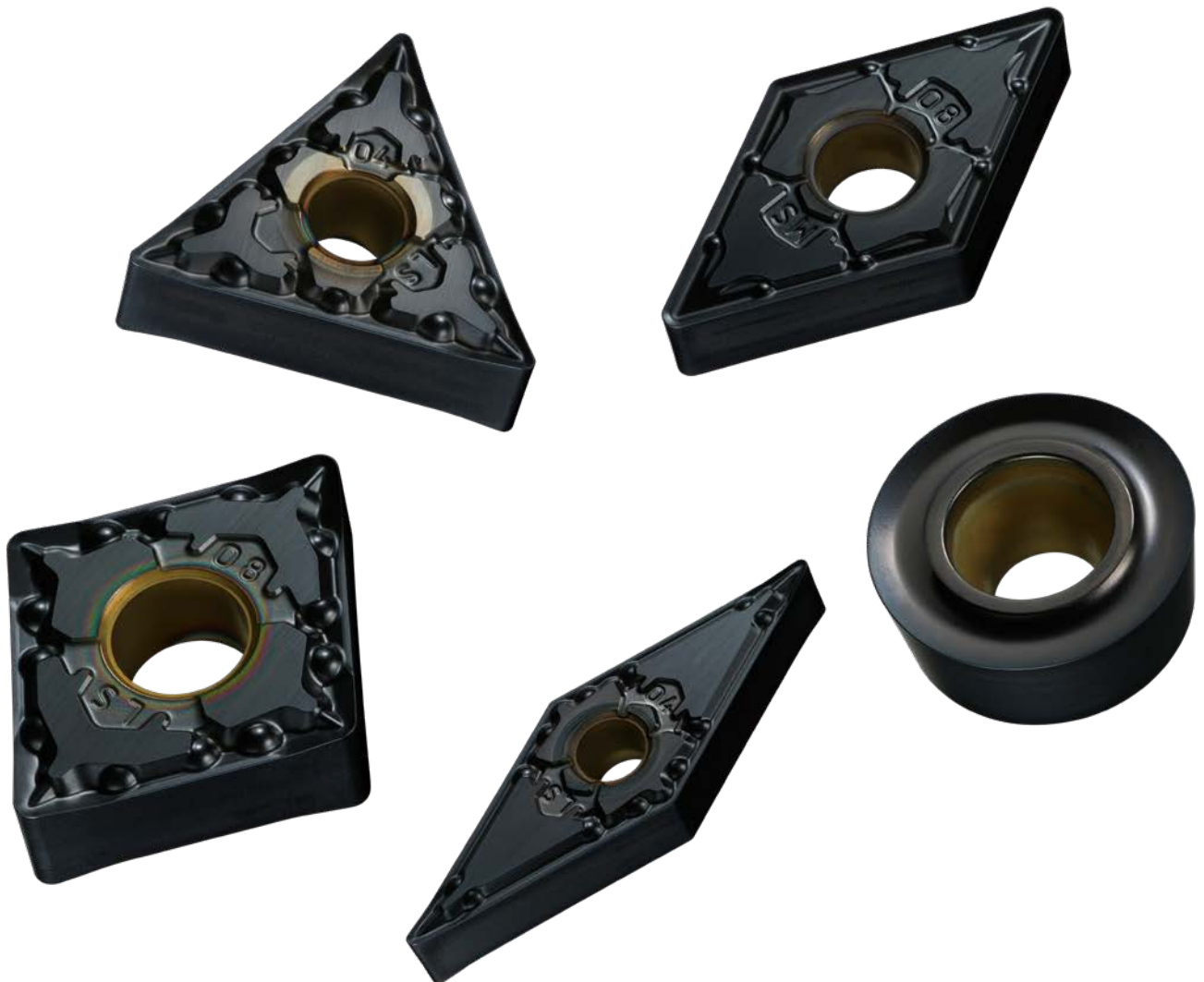


NEW

MV9005

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

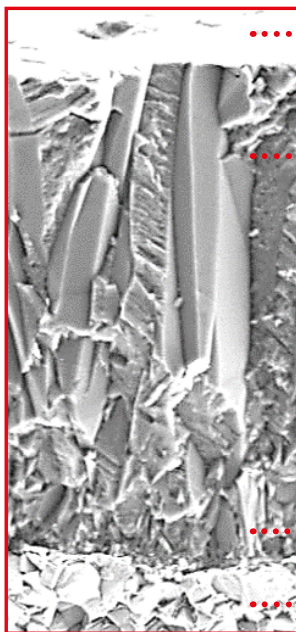


MV9005

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.



EXCELLENT WELDING RESISTANCE

Smooth surface.

OUTSTANDING WEAR RESISTANCE

Newly developed Al-Rich coating.

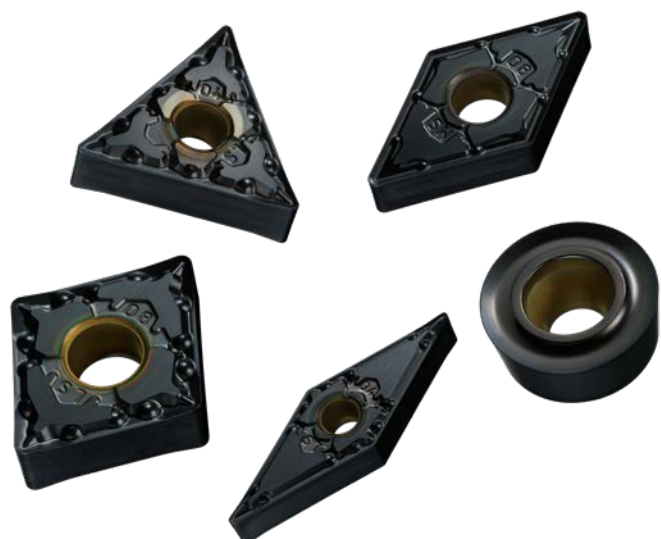
EXCELLENT CHIPPING RESISTANCE FOR STABLE MACHINING

Newly developed bonding layer.

EXCELLENT RESISTANCE TO PLASTIC DEFORMATION

Extremely hard dedicated cemented carbide substrate.

Graphical representation



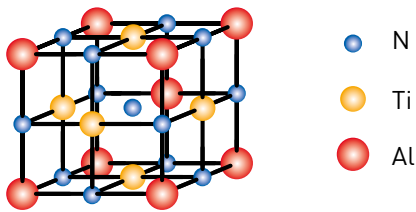
MV9005

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

COMPLETE COATING TECHNOLOGY THAT TOPPLES CURRENT TOOL LIFE STANDARDS

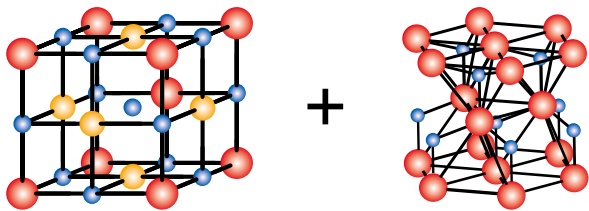
Due to the newly developed Al-Rich coating.

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.



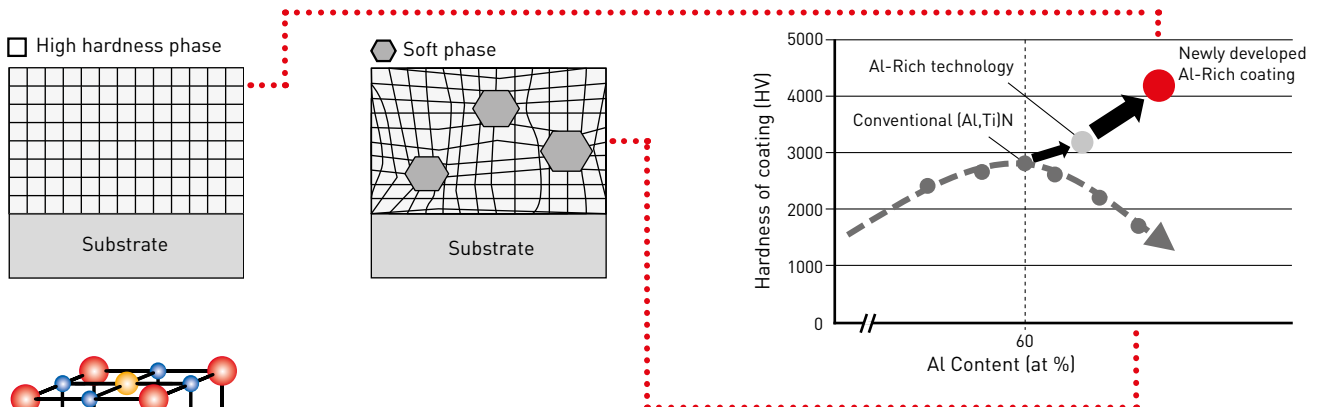
The combination of atoms with different sizes creates an exceptionally hard crystal structure.

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.


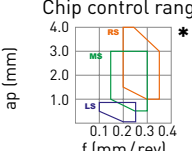
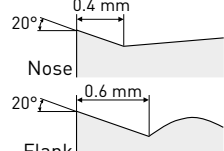
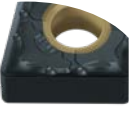
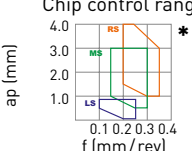
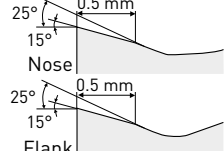
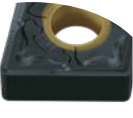
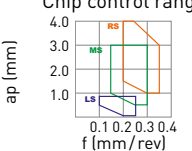
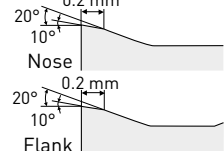
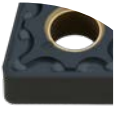
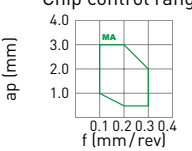
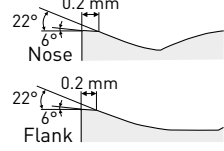


Crystal image of MV9005

MV9005

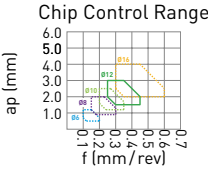
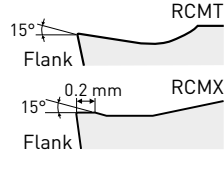
CHIPBREAKER SYSTEM

NEGATIVE INSERTS

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

* 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		
	<p>Balance of strength and sharpness due to a combination of a flat land and rake angle.</p>	<p>Chip Control Range</p> 	

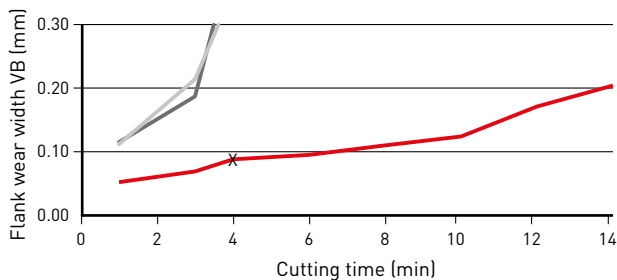
MV9005

CUTTING PERFORMANCE

COMPARISON OF WEAR RESISTANCE WHEN MACHINING INCONEL®718

Exhibits excellent wear resistance and extended tool life.

Material	Inconel®718
Insert	CNMG120412-00
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

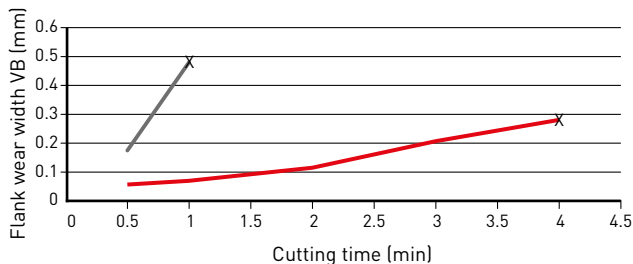


Conventional A

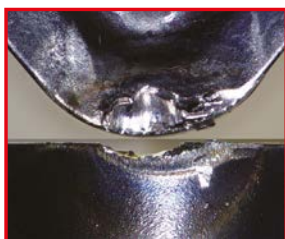
COMPARISON OF WEAR RESISTANCE WHEN MACHINING INCONEL®718

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

Material	Inconel®718
Insert	CNMG120412-00
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

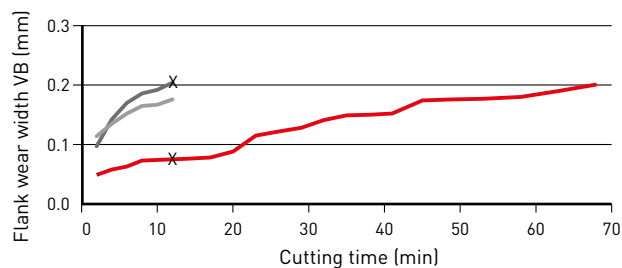
MV9005

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.

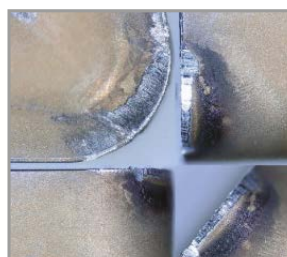
Material	Rene 41 (Ni based heat resistant alloys)
Insert	CNMG120412- 
Vc (m/min)	30
f (mm/rev)	0.1
ap (mm)	0.5
Cutting mode	Wet cutting



TAKEN AFTER 12 MINUTES MACHINING




MV9005
MS Breaker

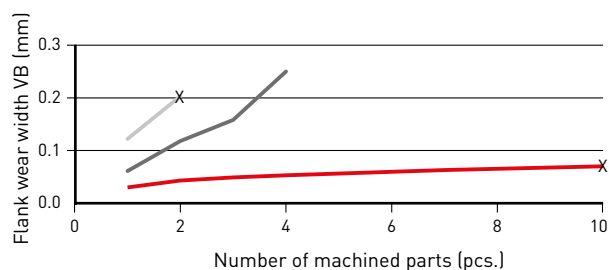


Conventional A

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



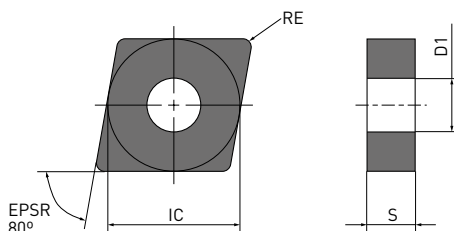
Conventional B




CNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

CNMG



Order number	  	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

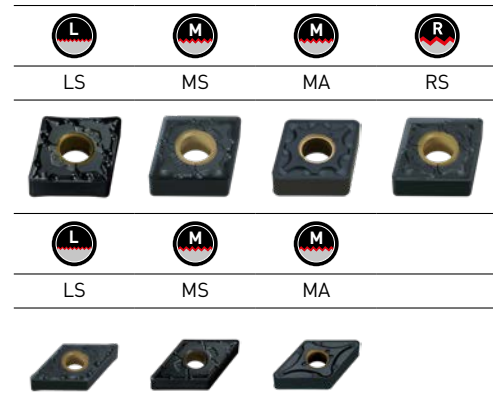
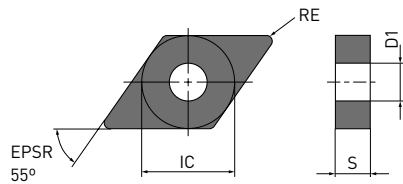


DNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

DNMG



Order number	  	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

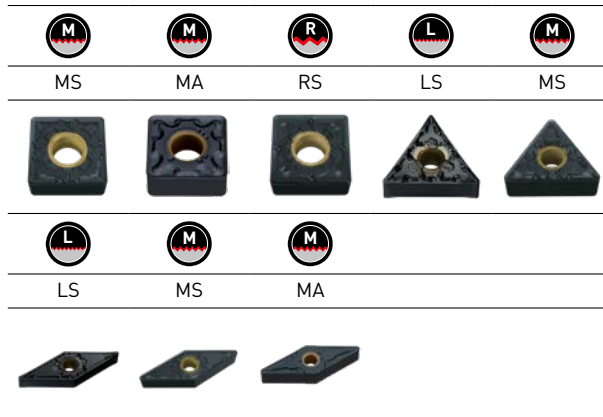
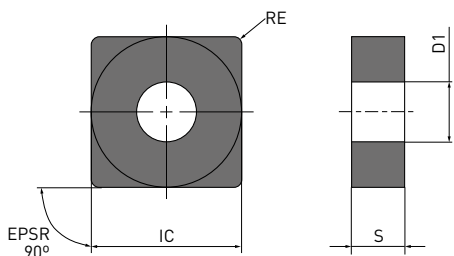


SNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

SNMG



Order number		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

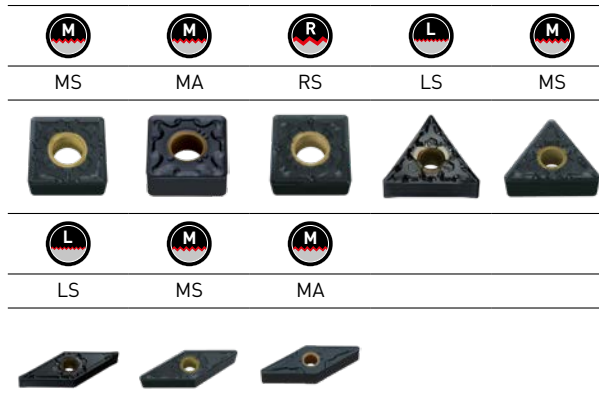
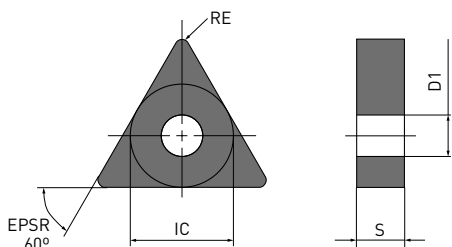





TNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

TNMG



Order number	  	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

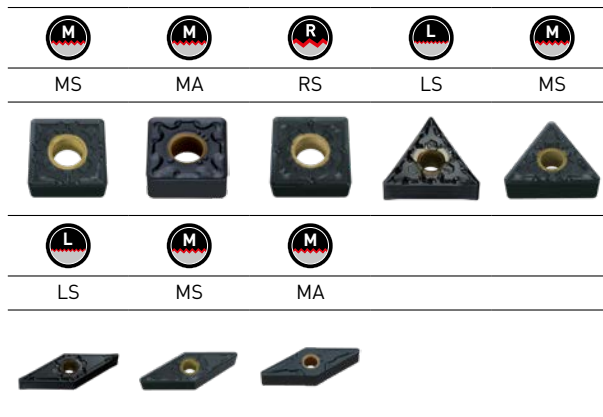
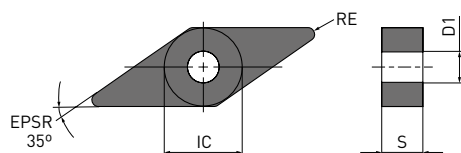





VNMG

NEGATIVE INSERTS (WITH HOLE)

M Class

VNMG



Order number	  	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

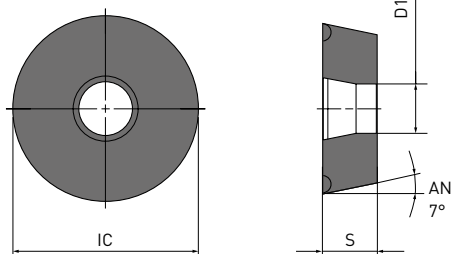


RCMT/ RCMX

7° POSITIVE INSERTS (WITH HOLE)

M Class

RCMT/RCMX






Standard



Standard



Order number	  	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



MV9005

RECOMMENDED CUTTING CONDITIONS

NEGATIVE INSERTS

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

1/1

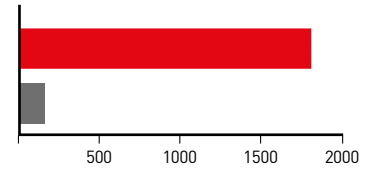
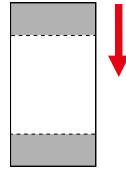
1. Verify the recommended conditions for each boring bar as cutting conditions for internal machining can differ.



MV9005

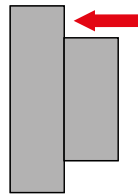
EXAMPLE OF USAGE

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



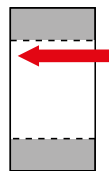
Results Notch wear is suppressed, and it is possible to significantly extend the tool life.

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.

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