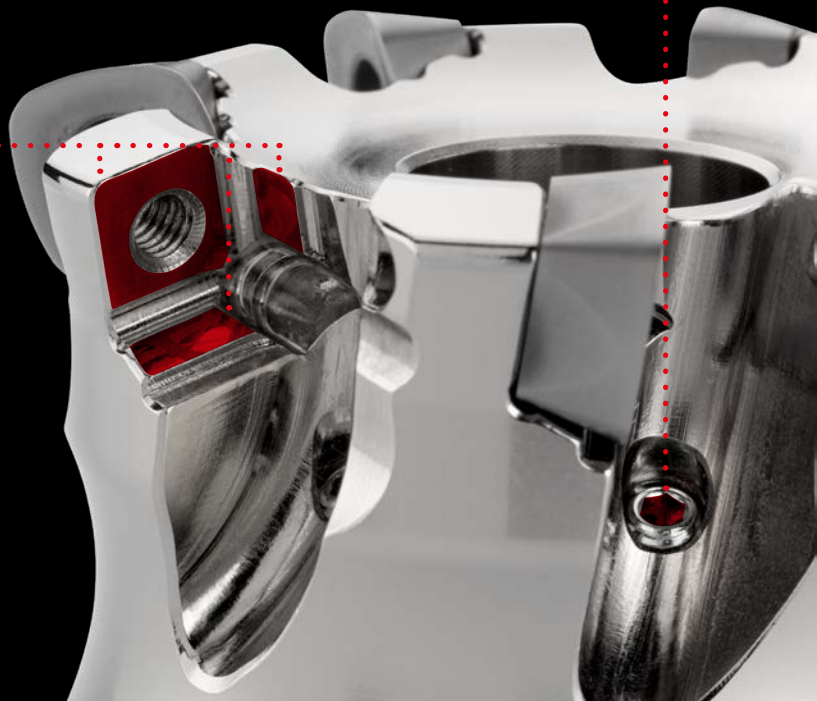
The approach angle of 15° achieves an APMX of 2 mm, which enables a high removal rate but with low radial forces.

### 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.

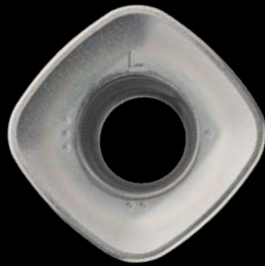


# 415SD (MPLUS)

## INSERTS FOR HIGH-FEED EFFICIENT MACHINING

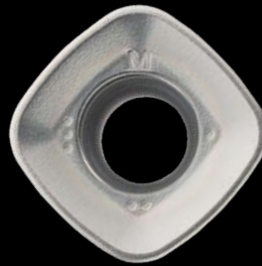
### THE PVD-COATED, HIGH-PERFORMANCE GRADE MP9130 FOCUSES ON TITANIUM MACHINING

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



**L-BREAKER**

Ideal for applications that require low cutting resistance.



**M-BREAKER**

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



**R-BREAKER**

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



**Highest productivity even when applications require low cutting resistance.**

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

# 415SD (MPLUS)



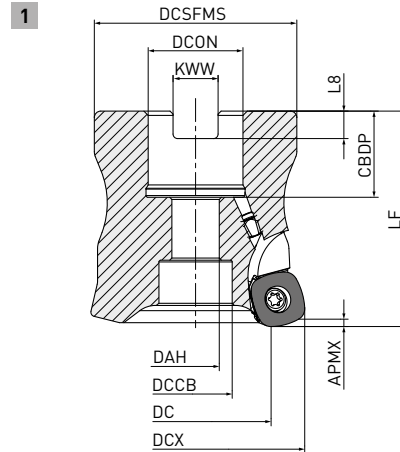
## HIGH-FEED CUTTER

S




**415SD**


GAMP : 9°  
GAMF : 5° – 6°



Right hand tool holder only.

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

### ARBOR TYPE

Order number	Stock	APMX	DC	DCON	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. Please refer to page 144, for maximum depth of cut (APMX).

# 415SD (MPLUS)



## HIGH-FEED CUTTER






### MOUNTING DIMENSIONS

Order number	CBDP	DAH	DCCB	DCON	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

## INSERTS

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

## 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→

Nozzle Dia.	Ø0.6mm	Ø0.8mm	Ø1.2mm	Ø1.6mm
Order number	HSD04004H06	HSD04004H08	HSD04004H12	HSD04004H16



# 415SD (MPLUS)

## 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)

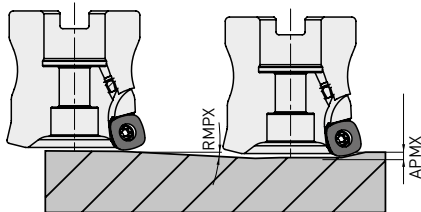
### DEPTH OF CUT / FEED PER TOOTH

Material	Properties	Cutting conditions	Coolant	Grade	ae ≤ 0.5 DC		ae ≤ 0.75 DC		ae = DC				
					 ap	 fz	 ap	 fz	 ap	 fz			
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)
					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)
					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)
					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)
					R	≤ 2	0.6 (0.4–0.8)	R	≤ 2	0.5 (0.3–0.6)	R	≤ 2	0.4 (0.2–0.5)

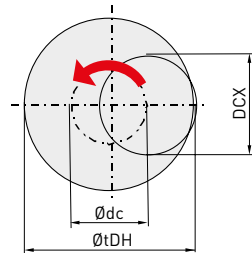
# 415SD (MPLUS)

## MAXIMUM CAPACITIES BY MODE

### RAMPING



### HELICAL DRILLING



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

$$\text{ØDC} = \text{ØDH} - \text{DCX}$$

Locus of the centre of the tool      Desired hole diameter      Cutting Diameter Maximum

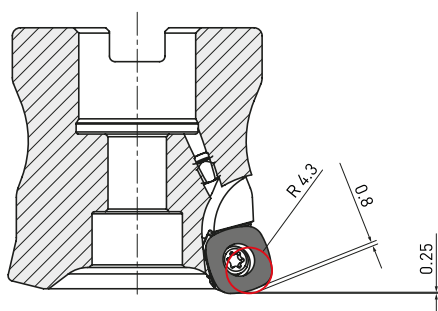
- For the depth of cut per pass, refer to the cutting conditions above for helical drilling.
- Set the machine spindle revolution so that the tool is rotating and cutting in a down cut direction.

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

























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

## NOTE FOR PROGRAMMING

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



# SYMBOLS

 Recommended cutting conditions		MACHINING TYPE	
<b>NEW</b> New/Product expansion		 Roughing	
APPLICATION			
 Face milling		 Medium cutting	
 Chamfer milling		 Light cutting	
 Shoulder milling with R		 Pre-finishing	
 Face milling close to a wall		 Finishing	
 Shoulder milling		 Fine-finishing	
 Side milling		TOOL MATERIAL	
 Slot milling		 <b>UWC</b> Ultra micro grain carbide substrate material.	
 Ramping		 <b>CBN</b> Mitsubishi Materials' original CBN material.	
 Pocket milling		 <b>CERAMIC</b> For high speed efficient machining of super alloys due to the excellent high temperature strength property.	
 Slot milling with R		 <b>KHA S</b> High hardness powder metallurgy HSS substrate material.	
 Copy milling		 <b>HGSS</b> High grade high alloy HSS substrate material.	
 T-Slot milling		 <b>CO HSS</b> Cobalt high speed steel substrate material.	
		 <b>HSS</b> High speed steel substrate material.	

## COATING



### SMART MIRACLE Coating

New smooth and dense coating technology for high efficiency milling of difficult to cut materials.



### CRN Coating

Newly developed CrN coating for Copper Electrodes machining.



### Violet Coating

Increased tool life of 2-3 times more than TiN coated products.



### DP Coating

New generation coating suitable for a wide range of materials.



### MIRACLE Coating

The original Miracle (Al,Ti)N coating. Also suitable for dry cutting.



### [Al, Ti]N Coating

[Al,Ti]N highly versatile application range.



### [Al,Ti,Cr]N multi-layer Coating

For carbon, alloy and hardened steels.



### IMPACT MIRACLE Coating

Single phase nano crystal coating technology has higher film hardness and heat resistance.



### MIRACLE Coating

The original MIRACLE (Al,Ti)N coating. Also suitable for dry cutting.



### VFR Coating

The (AlCrSi)N/(AlTiSi)N PVD multilayer coating is ideal for machining of extremely hard materials up to 70 HRC.



### DLC Coating

Hardness similar to CVD diamond coating achieved with high adhesion strength.



### Diamond Coating

Suitable for CFRP and CFRP-aluminium materials.



### Diamond Coating

Suitable for graphite machining.



### Diamond Coating

The original CVD diamond coating.



### CVD Diamond Coating

Unique multi-layer micro-grain diamond crystal control technology drastically improves wear resistance and smoothness.

## CUTTING EDGE PROPERTIES



### Sharp corner edge

Indicates the end mill has a sharp corner edge.



### Gash land

Indicates the end mill cutting edge has a protective chamfer.



### Rake angle



### Helix angle

Indicates the helix angle of the end mill.



### Point angle

Indicates the drill point angle.



### Roughing flute geometry



### Variable helix



### Rounded gash



### Corner angle

## WEB THINNING



### X type point geometry

X web thinning used at the drill point.



### XR type point geometry

XR web thinning used at the drill point.



### S type point geometry

Easy cutting geometry.



### N type point geometry

Effective when the point web is thick.



### Chipbreaker

# SYMBOLS

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## 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**





# MITSUBISHI MATERIALS CORPORATION

## GERMANY

MMC HARTMETALL GMBH  
Comeniusstr. 2 . 40670 Meerbusch  
Phone +49 2159 91890 . Fax +49 2159 918966  
Email admin@mmchg.de

## U.K.

MMC HARDMETAL U.K. LTD.  
Mitsubishi House . Galena Close . Tamworth . Staffs. B77 4AS  
Phone +44 1827 312312  
Email sales@mitsubishicarbide.co.uk

## SPAIN

MITSUBISHI MATERIALS ESPAÑA, S.A.  
Calle Emperador 2 . 46136 Museros/Valencia  
Phone +34 96 1441711 . Fax +34 96 1443786  
Email comercial@mmevalencia.es

## FRANCE

MMC METAL FRANCE S.A.R.L.  
6, Rue Jacques Monod . 91400 Orsay  
Phone +33 1 69 35 53 53 . Fax +33 1 69 35 53 50  
Email mmfsales@mmc-metal-france.fr

## POLAND

MMC HARDMETAL POLAND SP. Z O.O  
Al. Armii Krajowej 61 . 50 - 541 Wrocław  
Phone +48 71335 1620 . Fax +48 71335 1621  
Email sales@mitsubishicarbide.com.pl


## ITALY

MMC ITALIA S.R.L.  
Viale Certosa 144 . 20156 Milano  
Phone +39 0293 77031 . Fax +39 0293 589093  
Email info@mmc-italia.it

## TURKEY

MMC HARTMETALL GMBH ALMANYA - İZMİR MERKEZ ŞUBESİ  
Adalet Mahallesi Anadolu Caddesi No: 41-1 . 15001 35530 Bayraklı/İzmir  
Phone +90 232 5015000 . Fax +90 232 5015007  
Email info@mmchg.com.tr

[www.mmc-carbide.com](http://www.mmc-carbide.com)

Order Code: N034E 

Published: 2023.10 (2.25, LD), Printed in Germany