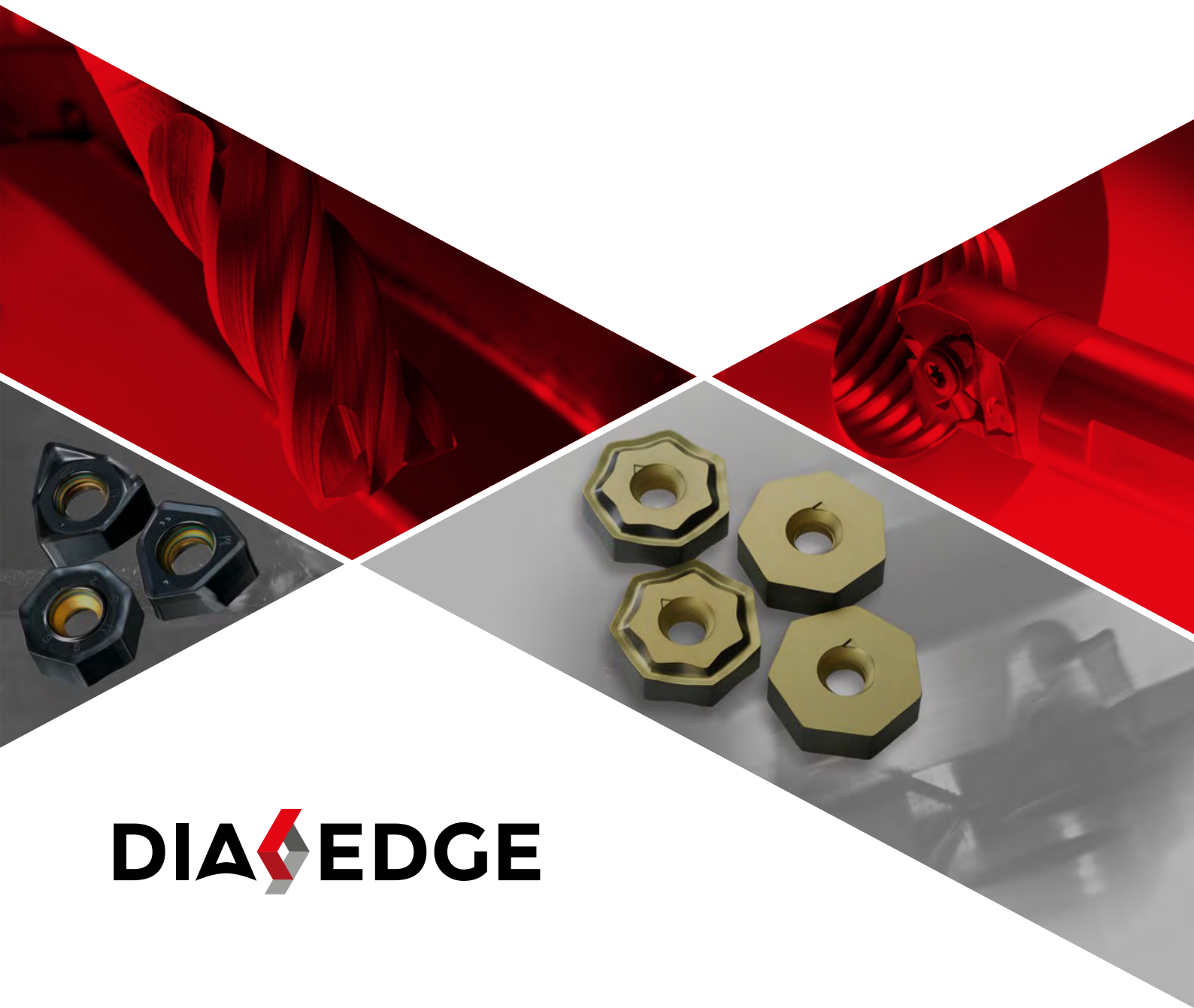
MITSUBISHI MATERIALS

PRODUCT NEWS 2024-1



DIA EDGE

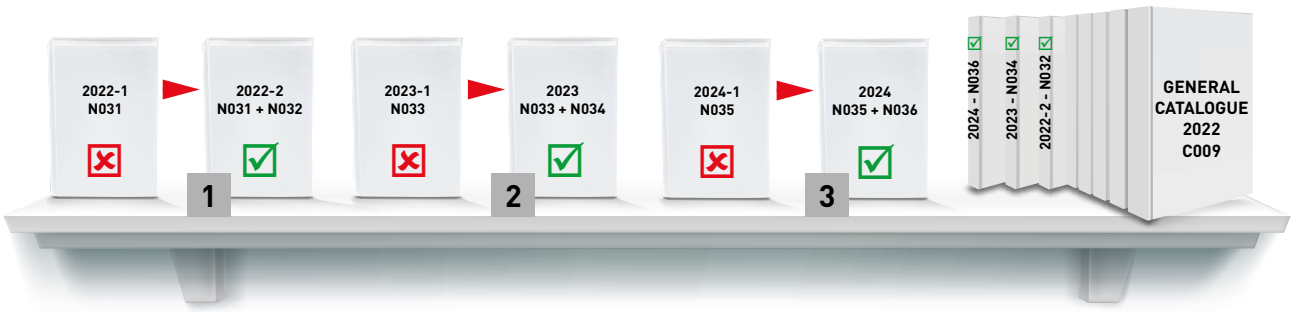
DIA EDGE

BETTER. TOGETHER.

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 2024-1

NEW PRODUCTS AND SERIES EXPANSIONS AT A GLANCE

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

CURRENT, INNOVATIVE, COMPETITIVE

NOTES: This Product News 2024-1 (N035) complements the General Catalogue C009, Product News 2022-2 (N032) and the Product News 2023 (N034).
It contains all new products and series expansions that have been launched after the release of the N032, N034 book and the C009 catalogue.

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

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TURNING TOOLS

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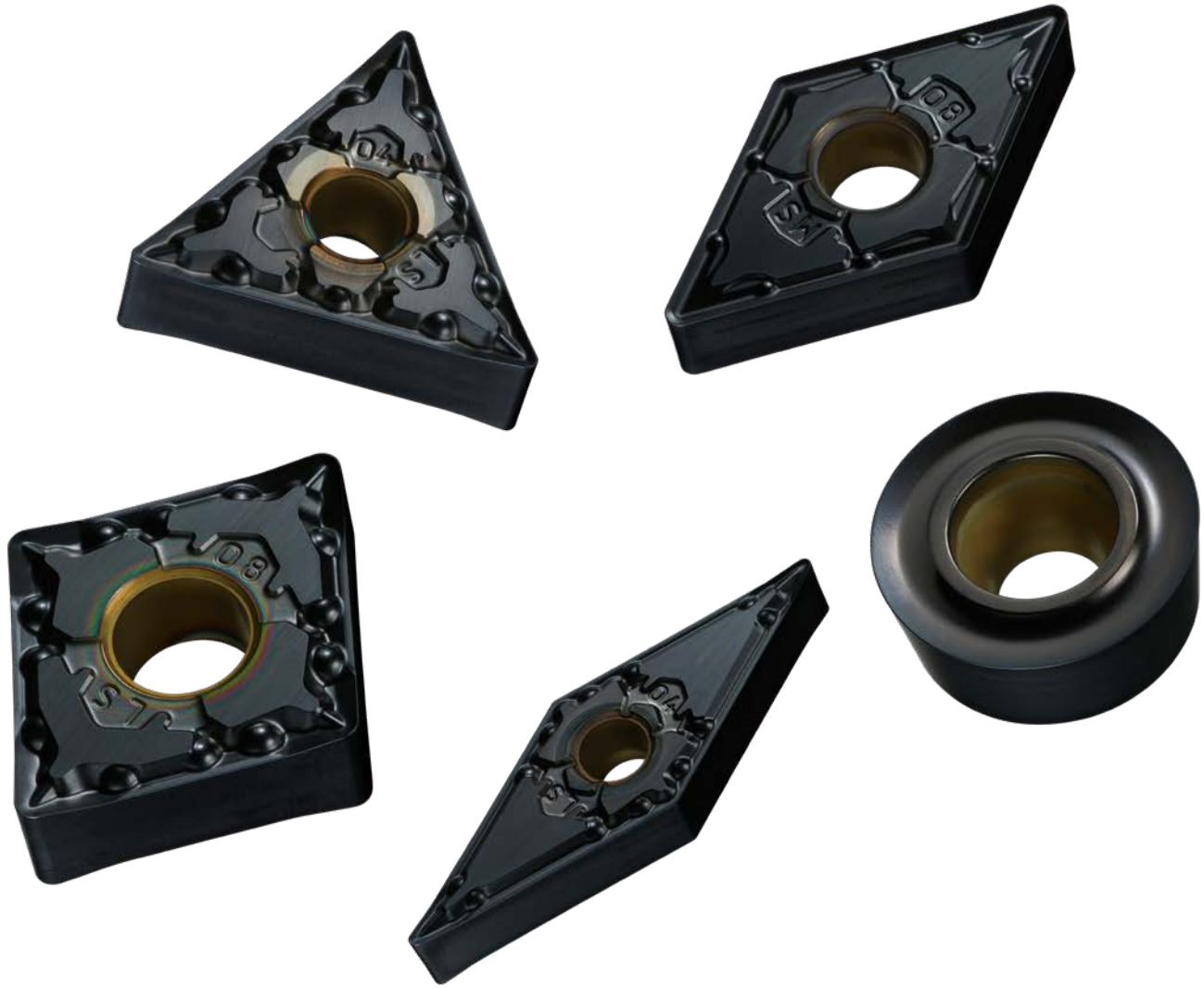
DRILLING TOOLS

MPLUS TOOLS

NEW

MV9005

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



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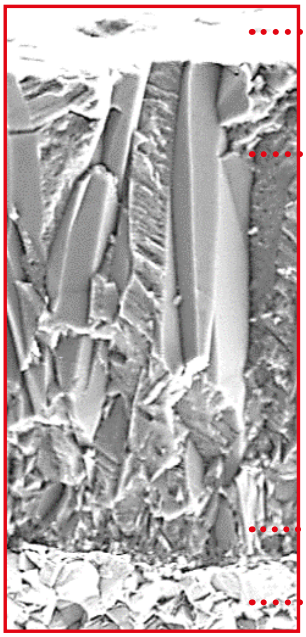
DIA EDGE

MV9005

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

ADVANCED WEAR RESISTANCE

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



Graphical representation

EXCELLENT WELDING RESISTANCE

Smooth surface.

OUTSTANDING WEAR RESISTANCE

Newly developed Al-Rich coating.

EXCELLENT CHIPPING RESISTANCE FOR STABLE MACHINING

Newly developed bonding layer.

EXCELLENT RESISTANCE TO PLASTIC DEFORMATION

Extremely hard dedicated cemented carbide substrate.

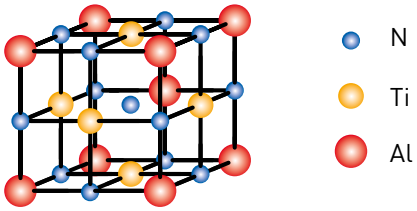
MV9005

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

COMPLETE COATING TECHNOLOGY THAT TOPPLES CURRENT TOOL LIFE STANDARDS

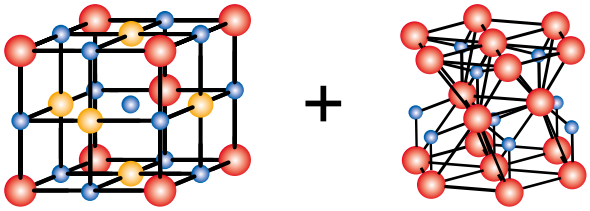
Due to the newly developed Al-Rich coating.

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



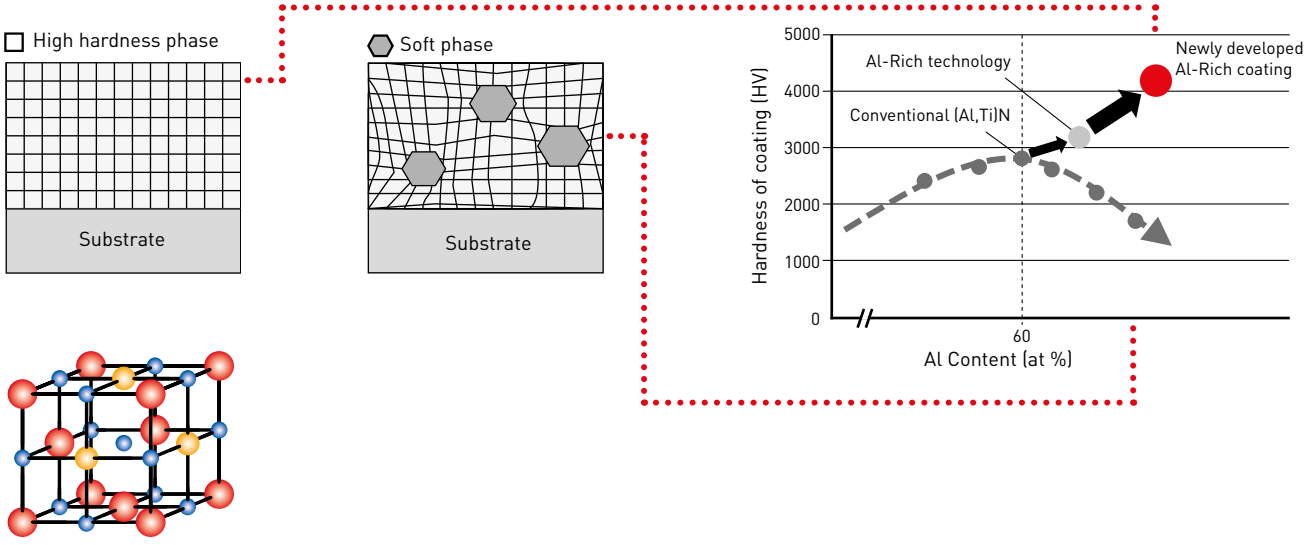
The combination of atoms with different sizes creates an exceptionally hard crystal structure.

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



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

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

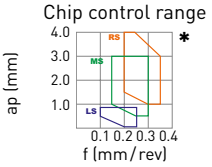
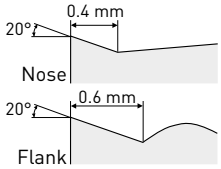
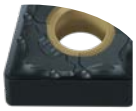
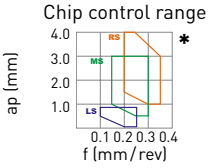
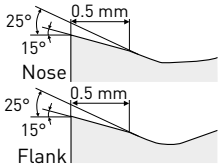
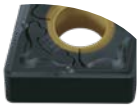
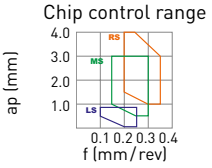
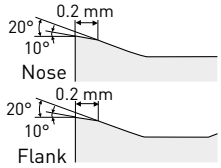
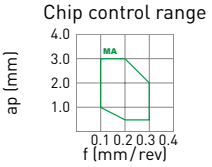
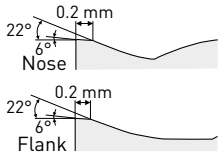


Crystal image of MV9005

MV9005

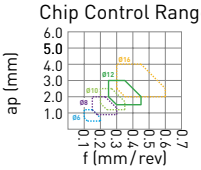
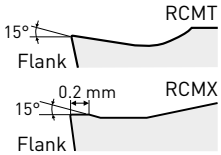
CHIPBREAKER SYSTEM

NEGATIVE INSERTS

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

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

POSITIVE INSERTS

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

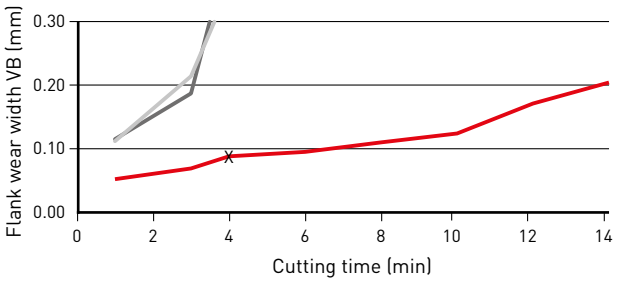
MV9005

CUTTING PERFORMANCE

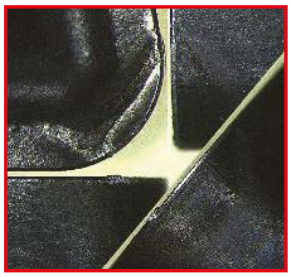
COMPARISON OF WEAR RESISTANCE WHEN MACHINING INCONEL®718

Exhibits excellent wear resistance and extended tool life.

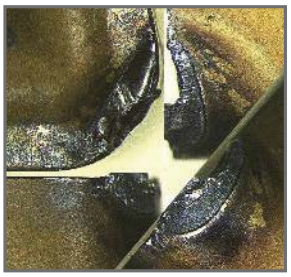
Material	Inconel®718
Insert	CNMG120412-○○
Vc (m/min)	100
f (mm/rev)	0.3
ap (mm)	0.75
Cutting mode	Wet cutting



TAKEN AFTER MACHINING 4 MINUTES



MV9005
MS Breaker

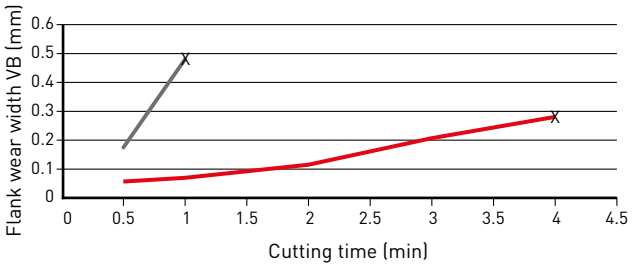


Conventional A

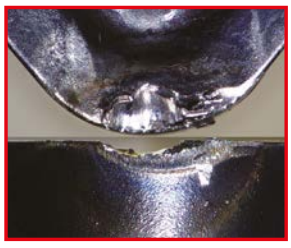
COMPARISON OF WEAR RESISTANCE WHEN MACHINING INCONEL®718

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

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



4 MIN. MACHINING



MV9005
MS Breaker

1 MIN. MACHINING

Conventional A

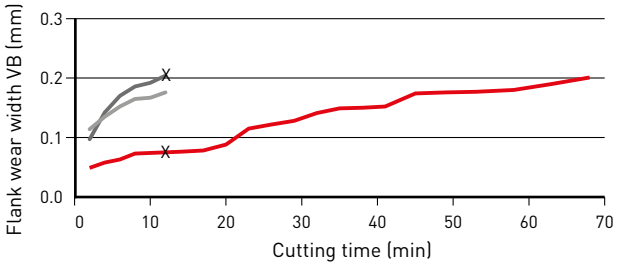
MV9005

CUTTING PERFORMANCE

COMPARISON OF WEAR RESISTANCE WHEN MACHINING RENE 41

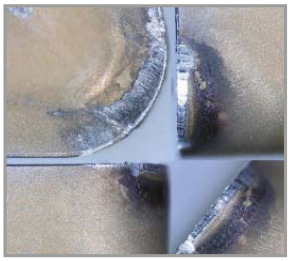
Exhibits excellent wear resistance even when machining heat resistant alloy components that are used in high temperature environments of 800 °C or higher.

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



TAKEN AFTER 12 MINUTES MACHINING

MV9005
MS Breaker

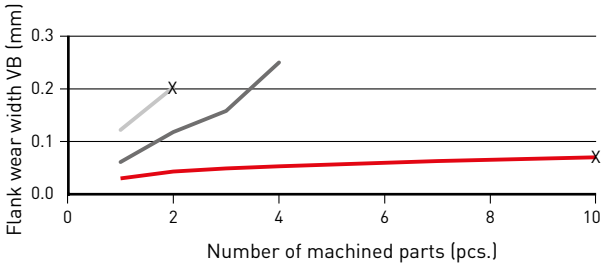


Conventional A

COMPARISON WHEN MACHINING A NICKEL-BASED SUPER ALLOY CONTAINING COBALT

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

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



10 PARTS

MV9005
MS Breaker

1 PART

Conventional B

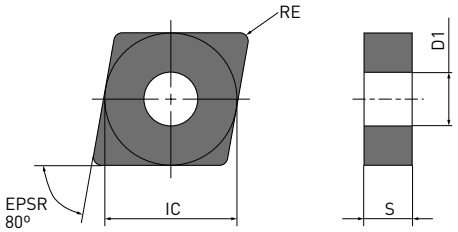
■ : MV9005 ■ A ■ B : Conventional tool

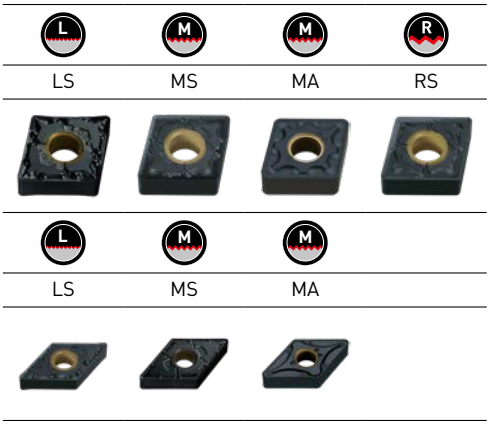
CNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

CNMG





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

1/1

19 Vc

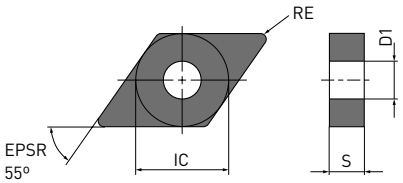
● : Inventory maintained. ★ : Inventory maintained in Japan.

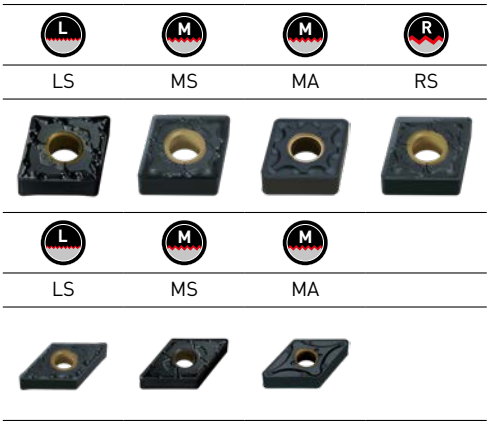
DNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

DNMG





Order number	L M R	MV9005	IC	S	RE	D1
DNMG150402-LS	L	●	12.7	4.76	0.2	5.16
DNMG150404-LS	L	●	12.7	4.76	0.4	5.16
DNMG150408-LS	L	●	12.7	4.76	0.8	5.16
DNMG150404-MS	M	●	12.7	4.76	0.4	5.16
DNMG150408-MS	M	●	12.7	4.76	0.8	5.16
DNMG150412-MS	M	●	12.7	4.76	1.2	5.16
DNMG150404-MA	M	●	12.7	4.76	0.4	5.16
DNMG150408-MA	M	●	12.7	4.76	0.8	5.16
DNMG150412-MA	M	●	12.7	4.76	1.2	5.16

1/1

19 Vc

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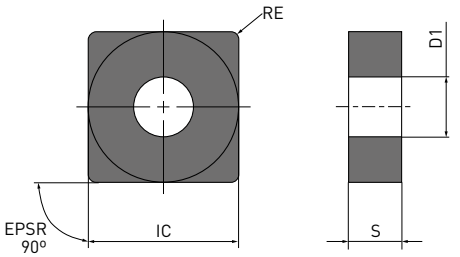
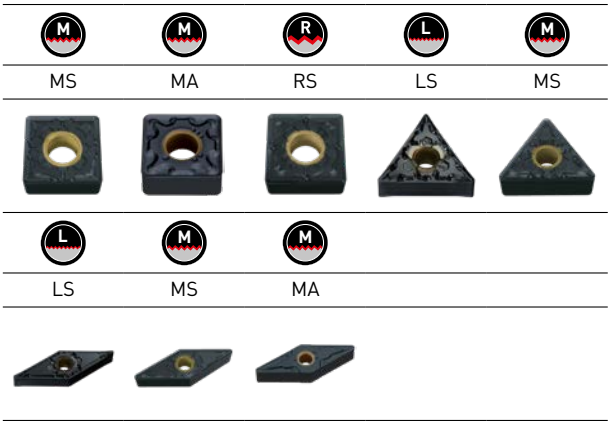
SNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

SNMG





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

1/1

19 Vc

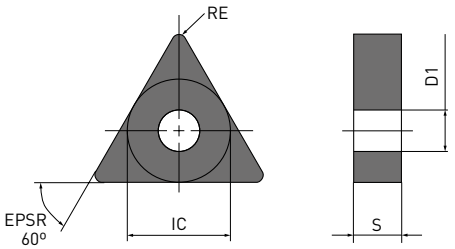
● : Inventory maintained. ★ : Inventory maintained in Japan.

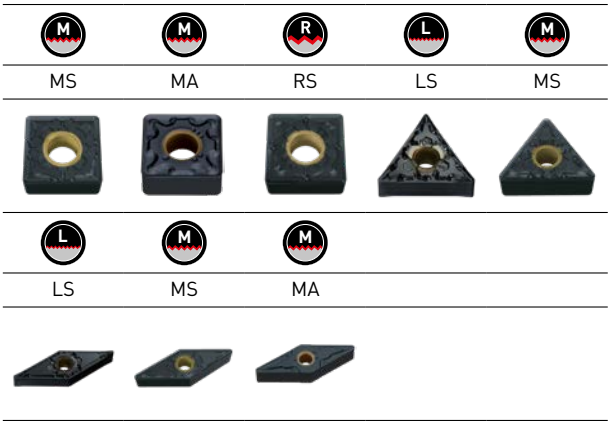
TNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

TNMG





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

1/1

19 Vc

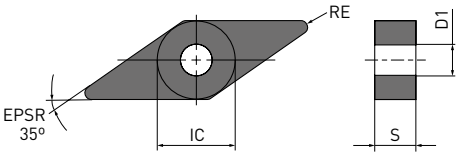
● : Inventory maintained. ★ : Inventory maintained in Japan.

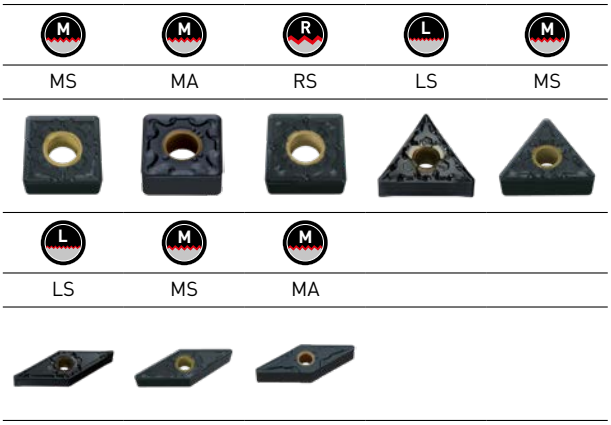
VNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

VNMG





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

1/1

19 Vc

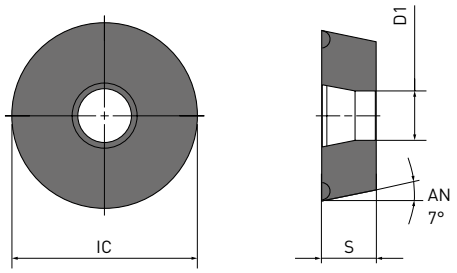
● : Inventory maintained. ★ : Inventory maintained in Japan.

RCMT/ RCMX

7° POSITIVE INSERTS (WITH HOLE)

M Class

RCMT / RCMX



Standard

Standard

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

1/1

19 Vc

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

MV9005

RECOMMENDED CUTTING CONDITIONS

NEGATIVE INSERTS

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

1/1

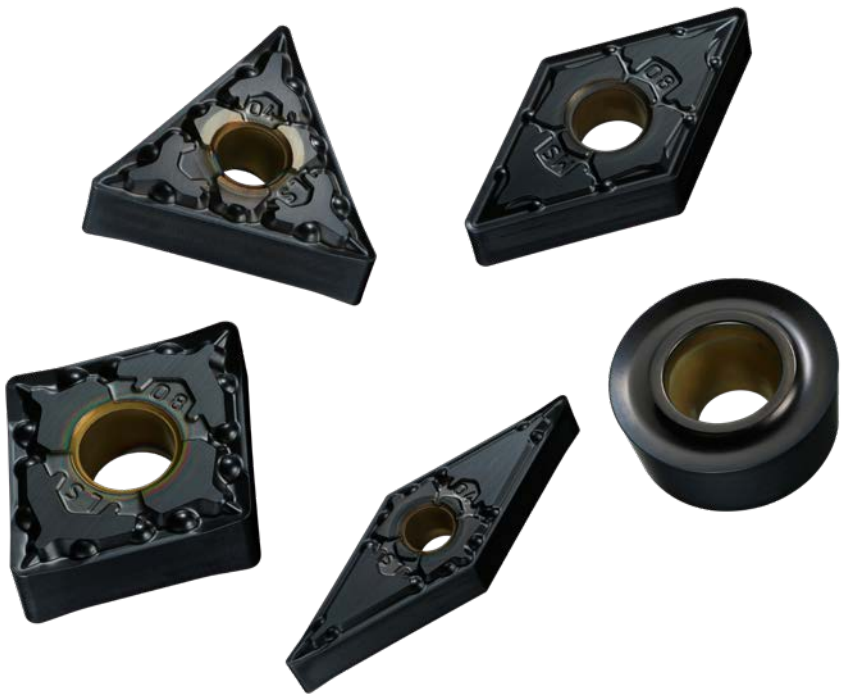
1. Verify the recommended conditions for each boring bar as cutting conditions for internal machining can differ.

POSITIVE INSERTS

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

1/1

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

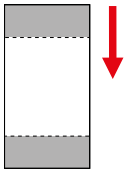


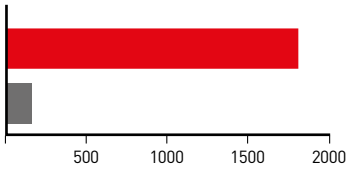
Cutting conditions: ●: Stable cutting

MV9005

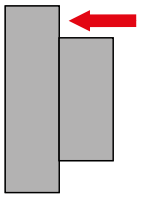
EXAMPLE OF USAGE

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

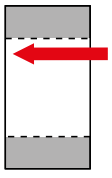




Insert	CNMG120412-MS
Material	Inconel®718
Component	Aerospace component
Application	Turning
Vc (m/min)	MV9005 = 100 Conventional = 80
f (mm/rev)	MV9005 = 0.30 Conventional = 0.25
ap (mm)	0.15 – 0.35
Cutting mode	Wet cutting
Results	Cutting conditions improve machining efficiency by 50 % compared to conventional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



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

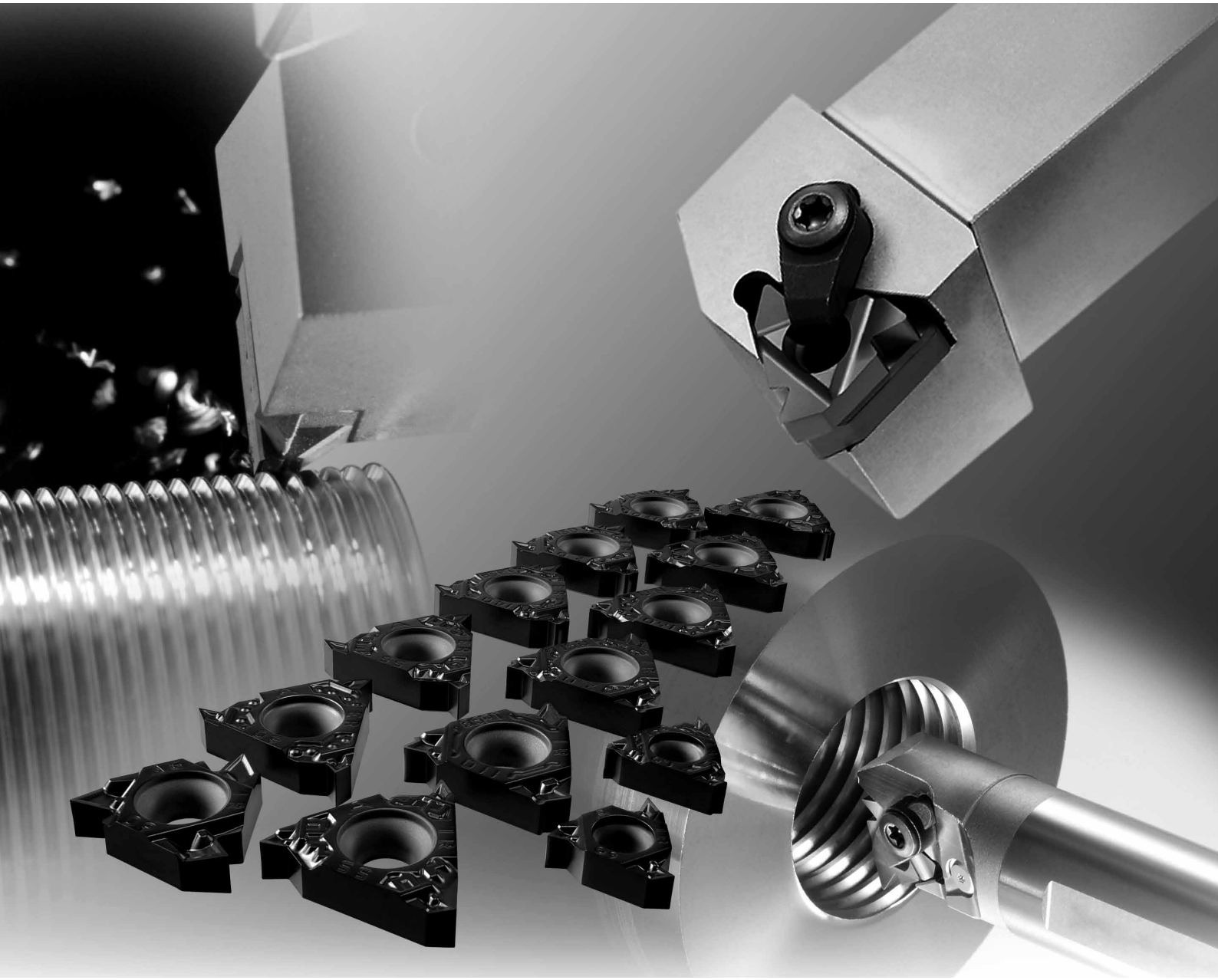


The examples shown are customer's applications, therefore can differ from the recommended conditions.

■ : MV9005 ■ A : Conventional tool

MMT THREADING SERIES

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



Interested in more...

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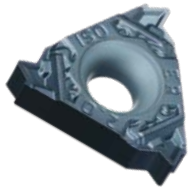
FEATURES OF MMT SERIES

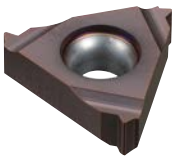
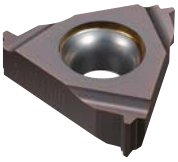
A WIDE VARIETY OF PRODUCTS

M-CLASS INSERTS WITH 3-D CHIPBREAKERS

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



G-CLASS GROUND INSERTS

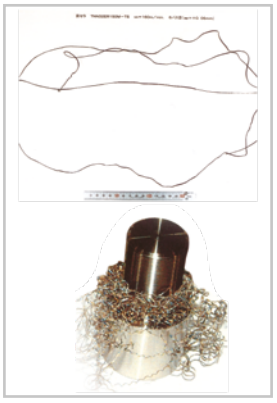
M, UNC, UNF, W, G, Rp, R, Rc, NPTF, NPT	Rd, CSG, LCSG	Tr, ACME, BCSG
		

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

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

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

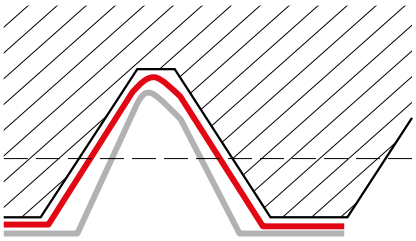
MMT



Conventional

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

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



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

MMT series
Theoretical thread profile
Conventional insert

FEATURES OF MMT SERIES

NEW

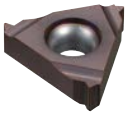
AG TYPE IS ADDED TO THE ACCURATE M-CLASS TYPE 3-D CHIPBREAKER

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

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

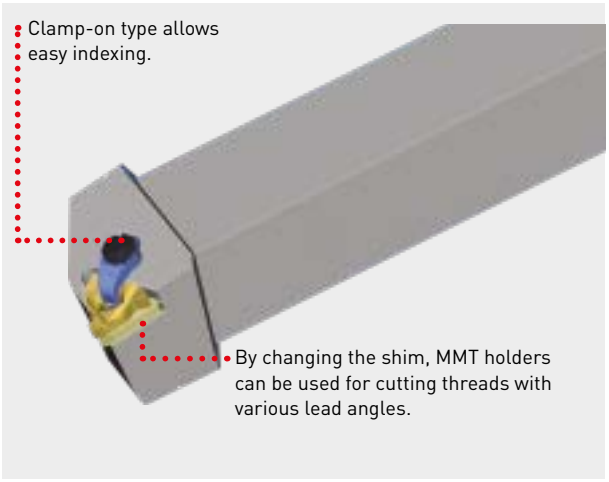
- For ideal chip control and a high cost performance ratio, M-class inserts with 3-D chipbreakers are recommended.
- G-class inserts are recommended where higher precision is required.

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

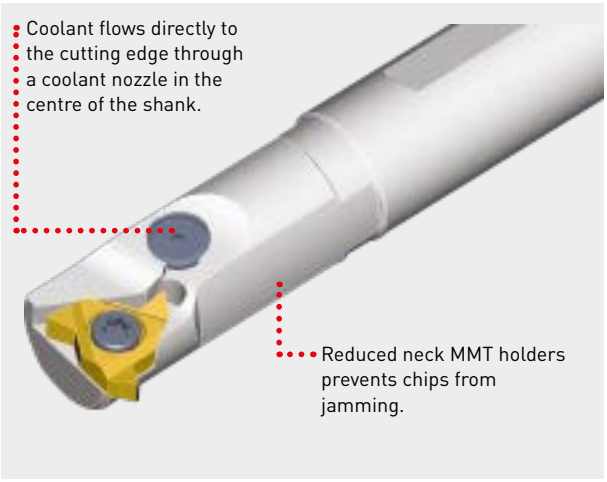
Insert	Chip control	Precision of thread
G-class inserts 	○	◎

HOLDER (USE OF SPECIAL SURFACE TREATMENT)

EXTERNAL



INTERNAL

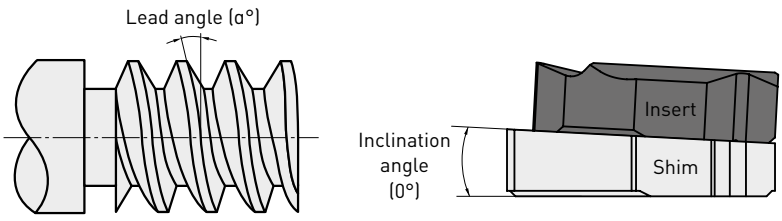


Order number of coolant guide screw: TFS03006
(Except MMTIR1316/MMTIR1516)

SUITABLE FOR THREADING WITH A LARGE LEAD ANGLE

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

Standard shim delivered with the holder.



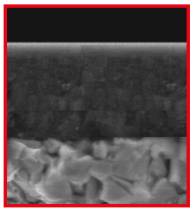
By changing only the shim, MMT holders can be used for turning of threads with various lead angles as well as the turning of left hand threads.

PVD COATED CARBIDE GRADE FOR STABLE THREADING

MP9025

Tough grade with an emphasis on cutting edge stability.

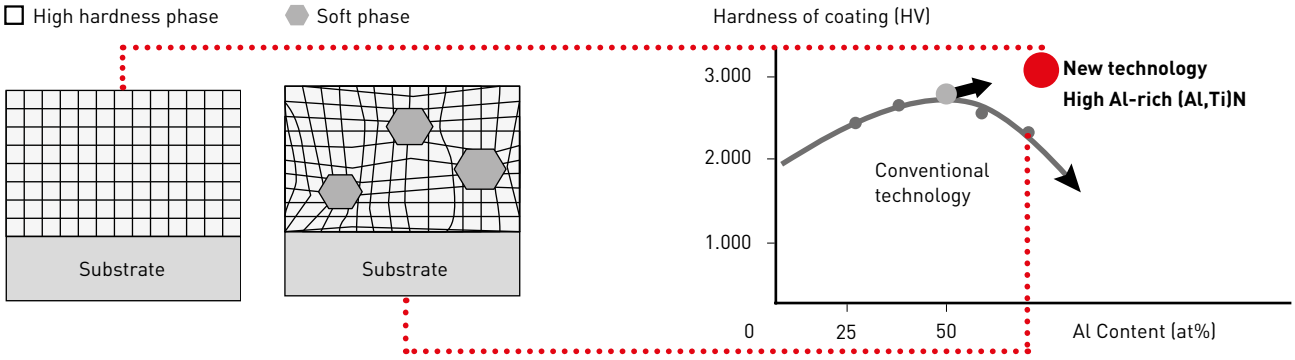
Demonstrates excellent fracture resistance when machining at low cutting speeds, internal machining, and even on small corner R sizes.
With excellent adhesion resistance, it is effective when machining heat resistant alloys and precipitation hardening stainless steel.



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

HIGH AL AND CONVENTIONAL COATING COMPARISON

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



VP10MF

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

VP15TF

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

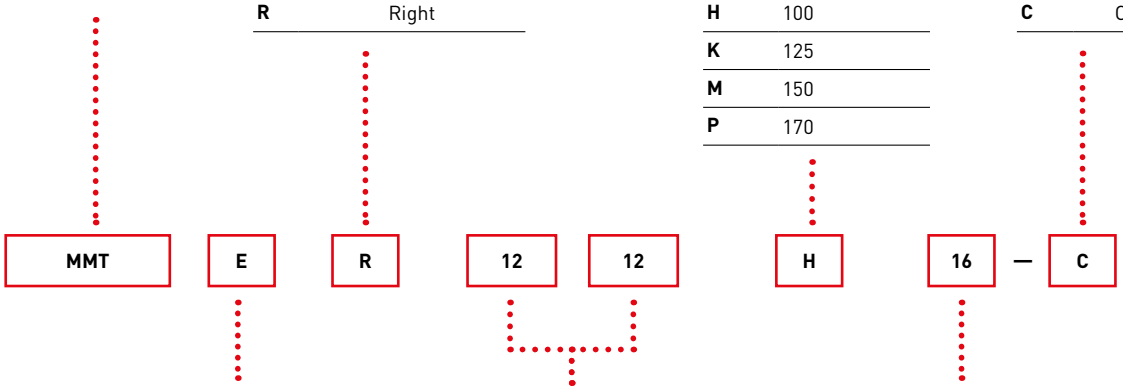
VP20RT

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

MMT SERIES ORDER NUMBER

HOLDERS

EXTERNAL



Designation

Hand of tool	
R	Right

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

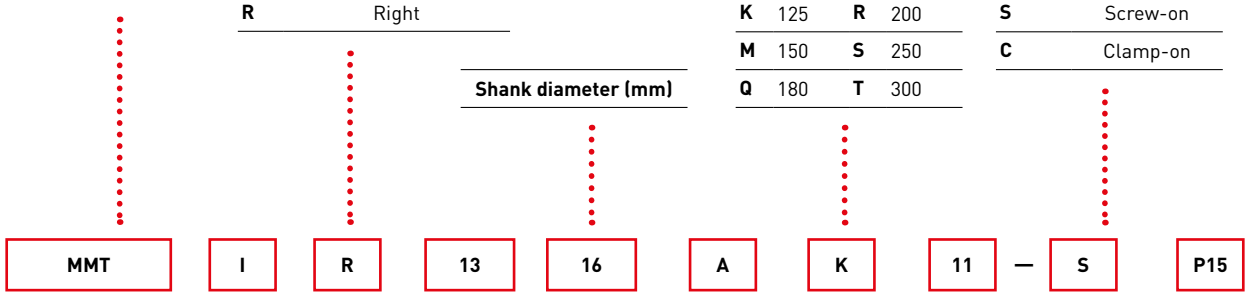
Method of holding	
C	Clamp-on

Application	
E	External

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

Insert size (mm)	
16	9.525
22	12.7

INTERNAL



Designation

Hand of tool	
R	Right

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

Method of holding	
S	Screw-on
C	Clamp-on

Application	
I	Internal

Min.Cutting diameter (mm)

Shank diameter (mm)

Shank material	
A	Steel shank with coolant hole

Insert size (mm)	
11	6.35
16	9.525
22	12.7

Lead angle	
P15	1.5°
P25	2.5°
P35	3.5°

MMT SERIES ORDER NUMBER

INSERTS

M-CLASS

Designation
MMT

Diameter of inscribed circle (mm)	
11	6.35
16	9.525

Application	
E	External
I	Internal

Hand of tool	
R	Right

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

Threading type	
60	Partial Profile 60°
55	Partial Profile 55°
ISO	ISO Metric
W	Whitworth for BSW, BSP
BSPT	BSPT
UN	American UN

M-class inserts with 3-D chipbreakers

G-CLASS

Designation
MMT

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

Application	
E	External
I	Internal

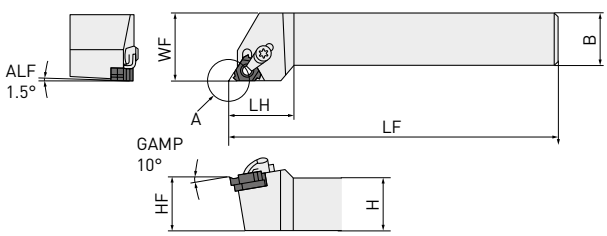
Hand of tool	
R	Right

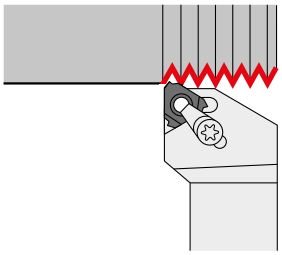
Pitch		
050	0.5 mm	**A** 0.5 – 1.5 mm or 48 – 16 thread/inch
075	0.75 mm	
100	1.0 mm	
125	1.25 mm	**G** 1.75 – 3.0 mm or 14 – 8 thread/inch
150	1.5 mm	
175	1.75 mm	
200	2.0 mm	**AG** 0.5 – 3.0 mm or 48 – 8 thread/inch
250	2.5 mm	
300	3.0 mm	
350	3.5 mm	**N** 3.5 – 5.0 mm or 7 – 5 thread/inch
400	4.0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

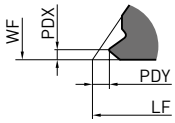
Threading type	
60	Partial Profile 60°
55	Partial Profile 55°
ISO	ISO Metric
W	Whitworth for BSW, BSP
BSPT	BSPT
UN	American UN
RD	Round DIN 405
TR	ISO Trapezoidal 30°
ACME	American ACME
UNJ	UNJ
APBU	API Buttress Casing
APRD	API Round Casing&Tubing
NPT	NPT
NPTF	NPTF

MMTE HOLDER

EXTERNAL THREADING







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

Right hand tool holder only.

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

(5 inserts per case)

30 Vc

SPARE PARTS

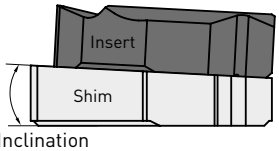
Order number		 *		 *		
	Clamp bridge	Clamp screw	Stop ring	Shim screw	Shim	Wrench
MMTER1212H16-C	SETK51	SETS51	CR4	HFC03008	CTE32TP15	1.TKY15F 2.HKY20R
MMTER1616H16-C						
MMTER2020K16-C						
MMTER2525M16-C						
MMTER3232P16-C						
MMTER2525M22-C	SETK61	SETS61	CR5	HFC04010	CTE43TP15	1.TKY20F 2.HKY25R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

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

SHIM

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

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



Inclination angle (0°)

Standard shim delivered with the holder.

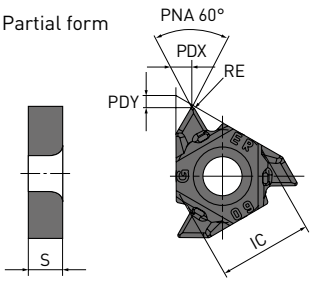
● : Inventory maintained. ★ : Inventory maintained in Japan.

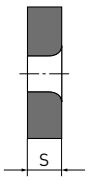
MMT

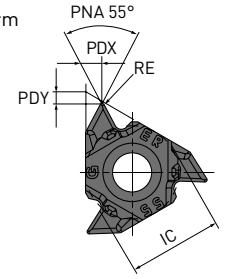
M-CLASS INSERTS WITH 3-D CHIPBREAKERS

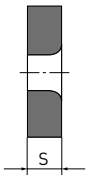
INSERTS

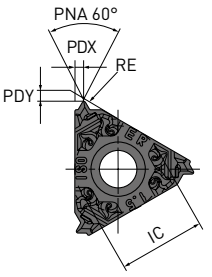
Order number	NEW MP9025	VP15TF	VP20RT	Pitch mm	Thread/ inch	IC	S	PDY	PDX	RE	Total cutting depth	Geometry
PARTIAL PROFILE 60°												
MMT16ERAG60-S	●	●	●	0.5–3.0	48–8	9.525	3.44	1.2	1.7	0.08	—	Partial form
MMT16ERA60-S	●		●	0.5–1.5	48–16	9.525	3.44	0.8	0.9	0.06	—	
MMT16ERG60-S	●		●	1.75–3.0	14–8	9.525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

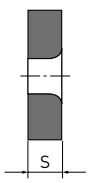


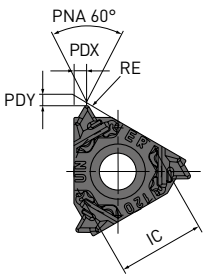












1/2

(5 inserts per case)

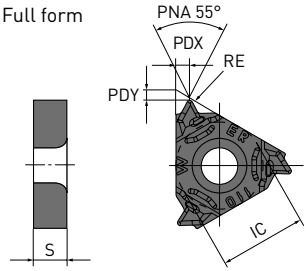
30 Vc

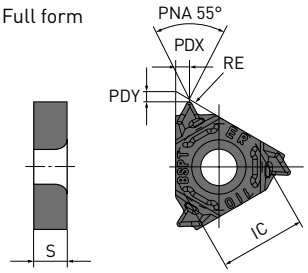
● / ★ = Expansion

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

MMT – M-CLASS INSERTS WITH 3-D CHIPBREAKERS

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





(5 inserts per case)

30 Vc

1. Identification: Please see page 26 (M-Class).

● / ★ = Expansion

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

MMTE HOLDER

RECOMMENDED CUTTING CONDITIONS

EXTERNAL THREADING

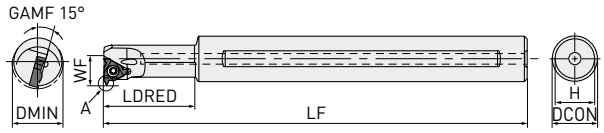
	Material	Hardness	Grade	Vc
P	Mild steel	≤180HB	MP9025	80 (60–100)
			VP10MF	150 (70–230)
			VP15TF	100 (60–140)
			VP20RT	80 (60–100)
	Carbon steel Alloy steel	180 – 280HB	MP9025	80 (60–100)
			VP10MF	140 (80–200)
			VP15TF	100 (60–140)
			VP20RT	80 (60–100)
M	Stainless steel	≤200HB	MP9025	80 (40–120)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

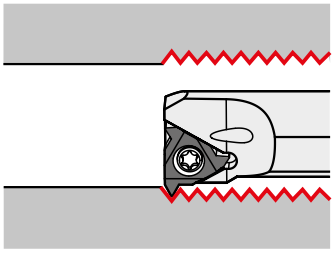
1/1

MMTI BORING BARS

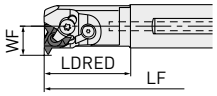
INTERNAL THREADING

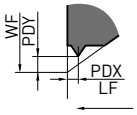
1 Screw-on type





2 Clamp-on type

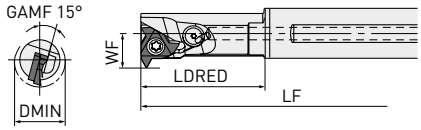




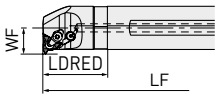
Details of position A. Refer to the insert standards for dimensions PDX and PDY.

Right hand tool holder only.

3 Screw-on type



4 Clamp-on type



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

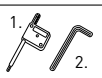
1/1

35 Vc

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

MMTI – INTERNAL THREADING

SPARE PARTS

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

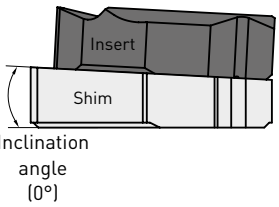
1. Select and use a shim as shown below (sold separately), dependant on the lead angle.
   • A screw-on tool holder uses no shim. (The holder body has a lead angle.) Use a tool holder with the appropriate lead angle.
   • Min. cutting diameter (DMIN) shows the internal hole diameter, not the thread diameter.

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

SHIM

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

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



Standard shim delivered with the holder.

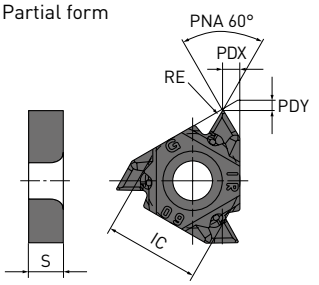
● : Inventory maintained. ★ : Inventory maintained in Japan.

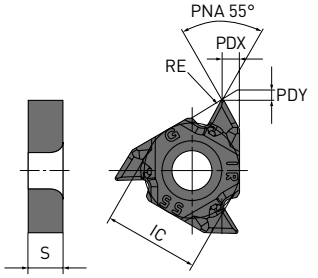
MMT

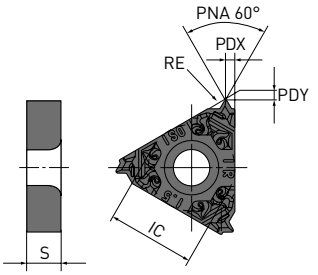
M-CLASS INSERTS WITH 3-D CHIPBREAKERS

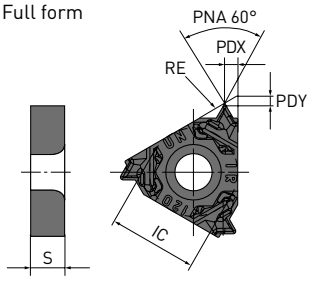
INSERTS

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









1/2

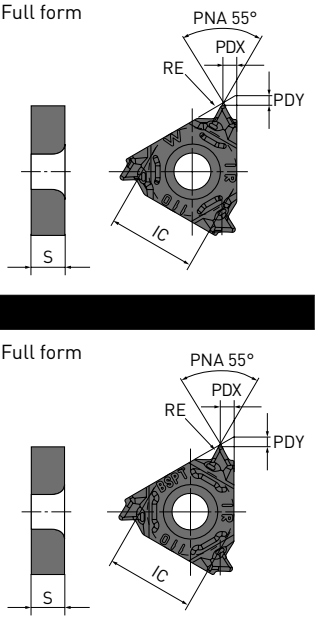
● / ★ = Expansion

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

MMT – M-CLASS INSERTS WITH 3-D CHIPBREAKERS

INSERTS

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



(5 inserts per case)

35 Vc

1. Identification: Please see page 26 (M-Class).

● / ★ = Expansion

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

MMTI BORING BARS

RECOMMENDED CUTTING CONDITIONS

INTERNAL THREADING

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

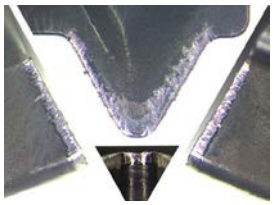
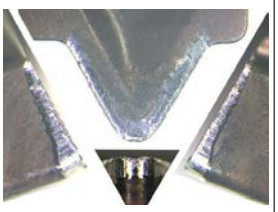
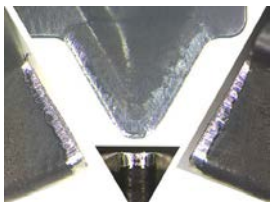
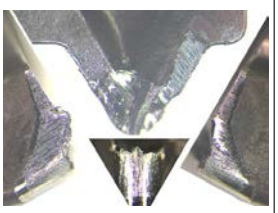
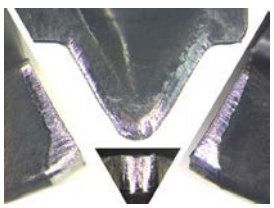
1/1

CUTTING PERFORMANCE

INCONEL®718 – COMPARISON OF WEAR BY MACHINING LENGTH

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

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

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

VQ

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

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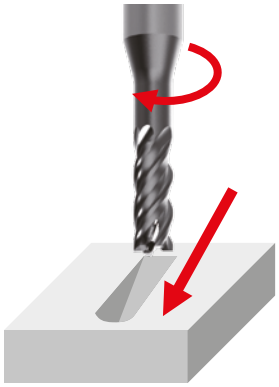
NEW

VQ4MVM

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

RAMPING IS A METHOD OF SINKING GRADUALLY AS THE TOOL TRAVERSES

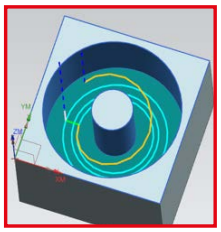
This eliminates the need for a pilot hole when machining pockets, thereby reducing costs through tool consolidation. Compared to direct plunge cutting, ramping enables simultaneous multi-axis feed at high speeds to lower machining times. This method is ideal for machining wide and shallow pockets.



Steep ramping capability

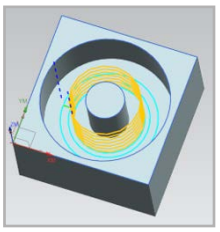
VQ4MVM provides high-performance and multi-functionality. It can perform shoulder milling, grooving and helical machining as well as ramping angles of up to 30° in carbon and alloy steels.

14 sec

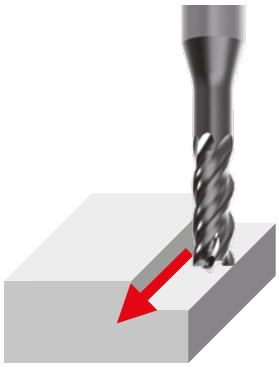


VQ4MVM
Helical and ramping
Only 1 pass needed

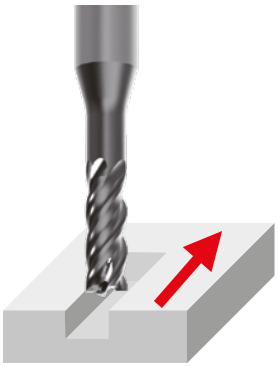
27 sec



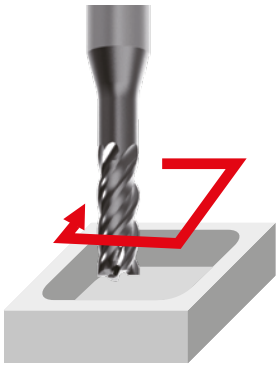
Conventional
Helical milling
7 passes needed



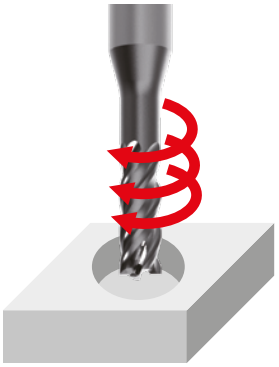
Shoulder milling



Slot milling



Pocket milling



Helical milling

NEW

VQ4MVM

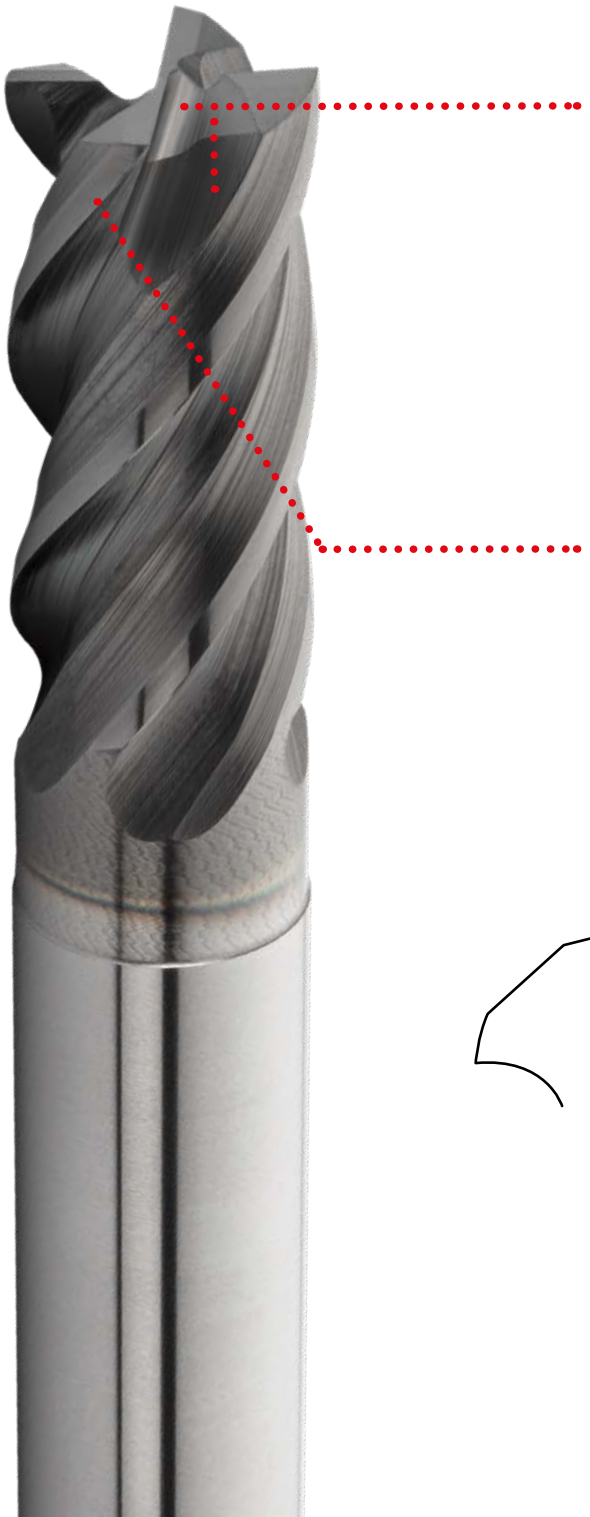
HIGH PERFORMANCE END MILL

NEWLY-DEVELOPED COATING WITH IMPROVED WEAR RESISTANCE

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

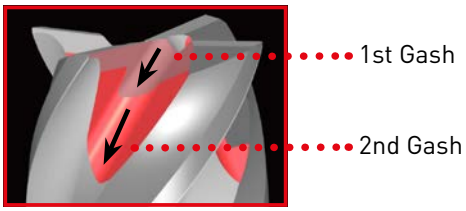
SMART MIRACLE Coating
(Al,Cr)N coating is the most suitable coating for higher efficiency machining.

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



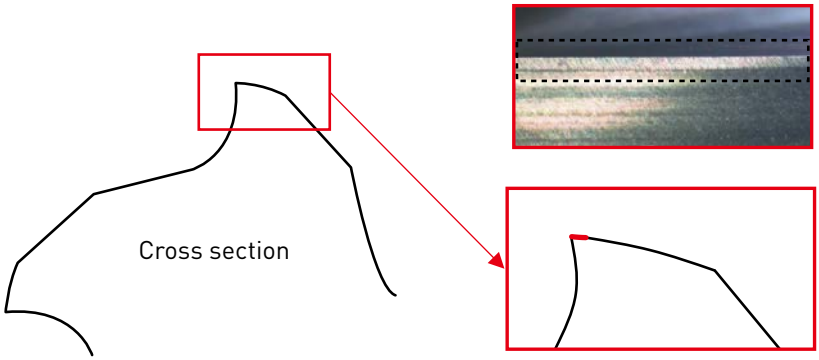
SECONDARY GASH

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



MICRO RELIEF ANGLE

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



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

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

VQ4MVM

Conventional

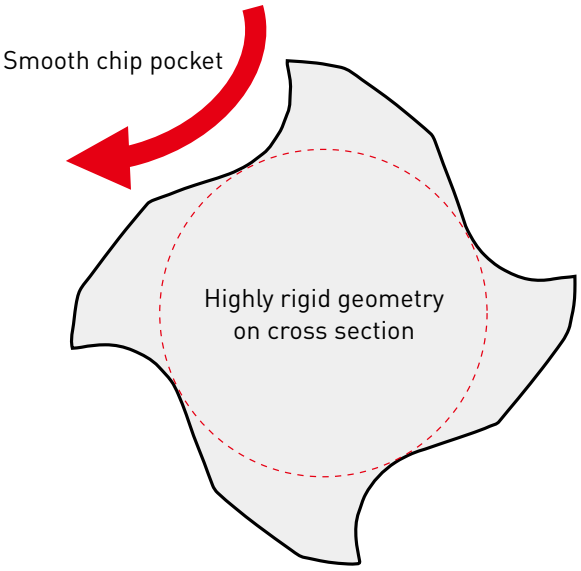
NEW

VQ4MVM

HIGH PERFORMANCE END MILL

CHIP POCKET AND HIGHLY RIGID GEOMETRY

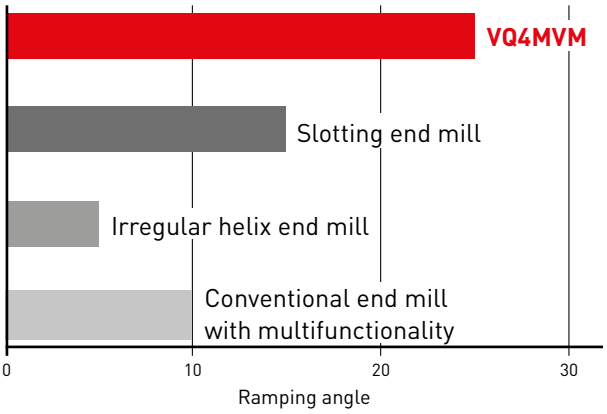
VQ4MVM is suitable for strong ramping machining and chip evacuation performance due to the highly rigid geometry.



COMPARISON OF RAMPING ANGLES WHEN MACHINING X5CrNi18-10

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

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

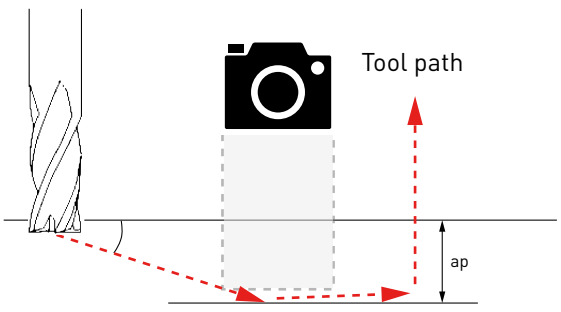


MACHINING SURFACE

VQ4MVM

Conventional end mill

SHOOTING POINT



Ramping angle α

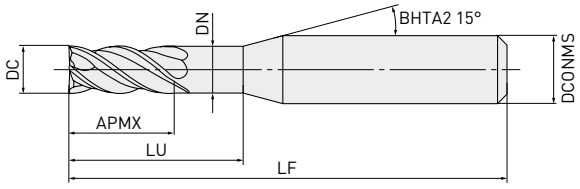
NEW

VQ4MVM

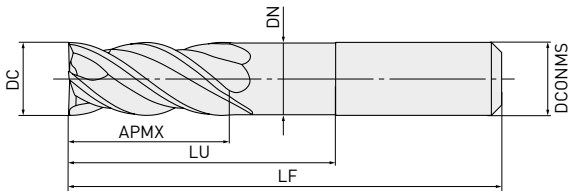
END MILL, MEDIUM CUT LENGTH, 4 FLUTE, FOR MULTIFUNCTIONAL MACHINING

P M S

1



2



DC ≤ 12
0 -0.020

DCONMS = 6
0 -0.008

DCONMS 8, 10	DCONMS = 12
0 -0.009	0 -0.011

- Multifunctional end mill that enables a strong ramping capability.
- Chip evacuation is improved by increasing the capacity of the radial cutting edge pocket.

Order number	Stock	DC	APMX	LF	DCONMS	LU	DN	ZEFP	Type
VQ4MVMD0400N180	●	4	11	50	6	18	3.85	4	1
VQ4MVMD0500N180	●	5	13	50	6	18	4.85	4	1
VQ4MVMD0600N200	●	6	13	60	6	20	5.85	4	2
VQ4MVMD0800N240	●	8	19	60	8	24	7.85	4	2
VQ4MVMD1000N300	●	10	22	70	10	30	9.70	4	2
VQ4MVMD1200N360	●	12	26	75	12	36	11.70	4	2

1/1

42 Vc

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

NEW

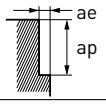
VQ4MVM

RECOMMENDED CUTTING CONDITIONS

SIDE MILLING

	Material	DC	n	Vc	f	ap	ae
P	Mild steel, Carbon steel, Alloy steel (180 – 280HB),	4	9500	120	1400	6	1.2
		5	7600	120	1400	7.5	1.5
		6	6400	120	1400	9	1.8
		8	4800	120	1300	12	2.4
		10	3800	120	1200	15	3
		12	3200	120	1000	18	3.6
P	Pre-hardened steel (≤45HRC), Alloy tool steel	4	5600	70	490	4	0.4
		5	4500	70	500	5	0.5
		6	3700	70	500	6	0.6
		8	2800	70	520	8	0.8
		10	2200	70	460	10	1
		12	1900	70	450	12	1
M	Austenitic stainless steel, Ferritic and martensitic stainless steel,	4	6400	80	470	4	0.6
		5	5100	80	470	5	0.9
		6	4200	80	580	6	1.2
		8	3200	80	630	8	1.5
S	Titanium alloy	10	2500	80	660	10	1.8
		12	2100	80	610	12	2.4
M	Precipitation hardening stainless steel, Cobalt chromium alloy	4	5600	70	490	4	0.8
		5	4500	70	500	5	1
		6	3700	70	500	6	1.2
		8	2800	70	520	8	1.6
		10	2200	70	460	10	2
		12	1900	70	450	12	2.4
S	Heat resistant alloy	4	2400	30	120	4	0.4
		5	1900	30	120	5	0.5
		6	1600	30	130	6	0.6
		8	1200	30	130	8	0.8
		10	950	30	140	10	1
		12	800	30	140	12	1.2

1/1



1. SMART MIRACLE coating has very low electrical conductivity; therefore, an external contact type of tool setter (electrically transmitted) may not work.
   When measuring the tool length, please use an internal contact type (non-electrical type) or a laser tool setter.
2. When cutting austenitic stainless steels and titanium alloys, the use of water-soluble cutting fluid is effective.
3. If the depth of cut is shallow, the revolution and feed rate can be increased.
4. If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

NEW

VQ4MVM

SLOT MILLING AND RAMPING

	Material	DC	n	Vc	f	ap	ae
P	Mild steel, Carbon steel, Alloy steel (180 – 280HB)	4	8000	100	840	4	4
		5	6400	100	840	5	5
		6	5300	100	840	6	6
		8	4000	100	740	8	8
		10	3200	100	680	10	10
		12	2700	100	570	12	12
P	Pre-hardened steel (≤45HRC), Alloy tool steel	4	4800	60	210	2	4
		5	3800	60	210	2.5	5
		6	3200	60	230	3	6
		8	2400	60	240	4	8
		10	1900	60	270	5	10
		12	1600	60	260	6	12
M S	Austenitic stainless steel, Ferritic and martensitic stainless steel, Titanium alloy	4	4800	60	280	4	4
		5	3800	60	280	5	5
		6	3200	60	300	6	6
		8	2400	60	320	8	8
		10	1900	60	350	10	10
		12	1600	60	340	12	12
M	Precipitation hardening stainless steel, Cobalt chromium alloy	4	4000	50	250	2	4
		5	3200	50	250	2.5	5
		6	2700	50	290	3	6
		8	2000	50	260	4	8
		10	1600	50	230	5	10
		12	1300	50	210	6	12
S	Heat resistant alloy	4	2000	25	93	1.2	4
		5	1600	25	95	1.5	5
		6	1300	25	96	1.8	6
		8	990	25	100	2.4	8
		10	800	25	120	3	10
		12	660	25	110	3.6	12

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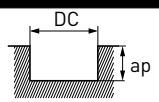

1. SMART MIRACLE coating has very low electrical conductivity; therefore, an external contact type of tool setter (electric transmitted) may not work.
   When measuring the tool length, please use an internal contact type (non-electricity type) or a laser tool setter.
2. When cutting austenitic stainless steels and titanium alloys, the use of water-soluble cutting fluid is effective.
3. When performing machining with a strong ramping angle, a high clamping force tool holder is recommended.
4. When performing ramping deeper than the recommended depth of cut, please divide the process into multiple steps within the recommended depth of cut.
5. If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

NEW

VQ4MVM

FEED RATE FACTOR FOR RAMPING

	Material	DC	Slot milling feed %						
			1°	5°	10°	15°	20°	25°	30°
P	Mild steel, Carbon steel, Alloy steel (180 – 280HB),	4	100	90	80	80	60	60	60
		5	100	90	80	80	60	60	60
		6	100	90	80	80	60	60	60
		8	100	95	90	90	90	75	75
		10	100	95	95	95	90	80	80
		12	100	95	95	95	90	80	80
P	Pre-hardened steel (≤45HRC), Alloy tool steel	4	80	70	60				
		5	80	70	60				
		6	80	70	60				
		8	70	60	50				
		10	70	60	50				
		12	70	60	50				
M	Austenitic stainless steel, Ferritic and martensitic stainless steel, Titanium alloy	4	90	80	70	50			
		5	90	80	70	50			
		6	90	80	70	60			
		8	90	80	70	60			
S		10	80	70	60	50			
		12	80	70	60	50			
M	Precipitation hardening stainless steel, Cobalt chromium alloy	4	90	80	70	60	60		
		5	90	80	70	60	60		
		6	90	80	70	60	60		
		8	90	80	70	60	60		
		10	80	80	70	60	60		
		12	80	80	70	60	60		
S	Heat resistant alloy	4	90	80					
		5	90	80					
		6	90	80					
		8	90	80					
		10	80	70					
		12	80	70					

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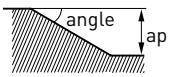
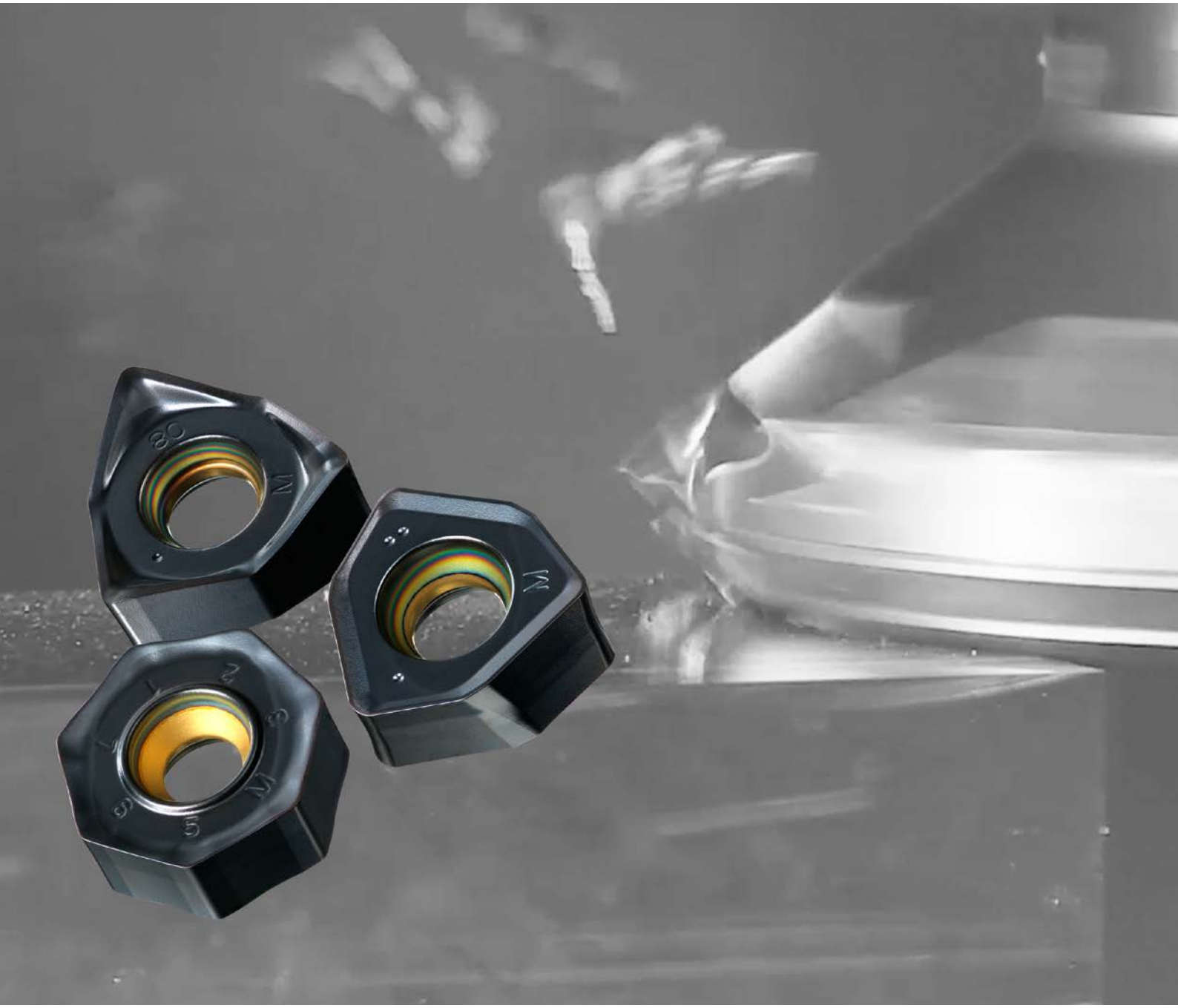


1. SMART MIRACLE coating has very low electrical conductivity; therefore, an external contact type of tool setter (electric transmitted) may not work.
   When measuring the tool length, please use an internal contact type (non-electrical type) or a laser tool setter.
2. When performing ramping, please use the feed rate shown on the previous page multiplied by the coefficient.
3. When cutting austenitic stainless steels and titanium alloys, the use of water-soluble cutting fluid is effective.
4. When performing machining with large ramping angles, a high clamping force tool holder is recommended. Also, if the machine or workpiece material lacks rigidity, or if chipping occurs on the cutting edge, adjust the ramping angle and feed rate.
5. When performing ramping deeper than the recommended depth of cut, please divide the process into multiple steps within the recommended depth of cut.

NEW

MV1000 SERIES

SETTING A NEW STANDARD FOR TOOL LIFE



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MV1000 SERIES

COATED CARBIDE GRADE FOR MILLING

ADVANCED WEAR RESISTANCE

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

ADVANCED THERMAL SHOCK RESISTANCE

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

Graphical representation

EXCELLENT WELDING RESISTANCE

Smooth surface.

OUTSTANDING WEAR RESISTANCE

Newly developed Al-Rich coating.

EXCELLENT CHIPPING RESISTANCE FOR STABLE MACHINING

Newly developed bonding layer.

FRACTURE RESISTANCE FOR THE ULTIMATE STABILITY

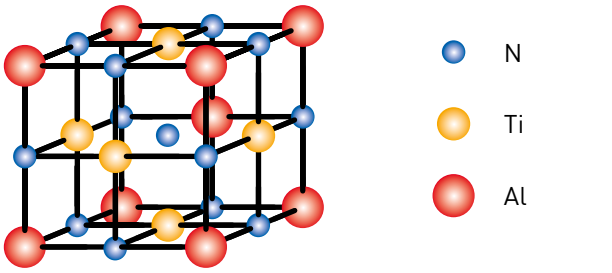
Exclusive cemented carbide substrate.

MV1000 SERIES

COMPLETE COATING TECHNOLOGY THAT REWRITES CURRENT TOOL LIFE STANDARDS

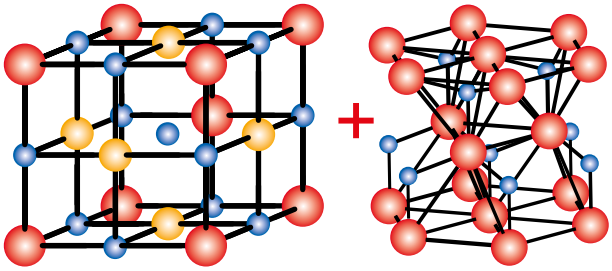
DUE TO THE NEWLY DEVELOPED AL-RICH COATING

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



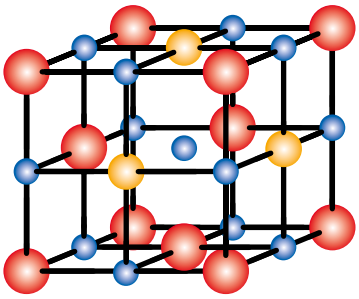
The combination of atoms with different sizes creates an exceptionally hard crystal structure.

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

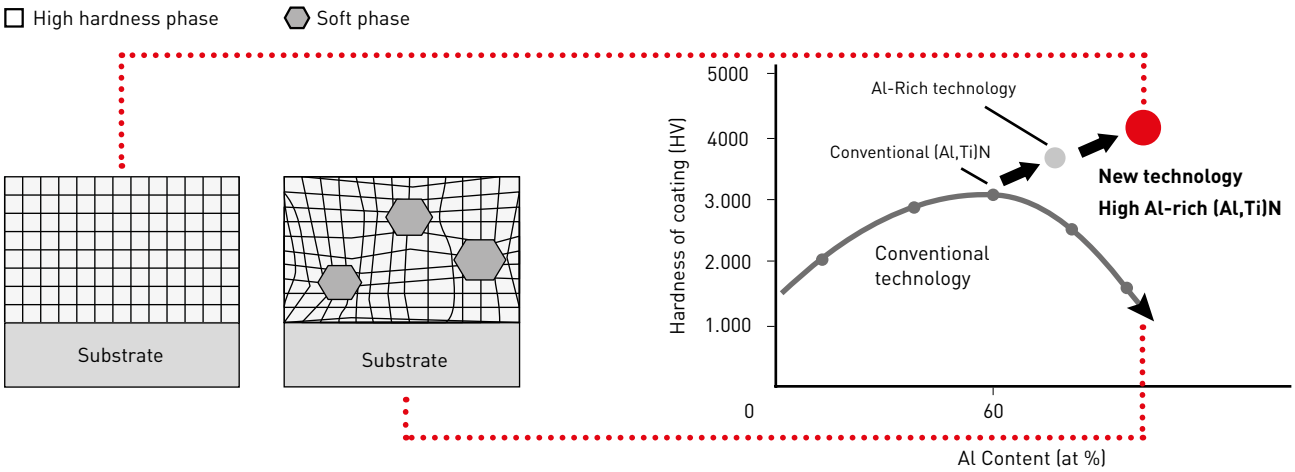


When the Al ratio is over 60 %, a softer crystal phase is formed.

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



Crystal image of **MV1000** series



MV1020 / MV1030

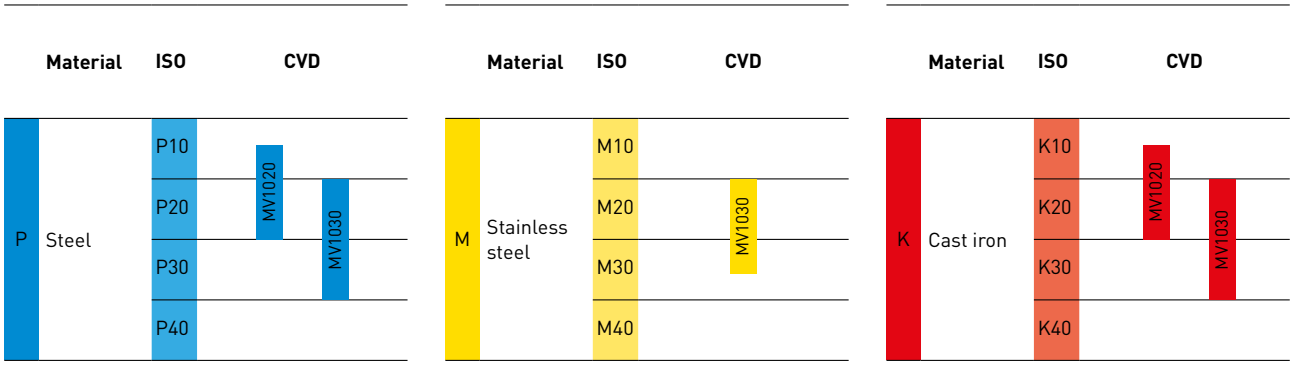
COATED CARBIDE GRADE FOR MILLING

MV1020

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

MV1030

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



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

MV1000 SERIES

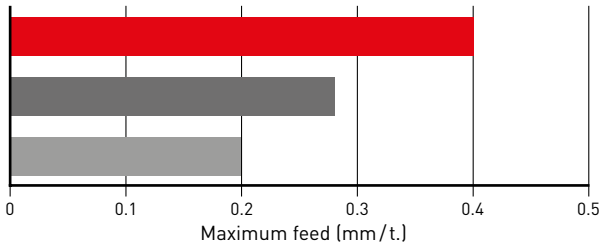
CUTTING PERFORMANCE

MV1030

COMPARISON OF FRACTURE RESISTANCE FOR INTERMITTENT CUTTING OF ALLOY STEEL

MV1030 is capable of high feed machining due to its excellent fracture resistance even during interrupted cutting.

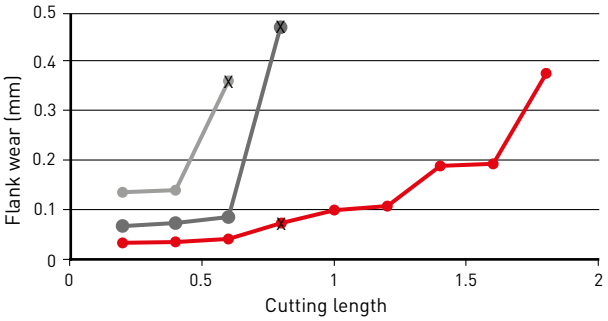
Material	DIN 41CrMo4
Tool	ASX445
Insert	SEMT13T3AGSN-JM
Vc (m/min)	200
ap (mm)	3.0
ae (mm)	100
Cutting mode	Dry cutting



COMPARISON OF WEAR RESISTANCE WHEN MACHINING STAINLESS STEEL

MV1030 suppresses damage at the cut border and can be expected to significantly improve tool life.

Material	DIN X5CrNi189
Tool	ASX445
Insert	SEMT13T3AGSN-JM
Vc (m/min)	180
fz (mm/t)	0.2
ap (mm)	2.0
ae (mm)	100
Cutting mode	Dry cutting Single insert

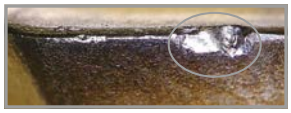


AFTER MACHINING 0.8 M

MV1030

Conventional A

AFTER MACHINING 0.6 M



Conventional B

■ : MV1030 ■ A ■ B : Conventional tool

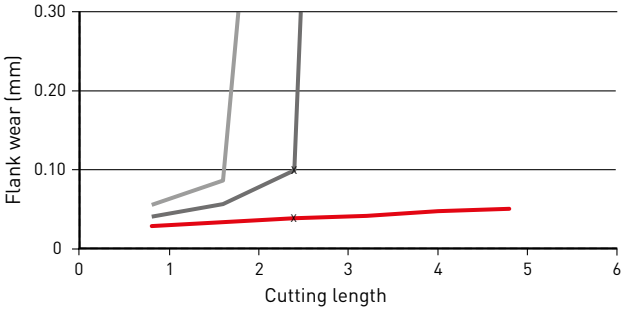
MV1000 SERIES

CUTTING PERFORMANCE

MV1020

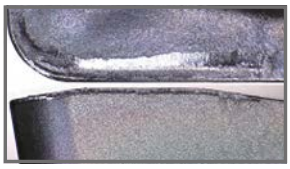
COMPARISON OF WEAR RESISTANCE WHEN MACHINING ALLOY STEEL

Material	DIN 41CrMo4
Tool	WWX400
Insert	6NMU1409080PNER-M
Vc (m/min)	300
fz (mm/t)	0.15
ap (mm)	3.0
ae (mm)	52
Cutting mode	Dry cutting Single insert



TAKEN AFTER CUTTING LENGTH OF 2.4 M

MV1020

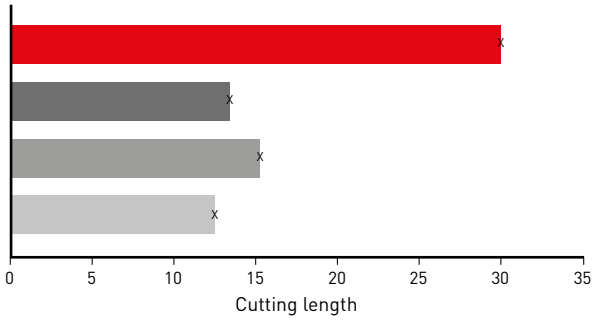


Conventional A

Conventional B

COMPARISON OF WEAR RESISTANCE WHEN MACHINING DUCTILE CAST IRON

Material	DIN GGG70
Tool	WJX14
Insert	JOMU140715ZZER-M
Vc (m/min)	220
fz (mm/t)	1.0
ap (mm)	1.0
ae (mm)	45
Cutting mode	Dry cutting Single insert



30.4 M

MV1020

13.6 M

Conventional A

15.2 M

Conventional B

12.8 M

Conventional C

■ : MV1020 ■ A ■ B ■ C : Conventional tool

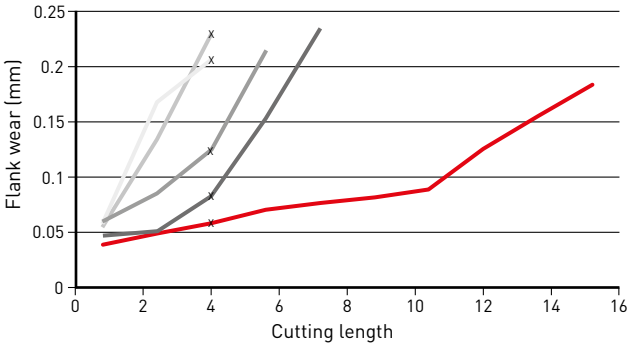
MV1000 SERIES

CUTTING PERFORMANCE

MV1020

COMPARISON OF WEAR RESISTANCE WHEN MACHINING DUCTILE CAST IRON

Material	DIN GGG70
Tool	AHX440
Insert	NNMU130508ZEN-M
Vc (m/min)	300
fz (mm/t)	0.1
ap (mm)	2.0
ae (mm)	52
Cutting mode	Dry cutting Single insert



TAKEN AFTER CUTTING LENGTH OF 4.0 M

MV1020

Conventional A

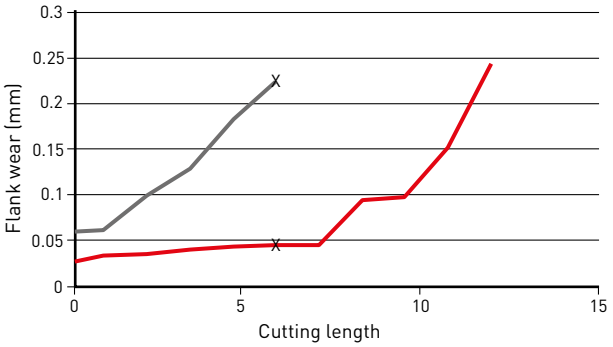
Conventional B

Conventional C

Conventional D

COMPARISON OF WEAR RESISTANCE WHEN MACHINING ALLOY STEEL

Material	DIN 41CrMo4
Tool	WSX445
Insert	SNMU140812ANER-M
Vc (m/min)	300
fz (mm/t)	0.2
ap (mm)	2.0
ae (mm)	100
Cutting mode	Dry cutting



TAKEN AFTER CUTTING LENGTH OF 6.0 M

12 M CUTTING LENGTH ACHIEVED

MV1020

CHIPPING OCCURS AT CUTTING LENGTH OF 6 M

Conventional A

■ : MV1020 ■ A ■ B ■ C ■ D : Conventional tool

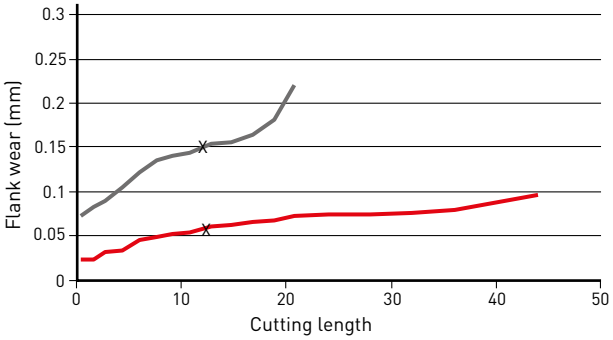
MV1000 SERIES

CUTTING PERFORMANCE

MV1020

COMPARISON OF WEAR RESISTANCE FOR ROLLED STEEL

Material	DIN St 44-2
Tool	ASX445
Insert	SEMT13T3AGSN-JM
Vc (m/min)	300
fz (mm/t)	0.2
ap (mm)	2.0
ae (mm)	100
Cutting mode	Dry cutting

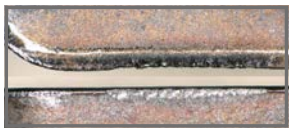


TAKEN AFTER CUTTING LENGTH OF 12.8 M

40 M CUTTING LENGTH ACHIEVED

MV1020

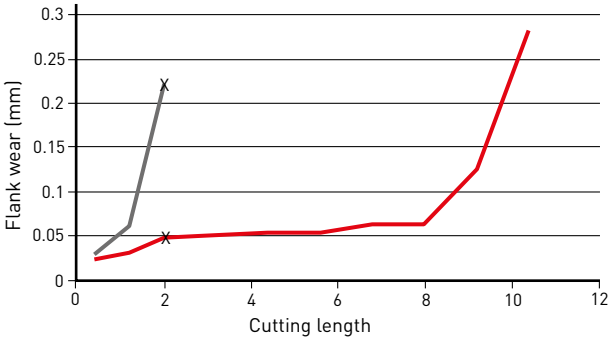
WEAR PROGRESSED AND THE SUBSTRATE WAS EXPOSED



Conventional

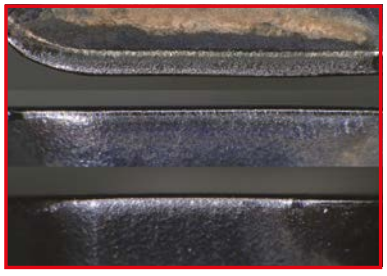
COMPARISON OF WEAR RESISTANCE WHEN MACHINING CARBON STEEL

Material	DIN Ck55
Tool	ASX445
Insert	SEMT13T3AGSN-JM
Vc (m/min)	200
fz (mm/t)	0.2
ap (mm)	2.0
ae (mm)	100
Cutting mode	Wet cutting



TAKEN AFTER CUTTING LENGTH OF 2.0 M

10 M CUTTING LENGTH ACHIEVED



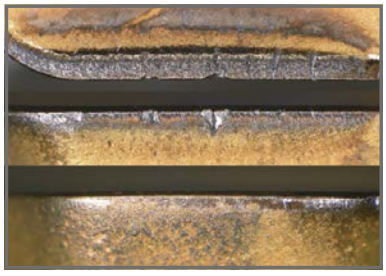
MV1020

Rake face

Main cutting edge

Wiper

CHIPPING OCCURRED DUE TO THERMAL CRACKS AT A CUTTING LENGTH OF 2 M



Conventional

■ : MV1020 ■ : Conventional tool

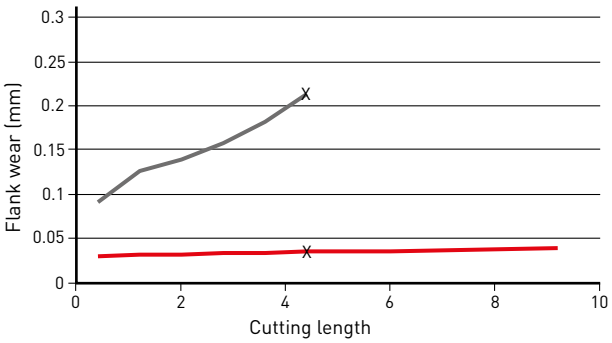
MV1000 SERIES

CUTTING PERFORMANCE

MV1020

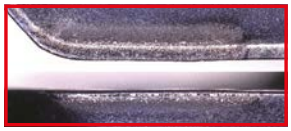
COMPARISON OF WEAR RESISTANCE WHEN MACHINING DUCTILE CAST IRON

Material	DIN GGG40.5
Tool	ASX445
Insert	SEMT13T3AGSN-JM
Vc (m/min)	250
fz (mm/t)	0.2
ap (mm)	2.0
ae (mm)	100
Cutting mode	Dry cutting



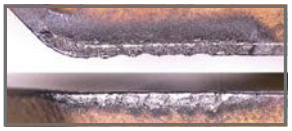
TAKEN AFTER CUTTING LENGTH OF 4.4 M

ACHIEVES A CUTTING LENGTH OF 9 M OR MORE



MV1020

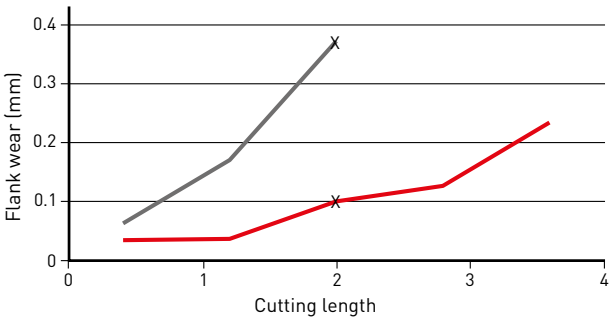
UNABLE TO CONTINUE MACHINING AFTER A CUT LENGTH OF 4.4 M



Conventional

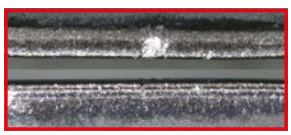
COMPARISON OF WEAR RESISTANCE WHEN MACHINING DUCTILE CAST IRON WET CUTTING

Material	DIN GGG70
Tool	ASX445
Insert	SEMT13T3AGSN-JM
Vc (m/min)	200
fz (mm/t)	0.2
ap (mm)	2.0
ae (mm)	100
Cutting mode	Wet cutting



TAKEN AFTER CUTTING LENGTH OF 2.0 M

3.5 M CUTTING LENGTH ACHIEVED



MV1020

UNABLE TO CONTINUE PROCESSING WITH A CUT LENGTH OF 2.0 M

Conventional

MV1000 SERIES

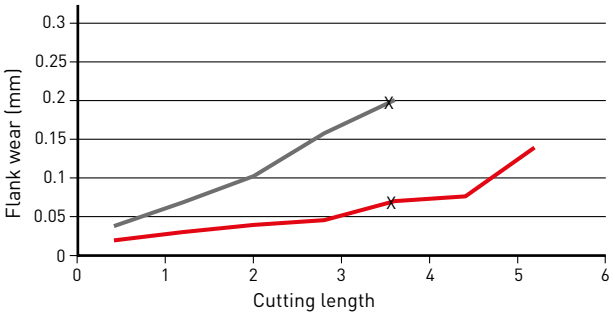
CUTTING PERFORMANCE

MV1020

COMPARISON OF WEAR RESISTANCE WHEN MACHINING DUCTILE CAST IRON

DRY CUTTING

Material	DIN GGG70
Tool	ASX445
Insert	SEMT13T3AGSN-JM
Vc (m/min)	200
fz (mm/t)	0.2
ap (mm)	2.0
ae (mm)	100
Cutting mode	Dry cutting



TAKEN AFTER CUTTING LENGTH OF 3.6 M

5.0 M CUTTING LENGTH ACHIEVED

MV1020

CHIPPING OCCURRED DUE TO PEELING OF THE COATING

Conventional

■ : MV1020 ■ : Conventional tool

MV1000 SERIES

INSERTS

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

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

Honing:
E: Round

Order number	Application	Class	Honing	MV1020	MV1030	IC	S	S1	BS	RE/ BCH	Geometry
6NMU0906040PNER-M	General purpose cutting	M	E	●		9.0	5.3	6.1	1.6	0.4	**WWX200**
6NMU0906080PNER-M	General purpose cutting	M	E	●		9.0	5.3	6.1	1.2	0.8	
6NMU0906080PNER-R	Cutting edge strength	M	E	●		9.0	5.3	6.1	1.2	0.8	
6NGU1409040PNER-L	Low cutting resistance	G	E	●	●	14.0	7.0	9.0	1.7	0.4	**WWX400**
6NGU1409080PNER-L	Low cutting resistance	G	E	●	●	14.0	7.0	9.0	1.3	0.8	
6NGU1409040PNER-M	General purpose cutting	G	E	●	●	14.0	7.0	9.0	1.7	0.4	
6NGU1409080PNER-M	General purpose cutting	G	E	●	●	14.0	7.0	9.0	1.3	0.8	
6NMU1409040PNER-M	General purpose cutting	M	E	●	●	14.0	7.0	9.0	1.7	0.4	
6NMU1409080PNER-M	General purpose cutting	M	E	●	●	14.0	7.0	9.0	1.3	0.8	
6NMU1409160PNER-M	General purpose cutting	M	E	●	●	14.0	7.0	9.0	0.5	1.6	
6NMU1409200PNER-M	General purpose cutting	M	E	●	●	14.0	7.0	9.0	0.5	2.0	
6NMU1409080PNER-R	Cutting edge strength	M	E	●	●	14.0	7.0	9.0	1.3	0.8	
6NMU1409160PNER-R	Cutting edge strength	M	E	●	●	14.0	7.0	9.0	0.5	1.6	
6NMU1409200PNER-R	Cutting edge strength	M	E	●	●	14.0	7.0	9.0	0.5	2.0	
SNGU140812ANER-L	Low cutting resistance	G	E	●	●	14.0	8.4	—	1.5	1.2	**WSX445**
SNGU140812ANER-M	General purpose cutting	G	E	●	●	14.0	8.4	—	1.5	1.2	
SNMU140812ANER-M	General purpose cutting	M	E	●	●	14.0	8.4	—	1.5	1.2	
SNMU140812ANER-R	Cutting edge strength	M	E	●	●	14.0	8.4	—	1.5	1.2	
SNMU140812ANER-H	Cutting edge strength	M	E	●	●	14.0	8.4	—	1.5	1.2	
JOMU090512ZZER-L	Low cutting resistance	M	E	●	●	9.525	4.73	—	0.88	1.2	**WJX**
JOMU140715ZZER-L	Low cutting resistance	M	E	●	●	14.0	6.58	—	1.3	1.5	
JOMU090512ZZER-M	General purpose cutting	M	E	●	●	9.525	4.75	—	0.88	1.2	
JOMU140715ZZER-M	General purpose cutting	M	E	●	●	14.0	6.63	—	1.3	1.5	
JOMU090512ZZER-R	Cutting edge strength	M	E	●	●	9.525	4.83	—	0.88	1.2	
JOMU140715ZZER-R	Cutting edge strength	M	E	●	●	14.0	6.75	—	1.3	1.5	
SNMU1206C05ZNER-M	Cast iron milling	M	E	●	●	12.7	6.2	—	1.6	0.5	**WSF406W**

(10 inserts in one case)

58 Vc

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

MV1000 SERIES – INSERTS

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

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

Honing:
E: Round

Order number	Application	Class	Honing	MV1020	MV1030	L	S	LE	BS	RE	Geometry
LOGU0904020PNER-L	Low cutting resistance	G	E	●	●	8.7	4.3	7.6	1.7	0.2	VPX200
LOGU0904040PNER-L		G	E	●	●	8.7	4.3	7.6	1.5	0.4	
LOGU0904080PNER-L		G	E	●	●	8.7	4.3	7.6	1.2	0.8	
LOGU0904100PNER-L		G	E	●	●	8.7	4.3	7.6	1.0	1.0	
LOGU0904120PNER-L		G	E	●	●	8.7	4.3	7.6	0.8	1.2	
LOGU0904160PNER-L		G	E	●	●	8.7	4.3	7.6	0.5	1.6	
LOGU0904020PNER-M	General purpose cutting	G	E	●	●	8.7	4.3	7.6	1.7	0.2	
LOGU0904040PNER-M		G	E	●	●	8.7	4.3	7.6	1.6	0.4	
LOGU0904080PNER-M		G	E	●	●	8.7	4.3	7.6	1.2	0.8	
LOGU0904100PNER-M		G	E	●	●	8.7	4.3	7.6	1.0	1.0	
LOGU0904120PNER-M		G	E	●	●	8.7	4.3	7.6	0.9	1.2	
LOGU0904160PNER-M		G	E	●	●	8.7	4.3	7.6	0.5	1.6	
LOGU1207020PNER-L	Low cutting resistance	G	E	●	●	12.4	7.0	11.3	3.0	0.2	VPX300
LOGU1207040PNER-L		G	E	●	●	12.4	7.0	11.3	2.8	0.4	
LOGU1207080PNER-L		G	E	●	●	12.4	7.0	11.3	2.6	0.8	
LOGU1207100PNER-L		G	E	●	●	12.4	7.0	11.3	2.5	1.0	
LOGU1207120PNER-L		G	E	●	●	12.4	7.0	11.3	2.4	1.2	
LOGU1207160PNER-L		G	E	●	●	12.4	7.0	11.3	1.8	1.6	
LOGU1207200PNER-L		G	E	●	●	12.4	7.0	11.3	1.4	2.0	
LOGU1207240PNER-L		G	E	●	●	12.4	7.0	11.3	1.2	2.4	
LOGU1207300PNER-L		G	E	●	●	12.4	7.0	11.3	0.6	3.0	
LOGU1207320PNER-L		G	E	●	●	12.4	7.0	11.3	0.4	3.2	
LOGU1207020PNER-M	General purpose cutting	G	E	●	●	12.4	7.0	11.3	3.0	0.2	
LOGU1207040PNER-M		G	E	●	●	12.4	7.0	11.3	2.8	0.4	
LOGU1207080PNER-M		G	E	●	●	12.4	7.0	11.3	2.4	0.8	
LOGU1207100PNER-M		G	E	●	●	12.4	7.0	11.3	2.3	1.0	
LOGU1207120PNER-M		G	E	●	●	12.4	7.0	11.3	2.1	1.2	
LOGU1207160PNER-M		G	E	●	●	12.4	7.0	11.3	1.7	1.6	
LOGU1207200PNER-M		G	E	●	●	12.4	7.0	11.3	1.4	2.0	
LOGU1207240PNER-M		G	E	●	●	12.4	7.0	11.3	1.0	2.4	
LOGU1207300PNER-M		G	E	●	●	12.4	7.0	11.3	0.5	3.0	
LOGU1207320PNER-M		G	E	●	●	12.4	7.0	11.3	0.3	3.2	

(10 inserts in one case)

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

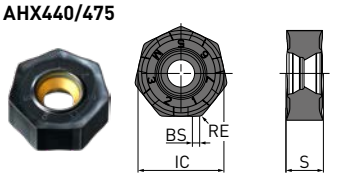
MV1000 SERIES – INSERTS

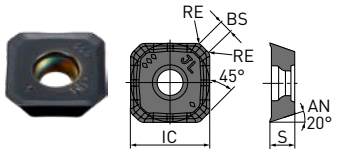
P	Steel	◆	◆
M	Stainless steel		◆
K	Cast iron	◆	◆

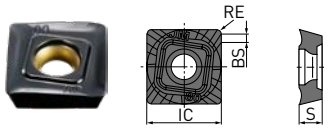
Please note that the cutting conditions differ depending on multiple factors, for more details refer to the recommended cutting conditions.

Honing:
E: Round S: Chamfer + round

Order number	Application	Class	Honing	MV1020	MV1030	IC	S	S1	BS	RE	Geometry
NNMU130508ZER-L	Low cutting resistance	M	E	●	●	13.4	5.77	—	1.0	0.8	**AHX440/475**
NNMU130508ZEN-M	General purpose cutting	M	E	●	●	13.4	5.57	—	1.0	0.8	
NNMU130532ZEN-M	General purpose cutting	M	E	●	●	13.4	5.57	—	—	3.2	
NNMU130532ZEN-R	Cutting edge strength	M	E	●	●	13.4	5.47	—	—	3.2	
SEET13T3AGEN-JL	Finish-light cutting	E	E	●	●	13.4	3.97	—	1.9	1.5	**ASX445**
SEMT13T3AGSN-JM	Light-rough cutting	M	S	●	●	13.4	3.97	—	1.9	1.5	
SEMT13T3AGSN-JH	Medium-heavy cutting	M	S	●	●	13.4	3.97	—	1.9	1.5	
SEMT13T3AGSN-FT	Cast iron milling	M	S	●	●	13.4	3.97	—	1.9	1.5	
SOET12T308PEER-JL	Finish-light cutting	E	E	●	●	12.7	3.97	—	1.4	0.8	**ASX400**
SOMT12T308PEER-JM	Light-rough cutting	M	E	●	●	12.7	3.97	—	1.4	0.8	
SOMT12T308PEER-JH	Medium-heavy cutting	M	E	●	●	12.7	3.97	—	1.4	0.8	
SOMT12T320PEER-FT	Heavy interrupted cutting	M	E	●	●	12.7	3.97	—	0.5	2.0	







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(10 inserts in one case)

58 Vc

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

MV1000 SERIES

COATED CARBIDE GRADE FOR MILLING

COVERS A WIDE RANGE OF CUTTING SPEEDS (DRY CUTTING WITH WWX400)

	Material	Properties	Grade	Vc
P	Mild steel	≤180HB	MV1020	305 (250 – 360)
			MV1030	235 (190 – 280)
			MP6120	245 (200 – 290)
			MP6130	235 (190 – 280)
	Carbon steel Alloy steel	180–280HB	MV1020	260 (210 – 310)
			MV1030	200 (155 – 245)
			MP6120	205 (160 – 250)
			MP6130	200 (155 – 245)
		280–350HB	MV1020	260 (210 – 310)
			MV1030	200 (155 – 245)
			MP6120	200 (155 – 245)
			MP6130	195 (150 – 240)
M	Stainless steel	>200HB	MV1030	180 (155 – 200)
			MP7130	175 (150 – 200)
			VP15TF	175 (150 – 200)
K	Ductile cast iron	Tensile strength ≤450MPa	MV1020	255 (200 – 310)
			MV1030	205 (160 – 250)
			MP6120	205 (160 – 250)
			MP6130	205 (160 – 250)
		Tensile strength >450MPa	MV1020	225 (160 – 290)
			MV1030	170 (130 – 210)
			MP6120	170 (130 – 210)
			MP6130	170 (130 – 210)

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MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

WWX200/400

CUTTING SPEED (DRY CUTTING)

	Material	Properties	Conditions	MV1020			MV1030		
				ae			ae		
				≥0.5 DC	≥0.8 DC	DC (Slot)	≥0.5 DC	≥0.8 DC	DC (Slot)
				Vc			Vc		
P	Mild steel	≤180HB	●	300 (250–350)	280 (230–330)	250 (200–300)	230 (190–270)	210 (170–250)	190 (150–230)
			◐	290 (240–340)	260 (210–320)	240 (190–290)	230 (190–270)	210 (170–250)	190 (150–230)
	Carbon steel Alloy steel	180–350HB	●	260 (210–310)	240 (190–280)	210 (160–260)	200 (160–240)	180 (140–220)	160 (120–200)
			◐	250 (200–300)	230 (180–270)	200 (150–250)	200 (160–240)	180 (140–220)	160 (120–200)
M	Stainless steel	—	●	—	—	—	180 (160–200)	160 (140–180)	—
			◐	—	—	—	170 (150–190)	150 (130–170)	—
K	Ductile cast iron	Tensile strength ≤450MPa	●	240 (200–310)	220 (170–280)	200 (150–260)	210 (170–250)	190 (150–230)	170 (130–210)
			◐	230 (190–300)	210 (160–270)	190 (140–250)	210 (170–250)	190 (150–230)	170 (130–210)
		Tensile strength ≤800MPa	●	210 (160–280)	190 (140–250)	160 (120–210)	170 (130–210)	150 (110–190)	130 (90–170)
			◐	200 (150–270)	180 (130–240)	150 (110–200)	170 (130–210)	150 (110–190)	130 (90–170)

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WWX200/400

CUTTING SPEED (WET CUTTING)

	Material	Properties	Conditions	MV1020			MV1030		
				ae			ae		
				≥0.5 DC	≥0.8 DC	DC (Slot)	≥0.5 DC	≥0.8 DC	DC (Slot)
				Vc			Vc		
P	Mild steel	≤180HB	●	220 (210–230)	190 (180–210)	180 (160–190)	140 (130–150)	120 (110–130)	110 (100–120)
			◐	210 (200–220)	180 (170–200)	170 (150–180)	140 (130–150)	120 (110–130)	110 (100–120)
	Carbon steel Alloy steel	180–350HB	●	200 (190–210)	170 (160–190)	160 (150–170)	140 (130–150)	120 (110–130)	110 (100–120)
			◐	190 (180–200)	160 (150–180)	150 (140–160)	140 (130–150)	120 (110–130)	110 (100–120)
K	Ductile cast iron	Tensile strength ≤450MPa	●	200 (180–240)	180 (150–220)	150 (130–200)	160 (140–180)	140 (120–160)	120 (100–140)
			◐	190 (170–230)	170 (140–210)	140 (120–190)	160 (140–180)	140 (120–160)	120 (100–140)
		Tensile strength ≤800MPa	●	180 (170–210)	160 (150–190)	140 (120–160)	150 (140–160)	130 (120–140)	110 (100–120)
			◐	170 (160–200)	150 (140–180)	120 (110–150)	150 (140–160)	130 (120–140)	110 (100–120)

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1. The recommended cutting speed has been calculated for a depth of cut 2 mm. Please reduce the cutting speed by an appropriate amount corresponding to the increase in cutting depth.

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

MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

WWX200

DEPTH OF CUT / FEED PER TOOTH

DRY AND WET CUTTING

	Material	Properties	Conditions	ae ≥0.5 DC ap	ae ≥0.5 DC fz	ae ≥0.8 DC ap	ae ≥0.8 DC fz	ae DC (Slot) ap	ae DC (Slot) fz
P	Mild steel	≤180HB	●●	L, M ≤3.0	0.13 (0.10–0.15)	L, M ≤3.0	0.13 (0.10–0.15)	L, M ≤2.0	0.13 (0.10–0.15)
			●	M,R ≤3.0	0.16 (0.10–0.20)	M,R ≤3.0	0.16 (0.10–0.20)	—	—
	Carbon steel Alloy steel	180–350HB	●●	L, M ≤3.0	0.13 (0.10–0.15)	L, M ≤3.0	0.13 (0.10–0.15)	L, M ≤2.0	0.13 (0.10–0.15)
			●	M,R ≤3.0	0.16 (0.10–0.20)	M,R ≤3.0	0.16 (0.10–0.20)	—	—
K	Ductile cast iron	Tensile strength ≤450MPa	●●	L, M ≤3.0	0.13 (0.10–0.15)	L, M ≤3.0	0.13 (0.10–0.15)	L, M ≤2.0	0.13 (0.10–0.15)
			●	M,R ≤3.0	0.16 (0.10–0.20)	M,R ≤3.0	0.16 (0.10–0.20)	—	—
		Tensile strength ≤800MPa	●●	L, M ≤3.0	0.13 (0.10–0.15)	L, M ≤3.0	0.13 (0.10–0.15)	L, M ≤2.0	0.13 (0.10–0.15)
			●	M,R ≤3.0	0.16 (0.10–0.20)	M,R ≤3.0	0.16 (0.10–0.20)	—	—

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1. Refer to the above table and set up cutting conditions according to the application.

WWX400

DEPTH OF CUT / FEED PER TOOTH

DRY AND WET CUTTING

	Material	Properties	Conditions	ae ≥0.5 DC ap	ae ≥0.5 DC fz	ae ≥0.8 DC ap	ae ≥0.8 DC fz	ae DC (Slot) ap	ae DC (Slot) fz
P	Mild steel	≤180HB	●●	L, M ≤4.0	0.13 (0.10–0.15)	L, M ≤3.0	0.13 (0.10–0.15)	L, M ≤2.0	0.13 (0.10–0.15)
			●	M,R ≤4.0	0.16 (0.10–0.20)	M,R ≤3.0	0.16 (0.10–0.20)	—	—
	Carbon steel Alloy steel	180–350HB	●●	L, M ≤4.0	0.13 (0.10–0.15)	L, M ≤3.0	0.13 (0.10–0.15)	L, M ≤2.0	0.13 (0.10–0.15)
			●	M,R ≤4.0	0.16 (0.10–0.20)	M,R ≤3.0	0.16 (0.10–0.20)	—	—
M	Stainless steel	—	●●	L,M ≤2.0	0.13 (0.10–0.15)	L, M ≤2.0	0.13 (0.10–0.15)	—	—
K	Ductile cast iron	Tensile strength ≤450MPa	●●	L, M ≤4.0	0.13 (0.10–0.15)	L, M ≤3.0	0.13 (0.10–0.15)	L, M ≤2.0	0.13 (0.10–0.15)
			●	M,R ≤4.0	0.16 (0.10–0.20)	M,R ≤3.0	0.16 (0.10–0.20)	—	—
		Tensile strength ≤800MPa	●●	L, M ≤4.0	0.13 (0.10–0.15)	L, M ≤3.0	0.13 (0.10–0.15)	L, M ≤2.0	0.13 (0.10–0.15)
			●	M,R ≤4.0	0.16 (0.10–0.20)	M,R ≤3.0	0.16 (0.10–0.20)	—	—

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1. Refer to the above table and set up cutting conditions according to the application.

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

MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

WSX445

CUTTING SPEED

DRY AND WET CUTTING

	Material	Properties	MV1020 Vc Dry cutting	MV1020 Vc Wet cutting	MV1030 Vc Dry cutting	MV1030 Vc Wet cutting
P	Mild steel	≤180HB	300 (200 – 400)	220 (120 – 320)	250 (200 – 300)	150 (100 – 200)
P	Carbon steel Alloy steel	180–350HB	260 (170 – 350)	200 (100 – 300)	220 (170 – 270)	120 (80 – 160)
P	Carbon steel Alloy steel	280–350HB	180 (100 – 250)	150 (100 – 200)	180 (100 – 250)	120 (80 – 160)
M	Stainless steel	—	—	—	200 (150 – 250)	—
K	Ductile cast iron	Tensile strength ≤450MPa	240 (130 – 350)	200 (130 – 250)	160 (110 – 240)	150 (100 – 200)
K	Ductile cast iron	Tensile strength ≤800MPa	220 (80 – 350)	180 (80 – 230)	180 (110 – 250)	140 (80 – 200)

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WSX445

DEPTH OF CUT / FEED PER TOOTH

DRY AND WET CUTTING

	Material	Properties	L fz	L ap	L, M fz	L, M ap	M fz	M ap	M, R fz	M, R ap	R, H fz	R, H ap
P	Mild steel	≤180HB	0.15 (0.1–0.2)	≤1.0	0.15 (0.1–0.2)	≤2.0	0.2 (0.15–0.25)	≤3.0	0.2 (0.15–0.25)	≤4.0	0.25 (0.2–0.3)	≤5.0
P	Carbon steel Alloy steel	180–350HB	0.15 (0.1–0.2)	≤1.0	0.15 (0.1–0.2)	≤2.0	0.2 (0.15–0.25)	≤3.0	0.2 (0.15–0.25)	≤4.0	0.25 (0.2–0.3)	≤5.0
P	Carbon steel Alloy steel	280–350HB	0.15 (0.1–0.2)	≤1.0	0.15 (0.1–0.2)	≤2.0	0.2 (0.15–0.25)	≤3.0	0.2 (0.15–0.25)	≤4.0	0.25 (0.2–0.3)	≤5.0
M	Stainless steel	—	0.15 (0.1–0.2)	≤1.0	0.15 (0.1–0.2)	≤2.0	0.2 (0.15–0.25)	≤3.0	—	—	—	—
K	Ductile cast iron	Tensile strength ≤450MPa	0.15 (0.1–0.2)	≤1.0	0.15 (0.1–0.2)	≤2.0	0.2 (0.15–0.25)	≤3.0	0.2 (0.15–0.25)	≤4.0	0.25 (0.2–0.3)	≤5.0
K	Ductile cast iron	Tensile strength ≤800MPa	0.15 (0.1–0.2)	≤1.0	0.15 (0.1–0.2)	≤2.0	0.2 (0.15–0.25)	≤3.0	0.2 (0.15–0.25)	≤4.0	0.25 (0.2–0.3)	≤5.0

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MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

CHIPBREAKER SELECTION TABLE

WJX09

	Material	Properties	L		M		R	
			Conditions	ap	Conditions	ap	Conditions	ap
P	Mild steel	≤180HB	● ◐	≤1.0	● ◐	≤1.5	◐ ✣	≤1.5
P	Carbon steel, Alloy steel	180–350HB	● ◐	≤1.0	● ◐	≤1.5	◐ ✣	≤1.5
M	Stainless steel	—	● ◐	≤1.0	● ◐	≤1.0	—	—
K	Ductile cast iron	Tensile strength ≤450MPa	● ◐	≤1.0	● ◐	≤1.5	◐ ✣	≤1.5
K		Tensile strength ≤800MPa	● ◐	≤1.0	● ◐	≤1.0	◐ ✣	≤1.0

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WJX14

	Material	Properties	L		M		R	
			Conditions	ap	Conditions	ap	Conditions	ap
P	Mild steel	≤180HB	● ◐	≤2.0	● ◐	≤3.0	◐ ✣	≤3.0
P	Carbon steel, Alloy steel	180–350HB	● ◐	≤2.0	● ◐	≤3.0	◐ ✣	≤3.0
M	Stainless steel	—	● ◐	≤2.0	● ◐	≤1.5	—	—
K	Ductile cast iron	Tensile strength ≤450MPa	● ◐	≤2.0	● ◐	≤3.0	—	—
K		Tensile strength ≤800MPa	● ◐	≤2.0	● ◐	≤2.0	—	—

1/1

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

MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

WJX09

CUTTING SPEED (DRY CUTTING)

	Material	Properties	MV1020	MV1030
			Vc	Vc
P	Mild steel	≤180HB	230 (180 – 280)	160 (100 – 220)
P	Carbon steel, Alloy steel	180–350HB	220 (170 – 270)	150 (80 – 220)
M	Stainless steel	≤200HB	—	160 (130 – 200)
M	Stainless steel	>200HB	—	140 (80 – 200)
K	Ductile cast iron	Tensile strength ≤450MPa	210 (160 – 260)	160 (120 – 210)
K	Ductile cast iron	Tensile strength ≤800MPa	190 (140 – 240)	130 (90 – 170)

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WJX09

DEPTH OF CUT / FEED PER TOOTH

DRY CUTTING

	Material	Properties		ap	DCX = 25, 28 (Z=2)	DCX = 25, 28 (Z=3)	DCX ≥ 32
					fz	fz	fz
P	Mild steel	≤180HB	M, R	≤0.5	1.3 (0.4 – 2.0)	1.3 (0.4 – 2.0)	1.5 (0.5 – 2.0)
P	Mild steel	≤180HB	M, R	≤1.0	1.0 (0.3 – 1.3)	0.8 (0.3 – 1.0)	1.2 (0.4 – 1.5)
P	Mild steel	≤180HB	M, R	≤1.5	0.6 (0.3 – 1.0)	—	0.8 (0.4 – 1.2)
P	Mild steel	≤180HB	L	≤0.5	1.2 (0.4 – 1.6)	1.2 (0.4 – 1.6)	1.2 (0.4 – 1.6)
P	Mild steel	≤180HB	L	≤1.0	0.8 (0.3 – 1.2)	0.8 (0.3 – 1.0)	1.0 (0.4 – 2.5)
P	Carbon steel Alloy steel	180–350HB	M, R	≤0.5	1.3 (0.4 – 1.7)	1.3 (0.4 – 1.7)	1.5 (0.4 – 2.0)
P	Carbon steel Alloy steel	180–350HB	M, R	≤1.0	0.8 (0.3 – 1.0)	0.7 (0.3 – 0.9)	1.0 (0.3 – 1.3)
P	Carbon steel Alloy steel	180–350HB	M, R	≤1.5	0.5 (0.3 – 0.7)	—	0.7 (0.3 – 1.0)
P	Carbon steel Alloy steel	180–350HB	L	≤0.5	1.2 (0.3 – 1.5)	1.2 (0.3 – 1.5)	1.2 (0.3 – 1.5)
P	Carbon steel Alloy steel	180–350HB	L	≤1.0	0.7 (0.2 – 1.0)	0.7 (0.2 – 0.9)	0.7 (0.2 – 1.0)
M	Stainless steel	—	L	≤0.5	0.8 (0.3 – 1.0)	0.8 (0.3 – 1.0)	0.8 (0.3 – 1.0)
M	Stainless steel	—	L	≤1.0	1.0 (0.4 – 1.2)	1.0 (0.4 – 1.2)	1.0 (0.4 – 1.2)
M	Stainless steel	—	M	≤0.5	0.6 (0.2 – 0.8)	0.6 (0.2 – 0.8)	0.6 (0.2 – 0.8)
M	Stainless steel	—	M	≤1.0	0.8 (0.3 – 1.0)	0.8 (0.3 – 1.0)	0.8 (0.3 – 1.0)
K	Ductile cast iron	Tensile strength ≤450MPa	M, R	≤0.5	1.3 (0.4 – 1.7)	1.3 (0.4 – 1.7)	1.5 (0.4 – 2.0)
K	Ductile cast iron	Tensile strength ≤450MPa	M, R	≤1.0	0.8 (0.3 – 1.0)	0.7 (0.3 – 0.9)	1.0 (0.3 – 1.3)
K	Ductile cast iron	Tensile strength ≤450MPa	M, R	≤1.5	0.5 (0.3 – 0.7)	—	0.7 (0.3 – 1.0)
K	Ductile cast iron	Tensile strength ≤450MPa	L	≤0.5	1.0 (0.3 – 1.3)	1.0 (0.3 – 1.3)	1.0 (0.3 – 1.3)
K	Ductile cast iron	Tensile strength ≤450MPa	L	≤1.0	0.8 (0.2 – 1.0)	0.7 (0.2 – 0.9)	0.8 (0.2 – 1.2)
K	Ductile cast iron	Tensile strength ≤800MPa	M, R	≤0.5	1.0 (0.2 – 1.5)	1.0 (0.2 – 1.5)	1.3 (0.3 – 1.7)
K	Ductile cast iron	Tensile strength ≤800MPa	M, R	≤1.0	0.8 (0.2 – 1.0)	0.6 (0.2 – 0.8)	1.0 (0.3 – 1.2)
K	Ductile cast iron	Tensile strength ≤800MPa	L	≤0.5	0.8 (0.3 – 1.2)	0.8 (0.3 – 1.2)	0.8 (0.3 – 1.2)
K	Ductile cast iron	Tensile strength ≤800MPa	L	≤1.0	0.5 (0.2 – 0.8)	0.5 (0.2 – 0.8)	0.5 (0.2 – 0.8)

1/1

1. To discharge chips effectively, use an air blow when machining. When the air blow is less effective at discharging chips, we recommend wet cutting.
2. When wet cutting, tool life may become shorter than dry cutting. When carrying out wet cutting for the applications recommended with dry cutting, reduce the cutting speed by 25 %.
3. When large vibration occurs, reduce the cutting conditions.
4. For interrupted cutting, reduce the cutting speed and feed rate by 20 %.

MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

WJX14

CUTTING SPEED (DRY CUTTING)

	Material	Properties	MV1020	MV1030
			Vc	Vc
P	Mild steel	≤180HB	220 (170 – 270)	130 (80 – 180)
P	Carbon steel, Alloy steel	180–350HB	200 (150 – 250)	120 (60 – 180)
M	Stainless steel	≤200HB	—	160 (130 – 200)
M	Stainless steel	>200HB	—	140 (100 – 200)
K	Ductile cast iron	Tensile strength ≤450MPa	200 (150 – 250)	150 (100 – 200)
K	Ductile cast iron	Tensile strength ≤800MPa	180 (130 – 230)	120 (80 – 160)

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MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

WJX09

DEPTH OF CUT / FEED PER TOOTH

DRY CUTTING

	Material	Properties		ap	DCX = 50, 52	DCX ≥ 63
					fz	fz
P	Mild steel	≤180HB	M, R	≤1.0	1.5 (0.6 – 2.5)	1.7 (0.6 – 2.8)
				≤1.5	1.3 (0.6 – 2.0)	1.5 (0.6 – 2.5)
				≤2.0	1.2 (0.6 – 2.0)	1.3 (0.6 – 2.5)
				≤2.5	0.8 (0.3 – 1.5)	1.0 (0.3 – 1.6)
				≤3.0	0.4 (0.2 – 1.0)	0.5 (0.2 – 1.2)
			L	≤1.0	1.2 (0.4 – 2.0)	1.2 (0.4 – 2.0)
				≤1.5	1.0 (0.4 – 1.8)	1.0 (0.4 – 2.5)
				≤2.0	0.8 (0.4 – 1.7)	0.8 (0.4 – 1.7)
	Carbon steel Alloy steel	180–350HB	M, R	≤1.0	1.5 (0.5 – 2.0)	1.7 (0.5 – 2.5)
				≤1.5	1.2 (0.5 – 1.7)	1.3 (0.5 – 2.2)
				≤2.0	1.0 (0.5 – 1.5)	1.2 (0.5 – 2.0)
				≤2.5	0.7 (0.3 – 1.2)	0.9 (0.3 – 1.5)
				≤3.0	0.3 (0.2 – 0.8)	0.4 (0.2 – 1.0)
			L	≤1.0	1.0 (0.3 – 1.7)	1.0 (0.3 – 1.7)
				≤1.5	0.8 (0.3 – 1.5)	0.8 (0.3 – 1.5)
				≤2.0	0.7 (0.3 – 1.2)	0.7 (0.3 – 1.2)
M	Stainless steel	≤200HB	M	≤1.0	1.0 (0.5 – 1.2)	1.0 (0.5 – 1.2)
				≤1.5	1.0 (0.5 – 1.0)	1.0 (0.5 – 1.0)
			L	≤1.0	0.8 (0.3 – 1.2)	0.8 (0.3 – 1.2)
				≤1.5	0.8 (0.3 – 1.0)	0.8 (0.3 – 1.0)
		>200HB	M	≤1.0	1.0 (0.5 – 1.2)	1.0 (0.5 – 1.2)
				≤1.5	1.0 (0.5 – 1.0)	1.0 (0.5 – 1.0)
			L	≤1.0	0.8 (0.3 – 1.2)	0.8 (0.3 – 1.2)
				≤1.5	0.8 (0.3 – 1.0)	0.8 (0.3 – 1.0)
K	Ductile cast iron	Tensile strength ≤450MPa	MR	≤1.0	1.5 (0.5 – 2.0)	1.7 (0.5 – 2.5)
				≤1.5	1.3 (0.5 – 1.8)	1.5 (0.5 – 2.0)
				≤2.0	1.2 (0.5 – 1.8)	1.3 (0.5 – 2.0)
				≤2.5	0.7 (0.3 – 1.2)	0.9 (0.3 – 1.5)
				≤3.0	0.3 (0.2 – 0.8)	0.4 (0.2 – 1.0)
			L	≤1.0	1.2 (0.3 – 2.0)	1.2 (0.3 – 2.0)
				≤1.5	1.0 (0.3 – 1.7)	1.0 (0.3 – 1.7)
				≤2.0	0.8 (0.3 – 1.5)	0.8 (0.3 – 1.5)
		Tensile strength ≤800MPa	M	≤1.0	1.3 (0.4 – 1.8)	1.5 (0.4 – 2.0)
				≤1.5	1.2 (0.4 – 1.5)	1.3 (0.4 – 1.8)
				≤2.0	1.0 (0.4 – 1.5)	1.2 (0.4 – 1.8)
			L	≤1.0	1.0 (0.3 – 1.7)	1.0 (0.3 – 1.7)
				≤1.5	0.8 (0.3 – 1.5)	0.8 (0.3 – 1.5)
				≤2.0	0.7 (0.3 – 1.2)	0.7 (0.3 – 1.2)

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1. To discharge chips effectively, use an air blow when machining. When the air blow is less effective at discharging chips, we recommend wet cutting.
2. When wet cutting, tool life may become shorter than dry cutting. When carrying out wet cutting for the applications recommended with dry cutting, reduce the cutting speed by 25 %.
3. When large vibration occurs, reduce the cutting conditions.
4. For interrupted cutting, reduce the cutting speed and feed rate by 20 %.

MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

VPX200 / 300

CUTTING SPEED (DRY CUTTING)

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

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WET CUTTING

	Material	Properties	Conditions	Recommendation 1st	Recommendation 2nd	ae ≤0.25 DC MV1020	ae ≤0.25 DC MV1030	ae 0.25 – 0.5 DC MV1020	ae 0.25 – 0.5 DC MV1030	ae 0.5 – 0.75 DC MV1020	ae 0.5 – 0.75 DC MV1030	ae DC (Slot) MV1020	ae DC (Slot) MV1030
P	Mild steel	≤180HB	●●	L	M	210 (150–290)	140 (100–190)	200 (140–270)	130 (90–180)	150 (110–180)	100 (70–120)	150 (110–180)	100 (70–120)
P	Carbon steel Alloy steel	180–280HB	●●	L	M	180 (140–210)	120 (90–140)	170 (120–200)	110 (80–130)	150 (110–180)	100 (70–120)	150 (110–180)	100 (70–120)
P	Carbon steel Alloy steel	280–350HB	●●	L	M	140 (110–160)	120 (90–140)	130 (90–150)	110 (80–130)	120 (80–140)	100 (70–120)	120 (80–140)	120 (80–140)
K	Ductile cast iron	Tensile strength ≤450MPa	●●	M	L	180 (150–240)	130 (80–180)	170 (140–230)	120 (70–170)	150 (130–200)	105 (60–150)	150 (130–200)	105 (60–150)
K	Ductile cast iron	Tensile strength ≤800MPa	●●	M	L	160 (130–210)	130 (80–180)	150 (120–200)	120 (70–170)	130 (110–170)	105 (60–150)	130 (110–170)	105 (60–150)

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

MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

VPX200

DEPTH OF CUT / FEED PER TOOTH

DRY AND WET CUTTING

	Material	Properties	ae	Conditions	DC					
					Ø 16 – Ø 18		Ø 20 – Ø 25		Ø 28 – Ø 63	
					ap	fz	ap	fz	ap	fz
P	Mild steel	≤180HB	≤0.25DC	● ◐	≤6	0.10–0.15	≤8	0.10–0.20	≤8	0.10–0.25
			0.25–0.5DC	● ◐	≤5	0.08–0.12	≤8	0.10–0.15	≤8	0.10–0.20
			0.5–0.75DC	● ◐	≤4	0.08–0.12	≤6	0.08–0.12	≤6	0.10–0.15
			DC (Slot)	● ◐	≤2	0.06–0.10	≤4	0.06–0.10	≤4	0.08–0.12
	Carbon steel Alloy steel	180–280HB	≤0.25DC	● ◐	≤6	0.10–0.15	≤8	0.10–0.20	≤8	0.10–0.25
			0.25–0.5DC	● ◐	≤5	0.08–0.12	≤8	0.10–0.15	≤8	0.10–0.20
			0.5–0.75DC	● ◐	≤4	0.08–0.12	≤6	0.08–0.12	≤6	0.10–0.15
			DC (Slot)	● ◐	≤2	0.06–0.10	≤4	0.06–0.10	≤4	0.08–0.12
		280–350HB	≤0.25DC	● ◐	≤6	0.10–0.15	≤8	0.10–0.15	≤8	0.10–0.20
			0.25–0.5DC	● ◐	≤5	0.08–0.12	≤8	0.08–0.12	≤8	0.10–0.15
			0.5–0.75DC	● ◐	≤4	0.08–0.12	≤6	0.06–0.10	≤6	0.08–0.12
			DC (Slot)	● ◐	≤2	0.06–0.10	≤4	0.06–0.10	≤4	0.06–0.10
M	Stainless steel	—	≤0.25DC	● ◐	≤6	0.10–0.15	≤8	0.10–0.20	≤8	0.10–0.20
			0.25–0.5DC	● ◐	≤5	0.08–0.12	≤8	0.08–0.15	≤8	0.08–0.15
			0.5–0.75DC	● ◐	≤4	0.06–0.10	≤6	0.08–0.12	≤6	0.08–0.12
			DC (Slot)	● ◐	≤2	0.06–0.10	≤4	0.06–0.10	≤4	0.06–0.10
K	Ductile cast iron	Tensile strength ≤800MPa	≤0.25DC	● ◐	≤6	0.10–0.15	≤8	0.10–0.20	≤8	0.10–0.20
			0.25–0.5DC	● ◐	≤5	0.08–0.12	≤8	0.10–0.15	≤8	0.10–0.15
			0.5–0.75DC	● ◐	≤4	0.08–0.12	≤6	0.08–0.12	≤6	0.08–0.12
			DC (Slot)	● ◐	≤2	0.06–0.10	≤4	0.06–0.10	≤4	0.06–0.10

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1. These cutting conditions should be referenced for standard shank types (last letter in designation is S) and arbor shank types. If there is chatter, insert chipping, etc. during machining, alter conditions accordingly
2. Chattering vibration is more likely under the following circumstances. Use a cut and feed per tooth that are at minimum recommended conditions or below.
   - When tool overhang is long (using a long shank, screw-in type, etc.)
   - Rigidity of machine, workpiece material or attachment of workpiece material is low
   - Corner radius during pocket milling
3. A type with fewer teeth is recommended when the depth of cut in the radius direction (ae) is 0.5 DC or more.
4. Wet cutting is recommended, when focusing on the surface finish. (Service life is shorter than for dry cutting.)
5. When using under higher than recommended cutting conditions, or for long periods of time, the clamp screw may become fatigued and break during machining. Please use a new clamp screw periodically.

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

MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

VPX300

DEPTH OF CUT / FEED PER TOOTH

DRY AND WET CUTTING

	Material	Properties	ae	Conditions	DC			
					Ø 25		Ø 28 – Ø 80	
					ap	fz	ap	fz
P	Mild steel	≤180HB	≤0.25DC	● ◐	≤11	0.10 – 0.20	≤11	0.10 – 0.30
			0.25–0.5DC	● ◐	≤11	0.10 – 0.15	≤11	0.10 – 0.25
			0.5–0.75DC	● ◐	≤8	0.08 – 0.12	≤8	0.10 – 0.20
			DC (Slot)	● ◐	≤5	0.06 – 0.10	≤5	0.08 – 0.15
	Carbon steel Alloy steel	180–280HB	≤0.25DC	● ◐	≤11	0.10 – 0.20	≤11	0.10 – 0.30
			0.25–0.5DC	● ◐	≤11	0.10 – 0.15	≤11	0.10 – 0.25
			0.5–0.75DC	● ◐	≤8	0.08 – 0.12	≤8	0.10 – 0.20
			DC (Slot)	● ◐	≤5	0.06 – 0.10	≤5	0.08 – 0.15
		280–350HB	≤0.25DC	● ◐	≤11	0.10 – 0.15	≤11	0.10 – 0.25
			0.25–0.5DC	● ◐	≤11	0.08 – 0.12	≤11	0.10 – 0.20
			0.5–0.75DC	● ◐	≤8	0.06 – 0.10	≤8	0.10 – 0.15
			DC (Slot)	● ◐	≤5	0.06 – 0.10	≤5	0.08 – 0.12
M	Stainless steel	—	≤0.25DC	● ◐	≤11	0.10 – 0.20	≤11	0.10 – 0.20
			0.25–0.5DC	● ◐	≤11	0.08 – 0.15	≤11	0.08 – 0.15
			0.5–0.75DC	● ◐	≤8	0.08 – 0.12	≤8	0.08 – 0.12
			DC (Slot)	● ◐	≤5	0.06 – 0.10	≤5	0.06 – 0.10
K	Ductile cast iron	Tensile strength ≤800MPa	≤0.25DC	● ◐	≤11	0.10 – 0.20	≤11	0.10 – 0.25
			0.25–0.5DC	● ◐	≤11	0.10 – 0.15	≤11	0.10 – 0.20
			0.5–0.75DC	● ◐	≤8	0.08 – 0.12	≤8	0.10 – 0.15
			DC (Slot)	● ◐	≤5	0.06 – 0.10	≤5	0.08 – 0.12

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1. These cutting conditions should be referenced for standard shank types (last letter in designation is S) and arbor shank types. If there is chatter, insert chipping, etc. during machining, alter conditions accordingly.
2. Chattering vibration is more likely under the following circumstances. Use a cut and feed per tooth that are at minimum recommended conditions or below.
   - When tool overhang is long (using a long shank, screw-in type, etc.)
   - Rigidity of machine, workpiece material or attachment of workpiece material is low
   - Corner radius during pocket milling
3. A type with fewer teeth is recommended when the depth of cut in the radius direction (ae) is 0.5 DC or more.
4. Wet cutting is recommended, when focusing on the surface finish. (Service life is shorter than for dry cutting.)
5. When using under higher than recommended cutting conditions, or for long periods of time, the clamp screw may become fatigued and break during machining. Please renew the clamp screw periodically.

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

MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

AHX440S

DRY CUTTING

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

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

AHX475S

DRY CUTTING

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

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

MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

WSF406W

DRY CUTTING

	Material	Properties	Conditions	ap	Vc		fz	ae
					MV1020	MV1030		
K	Gray cast iron	Tensile strength ≤350MPa	●	ap ≤ 0.5 mm	300 (250 – 300)	150 (100 – 200)	0.13 (0.08 – 0.20)	≤0.8DC
				ap ≤ 2.0 mm	250 (210 – 300)	150 (100 – 200)	0.15 (0.10 – 0.25)	≤0.8DC
				2.0 mm < ap ≤ 4.0 mm	220 (190 – 260)	140 (80 – 200)	0.13 (0.10 – 0.20)	≤0.8DC
				4.0 mm < ap ≤ 7.5 mm	200 (180 – 230)	110 (60 – 160)	0.10 (0.08 – 0.15)	≤0.8DC
			◐	ap ≤ 0.5 mm	250 (210 – 300)	150 (100 – 200)	0.13 (0.08 – 0.20)	≤0.8DC
				ap ≤ 2.0 mm	220 (190 – 260)	150 (100 – 200)	0.15 (0.10 – 0.25)	≤0.8DC
				2.0 mm < ap ≤ 4.0 mm	200 (180 – 230)	140 (80 – 200)	0.13 (0.10 – 0.20)	≤0.8DC
				4.0 mm < ap ≤ 7.5 mm	180 (160 – 210)	110 (60 – 160)	0.10 (0.08 – 0.15)	≤0.8DC
			✣	ap ≤ 0.5 mm	220 (190 – 260)	140 (80 – 200)	0.13 (0.08 – 0.20)	≤0.8DC
				ap ≤ 2.0 mm	200 (180 – 230)	140 (80 – 200)	0.15 (0.10 – 0.25)	≤0.8DC
				2.0 mm < ap ≤ 4.0 mm	180 (160 – 210)	110 (60 – 160)	0.13 (0.10 – 0.20)	≤0.8DC
				4.0 mm < ap ≤ 7.5 mm	150 (100 – 180)	80 (40 – 120)	0.10 (0.08 – 0.15)	≤0.8DC
	Ductile cast iron	Tensile strength ≤450MPa	●	ap ≤ 0.5 mm	230 (200 – 250)	110 (60 – 160)	0.13 (0.08 – 0.20)	≤0.8DC
				ap ≤ 2.0 mm	200 (170 – 230)	110 (60 – 160)	0.15 (0.10 – 0.25)	≤0.8DC
				2.0 mm < ap ≤ 4.0 mm	180 (150 – 210)	90 (50 – 130)	0.13 (0.10 – 0.20)	≤0.8DC
				4.0 mm < ap ≤ 7.5 mm	160 (130 – 190)	70 (40 – 100)	0.10 (0.08 – 0.15)	≤0.8DC
			◐	ap ≤ 0.5 mm	200 (170 – 230)	110 (60 – 160)	0.13 (0.08 – 0.20)	≤0.8DC
				ap ≤ 2.0 mm	180 (150 – 210)	110 (60 – 160)	0.15 (0.10 – 0.25)	≤0.8DC
				2.0 mm < ap ≤ 4.0 mm	160 (130 – 190)	90 (50 – 130)	0.13 (0.10 – 0.20)	≤0.8DC
				4.0 mm < ap ≤ 7.5 mm	140 (110 – 170)	70 (40 – 100)	0.10 (0.08 – 0.15)	≤0.8DC
			✣	ap ≤ 0.5 mm	180 (150 – 200)	90 (50 – 130)	0.13 (0.08 – 0.20)	≤0.8DC
				ap ≤ 2.0 mm	160 (130 – 190)	90 (50 – 130)	0.15 (0.10 – 0.25)	≤0.8DC
				2.0 mm < ap ≤ 4.0 mm	140 (110 – 170)	70 (40 – 100)	0.13 (0.10 – 0.20)	≤0.8DC
				4.0 mm < ap ≤ 7.5 mm	120 (90 – 150)	60 (30 – 90)	0.10 (0.08 – 0.15)	≤0.8DC
	Ductile cast iron	Tensile strength ≤800MPa	●	ap ≤ 0.5 mm	230 (200 – 250)	110 (60 – 160)	0.13 (0.08 – 0.20)	≤0.8DC
				ap ≤ 2.0 mm	200 (170 – 230)	110 (60 – 160)	0.15 (0.10 – 0.25)	≤0.8DC
				2.0 mm < ap ≤ 4.0 mm	180 (150 – 210)	90 (50 – 130)	0.13 (0.10 – 0.20)	≤0.8DC
				4.0 mm < ap ≤ 7.5 mm	160 (130 – 190)	70 (40 – 100)	0.10 (0.08 – 0.15)	≤0.8DC
			◐	ap ≤ 0.5 mm	200 (170 – 230)	110 (60 – 160)	0.13 (0.08 – 0.20)	≤0.8DC
				ap ≤ 2.0 mm	180 (150 – 210)	110 (60 – 160)	0.15 (0.10 – 0.25)	≤0.8DC
				2.0 mm < ap ≤ 4.0 mm	160 (130 – 190)	90 (50 – 130)	0.13 (0.10 – 0.20)	≤0.8DC
				4.0 mm < ap ≤ 7.5 mm	140 (110 – 170)	70 (40 – 100)	0.10 (0.08 – 0.15)	≤0.8DC
			✣	ap ≤ 0.5 mm	180 (150 – 210)	90 (50 – 130)	0.13 (0.08 – 0.20)	≤0.8DC
				ap ≤ 2.0 mm	160 (130 – 190)	90 (50 – 130)	0.15 (0.10 – 0.25)	≤0.8DC
				2.0 mm < ap ≤ 4.0 mm	140 (110 – 170)	70 (40 – 100)	0.13 (0.10 – 0.20)	≤0.8DC
				4.0 mm < ap ≤ 7.5 mm	120 (90 – 150)	60 (30 – 90)	0.10 (0.08 – 0.15)	≤0.8DC

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

MV1000 SERIES

RECOMMENDED CUTTING CONDITIONS

ASX445

DRY AND WET CUTTING

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

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ASX400

DRY AND WET CUTTING

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

1/1

AHX SERIES

FEATURING ECONOMICAL, HEPTAGONAL DOUBLE SIDED INSERTS WITH 14 CUTTING EDGES

Interested in more...

B195

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DIA EDGE

AHX SERIES

MULTI CORNER INSERT FACE MILLING CUTTERS

AHX440S

P
M
K
H

IDEAL FOR ROUGHING AND FINISHING ON SMALL AND LOW POWER MACHINES

- Diameter range Ø 40 – 160 mm (3 – 16 teeth)
- Double sided insert with 14 cutting edges
- Maximum depth of cut 3 mm (APMX)
- With through coolant holes (Ø 40 – 125 mm)
- Insert corner radius 0.8 mm and 3.2 mm

AHX475S

P
K
H

EFFICIENT HIGH-FEED MILLING AND PROCESS RELIABILITY

- Diameter range Ø 50 – 160 mm (4 – 12 teeth)
- Double sided insert with 14 cutting edges
- Maximum depth of cut 1.6 mm (APMX)
- With through coolant holes (Ø 50 – 160 mm)
- Feed rate up to 2 mm/tooth

AHX640S

P
M
K
H

IDEAL FOR GENERAL ROUGHING ON MEDIUM AND LARGER MACHINES

- Diameter range Ø 63 – 200 mm (4 – 12 teeth)
- Double sided insert with 14 cutting edges
- Maximum depth of cut 6 mm (APMX)
- With through coolant holes (Ø 63 – 125 mm)

AHX640W

K

IDEAL FOR GENERAL ROUGHING OF CAST IRON ON MEDIUM AND LARGER MACHINES

- Diameter range Ø 80 – 315 mm (8 – 44 teeth)
- Double sided insert with 14 cutting edges
- Maximum depth of cut 6 mm (APMX)
- High rigidity Anti-Fly (AFI) wedge clamping system

DOUBLE SIDED INSERT WITH 14 CUTTING EDGES FOR MACHINING OF STEEL, STAINLESS STEEL AND CAST IRON

ECONOMICAL HEPTAGONAL DOUBLE SIDED INSERT

Double positive cutting edge geometry offers lower cutting resistance for improved machining efficiency.

CUTTING EDGE STABILITY

Thicker inserts ensure greater stability and enable reliable machining.

SIMPLE INDICATION OF THE CUTTING EDGE

For easy handling and to recognize used and unused corners.

GRADES FOR MACHINING A WIDE RANGE OF MATERIALS

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

MP6120
For general milling of steel

MP6130
For interrupted milling of steel

MP7030
For general milling of stainless steel

MP7130
For general milling of stainless steel

MP7140
For unstable milling of stainless steel

MC5020
For general milling of cast iron

MP9120
For general milling of HRSA and titanium alloy

MP9130
For interrupted and general milling of HRSA and Titanium alloy

XC5010
The strength of ceramics allows for stable machining even when cutting at high-speeds

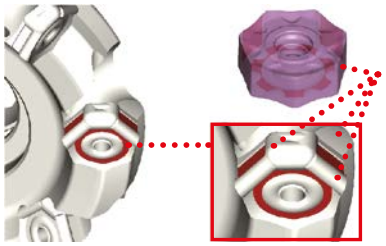
AHX440S / AHX475S / AHX640S

A UNIQUE FACE MILL FOR MACHINING OF STEEL, STAINLESS STEEL AND CAST IRON

AHX440S

DESIGNED TO CONTROL ABNORMAL INSERT BREAKAGE AND BODY DAMAGE

The unique conical insert shim and Anti Fly mechanism (A.F.I) hold the insert securely.
The outer edge of the insert is not in contact with the body, thereby preventing damage when sudden fracturing occurs.
The thick insert negates the need for a shim.



THROUGH COOLANT HOLES

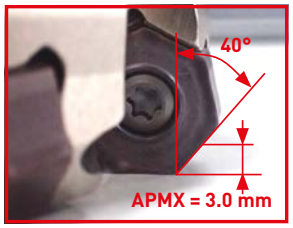
Improves chip discharge and prevents chip welding.

AHX475S

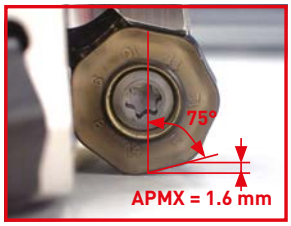
AHX475S

For high feed machining
High feed is possible with AHX475S by setting an RE = 3.2 mm insert to be used in a cutter body with a corner angle of 75° (KAPR 15°).
The maximum depths of cut (APMX) will be limited to 1.6 mm.

AHX640S



AHX440S
L Breaker



AHX475S

⚠ AHX475S is not compatible with stainless steel.

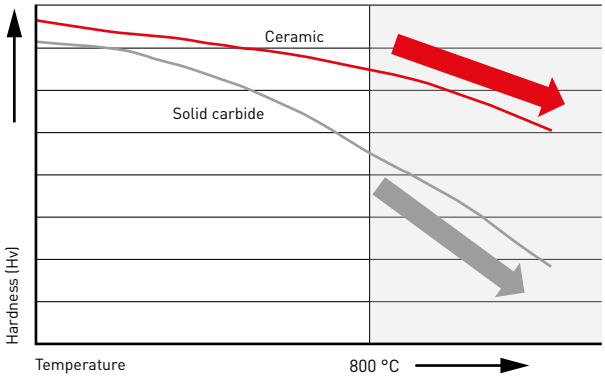
NEW

XC5010

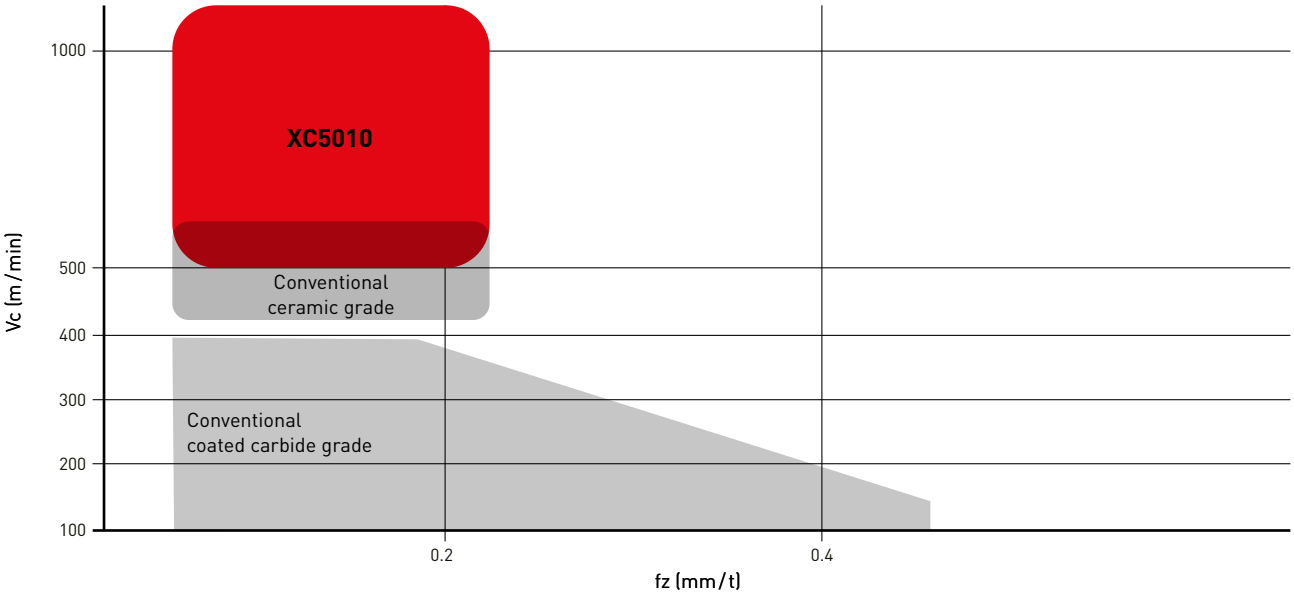
THE STRENGTH OF CERAMICS ALLOWS FOR STABLE MACHINING EVEN WHEN CUTTING AT HIGH-SPEEDS

HIGH TEMPERATURE HARDNESS OF CEMENTED CARBIDE AND CERAMIC

Cemented carbide inserts are significantly reduced in strength when temperatures exceed 800 degrees. However, the strength of ceramic inserts is not affected at these high temperatures, therefore can be used at the high-speeds and depths of cut required to generate sufficient heat to enable machining.



THE COMBINATION OF THE UNIQUE SHAPE AND THE COATED CERAMIC GRADE ACHIEVES STABLE MACHINING EVEN AT A CUTTING SPEEDS OF 1000 M/MIN



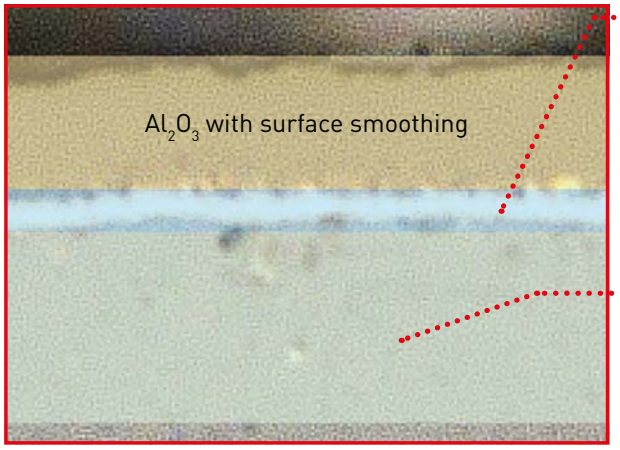
NEW

XC5010

THE STRENGTH OF CERAMICS ALLOWS FOR STABLE MACHINING EVEN WHEN CUTTING AT HIGH-SPEEDS

SURFACE-SMOOTHING AL_2O_3 COATING SUPPRESSES THE TRANSMISSION OF CUTTING HEAT

By applying an Al_2O_3 coating, which suppresses the transmission of cutting heat to the ceramic substrate, and together with a surface smoothing treatment, abnormal wear and adhesion of the workpiece material are suppressed.



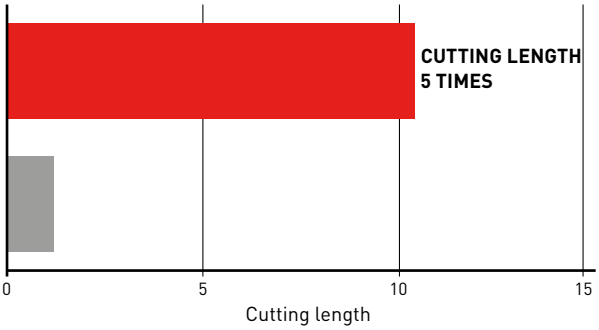
TECHNOLOGY IMPROVES ADHESION STRENGTH

Mitsubishi Materials' own adhesion technology has greatly improved the adhesion between the ceramic base material and the coating layer.

SILICON NITRIDE CERAMIC SUBSTRATE

By adopting a high toughness silicon nitride ceramic substrate as the base material, ultra-high-speed milling of ductile cast iron can be achieved even at high temperatures with minimal loss of strength.

Material	DIN GGG60
Tool	AHX640S
DC (mm)	80
Vc (m/min)	1000
fz (mm/t)	0.1
ap (mm)	2.0
ae (mm)	50
Cutting mode	Dry cutting



AFTER 1.2 M MACHINING

XC5010

Non-coated ceramic grade

Machining video
at Vc = 1200 m/min

■ : XC5010 ■ A : Non-coated ceramic grade

NEW

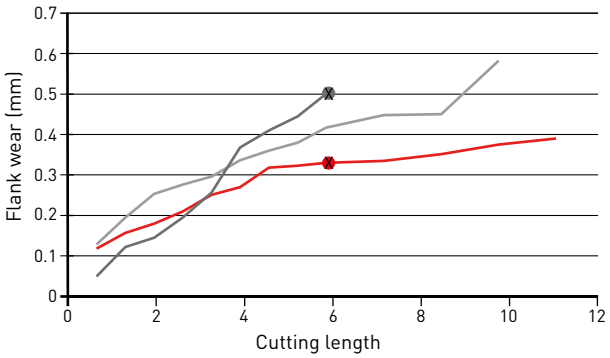
XC5010

CUTTING PERFORMANCE

COMPARISON OF WEAR WHEN MACHINING GGG70 Vc = 1000 M/MIN

Achieves a level of wear resistance that greatly surpasses carbide grades when high-speed roughing.

Material	DIN GGG70
Tool	AHX640S
DC (mm)	80
Vc (m/min)	1000
fz (mm/t)	0.1
ap (mm)	2.0
ae (mm)	40
Cutting mode	Dry cutting Single insert



AFTER MACHINING 6 M

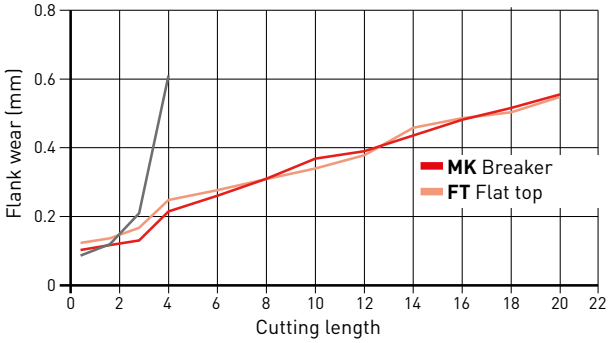
XC5010

Conventional A

COMPARISON OF FINISHED SURFACES WHEN MACHINING GGG70 AT Vc = 1000 M/MIN

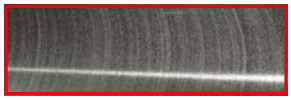
A high quality machined surface is maintained even after a cutting length of 20 m.

Material	DIN GGG70
Tool	AHX640S
DC (mm)	125
Vc (m/min)	1000
fz (mm/t)	0.1
ap (mm)	2.0
ae (mm)	100
Cutting mode	Dry cutting



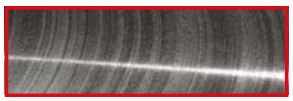
Cutting length 4 m

XC5010
MK Breaker



XC5010
FT Flat top

Cutting length 20 m



XC5010
MK Breaker

XC5010
FT Flat top

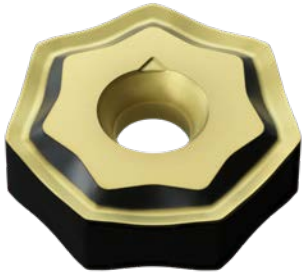
The conventional carbide grade chipped at a cutting length of 4 m.

■ : XC5010 ■ A ■ B : Conventional tool

NEW

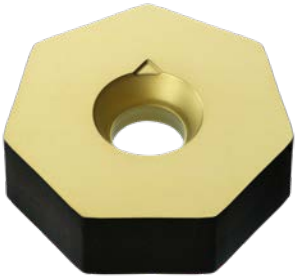
XC5010

CHIPBREAKER SYSTEM



MK BREAKER – GENERAL CUTTING

When compared to flat top inserts, the cutting resistance is lower when using the MK breaker. This reduces the load on the spindle thereby making it suitable for high speed cutting.



FT FLAT TOP – CUTTING EDGE STRENGTH

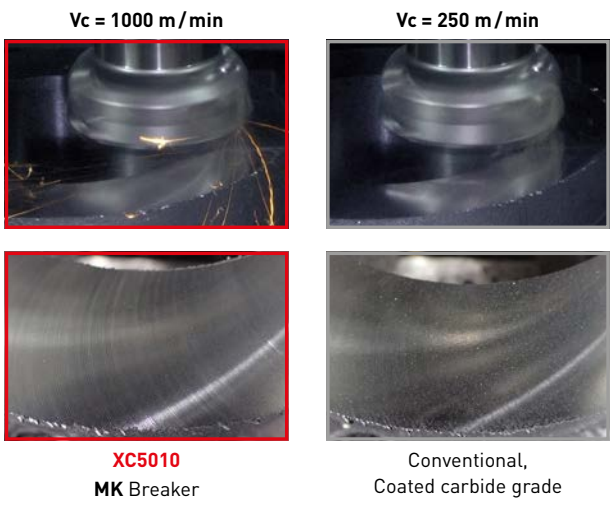
The high cutting edge strength of the flat top type enables stable cutting over long periods and helps to prevent sudden edge chipping.

The height setting when using MK inserts is different than when using FT type inserts.

GGG60 FINISH SURFACE COMPARISON

A high quality machined surface is maintained even when high speed cutting conditions are used.

Material	DIN GGG60
Tool	AHX640S
DC (mm)	63
fz (mm/t)	0.1
ap (mm)	1.0
ae (mm)	32
Cutting mode	Dry cutting



AHX STEEL SERIES

SELECTION REFERENCE TABLE (CUTTING EDGE COUNT AND CUTTING CONDITIONS)

DC	Type	ZEFF	AHX440S General cutting			AHX475S High feed machining			AHX640S General cutting		
			Stock	fr	APMX	Stock	fr	APMX	Stock	fr	APMX
40	Fine pitch	3	●	0.6 – 1.2	3						
	Extra fine pitch	4	●	0.8 – 1.6	3						
50	Fine pitch	4	●	0.8 – 1.6	3	●	2.4 – 4.0	1.6			
	Extra fine pitch	5	●	1.0 – 2.0	3	●	3.0 – 5.0	1.6			
	Super extra fine pitch	6	●	1.2 – 2.4	3						
63	Coarse pitch	4							●	0.8 – 1.6	6
	Fine pitch	5	●	1.0 – 2.0	3	●	3.0 – 5.0	1.6	●	1.0 – 2.0	6
	Extra fine pitch	6	●	1.2 – 2.4	3	●	3.6 – 6.0	1.6			
	Super extra fine pitch	8	●	1.6 – 3.2	3						
80	Coarse pitch	4							●	0.8 – 1.6	6
	Fine pitch	6	●	1.2 – 2.4	3	●	3.6 – 6.0	1.6	●	1.2 – 2.4	6
	Extra fine pitch	8	●	1.6 – 3.2	3	●	4.8 – 8.0	1.6			
	Super extra fine pitch	10	●	2.0 – 4.0	3						
100	Coarse pitch	5							●	1.0 – 2.0	6
	Fine pitch	7	●	1.4 – 2.8	3	●	4.2 – 7.0	1.6	●	1.4 – 2.8	6
	Extra fine pitch	9				●	5.4 – 9.0	1.6			
	Extra fine pitch	10	●	2.0 – 4.0	3						
	Super extra fine pitch	12	●	2.4 – 4.8	3						
125	Coarse pitch	6							●	1.2 – 2.4	6
	Fine pitch	8	●	1.6 – 3.2	3	●	4.8 – 8.0	1.6	●	1.6 – 3.2	6
	Extra fine pitch	10				●	6.0 – 10.0	1.6			
	Extra fine pitch	12	●	2.4 – 4.8	3						
	Super extra fine pitch	14	●	2.8 – 5.6	3						
160	Coarse pitch	7							●	1.4 – 2.8	6
	Fine pitch	10	●	2.0 – 4.0	3	●	6.0 – 10.0	1.6	●	2.0 – 4.0	6
	Extra fine pitch	12				●	7.2 – 12.0	1.6			
	Extra fine pitch	14	●	2.8 – 5.6	3						
	Super extra fine pitch	16	●	3.2 – 6.4	3						
200	Coarse pitch	8							●	1.6 – 3.2	6
	Fine pitch	12							●	2.4 – 4.8	6

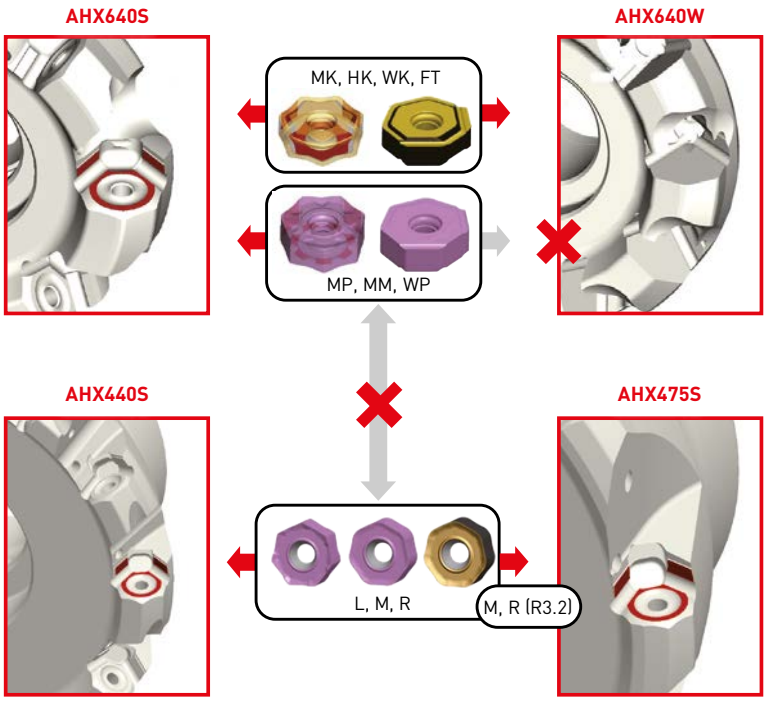
1. fr: Feed rate per revolution (AHX475S: the feed rate per cutter (fz) will be limited by the cutting width ae. Please refer to page 91 for details.)
2. APMX: Maximum depths of cut (AHX440S: the maximum depths of cut will vary depending on the type of chipbreaker.)
3. The depths of cut and feed rate are identical to the recommended conditions for carbon steel and alloy steel.

AHX STEEL SERIES

SELECTION REFERENCE TABLE (CUTTING EDGE COUNT AND CUTTING CONDITIONS)

COMPATIBILITY WITH INSERTS FOR AHX SERIES

The RE = 3.2 mm insert for use with AHX440S can be mounted on AHX475S type cutters.
All inserts for use with AHX640 can be mounted on AHX640S (note, however, that the height setting will differ).
The inserts for mounting on AHX640W are the MK, HK, WK and FT breaker types for casting.

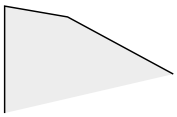


AHX STEEL SERIES

CHIPBREAKER SYSTEM

L Breaker

- Focus on cutting edge sharpness
- Low resistance type



M Breaker

- First Recommendation
- General use

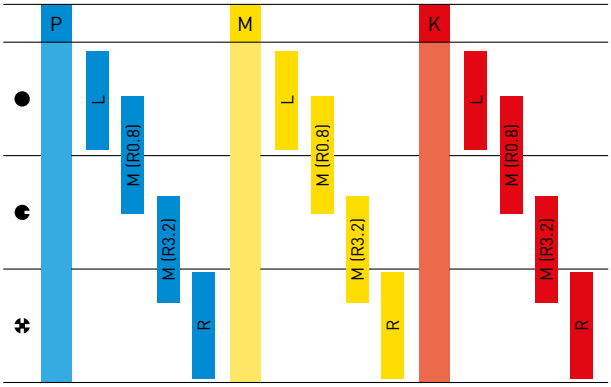
R Breaker

- Focus on fracture resistance
- Reinforced edge type

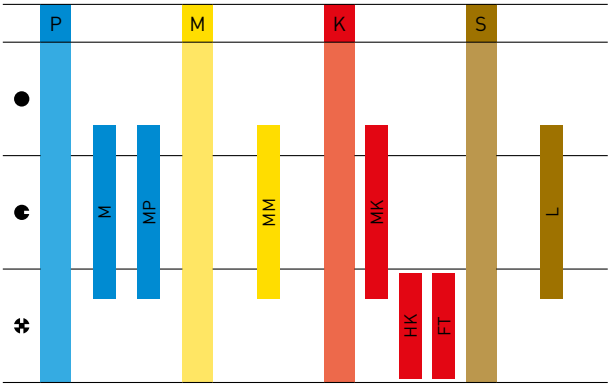
Cutting conditions:

●: Stable cutting ◔: General cutting ✠: Unstable cutting

AHX440S



AHX640S



WIPER INSERT OF AHX640S

Based on the number of inserts and the cutting conditions, use of wiper inserts can improve overall surface finishes.

P **WP** + combination with **MP**
Right-hand 2 corners,
left-hand 2 corners.

K **WK** + combination with **MK**
Right-hand 2 corners,
left-hand 2 corners.

AHX640W

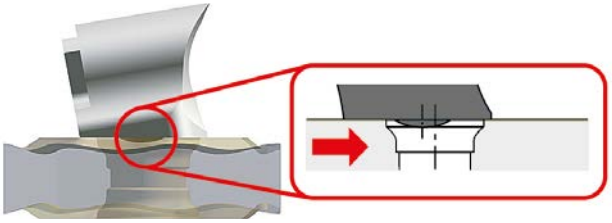
FACE MILLING CUTTER FOR HIGH EFFICIENCY MACHINING OF CAST IRON

HIGH RIGIDITY INSERTS SUITABLE FOR HIGH FEED MACHINING

Sloped cutting edge and large rake angle

INNOVATIVE CLAMP SYSTEM

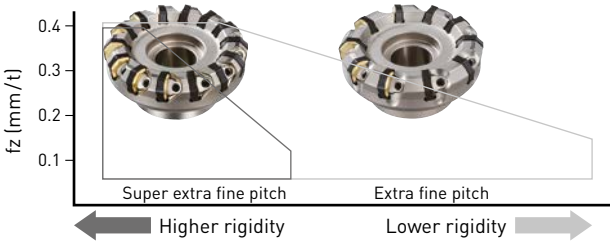
New type of wedge developed to increase the permissible number of teeth. Unique geometry uses a protruding section that fits inside the insert hole and acts as an Anti-Fly Insert (AFI) mechanism.



Prevents insert from flying out of the pocket.

2 VARIATIONS FOR DIFFERENT APPLICATIONS

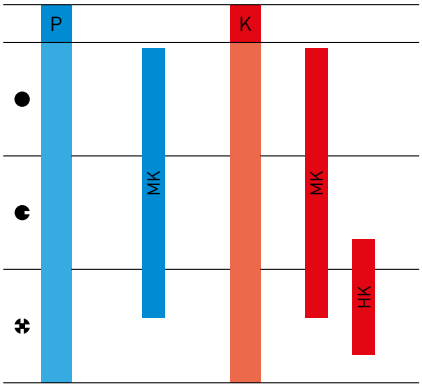
Extra fine pitch and super extra fine pitch types allow high efficiency milling under various machining conditions. Additionally, left hand types for use on special machines are also available as standard. Inserts can be used with both right and left hand type cutters.

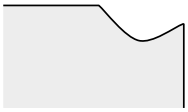


AHX640W

FACE MILLING CUTTER FOR HIGH EFFICIENCY MACHINING OF CAST IRON

INSERT APPLICATIONS





MK General purpose insert

- Accurate tolerance M-class insert.
- Neutral, double sided 14 corners.
- 20º rake angle for low cutting resistance.
  First recommendation for roughing and finishing.

HK Strong cutting edge insert

- Accurate tolerance M-class insert.
- Neutral, double sided 14 corners.
- High cutting edge strength to prevent fracturing of the cutting edge during unstable machining of non-uniform workpieces and high feed machining.

WK Wiper Insert

- Right-hand 2 corners, left-hand 2 corners.
- Based on the number of inserts and the cutting conditions, by using the wiper inserts it is possible to improve the overall surface finish.

1. The insert for AHX640W is compatible with AHX640S.
2. Please refer to page 79 for the proper use of the XC5010 insert.

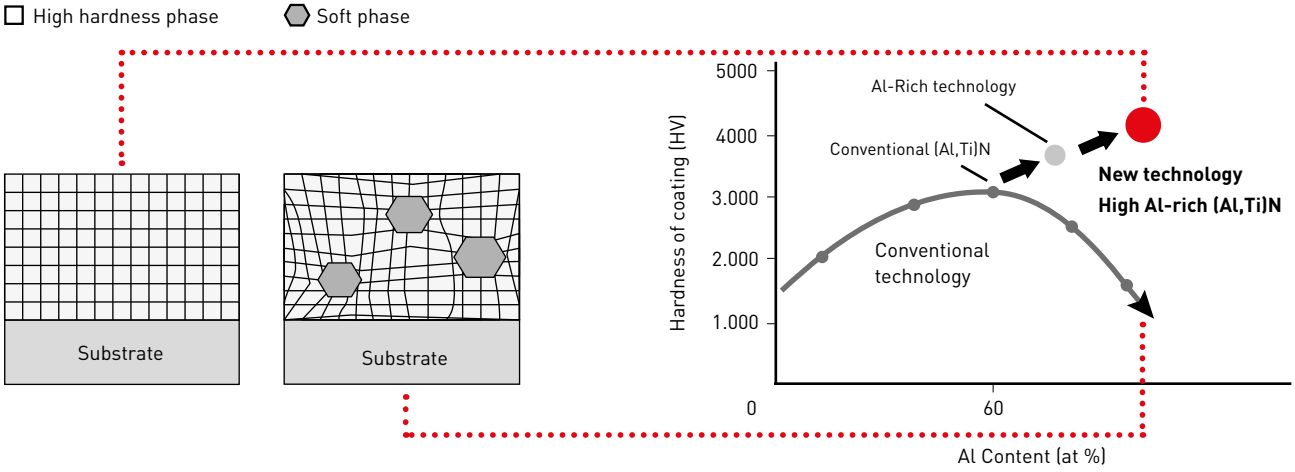
NEW

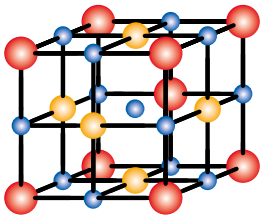
MV1020 / MV1030

NEWLY DEVELOPED Al-RICH COATING

ADVANCED WEAR AND THERMAL SHOCK RESISTANT

By adopting the newly developed Al-Rich coating technology, the (Al,Ti)N with a high Al content ratio displays a very high hardness. This greatly improves oxidation and wear resistance. The extreme heat resistance of this new series achieves amazing stability not only when dry cutting, but also during wet cutting where inserts are usually prone to thermal cracking. MV1020 offers overwhelmingly superior performance in high-speed cutting, and MV1030 achieves stable performance during interrupted and stainless steel machining.



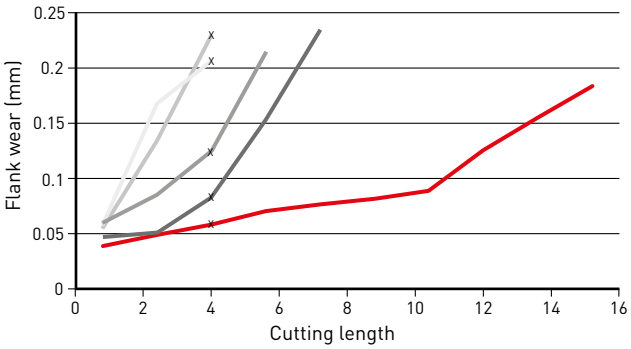


Crystal image of **MV1000** series

CUTTING PERFORMANCE

COMPARISON OF WEAR RESISTANCE WHEN MACHINING DUCTILE CAST IRON

Material	DIN GGG70
Tool	AHX440
Insert	NNMU130508ZEN-M
Vc (m/min)	300
fz (mm/t)	0.1
ap (mm)	2.0
ae (mm)	52
Cutting mode	Dry cutting Single insert



TAKEN AFTER CUTTING LENGTH OF 4.0 M

MV1020

Conventional A

Conventional B

Conventional C

Conventional D

■ : MV1020 ■ A ■ B ■ C ■ D : Conventional tool

MP6100 / MP7100 / MP9100

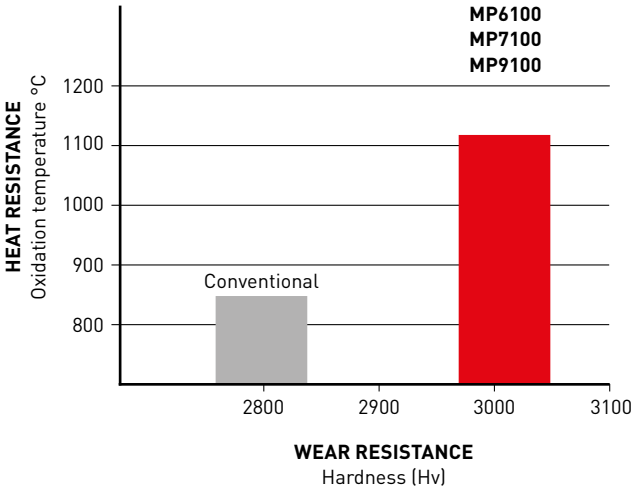
INSERT GRADES FOR A WIDE RANGE OF MATERIALS

ACCUMULATED Al-Ti-Cr-N BASED PVD COATING

Excellent welding resistance due to a low coefficient of friction.

PVD accumulated coating.

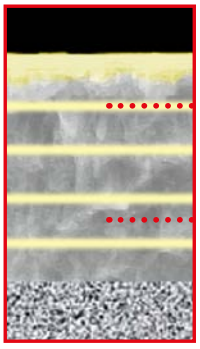
Special cemented carbide substrate.



COEFFICIENT OF FRICTION

	Material	Grade	Coefficient of friction (Measured at 600 °C)		
			C55	X10CrNi18-9	Ti6Al4V
P	Carbon steel, Alloy steel	MP61○○	0.4		
M	Stainless steel	MP71○○		0.5	
S	Titanium alloy, Heat resistant alloy	MP91○○		0.7	0.3
	Conventional		0.7		0.7

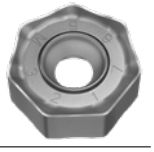
TOUGH-Σ



Graphical representation

Each grade has a layer suitable for each application area

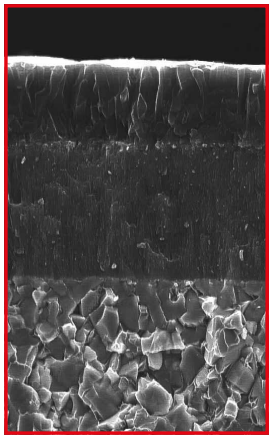
Base Layer High Al-(Al, Ti)N
The new technology Al-(Al, Ti)N coating provides stabilisation of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance.

P	**(Al,Cr)N** Tough against thermal cracks	
M	**TiN** Tough against notching	
S	**CrN** Tough resistant chipping	

P	PVD			M	PVD			K	CVD		PVD		S	PVD		H	PVD
P10	MP6120		VP15TF	M10			VP15TF	K10	MC5020	XC5010			S10	MP9120	VP15FT	H10	VP15TF
P20		MP6130		M20	MP7130	MP7030		K20			VP15TF		S20			H20	
P30				M30				K30				VP20RT	S30		MP9130	H30	
P40				M40	MP7140			K40					S40			H40	

MC5020

MC5020 has excellent wear, chipping and thermal crack resistance. These features prevent the problems usually associated with machining cast iron over prolonged periods.



Structure of
MC5020

IMPROVED WEAR RESISTANCE

The micro-grain wear resistant Al_2O_3 and fibrous TiCN layers deliver excellent wear resistance when milling a wide range of cast irons.

IMPROVED FRACTURE RESISTANCE

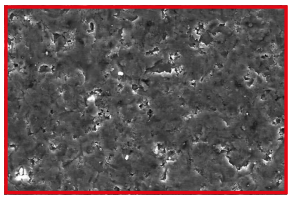
Use of a specially developed cemented carbide that provides superior resistance to fracture and thermal cracking prevents the cutting edge from sudden fracturing.

REDUCED ABNORMAL DAMAGE

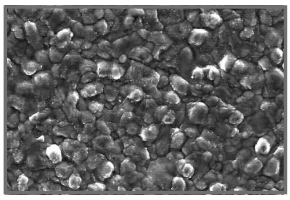
A black super smooth coating prevents abnormal damage such as weld chipping.

BLACK SUPER SMOOTH COATING

COMPARISON OF COATING SURFACE



MC5020



Conventional

CUTTING PERFORMANCE

WEAR RESISTANCE

MC5020

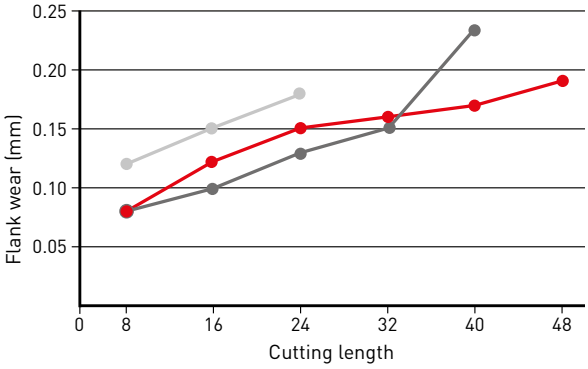
SURFACE FINISH

Surface finish condition

CUTTING PERFORMANCE

WEAR RESISTANCE

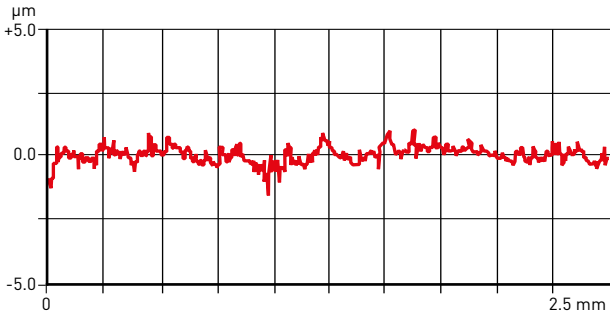
Material	DIN GG30
Tool	AHX640WR10010D
Insert	NNMU200608ZEN-MK
Vc (m/min)	300
fz (mm/t)	0.3
ap (mm)	5.0
ae (mm)	100
Cutting mode	Dry cutting Single insert



Wear comparison when machining with a single tooth.

SURFACE FINISH

Material	DIN GGG70
Tool	AHX640WR10014D
Insert	NNMU200608ZEN-MK
Wiper insert	WNEU2006ZEN7C-WK
Vc (m/min)	350
fz (mm/t)	0.1
ap (mm)	0.4
ae (mm)	80
Cutting mode	Air blow



■ : MC5020 ■ A ■ B : Conventional tool

AHX440S

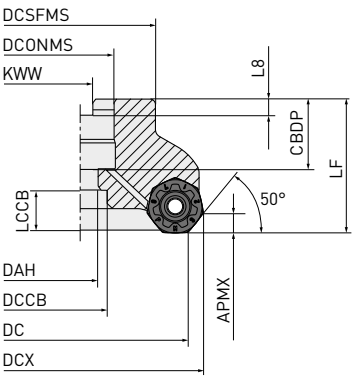
FACE MILL

P M K H

KAPR: 50°
GAMP: -10°
GAMF: -7°

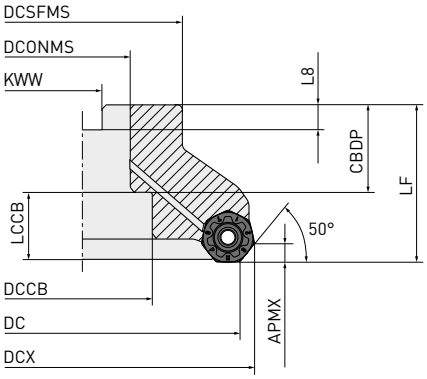
1

Ø 40
Ø 50
Ø 63
Ø 80



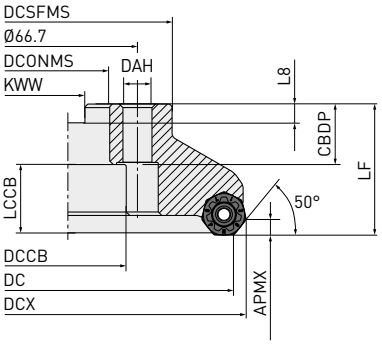
2

Ø 100
Ø 125
Ø 160



3

Ø 160



Right hand tool holder only.

Tool holder type	Set bolt order number			Geometry
AHX440S-040A○○AR	HSC08025H	HSC08040	1	1
AHX440S-050A○○AR	HSC10030H	HSC10035		
AHX440S-063A○○AR	HSC10030H	HSC10035		
AHX440S-080A○○AR	HSC12035H	HSC12035		
		HSC12045		
AHX440S-100B○○AR	MBA16033H	—	2	2
AHX440S-125B○○AR	MBA20040H	—		

AHX440S – FACE MILL

ARBOR TYPE

Order number	Stock	APMX	DC	DCONMS	LF	WT	ZEFF		Type
AHX440S-040A03AR	●	3	40	16	40	0.3	3	○	1
AHX440S-040A04AR	●	3	40	16	40	0.2	4	○	1
AHX440S-050A04AR	●	3	50	22	40	0.4	4	○	1
AHX440S-050A05AR	●	3	50	22	40	0.4	5	○	1
AHX440S-050A06AR	●	3	50	22	40	0.4	6	○	1
AHX440S-063A05AR	●	3	63	22	40	0.6	5	○	1
AHX440S-063A06AR	●	3	63	22	40	0.6	6	○	1
AHX440S-063A08AR	●	3	63	22	40	0.5	8	○	1
AHX440S-080A06AR	●	3	80	27	50	1.1	6	○	1
AHX440S-080A08AR	●	3	80	27	50	1.1	8	○	1
AHX440S-080A10AR	●	3	80	27	50	1.1	10	○	1
AHX440S-100B07AR	●	3	100	32	50	1.6	7	○	2
AHX440S-100B10AR	●	3	100	32	50	1.6	10	○	2
AHX440S-100B12AR	●	3	100	32	50	1.6	12	○	2
AHX440S-125B08AR	●	3	125	40	63	3.0	8	○	2
AHX440S-125B12AR	●	3	125	40	63	3.0	12	○	2
AHX440S-125B14AR	●	3	125	40	63	2.9	14	○	2
AHX440S-160C10NR	●	3	160	40	63	4.8	10	—	3
AHX440S-160C14NR	●	3	160	40	63	4.6	14	—	3
AHX440S-160C16NR	●	3	160	40	63	4.7	16	—	3

1/1

1. The cutter body is not supplied with the set bolt for the arbor. Please order a set bolt seperately.
2. ○ = With through coolant holes

91 Vc

MOUNTING DIMENSIONS

Order number	CBDP	DAH	DCCB	DCONMS	DCSFMS	DCX	KWW	L8	Type
AHX440S-040A03AR	18	9	—	16	37	48.4	8.4	5.6	1
AHX440S-040A04AR	18	9	—	16	37	48.4	8.4	5.6	1
AHX440S-050A04AR	20	11	—	22	47	58.4	10.4	6.3	1
AHX440S-050A05AR	20	11	—	22	47	58.4	10.4	6.3	1
AHX440S-050A06AR	20	11	—	22	47	58.4	10.4	6.3	1
AHX440S-063A05AR	20	11	—	22	50	71.4	10.4	6.3	1
AHX440S-063A06AR	20	11	—	22	50	71.4	10.4	6.3	1
AHX440S-063A08AR	20	11	—	22	50	71.4	10.4	6.3	1
AHX440S-080A06AR	23	13	—	27	56	88.4	12.4	7	1
AHX440S-080A08AR	23	13	—	27	56	88.4	12.4	7	1
AHX440S-080A10AR	23	13	—	27	56	88.4	12.4	7	1
AHX440S-100B07AR	32	—	45	32	78	108.4	14.4	8	2
AHX440S-100B10AR	32	—	45	32	78	108.4	14.4	8	2
AHX440S-100B12AR	32	—	45	32	78	108.3	14.4	8	2
AHX440S-125B08AR	40	—	56	40	89	133.4	16.4	9	2
AHX440S-125B12AR	40	—	56	40	89	133.4	16.4	9	2
AHX440S-125B14AR	40	—	56	40	89	133.3	16.4	9	2
AHX440S-160C10NR	40	—	56	40	100	168.4	16.4	9	3
AHX440S-160C14NR	40	—	56	40	100	168.4	16.4	9	3
AHX440S-160C16NR	40	—	56	40	100	168.4	16.4	9	3

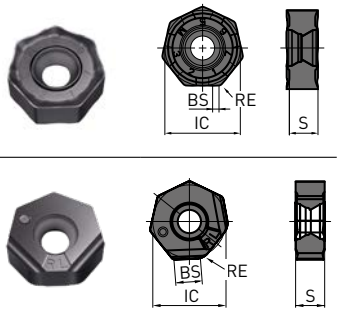
1/1

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

AHX440S – INSERTS

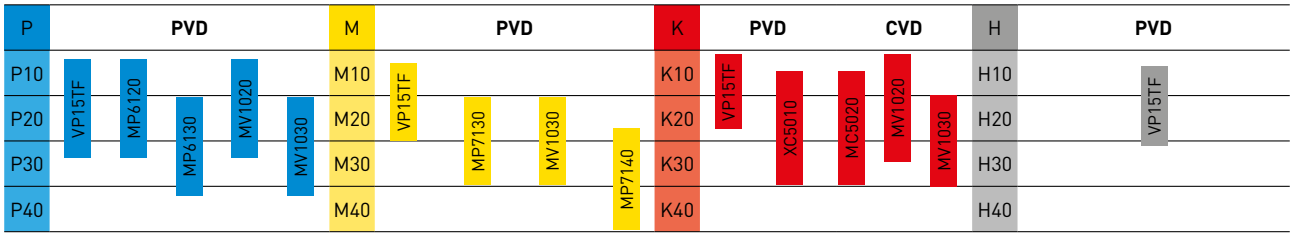
P	Steel	●: Stable cutting ◐: General cutting ✥: Unstable cutting
M	Stainless steel	
K	Cast iron	**Honing:**
H	Hardened steel	E: Round

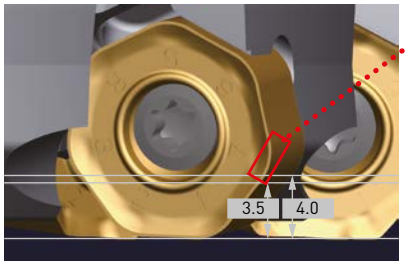
Order number	Class	Honing	MP6120	MP6130	MP7130	MP7140	MC5020	NEW MV1020	NEW MV1030	VP15TF	IC	S	BS	RE	APMX	Geometry
NNMU130508ZER-L	M	E	●	●	●	●	●	●	●	●	13.4	5.09	1	0.8	3	
NNMU130508ZEN-M	M	E	●	●	●	●	●	●	●	●	13.4	5.09	1	0.8	4*	
NNMU130532ZEN-M	M	E	●	●	●	●	●	●	●	●	13.4	5.09	—	3.2	4*	
NNMU130532ZEN-R	M	E	●	●	●	●	●	●	●	●	13.4	5.09	—	3.2	4*	
WNEU1305ZEN4C-M	E	E	●				●			●	13.4	5.09	4	2.7	0.5	



* Without using the wiper, APMX = 3.0 mm

GRADE SELECTION





NEXT CORNER RADIUS TO BE USED

When the next corner is not to be used, the APMX is 4.0 mm. When the next corner is to be used later (clockwise insert indexing), the APMX is 3.5 mm. This is to ensure that the next cutting edge isn't already worn from use at 4.0 mm depth of cut.

INSTRUCTIONS FOR USE OF WIPER INSERTS

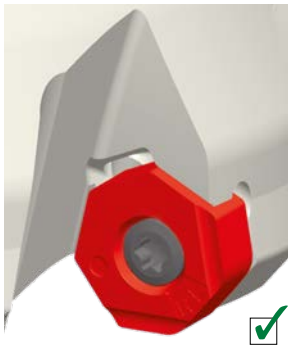


Fig. 1

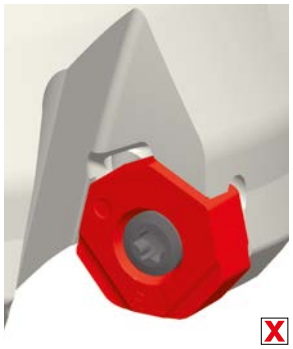


Fig. 2

1. These wiper inserts have 2 cutting edges for left hand use and 2 corners for right hand use. Position as shown in figure 1.
2. A satisfactory finished surface can be achieved with one wiper insert. However, if the feed rate per revolution will be equal to or greater than the width of the wiper edge, it is recommended to install the second and further wiper inserts spaced evenly within the cutting body.

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

AHX440S

RECOMMENDED CUTTING CONDITIONS

DRY CUTTING

	Material	Properties	Grade	Vc	fz	ap	ae
P	Mild steel	<180HB	MV1020	300 (200–400)	0.30 (0.20–0.40)	≤3	≤0.8DC
			MP6120	250 (200–300)	0.30 (0.20–0.40)	≤3	≤0.8DC
			VP15FT	250 (200–300)	0.30 (0.20–0.40)	≤3	≤0.8DC
			MV1030	245 (190–300)	0.30 (0.20–0.40)	≤3	≤0.8DC
			MP6130	240 (190–290)	0.30 (0.20–0.40)	≤3	≤0.8DC
	Carbon steel Alloy steel	180–280HB	MV1020	260 (170–350)	0.30 (0.20–0.40)	≤3	≤0.8DC
			MP6120	220 (170–270)	0.30 (0.20–0.40)	≤3	≤0.8DC
			VP15FT	220 (170–270)	0.30 (0.20–0.40)	≤3	≤0.8DC
			MV1030	210 (150–270)	0.30 (0.20–0.40)	≤3	≤0.8DC
			MP6130	200 (150–250)	0.30 (0.20–0.40)	≤3	≤0.8DC
		280–350HB	MV1020	180 (100–250)	0.30 (0.20–0.40)	≤3	≤0.8DC
			MP6120	140 (100–180)	0.30 (0.20–0.40)	≤3	≤0.8DC
			VP15FT	140 (100–180)	0.30 (0.20–0.40)	≤3	≤0.8DC
			MV1030	135 (90–180)	0.30 (0.20–0.40)	≤3	≤0.8DC
			MP6130	120 (90–150)	0.30 (0.20–0.40)	≤3	≤0.8DC
	Alloy tool steel	≤350HB	MP6120	140 (100–180)	0.15 (0.20–0.20)	≤ 1	≤0.8DC
			VP15FT	140 (100–180)	0.15 (0.20–0.20)	≤ 1	≤0.8DC
			MP6130	120 (90–150)	0.15 (0.20–0.20)	≤ 1	≤0.8DC
	Pre-hardened steel	35–45HRC	MP6120	140 (100–180)	0.15 (0.20–0.20)	≤ 1	≤0.8DC
			MP6130	120 (90–150)	0.15 (0.20–0.20)	≤ 1	≤0.8DC
M	Austenitic stainless steel	≤200HB	MP7130	200 (150–250)	0.20 (0.10–0.30)	≤3	≤0.8DC
			VP15FT	200 (150–250)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MV1030	185 (120–250)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MP7140	180 (120–230)	0.20 (0.10–0.30)	≤3	≤0.8DC
		≥200HB	MP7130	150 (100–200)	0.20 (0.10–0.30)	≤3	≤0.8DC
			VP15FT	150 (100–200)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MV1030	140 (80–200)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MP7140	130 (80–180)	0.20 (0.10–0.30)	≤3	≤0.8DC
	Ferritic and martensitic stainless steel	≤200HB	MP7130	200 (150–250)	0.20 (0.10–0.30)	≤3	≤0.8DC
			VP15FT	200 (150–250)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MV1030	185 (120–250)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MP7140	180 (120–230)	0.20 (0.10–0.30)	≤3	≤0.8DC
		≥200HB	MP7130	150 (100–200)	0.20 (0.10–0.30)	≤3	≤0.8DC
			VP15FT	150 (100–200)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MV1030	140 (80–200)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MP7140	130 (80–180)	0.20 (0.10–0.30)	≤3	≤0.8DC
	Two-phase stainless steel	≤280HB	MP7130	140 (100–180)	0.15 (0.20–0.20)	≤3	≤0.8DC
			VP15FT	140 (100–180)	0.15 (0.20–0.20)	≤3	≤0.8DC
			MP7140	120 (80–160)	0.15 (0.20–0.20)	≤3	≤0.8DC
	Hardened stainless steel	≤450HB	MP7130	130 (100–160)	0.15 (0.20–0.20)	≤3	≤0.8DC
			VP15FT	130 (100–160)	0.15 (0.20–0.20)	≤3	≤0.8DC
			MP7140	110 (80–140)	0.15 (0.20–0.20)	≤3	≤0.8DC

1. Reduce the cutting speed when using coolant.

AHX440S

RECOMMENDED CUTTING CONDITIONS

DRY CUTTING

	Material	Properties	Grade	Vc	fz	ap	ae
K	Grey cast iron	<350MPa	MC5020	220 (150–300)	0.30 (0.20–0.40)	≤3	≤0.8DC
			VP15FT	180 (130–230)	0.30 (0.20–0.40)	≤3	≤0.8DC
	Ductile cast iron	<450MPa	MV1020	240 (130–350)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MC5020	220 (150–300)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MV1030	185 (120–250)	0.20 (0.10–0.30)	≤3	≤0.8DC
			VP15FT	170 (120–220)	0.20 (0.10–0.30)	≤3	≤0.8DC
	Ductile cast iron	<800MPa	MV1020	220 (80–350)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MC5020	170 (150–200)	0.20 (0.10–0.30)	≤3	≤0.8DC
			MV1030	150 (100–200)	0.20 (0.10–0.30)	≤3	≤0.8DC
			VP15FT	140 (100–180)	0.20 (0.10–0.30)	≤3	≤0.8DC
H	Hardened steel	40–55HRC	VP15FT	80 (60–100)	0.15 (0.10–0.20)	≤1	≤0.8DC

1. Reduce the cutting speed when using coolant.

AHX440S

RECOMMENDED CUTTING CONDITIONS

WET CUTTING

	Material	Properties	Grade	Vc	fz	ap	ae
M	Austenitic stainless steel	≤200HB	MP7130	125 (100–150)	0.15 (0.10–0.20)	≤3	≤0.8DC
			VP15FT	125 (100–150)	0.15 (0.10–0.20)	≤3	≤0.8DC
			MP7140	100 (80–140)	0.15 (0.10–0.20)	≤3	≤0.8DC
		≥200HB	MP7130	100 (75–125)	0.15 (0.10–0.20)	≤3	≤0.8DC
			VP15FT	100 (75–125)	0.15 (0.10–0.20)	≤3	≤0.8DC
			MP7140	80 (55–105)	0.15 (0.10–0.20)	≤3	≤0.8DC
	Ferritic and martensitic stainless steel	≤200HB	MP7130	125 (100–150)	0.15 (0.10–0.20)	≤3	≤0.8DC
			VP15FT	125 (100–150)	0.15 (0.10–0.20)	≤3	≤0.8DC
			MP7140	100 (80–140)	0.15 (0.10–0.20)	≤3	≤0.8DC
		≥200HB	MP7130	100 (75–125)	0.15 (0.10–0.20)	≤3	≤0.8DC
			VP15FT	100 (75–125)	0.15 (0.10–0.20)	≤3	≤0.8DC
			MP7140	80 (55–105)	0.15 (0.10–0.20)	≤3	≤0.8DC
	Two-phase stainless steel	≤280HB	MP7130	80 (60–100)	0.10 (0.05–0.15)	≤3	≤0.8DC
			VP15FT	80 (60–100)	0.10 (0.05–0.15)	≤3	≤0.8DC
			MP7140	60 (40– 80)	0.10 (0.05–0.15)	≤3	≤0.8DC
	Hardened stainless steel	≤450HB	MP7130	70 (50– 90)	0.10 (0.05–0.15)	≤3	≤0.8DC
			VP15FT	70 (50– 90)	0.10 (0.05–0.15)	≤3	≤0.8DC
			MP7140	50 (30– 70)	0.10 (0.05–0.15)	≤3	≤0.8DC

AHX440S

RECOMMENDED CUTTING CONDITIONS

CUTTING CONDITIONS FOR WIPER INSERT

	Material	Properties	Grade	Vc	fz	ap
P	Mild steel	<180HB	MP6120	250 (200–300)	0.30 (0.20–0.40)	≤0.5
			VP15FT	250 (200–300)	0.30 (0.20–0.40)	≤0.5
	Carbon steel Alloy steel	180–280HB	MP6120	220 (170–270)	0.30 (0.20–0.40)	≤0.5
			VP15FT	220 (170–270)	0.30 (0.20–0.40)	≤0.5
		280–350HB	MP6120	140 (100–180)	0.30 (0.20–0.40)	≤0.5
			VP15FT	140 (100–180)	0.30 (0.20–0.40)	≤0.5
	Alloy tool steel	≤350HB	MP6120	140 (100–180)	0.15 (0.10–0.20)	≤0.5
			VP15FT	140 (100–180)	0.15 (0.10–0.20)	≤0.5
	Pre-hardened steel	35–45HRC	MP6120	140 (100–180)	0.15 (0.10–0.20)	≤0.5
			VP15FT	140 (100–180)	0.15 (0.10–0.20)	≤0.5
M	Austenitic stainless steel	≤200HB	VP15FT	125 (100–150)	0.15 (0.10–0.20)	≤0.5
		≥200HB	VP15FT	100 (75–125)	0.15 (0.10–0.20)	≤0.5
	Ferritic and martensitic stainless steel	≤200HB	VP15FT	125 (100–150)	0.15 (0.10–0.20)	≤0.5
		≥200HB	VP15FT	100 (75–125)	0.15 (0.10–0.20)	≤0.5
	Two-phase stainless steel	≤280HB	VP15FT	80 (60–100)	0.10 (0.05–0.15)	≤0.5
	Hardened stainless steel	≤450HB	VP15FT	70 (50– 90)	0.10 (0.05–0.15)	≤0.5
K	Grey cast iron	<350MPa	MC5020	320 (250–400)	0.30 (0.20–0.40)	≤0.5
			VP15FT	220 (150–300)	0.30 (0.20–0.40)	≤0.5
	Ductile cast iron	<450MPa	MC5020	250(200–300)	0.20 (0.10–0.30)	≤0.5
			VP15FT	200 (150–250)	0.20 (0.10–0.30)	≤0.5
		<800MPa	MC5020	220 (200–250)	0.20 (0.10–0.30)	≤0.5
			VP15FT	170 (150–200)	0.20 (0.10–0.30)	≤0.5
H	Hardened steel	40–55HRC	VP15FT	80 (60–100)	0.15 (0.10–0.20)	≤0.5

1/1

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

AHX475S

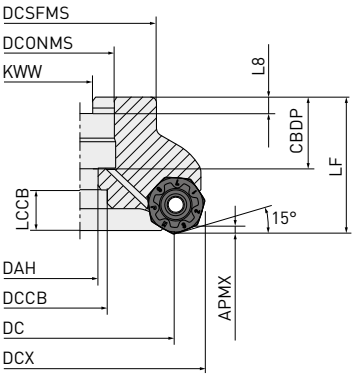
HIGH FEED MILLING CUTTER

P K H

KAPR: 15°
T: 16°
GAMP: -6°/9°
GAMF: -10°

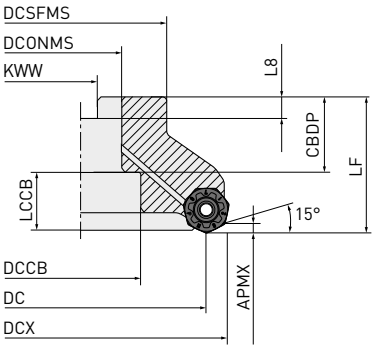
1

Ø 50
Ø 63
Ø 80
Ø 100

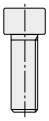
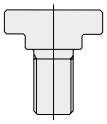


2

Ø 125
Ø 160



Right hand tool holder only.

Tool holder type	Set bolt order number		Geometry	
				
AHX475S-050A○○AR	HSC10030H	HSC10035	1	1 
AHX475S-063A○○AR	HSC10030H	HSC10035		
AHX475S-080A○○AR	HSC12035H	HSC12035		
		HSC12045		
AHX475S-100B○○AR	HSC16040H	—		
AHX475S-125B○○AR	MBA20040H	—	2	2 
AHX475S-160B○○AR	MBA20040H	—		

AHX475S – HIGH FEED MILLING CUTTER

ARBOR TYPE

Order number	Stock	APMX	DC	DCONMS	LF	WT	ZEFF	○	Type
AHX475S-050A04AR	●	1.6	50	22	50	0.6	4	○	1
AHX475S-050A05AR	●	1.6	50	22	50	0.6	5	○	1
AHX475S-063A05AR	●	1.6	63	22	50	1.0	5	○	1
AHX475S-063A06AR	●	1.6	63	22	50	0.9	6	○	1
AHX475S-080A06AR	●	1.6	80	27	50	1.6	6	○	1
AHX475S-080A08AR	●	1.6	80	27	50	1.5	8	○	1
AHX475S-100A07AR	●	1.6	100	32	63	3.2	7	○	2
AHX475S-100A09AR	●	1.6	100	32	63	3.2	9	○	2
AHX475S-125B08AR	●	1.6	125	40	63	3.8	8	○	2
AHX475S-125B10AR	●	1.6	125	40	63	3.8	10	○	2
AHX475S-160B10AR	●	1.6	160	40	63	5.4	10	○	2
AHX475S-160B12AR	●	1.6	160	40	63	5.3	12	○	2

1/1

1. The cutter body is not supplied with the set bolt for the arbor. Please order a set bolt seperately.
2. ○ = With through coolant holes

98 Vc

MOUNTING DIMENSIONS

Order number	CBDP	DAH	DCCB	DCONMS	DCSFMS	DCX	KWW	L8	Type
AHX475S-050A04AR	20	11	17	22	47	65.6	10.4	6.3	1
AHX475S-050A05AR	20	11	17	22	47	65.6	10.4	6.3	1
AHX475S-063A05AR	20	11	17	22	60	78.6	10.4	6.3	1
AHX475S-063A06AR	20	11	17	22	60	78.6	10.4	6.3	1
AHX475S-080A06AR	23	13	20	27	76	95.6	12.4	7	1
AHX475S-080A08AR	23	13	20	27	76	95.6	12.4	7	1
AHX475S-100A07AR	26	17	26	32	96	115.6	14.4	8	2
AHX475S-100A09AR	26	17	26	32	96	115.6	14.4	8	2
AHX475S-125B08AR	40	56	—	40	100	140.6	16.4	9	2
AHX475S-125B10AR	40	56	—	40	100	140.6	16.4	9	2
AHX475S-160B10AR	40	56	—	40	100	175.6	16.4	9	2
AHX475S-160B12AR	40	56	—	40	100	175.6	16.4	9	2

1/1

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

AHX475S – INSERTS

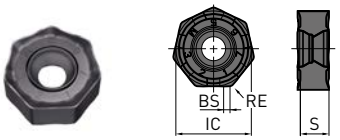
		MP6120	MP6130	MC5020	NEW MV1020	NEW MV1030	VP15TF
P	Steel	◐	✲		◐	◐	◐
K	Cast iron			◐	◐	◐	◐
H	Hardened steel						◐

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

Honing: E: Round

Order number	Class	Honing	MP6120	MP6130	MC5020	NEW MV1020	NEW MV1030	VP15TF	IC	S	BS	RE	APMX
NNMU130532ZEN-M	M	E	●	●	●	●	●	●	13.4	5.09	—	3.2	1.6
NNMU130532ZEN-R	M	E	●	●	●	●	●	●	13.4	5.09	—	3.2	1.6

Geometry



GRADE SELECTION

P	PVD	K	PVD	CVD	H	PVD
P10	VP15TF, MP6120, MV1020	K10	VP15TF, MV1020	MV1020, MC5020	H10	VP15TF
P20	MP6130	K20			H20	
P30	MV1030	K30			H30	
P40		K40			H40	

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

AHX475S

RECOMMENDED CUTTING CONDITIONS

DRY CUTTING

	Material	Properties	Grade		Vc	fz	ap	ae
P	Mild steel	<180HB	MV1020	R	220 (170 – 270)	0.6	≤1.6	≤0.5DC
			MV1020	R	220 (170 – 270)	0.8	≤1.6	0.5 – 0.8DC
			MV1020	M	220 (170 – 270)	1.0	≤1.6	0.8 – 1DC
			MP6120	R	150 (100 – 200)	0.6	≤1.6	≤0.5DC
			MP6120	R	150 (100 – 200)	0.8	≤1.6	0.5 – 0.8DC
			MP6120	M	150 (100 – 200)	1.0	≤1.6	0.8 – 1DC
			MV1030	R	140 (80 – 200)	0.6	≤1.6	≤0.5DC
			MV1030	R	140 (80 – 200)	0.8	≤1.6	0.5 – 0.8DC
			MV1030	M	140 (80 – 200)	1.0	≤1.6	0.8 – 1DC
			MP6130	R	130 (80 – 180)	0.6	≤1.6	≤0.5DC
			MP6130	R	130 (80 – 180)	0.8	≤1.6	0.5 – 0.8DC
			MP6130	M	130 (80 – 180)	1	≤1.6	0.8 – 1DC
	Carbon steel Alloy steel	180–280HB	MV1020	R	200 (150 – 250)	0.6	≤1.6	≤0.5DC
			MV1020	R	200 (150 – 250)	0.8	≤1.6	0.5 – 0.8DC
			MV1020	M	200 (150 – 250)	1.0	≤1.6	0.8 – 1DC
			MP6120	R	130 (80 – 180)	0.6	≤1.6	≤0.5DC
			MP6120	R	130 (80 – 180)	0.8	≤1.6	0.5 – 0.8DC
			MP6120	M	130 (80 – 180)	1.0	≤1.6	0.8 – 1DC
			MV1030	R	140 (80 – 200)	0.6	≤1.6	≤0.5DC
			MV1030	R	140 (80 – 200)	0.8	≤1.6	0.5 – 0.8DC
			MV1030	M	140 (80 – 200)	1.0	≤1.6	0.8 – 1DC
			MP6130	R	110 (60 – 160)	0.6	≤1.6	≤0.5DC
			MP6130	R	110 (60 – 160)	0.8	≤1.6	0.5 – 0.8DC
			MP6130	M	110 (60 – 160)	1	≤1.6	0.8 – 1DC
	Carbon steel Alloy steel	280–350HB	MV1020	R	150 (100 – 200)	0.5	≤1.6	≤0.5DC
			MV1020	R	150 (100 – 200)	0.6	≤1.6	0.5 – 0.8DC
			MV1020	R	150 (100 – 200)	0.7	≤1.6	0.8 – 1DC
			MP6120	R	100 (50 – 150)	0.5	≤1.6	≤0.5DC
			MP6120	R	100 (50 – 150)	0.6	≤1.6	0.5 – 0.8DC
			MP6120	R	100 (50 – 150)	0.7	≤1.6	0.8 – 1DC
			MV1030	R	90 (30 – 150)	0.5	≤1.6	≤0.5DC
			MV1030	R	90 (30 – 150)	0.6	≤1.6	0.5 – 0.8DC
			MV1030	R	90 (30 – 150)	0.7	≤1.6	0.8 – 1DC
			MP6130	R	80 (30 – 130)	0.5	≤1.6	≤0.5DC
			MP6130	R	80 (30 – 130)	0.6	≤1.6	0.5 – 0.8DC
			MP6130	R	80 (30 – 130)	0.7	≤1.6	0.8 – 1DC
	Alloy tool steel	<350HB	MP6120	R	100 (50 – 150)	0.5	≤1.6	≤0.5DC
			MP6120	R	100 (50 – 150)	0.6	≤1.6	0.5 – 0.8DC
			MP6120	R	100 (50 – 150)	0.7	≤1.6	0.8 – 1DC
			MP6130	R	80 (30 – 120)	0.5	≤1.6	≤0.5DC
			MP6130	R	80 (30 – 120)	0.6	≤1.6	0.5 – 0.8DC
			MP6130	R	80 (30 – 120)	0.7	≤1.6	0.8 – 1DC
	Pre-hardened steel	35–45HRC	MP6120	R	100 (70 – 130)	0.5	≤1.6	≤0.5DC
			MP6120	R	100 (70 – 130)	0.6	≤1.6	0.5 – 0.8DC
			MP6120	R	100 (70 – 130)	0.7	≤1.6	0.8 – 1DC
			MP6130	R	80 (50 – 110)	0.5	≤1.6	≤0.5DC
			MP6130	R	80 (50 – 110)	0.6	≤1.6	0.5 – 0.8DC
			MP6130	R	80 (50 – 110)	0.7	≤1.6	0.8 – 1DC

AHX475S

RECOMMENDED CUTTING CONDITIONS

DRY CUTTING

	Material	Properties	Grade		Vc	fz	ap	ae
K	Grey cast iron	<350MPa	MC5020	R	150 (100 – 200)	0.6	≤1.6	≤0.5DC
			MC5020	R	150 (100 – 200)	0.8	≤1.6	0.5 – 0.8DC
			MC5020	M	150 (100 – 200)	1.0	≤1.6	0.8 – 1DC
			VP15FT	R	120 (80 – 160)	0.6	≤1.6	≤0.5DC
			VP15FT	R	120 (80 – 160)	0.8	≤1.6	0.5 – 0.8DC
			VP15FT	M	120 (80 – 160)	1.0	≤1.6	0.8 – 1DC
	Ductile cast iron	<450MPa	MV1020	R	200 (150 – 250)	0.6	≤1.6	≤0.5DC
			MV1020	R	200 (150 – 250)	0.8	≤1.6	0.5 – 0.8DC
			MV1020	M	200 (150 – 250)	1.0	≤1.6	0.8 – 1DC
			MC5020	R	150 (100 – 200)	0.6	≤1.6	≤0.5DC
			MC5020	R	150 (100 – 200)	0.8	≤1.6	0.5 – 0.8DC
			MC5020	M	150 (100 – 200)	1.0	≤1.6	0.8 – 1DC
			MV1030	R	140 (80 – 200)	0.6	≤1.6	≤0.5DC
			MV1030	R	140 (80 – 200)	0.8	≤1.6	0.5 – 0.8DC
			MV1030	M	140 (80 – 200)	1.0	≤1.6	0.8 – 1DC
			VP15FT	R	120 (80 – 160)	0.6	≤1.6	≤0.5DC
			VP15FT	R	120 (80 – 160)	0.8	≤1.6	0.5 – 0.8DC
			VP15FT	M	120 (80 – 160)	1	≤1.6	0.8 – 1DC
	Ductile cast iron	<800MPa	MV1020	R	180 (130 – 230)	0.5	≤1.6	≤0.5DC
			MV1020	R	180 (130 – 230)	0.6	≤1.6	0.5 – 0.8DC
			MV1020	R	180 (130 – 230)	0.7	≤1.6	0.8 – 1DC
			MC5020	R	150 (100 – 200)	0.5	≤1.6	≤0.5DC
			MC5020	R	150 (100 – 200)	0.6	≤1.6	0.5 – 0.8DC
			MC5020	R	150 (100 – 200)	0.7	≤1.6	0.8 – 1DC
			MV1030	R	140 (80 – 200)	0.5	≤1.6	≤0.5DC
			MV1030	R	140 (80 – 200)	0.6	≤1.6	0.5 – 0.8DC
			MV1030	R	140 (80 – 200)	0.7	≤1.6	0.8 – 1DC
			VP15FT	R	120 (80 – 160)	0.5	≤1.6	≤0.5DC
			VP15FT	R	120 (80 – 160)	0.6	≤1.6	0.5 – 0.8DC
			VP15FT	R	120 (80 – 160)	0.7	≤1.6	0.8 – 1DC
H	Hardened steel	40–55HRC	VP15FT	R	70 (50 – 90)	0.4	≤1.6	≤0.5DC
			VP15FT	R	70 (50 – 90)	0.5	≤1.6	0.5 – 0.8DC
			VP15FT	R	70 (50 – 90)	0.6	≤1.6	0.8 – 1DC

AHX640S

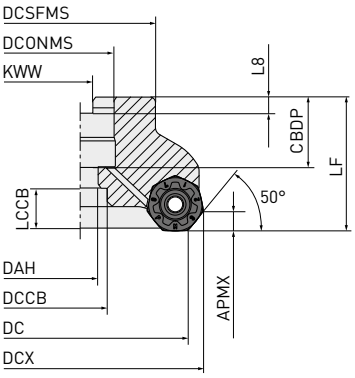
FACE MILL

P M K S H

KAPR: 50°
GAMP: -5°
GAMF: -6°

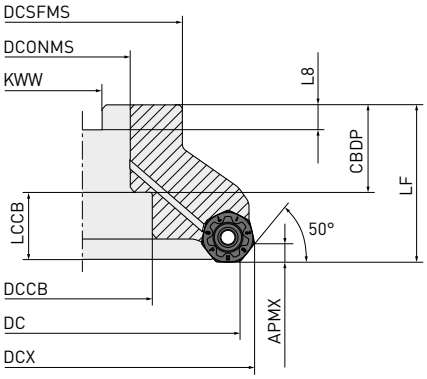
1

Ø 63
Ø 80



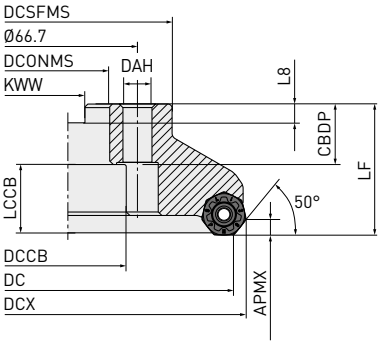
2

Ø 100
Ø 125



3

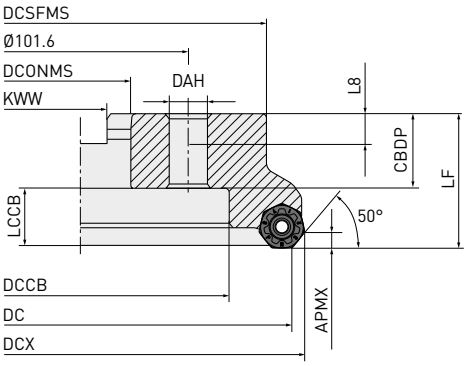
Ø 160



Right hand tool holder only.

4

Ø 200



Tool holder type	Set bolt		Geometry
AHX640S-063A○○AR	HSC10030H	1	1
AHX640S-080A○○AR	HSC12035H		
AHX640S-100B○○AR	MBA16033H		
AHX640S-125B○○AR	MBA20040H	2	2
AHX640S-160C○○NR	—	—	
AHX640S-200C○○NR	—	—	

AHX640S – FACE MILL

ARBOR TYPE

Order number	Stock	APMX	DC	DCONMS	LF	WT	ZEFF		Type
AHX640S-063A04AR	●	6	63	22	50	0.7	4	○	1
AHX640S-063A05AR	●	6	63	22	50	0.6	5	○	1
AHX640S-080A04AR	●	6	80	27	50	1.1	4	○	1
AHX640S-080A06AR	●	6	80	27	50	1.0	6	○	1
AHX640S-100B05AR	●	6	100	32	50	1.7	5	○	2
AHX640S-100B07AR	●	6	100	32	50	1.6	7	○	2
AHX640S-125B06AR	●	6	125	40	63	3.1	6	○	2
AHX640S-125B08AR	●	6	125	40	63	3.0	8	○	2
AHX640S-160C07NR	●	6	160	40	63	5.4	7	—	3
AHX640S-160C10NR	●	6	160	40	63	5.2	10	—	3
AHX640S-200C08NR	●	6	200	60	63	7.8	8	—	4
AHX640S-200C12NR	●	6	200	60	63	7.5	12	—	4

1/1

1. ○ = With through coolant holes

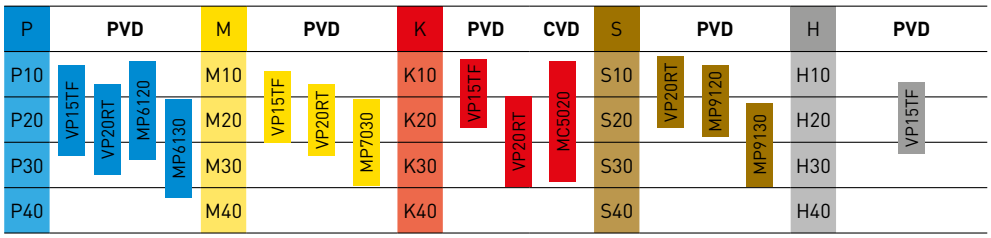
103 Vc

MOUNTING DIMENSIONS

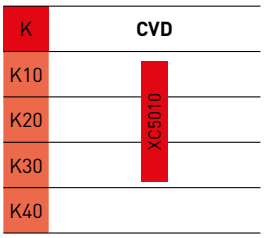
Order number	CBDP	DAH	DCCB	DCONMS	DCSFMS	DCX	KWW	L8	Type
AHX640S-063A04AR	20	11	—	22	50	75.55	10.4	6.3	1
AHX640S-063A05AR	20	11	—	22	50	75.55	10.4	6.3	1
AHX640S-080A04AR	23	13	—	27	56	92.55	12.4	7	1
AHX640S-080A06AR	23	13	—	27	56	92.55	12.4	7	1
AHX640S-100B05AR	32	—	45	32	78	112.55	14.4	8	2
AHX640S-100B07AR	32	—	45	32	78	112.55	14.4	8	2
AHX640S-125B06AR	42	—	56	40	89	137.55	16.4	9	2
AHX640S-125B08AR	42	—	56	40	89	137.55	16.4	9	2
AHX640S-160C07NR	29	—	56	40	120	172.55	16.4	9	3
AHX640S-160C10NR	29	—	56	40	120	172.55	16.4	9	3
AHX640S-200C08NR	32	—	140	60	175	212.55	25.7	14.22	4
AHX640S-200C12NR	32	—	140	60	175	212.55	25.7	14.22	4

1/1

GRADE SELECTION CARBIDE



GRADE SELECTION CERAMIC



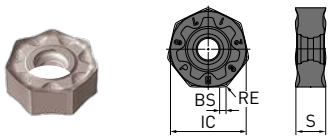
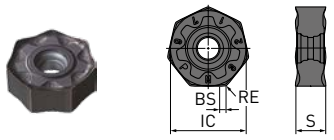
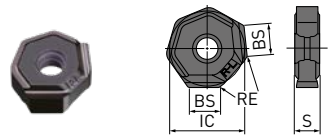
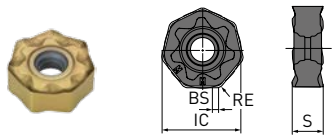
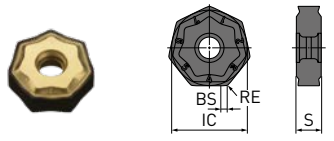
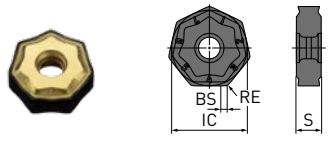
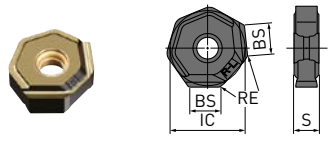
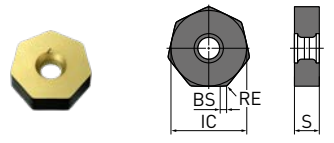
● : Inventory maintained. ★ : Inventory maintained in Japan.

AHX640S – INSERTS

		XC5010	MC5020	MP6120	MP6130	MP7030	MP9120	MP9130	VP15TF	VP20RT
P	Steel			●	✣				●	●
M	Stainless steel					◔			◔	◔
K	Cast iron	●	●						✣	●
S	Heat-resistant alloy, Titanium alloy						●	✣	●	●
H	Hardened steel								◔	

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

Honing:
E: Round

Order number	Class	Honing	XC5010	MC5020	MP6120	MP6130	MP7030	MP9120	MP9130	VP15TF	VP20RT	IC	S	BS	RE	APMX	Geometry
L																	
NNMU200712ZER-L	M	E						●	●			20	8.0	1.0	1.2	6	
M/MP																	
NNMU200708ZEN-MP	M	E								●		20	8.0	1.0	0.8	6	
NNMU200708ZEN-M	M	E			●	●						20	8.0	1.0	0.8	6	
WP (Wiper)																	
WNEU2007ZEN7C-WP	M	E								●		20	7.2	7.1	0.8	6	
MM																	
NNMU200712ZER-MM	M	E					●					20	8.0	1.0	1.2	6	
MK																	
NNMU200608ZEN-MK	M	E	●	●						●	★	20	6.55	1.0	0.8	6	
HK																	
NNMU200608ZEN-HK	M	E		●						●	★	20	6.55	1.0	0.8	6	
WK* (Wiper)																	
WNEU2006ZEN7C-WK	M	E		●								20	6.55	7.4	0.8	6	
FT																	
NEW NNMQ200708ZEN-FT	M	E	●									20	6.55	1.0	0.8	6	

* The MK/HK/WK breaker insert is compatible with AHX640S.

1. Possible wiper combinations: MK/HK with WK (wiper) & MP/L/M with WP (wiper).
2. Note that the height differs when MK/HK chipbreaker inserts are used.

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

AHX640S

RECOMMENDED CUTTING CONDITIONS

DRY CUTTING

	Material	Properties	Conditions	Grade		Vc	fz	ap	ae
P	Mild steel	<180HB		MP6120	M	250 (200–300)	0.30 (0.20–0.40)	≤5	≤0.8DC
				VP15FT	MP	250 (200–300)	0.30 (0.20–0.40)	≤5	≤0.8DC
				MP6130	M	220 (170–270)	0.40 (0.30–0.50)	≤5	≤0.8DC
	Carbon steel, Alloy steel	180–280HB		MP6120	M	220 (170–270)	0.30 (0.20–0.40)	≤5	≤0.8DC
				VP15FT	MP	220 (170–270)	0.30 (0.20–0.40)	≤5	≤0.8DC
				MP6130	M	190 (140–240)	0.40 (0.30–0.50)	≤5	≤0.8DC
		280–350HB		MP6120	M	140 (100–180)	0.30 (0.20–0.40)	≤5	≤0.8DC
				VP15FT	MP	140 (100–180)	0.30 (0.20–0.40)	≤5	≤0.8DC
				MP6130	M	110 (70–150)	0.40 (0.30–0.50)	≤5	≤0.8DC
	Alloy tool steel	≤350HB		MP6120	M	140 (100–180)	0.15 (0.10–0.20)	≤3	≤0.8DC
				VP15FT	MP	140 (100–180)	0.15 (0.10–0.20)	≤3	≤0.8DC
				MP6130	M	110 (70–150)	0.25 (0.20–0.30)	≤3	≤0.8DC
	Pre-hardened steel	35–45HRC		MP6120	M	140 (100–180)	0.15 (0.10–0.20)	≤3	≤0.8DC
				VP15FT	MP	140 (100–180)	0.15 (0.10–0.20)	≤5	≤0.8DC
				MP6130	M	110 (70–150)	0.25 (0.20–0.30)	≤3	≤0.8DC
M	Austenitic stainless steel	≤200HB		MP7030	MM	200 (150–250)	0.20 (0.10–0.30)	≤5	≤0.8DC
		≥200HB		MP7030	MM	150 (100–200)	0.20 (0.10–0.30)	≤5	≤0.8DC
	Two-phase stainless steel	≤280HB		MP7030	MM	140 (100–180)	0.15 (0.05–0.25)	≤5	≤0.8DC
	Ferritic and martensitic stainless steel	≤200HB		MP7030	MM	200 (150–250)	0.20 (0.10–0.30)	≤5	≤0.8DC
		≥200HB		MP7030	MM	150 (100–200)	0.20 (0.10–0.30)	≤5	≤0.8DC
	Precipitation hardening stainless steel	≤450HB		MP7030	MM	130 (100–160)	0.15 (0.05–0.25)	≤5	≤0.8DC
K	Grey cast iron	<350MPa		XC5010	MK, FT	800 (500–1000)	0.10 (0.10–0.30)	≤3	≤0.8DC
				MC5020	MK, HK	220 (150–300)	0.30 (0.20–0.40)	≤5	≤0.8DC
				VP15TF	MP	180 (130–230)	0.30 (0.20–0.40)	≤5	≤0.8DC
				VP15TF, VP20RT	MK, HK	180 (130–230)	0.30 (0.20–0.40)	≤5	≤0.8DC
	Ductile cast iron	<450MPa		XC5010	MK, FT	800 (500–1000)	0.10 (0.10–0.30)	≤3	≤0.8DC
				MC5020	MK, HK	200 (150–250)	0.20 (0.10–0.30)	≤5	≤0.8DC
				VP15TF	MP	170 (120–220)	0.20 (0.10–0.30)	≤5	≤0.8DC
				VP15TF, VP20RT	MK, HK	170 (120–220)	0.20 (0.10–0.30)	≤5	≤0.8DC
		<800MPa		XC5010	MK, FT	800 (500–1000)	0.10 (0.10–0.30)	≤3	≤0.8DC
				MC5020	MK, HK	170 (150–200)	0.20 (0.10–0.30)	≤5	≤0.8DC
				VP15TF	MP	140 (100–180)	0.20 (0.10–0.30)	≤5	≤0.8DC
				VP15TF, VP20RT	MK, HK	140 (100–180)	0.20 (0.10–0.30)	≤5	≤0.8DC
H	Hardened steel	40–55HRC		VP15TF	MP	80 (60–100)	0.15 (0.10–0.20)	≤3	≤0.8DC

1/1

1. Wet cutting is recommended for good surface finishing of stainless steel. (Tool life is short compared to dry cutting.)
2. Wet cutting with internal coolant is recommended for titanium and heat resistant alloys.
3. If the clamping rigidity of the work material is low and the tool overhang is long, adjust the cutting speed and feed in the table above.

AHX640S

RECOMMENDED CUTTING CONDITIONS

WET CUTTING

	Material	Properties	Grade		Vc	fz	ap	ae
M	Austenitic stainless steel	≤200HB	MP7030	MM	125 (100–150)	0.15 (0.10–0.20)	≤5	≤0.8DC
		≥200HB	MP7030	MM	100 (75–125)	0.15 (0.10–0.20)	≤5	≤0.8DC
	Two-phase stainless steel	≤280HB	MP7030	MM	80 (60–100)	0.10 (0.05–0.15)	≤5	≤0.8DC
	Ferritic and martensitic stainless steel	≤200HB	MP7030	MM	125 (100–150)	0.15 (0.10–0.20)	≤5	≤0.8DC
		≥200HB	MP7030	MM	100 (75–125)	0.15 (0.10–0.20)	≤5	≤0.8DC
	Precipitation hardening stainless steel	≤450HB	MP7030	MM	70 (50– 90)	0.10 (0.05–0.15)	≤5	≤0.8DC
S	Titanium alloy	—	MP7030	MM	40 (20– 50)	0.15 (0.10–0.20)	≤3	≤0.6DC
			MP9120	L	60 (50– 70)	0.10 (0.05–0.15)	≤3	≤0.6DC
			MP9130	L	40 (20– 50)	0.15 (0.10–0.20)	≤3	≤0.6DC
	Heat resistant alloy	—	MP7030	MM	40 (20– 50)	0.15 (0.10–0.20)	≤3	≤0.6DC
			MP9120	L	60 (50– 70)	0.10 (0.05–0.15)	≤3	≤0.6DC
			MP9130	L	40 (20– 50)	0.15 (0.10–0.20)	≤3	≤0.6DC

1/1

1. Wet cutting is recommended for good surface finishing of stainless steel. (Tool life is short compared to dry cutting.)
2. Wet cutting with internal coolant is recommended for titanium and heat resistant alloys.
3. When clamp rigidity is low and tool overhang is long, it is recommended to reduce the cutting speed and the feed rate by 30 %.

CUTTING CONDITIONS FOR WIPER INSERT

	Material	Properties	Main insert		Wiper insert		Vc	fz	ap	ae
P	Mild steel	≤180HB	VP15FT	MP	VP15FT	WP	250 (200–300)	0.30 (0.20–0.40)	≤0.5	≤0.8DC
			MP6120	M	MP6120	M	250 (200–300)	0.30 (0.20–0.40)	≤0.5	≤0.8DC
	Carbon steel, Alloy steel	180–280HB	VP15FT	MP	VP15FT	WP	220 (170–270)	0.30 (0.20–0.40)	≤0.5	≤0.8DC
			MP6120	M	MP6120	M	220 (170–270)	0.30 (0.20–0.40)	≤0.5	≤0.8DC
		280–350HB	VP15FT	MP	VP15FT	WP	140 (100–180)	0.30 (0.20–0.40)	≤0.5	≤0.8DC
			MP6120	M	MP6120	M	140 (100–180)	0.30 (0.20–0.40)	≤0.5	≤0.8DC
K	Grey cast iron	≤350MPa	MC5020	MK, HK	MC5020	WK	320 (250–400)	0.30 (0.20–0.40)	≤0.5	≤0.8DC
			VP15FT	MP	VP15FT	WP	220 (150–300)	0.30 (0.20–0.40)	≤0.5	≤0.8DC
	Ductile cast iron	≤450MPa	MC5020	MK, HK	MC5020	WK	250 (200–300)	0.20 (0.10–0.30)	≤0.5	≤0.8DC
			VP15FT	MP	VP15FT	WP	200 (150–250)	0.20 (0.10–0.30)	≤0.5	≤0.8DC
		≤800MPa	MC5020	MK, HK	MC5020	WK	220 (200–250)	0.20 (0.10–0.30)	≤0.5	≤0.8DC
			VP15FT	MP	VP15FT	WP	170 (150–200)	0.20 (0.10–0.30)	≤0.5	≤0.8DC
S	Heat resistant alloy	—	VP15FT	MP	VP15FT	WP	40 (20– 50)	0.15 (0.10–0.20)	≤0.5	≤0.8DC
H	Hardened steel	40–55HRC	VP15FT	MP	VP15FT	WP	80 (60–100)	0.15 (0.10–0.20)	≤0.5	≤0.8DC

1/1

1. When clamp rigidity is low and tool overhang is long, it is recommended to reduce the cutting speed and the feed rate by 30 %.
2. Please use WP geometry insert in combination with MP geometry inserts, and use WK geometry insert in combination with MK or HK geometry inserts

AHX640W

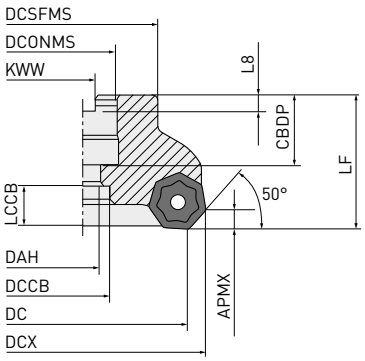
FACE MILLING
HIGH FEED MACHINING OF CAST IRON

K

KAPR: 50°
GAMP: -5°
GAMF: -6°

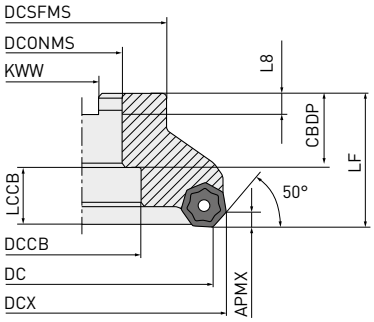
1

Ø 80



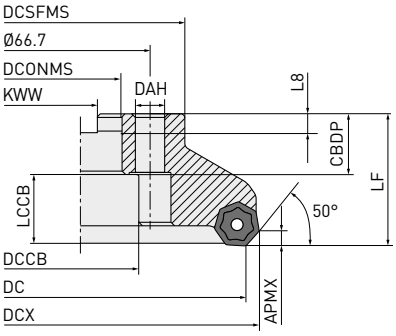
2

Ø 100
Ø 125



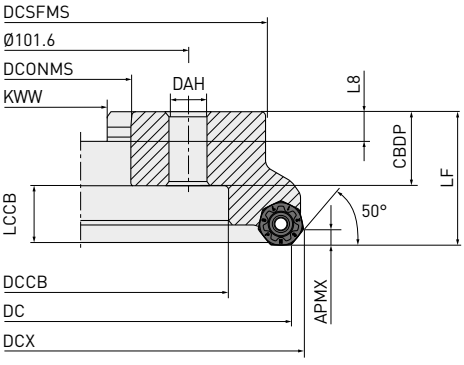
3

Ø 160



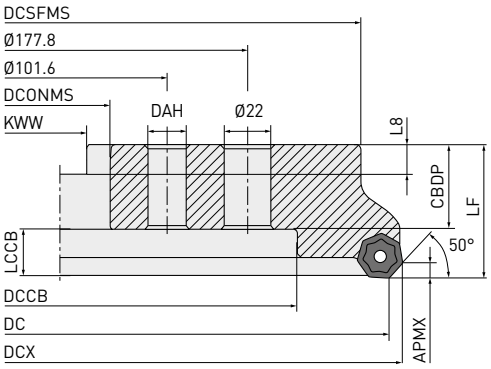
4

Ø 200
Ø 250



5

Ø 315



Right hand tool holder only.

AHX640W – FACE MILLING
HIGH FEED MACHINING OF CAST IRON

ARBOR TYPE

Order number	Stock		APMX	DC	DCONMS	LF	WT	ZEFF	Type
	R	L							
AHX640W-080A08R/L	●	●	6	80	27	50	1.5	8	1
AHX640W-080A10R/L	●	●	6	80	27	50	1.5	10	1
AHX640W-100B10R/L	●	●	6	100	32	50	2.1	10	2
AHX640W-100B14R/L	●	●	6	100	32	50	2.1	14	2
AHX640W-125B12R/L	●	●	6	125	40	63	3.1	12	2
AHX640W-125B18R/L	●	●	6	125	40	63	3.1	18	2
AHX640W-160C16R/L	●	●	6	160	40	63	5.6	16	3
AHX640W-160C22R/L	●	●	6	160	40	63	5.6	22	3
AHX640W-200C20R/L	●	●	6	200	60	63	8.0	20	4
AHX640W-200C28R/L	●	●	6	200	60	63	8.0	28	4
AHX640W-250C24R/L	●	●	6	250	60	63	12.6	24	4
AHX640W-250C36R/L	●	●	6	250	60	63	12.6	36	4
AHX640W-315C28R/L	●	●	6	315	60	80	31.5	28	5
AHX640W-315C44R/L	●	●	6	315	60	80	31.5	44	5

1/1

108 Vc

MOUNTING DIMENSIONS

Order number	CBDP	DAH	DCCB	DCONMS	DCSFMS	DCX	KWW	L8	Type
AHX640W-080A08R/L	23	13	—	27	56	92.6	12.4	7	1
AHX640W-080A10R/L	23	13	—	27	56	92.6	12.4	7	1
AHX640W-100B10R/L	32	—	45	32	70	112.6	14.4	8	2
AHX640W-100B14R/L	32	—	45	32	70	112.6	14.4	8	2
AHX640W-125B12R/L	32	—	56	40	80	137.6	16.4	9	2
AHX640W-125B18R/L	32	—	56	40	80	137.6	16.4	9	2
AHX640W-160C16R/L	29	—	56	40	100	172.6	16.4	9	3
AHX640W-160C22R/L	29	—	56	40	100	172.6	16.4	9	3
AHX640W-200C20R/L	32	—	135	60	155	212.6	25.7	14	4
AHX640W-200C28R/L	32	—	135	60	155	212.6	25.7	14	4
AHX640W-250C24R/L	32	—	180	60	200	262.6	25.7	14	4
AHX640W-250C36R/L	32	—	180	60	200	262.6	25.7	14	4
AHX640W-315C28R/L	57	—	225	60	285	327.6	25.7	14	5
AHX640W-315C44R/L	57	—	225	60	285	327.6	25.7	14	5

1/1

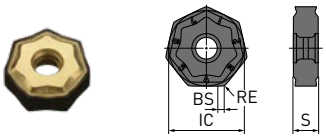
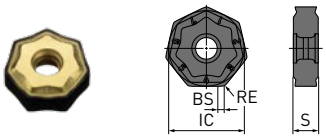
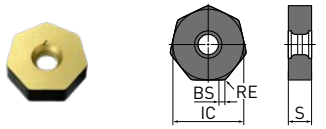
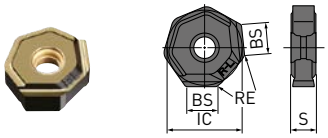
● : Inventory maintained. ★ : Inventory maintained in Japan.

AHX640W – INSERTS

K	Cast iron	XC5010	MC5020	VP15TF	VP20RT

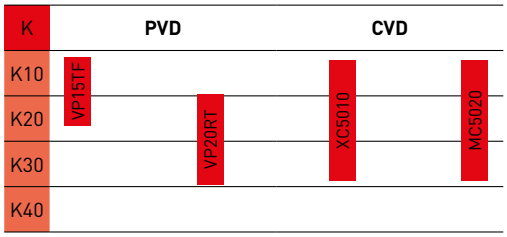
Cutting conditions :
●: Stable cutting ◔: General cutting ✥: Unstable cutting

Honing:
E: Round

Order number	Class	Honing	NEW XC5010	MC5020	VP15TF	VP20RT	IC	S	BS	RE	APMX	Geometry
MK												
NNMU200608ZEN-MK	M	E	●	●	●	●	20	6.1	1.0	0.8	6	
HK												
NNMU200608ZEN-HK	M	E		●	●	●	20	6.1	1.0	0.8	6	
FT												
NEW NNMQ200708ZEN-FT	M	E	●		●		20	6.55	1.0	0.8	6	
WK												
WNEU2006ZEN7C-WK	E	E		●			20	6.55	7.4	0.8	0.5	

1. The inserts can be used with both right and left hand cutters.

GRADE SELECTION



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

AHX640W

RECOMMENDED CUTTING CONDITIONS

GENERAL CUTTING

	Material	Properties	Conditions	Grade		Vc	fz	ap	ae
K	Gray cast iron	<350MPa		XC5010	MK, FT	800 (500–1000)	0.1 (0.1–0.3)	≤3	≤0.8DC
				MC5020	MK, HK	220 (150– 300)	0.3 (0.2–0.4)	≤5	≤0.8DC
				VP15TF/VP20RT	MK, HK	180 (130– 230)	0.3 (0.2–0.4)	≤5	≤0.8DC
	Ductile cast iron	<450MPa		XC5010	MK, FT	800 (500–1000)	0.1 (0.1–0.3)	≤3	≤0.8DC
				MC5020	MK, HK	200 (150– 250)	0.2 (0.1–0.3)	≤5	≤0.8DC
				VP15TF/VP20RT	MK, HK	170 (120– 220)	0.2 (0.1–0.3)	≤5	≤0.8DC
		<800MPa		XC5010	MK, FT	800 (500–1000)	0.1 (0.1–0.3)	≤3	≤0.8DC
				MC5020	MK, HK	170 (150– 200)	0.2 (0.1–0.3)	≤5	≤0.8DC
				VP15TF/VP20RT	MK, HK	140 (100– 180)	0.2 (0.1–0.3)	≤5	≤0.8DC

1/1

1. With reference to the above examples, adjust the cutting conditions according to the machining set up.
2. Tool life when wet cutting is short compared to dry cutting.

FINISHING (USE OF WIPER INSERTS)

	Material	Properties	Conditions	Grade		Vc	fz	ap
K	Gray cast iron	<350MPa		MC5020	MK, HK	320 (250–400)	0.2 (0.1–0.3)	<0.5
				MC5020	MK, HK	270 (200–350)	0.2 (0.1–0.3)	0.5–3
	Ductile cast iron	<450MPa		MC5020	MK, HK	270 (200–350)	0.2 (0.1–0.3)	<0.5
				MC5020	MK, HK	220 (200–250)	0.2 (0.1–0.3)	0.5–3

1/1

1. Please use 2 – 3 wiper inserts when the feed is greater than 6 mm/rev.

MX3030

NEW CERMET GRADE FOR A WIDER RANGE OF APPLICATIONS

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B280

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DIA EDGE

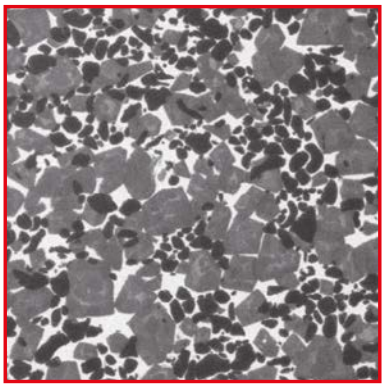
MX3030

NEW CERMET GRADE FOR A WIDER RANGE OF APPLICATIONS

Enables excellent surface finishes even at high efficiency machining conditions.

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

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



MX3030

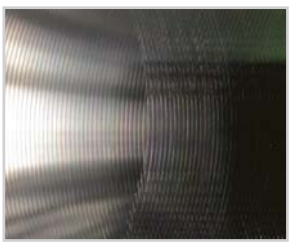
A special alloy is used for the binder material → Fracture resistance properties increased

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

MILD STEEL DIN ST37-2 SURFACE FINISH COMPARISON

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

MX3030



Conventional

MX3030

INSERTS

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

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

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

Order number	Hand	Class	Edge preparation	NEW MX3030	NX4545	IC	S	BS	RE	Geometry
SNGU140812ANER-L	R	G	E	●		14.0	8.4	1.5	1.2	**WSX445**
SNGU140812ANER-M	R	G	E	●						
SNMU140812ANER-M	R	M	E	●						
SNGU140812ANEL-L	L	G	E	★						
SNGU140812ANEL-M	L	G	E	★						
SNMU140812ANEL-M	L	M	E	★						
NEW SEET13T3AGEN-JL	—	E	E	●	●	13.4	3.97	1.9	1.5	**ASX445**
NEW SEMT13T3AGSN-JM	—	M	S	●	●					
NEW SOET12T308PEER-JL	R	E	E	●	●	12.7	3.97	1.4	0.8	**ASX400**
NEW SOMT12T308PEER-JM	R	M	E	●	●					
NEW OEMX12T3ETR1	R	M	T	★	●	12.7	3.97	1.0	—	**OCTACUT**
NEW OEMX1705ETR1	R	M	T	★	●	17.0	5.0	1.4	—	
NEW RPMW10T3M0E	—	M	E	★	●	10.0	3.97	—	—	**BRP**
NEW RPMW1204M0E	—	M	E	★	●	12.0	4.76	—	—	
NEW SPMW090304	—	M	T	★	●	9.525	3.18	—	0.4	**CESP, SFSP, CGSP**
NEW SPMW090308	—	M	T	★	●	9.525	3.18	—	0.8	
NEW SPMW120304	—	M	T	★	●	12.7	3.18	—	0.4	
NEW SPMW120308	—	M	T	●	●	12.7	3.18	—	0.8	

1/2

(10 inserts in one case)

113 Vc

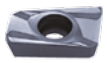
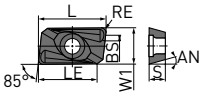
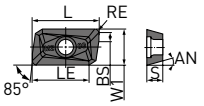
● : Inventory maintained. ★ : Inventory maintained in Japan.

MX3030 – INSERTS

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

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

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

	Order number	Hand	Class	Edge preparation	NEW MX3030	NX4545	L	LE	W1	S	BS	RE	Geometry
NEW	APMT1135PDER-H1	R	M	E	★	●	11.25	9	6.35	3.5	1.5	0.4	**BAP300**
NEW	APMT1135PDER-H2	R	M	E	★	●	11.25	9	6.35	3.5	1.2	0.8	
NEW	APMT1135PDER-M2	R	M	E	★	●	11.18	9	6.35	3.5	1.2	0.8	 
NEW	APMT1604PDER-H2	R	M	E	★	●	17.11	14	9.525	4.76	1.4	0.8	**BAP400, SRM2**
NEW	APMT1604PDER-M2	R	M	E	★	●	17.10	14	9.525	4.76	1.4	0.8	 

(10 inserts in one case)

113 Vc

CUTTING PERFORMANCE

SURFACE FINISH COMPARISON WHEN MACHINING DIN 42CrMo4 ALLOY STEEL

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

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

Ra 0.5105 µm Rz 3.1582 µm

MX3030

Ra 0.5320 µm Rz 3.8950 µm

Conventional

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

MX3030

RECOMMENDED CUTTING CONDITIONS

	Material	Properties	Cutter type	Inserts	Vc	ft	
							
P	Mild steel	≤180 HB	WSX445	L, M	180 (130 – 230)	0.15	
			ASX445	JL	180 (130 – 250)	0.15	
			ASX445	JM	180 (130 – 250)	0.2	
			ASX400	JL	180 (130 – 250)	0.15	
			ASX400	JM	180 (130 – 250)	0.18	
			OCTACUT	—	180 (100 – 250)	0.2	
			BAP	H	160 (120 – 200)	0.1	
			BRP	—	180 (130 – 250)	0.30*	
	Carbon steel Alloy steel	180 – 280 HB	WSX445	L, M	150 (120 – 180)	0.15	
			ASX445	JL	150 (120 – 180)	0.15	
			ASX445	JM	150 (120 – 180)	0.2	
			ASX400	JL	150 (120 – 180)	0.13	
			ASX400	JM	150 (120 – 180)	0.15	
			OCTACUT	—	120 (80 – 160)	0.2	
			BAP	H	120 (100 – 160)	0.08	
			BRP	—	150 (120 – 180)	0.30*	
			CESP, CFSP, CGSP	—	130 (100 – 160)	0.2	0.4
		280 – 350 HB	WSX445	L, M	150 (120 – 180)	0.15	
			ASX445	JL	100 (80 – 160)	0.15	
			ASX445	JM	100 (80 – 160)	0.2	
			ASX400	JL	100 (80 – 160)	0.1	
			ASX400	JM	100 (80 – 160)	0.13	
			OCTACUT	—	100 (80 – 160)	0.2	
			BAP	—	100 (80 – 160)	0.08	
			BRP	—	100 (80 – 160)	0.30*	
M	Stainless steel	≤270 HB	WSX445	L, M	130 (100 – 180)	0.15	
			ASX445	JL	150 (120 – 180)	0.15	
			ASX445	JM	150 (120 – 180)	0.2	
			ASX400	JL	150 (120 – 180)	0.15	
			ASX400	JM	150 (120 – 180)	0.18	
			OCTACUT	—	150 (100 – 200)	0.15	
			BAP	M	120 (80 – 140)	0.1	
			BRP4	—	150 (120 – 180)	0.30*	
K	Cast iron Ductile cast iron	≤500 MPa	WSX445	L, M	150 (120 – 180)	0.15	
			ASX445	JL	130 (100 – 160)	0.15	
			ASX445	JM	130 (100 – 160)	0.2	
			ASX400	JL	150 (120 – 180)	0.15	
			ASX400	JM	150 (120 – 180)	0.18	
			BAP	H	100 (80 – 120)	0.1	
			BRP4	—	150 (120 – 180)	0.30*	

1/1

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

SYMBOLS

Recommended cutting conditions

NEW New / Product expansion

APPLICATION


Face milling


Chamfer milling


Shoulder milling with R


Face milling close to a wall


Shoulder milling


Side milling


Slot milling


Ramping


Pocket milling


Slot milling with R


Copy milling


T-Slot milling

MACHINING TYPE

Roughing

Medium cutting

Light cutting

Pre-finishing

Finishing

Fine-finishing

TOOL MATERIAL

Ultra micro grain carbide
Ultra micro grain carbide substrate material.

Cubic boron nitride
Mitsubishi Materials' original CBN material.

Ceramic
For high speed efficient machining of super alloys due to the excellent high temperature strength property.

High hardness powder metallurgy HSS
High hardness powder metallurgy HSS substrate material.

High grade high alloy HSS
High grade high alloy HSS substrate material.

Cobalt high speed steel
Cobalt high speed steel substrate material.

High speed steel
High speed steel substrate material.

COATING

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

CRN Coating
Newly developed CrN coating for Copper Electrodes machining.

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

DP Coating
New generation coating suitable for a wide range of materials.

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

(Al, Ti)N Coating
(Al,Ti)N highly versatile application range.

(Al,Ti,Cr)N multi-layer Coating
For carbon, alloy and hardened steels.

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

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

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

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

Diamond Coating
Suitable for CFRP and CFRP-aluminium materials.

Diamond Coating
Suitable for graphite machining.

Diamond Coating
The original CVD diamond coating.

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

CUTTING EDGE PROPERTIES

Sharp corner edge
Indicates the end mill has a sharp corner edge.

Gash land
Indicates the end mill cutting edge has a protective chamfer.

Rake angle

Helix angle
Indicates the helix angle of the end mill.

Point angle
Indicates the drill point angle.

Roughing flute geometry

Variable helix

Rounded gash

Corner angle

WEB THINNING

X type point geometry
X web thinning used at the drill point.

XR type point geometry
XR web thinning used at the drill point.

S type point geometry
Easy cutting geometry.

N type point geometry
Effective when the point web is thick.

Chipbreaker

SYMBOLS

TOLERANCES	
	**Tolerance of taper angle** Indicates the tolerance of the taper angle.
	**R tolerance** Indicates the radial tolerance of a ball nose end mill.
	**R tolerance** Indicates the radial tolerance of the corner radius.
	**R tolerance** Indicates the radial tolerance of a cutter with a corner radius.
	**Outside diameter tolerance** Indicates the diameter tolerance of the end mill.
	**Peak tolerance** Indicates the tolerance for the end diameter.
	**Shank diameter tolerance**
	**Shank diameter tolerance**
	**Drill tolerance / diameter**
COOLANT HOLES	
	**External coolant**
	**Internal coolant**
	**Internal coolant**
	**Centered, internal coolant hole**
	**Radial, internal coolant holes**
	**Internal coolant holes**
	**Internal coolant holes**

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