MITSUBISHI MATERIALS

MV9005

COATED GRADE FOR HEAT RESISTANT SUPER ALLOYS

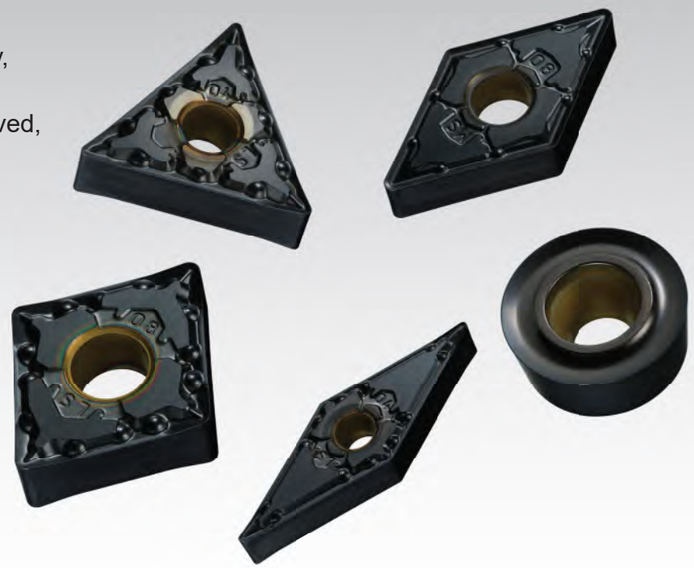
TOOL NEWS B271A

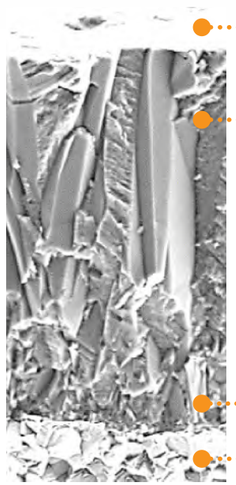
Coated Grade for Heat Resistant Super Alloys

MV9005

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

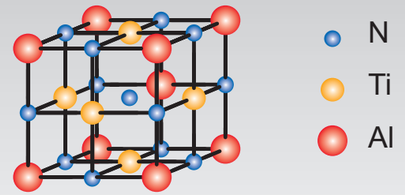
Excellent Resistance to Plastic Deformation
Extremely hard dedicated cemented carbide substrate

Complete Coating Technology that Topples Current Tool Life Standards

Due to

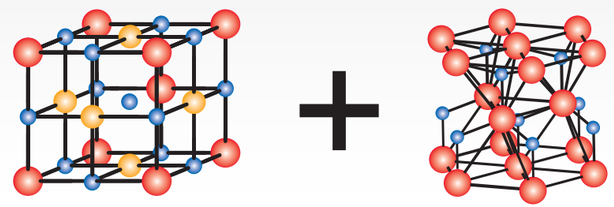
the Newly Developed Al-Rich Coating

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



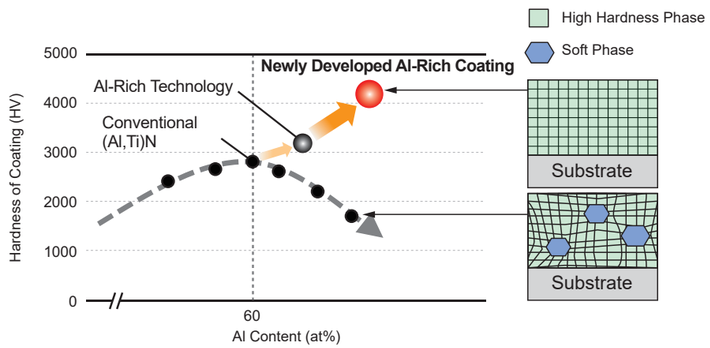
The combination of atoms with different sizes creates an exceptionally hard crystal structure.

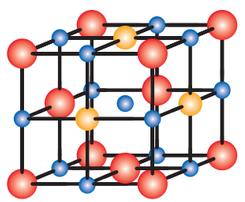
The hardness of (Al,Ti)N increases as the Al content ratio increases, but with conventional technology, when the Al content ratio exceeds 60%, the crystal structure changes and the hardness of (Al,Ti)N decreases.



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 high the hardness of (Al,Ti)N.





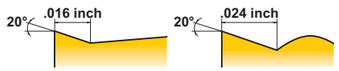
Crystal image of **MV9005**

Chip Breaker System

Negative Inserts

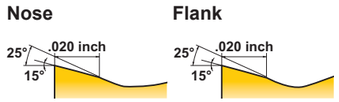
LS Breaker for Light Cutting

Enhanced chip disposal for depths of cut smaller than the corner R.



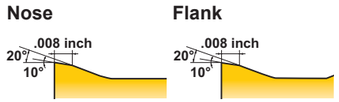
MS Breaker Newly Designed for Medium Cutting

The large 2-step rake angle generates chips smoothly and without tangling during low feed cutting.



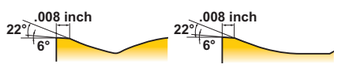
RS Breaker for Rough Cutting

During low speed cutting, the positive land controls chip welding and abrasion at the depth of cut line.



MA Breaker Multi-assist Chip Breaker

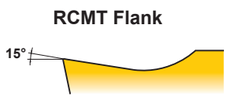
Suitable for medium cutting range.

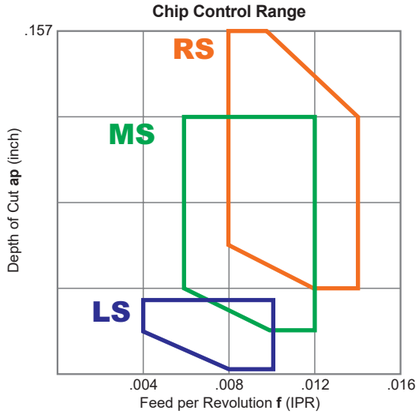


Positive Inserts

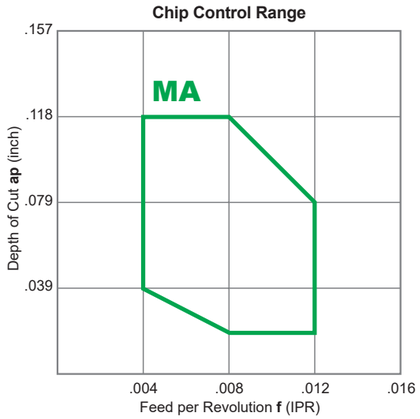
RCMT, RCMX for Medium Cutting

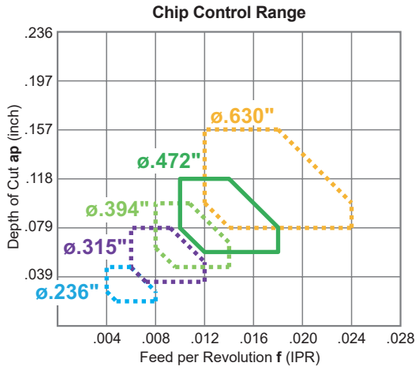
Balance of strength and sharpness due to a combination of a flat land and rake angle.





The chip breaker control range was tested for optimum chip evacuation when cutting Inconel718 with a CNMG432◯◯ insert.

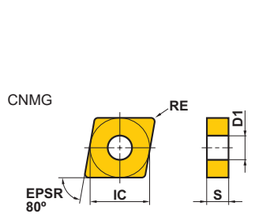




MV9005

Negative Inserts (With Hole)

M Class



Light	Medium	Medium	Rough
LS	MS	MA	RS
			
Light	**Medium**	**Medium**	
LS	MS	MA	
			

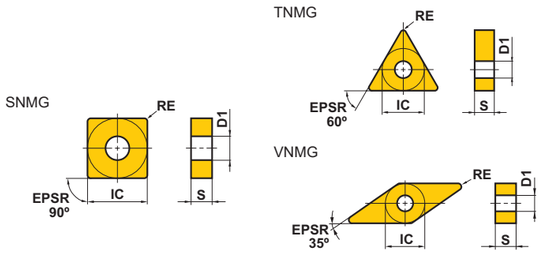
(inch)

Order Number	Cutting Area	MV9005	IC	S	RE	D1
CNMG430.5LS	L	●	.500	.187	.008	.203
CNMG431LS	L	●	.500	.187	.016	.203
CNMG432LS	L	●	.500	.187	.031	.203
CNMG431MS	M	●	.500	.187	.016	.203
CNMG432MS	M	●	.500	.187	.031	.203
CNMG433MS	M	●	.500	.187	.047	.203
CNMG432MA	M	●	.500	.187	.031	.203
CNMG433MA	M	●	.500	.187	.047	.203
CNMG434MA	M	●	.500	.187	.063	.203
CNMG432RS	R	●	.500	.187	.031	.203
CNMG433RS	R	●	.500	.187	.047	.203
CNMG434RS	R	●	.500	.187	.063	.203
CNMG644RS	R	●	.750	.250	.063	.312
DNMG430.5LS	L	●	.500	.187	.008	.203
DNMG431LS	L	●	.500	.187	.016	.203
DNMG432LS	L	●	.500	.187	.031	.203
DNMG431MS	M	●	.500	.187	.016	.203
DNMG432MS	M	●	.500	.187	.031	.203
DNMG433MS	M	●	.500	.187	.047	.203
DNMG431MA	M	●	.500	.187	.016	.203
DNMG432MA	M	●	.500	.187	.031	.203
DNMG433MA	M	●	.500	.187	.047	.203

● : USA Stock ★ : Stocked in Japan
(10 inserts in one case)

MV9005

Negative Inserts (With Hole)
M Class



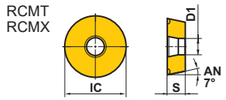
Medium	Medium	Rough	Light	Medium
MS	MA	RS	LS	MS
				
Light	**Medium**	**Medium**		
LS	MS	MA		
				

(inch)

Order Number	Cutting Area	MV9005	IC	S	RE	D1
SNMG431MS	M	●	.500	.187	.016	.203
SNMG432MS	M	●	.500	.187	.031	.203
SNMG433MS	M	●	.500	.187	.047	.203
SNMG431MA	M	●	.500	.187	.016	.203
SNMG432MA	M	●	.500	.187	.031	.203
SNMG433MA	M	●	.500	.187	.047	.203
SNMG432RS	R	●	.500	.187	.031	.203
SNMG433RS	R	●	.500	.187	.047	.203
SNMG434RS	R	●	.500	.187	.063	.203
TNMG330.5LS	L	●	.375	.187	.008	.150
TNMG331LS	L	●	.375	.187	.016	.150
TNMG332LS	L	●	.375	.187	.031	.150
TNMG331MS	M	●	.375	.187	.016	.150
TNMG332MS	M	●	.375	.187	.031	.150
TNMG333MS	M	●	.375	.187	.047	.150
VNMG330.5LS	L	●	.375	.187	.008	.150
VNMG331LS	L	●	.375	.187	.016	.150
VNMG332LS	L	●	.375	.187	.031	.150
VNMG331MS	M	●	.375	.187	.016	.150
VNMG332MS	M	●	.375	.187	.031	.150
VNMG331MA	M	●	.375	.187	.016	.150
VNMG332MA	M	●	.375	.187	.031	.150

● : USA Stock ★ : Stocked in Japan
(10 inserts in one case)

7° Positive Inserts (With Hole)
M Class



Medium
Standard

Medium
Standard


(inch)

Order Number	Cutting Area	MV9005	IC	S	RE	D1
RCMT0602M0	M	●	.236	.094	–	.110
RCMT0803M0	M	●	.315	.125	–	.134
RCMT10T3M0	M	●	.394	.156	–	.173
RCMT1204M0	M	●	.472	.187	–	.173
RCMT1606M0	M	●	.630	.250	–	.217
RCMX1003M0	M	●	.394	.125	–	.142
RCMX1204M0	M	●	.472	.187	–	.165
RCMX1606M0	M	●	.630	.250	–	.205

Recommended Cutting Conditions

■ Negative Inserts

(inch)

	Workpiece Material	Cutting Conditions	Cutting Area	Chip Breaker	Grade	vc (SFM)	f (IPR)	ap
S	Ni Based Heat Resistant Alloys (Inconel718, Hastelloy, WASPALOY)	Stable Cutting	Light Cutting	**LS**	**MV9005**	165–360	.004–.010	.008–.031
			Medium Cutting	**MS**	**MV9005**	165–360	.006–.012	.020–.118

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

■ Positive Inserts

RCMT, RCMX

(inch)

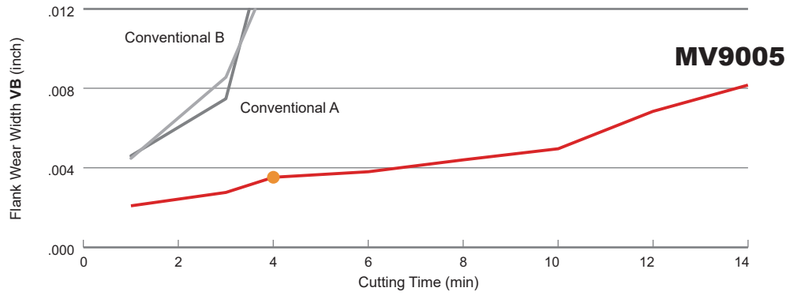
	Workpiece Material	Cutting Conditions	Cutting Area	Grade	vc (SFM)	f (IPR)	ap
S	Ni Based Heat Resistant Alloys (Inconel718, Hastelloy, WASPALOY)	Stable Cutting	Medium Cutting	**MV9005**	130–260	.010–.018	.059–.118

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

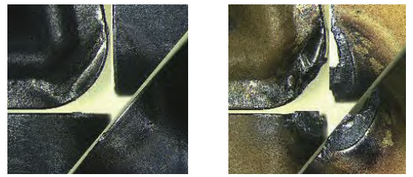
Cutting Performance

Comparison of wear resistance when machining Inconel718

Exhibits excellent wear resistance and extended tool life.



Taken after machining 4 minutes

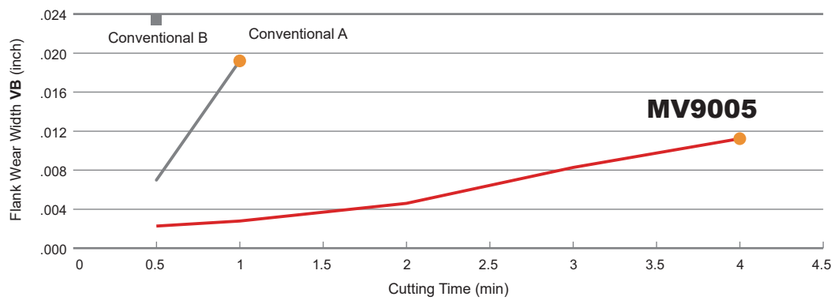


MV9005 MS Br Conventional A

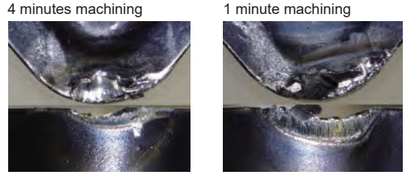
<Cutting Conditions>
Workpiece Material : Inconel718
Inserts : CNMG433◌◌
Cutting Speed : vc=330 SFM
Feed per Rev. : f=.012 IPR
Depth of Cut : ap=.030 inch
Cutting Mode : Wet Cutting

Comparison of wear resistance when machining Inconel718

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



4 minutes machining 1 minute machining



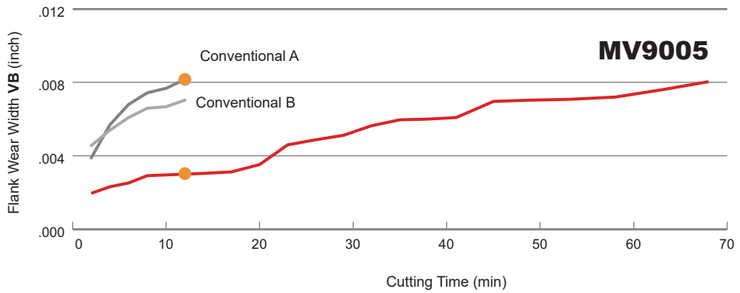
MV9005 MS Br Conventional A

<Cutting Conditions>
Workpiece Material : Inconel718
Inserts : CNMG433◌◌
Cutting Speed : vc=460 SFM
Feed per Rev. : f=.012 IPR
Depth of Cut : ap=.030 inch
Cutting Mode : Wet Cutting

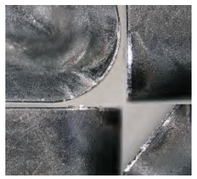
Cutting Performance

Comparison of wear resistance when machining Rene41

Exhibits excellent wear resistance even when machining heat resistant alloy components that are used in high temperature environments of 1472°F or higher.



Taken after machining 12 minutes



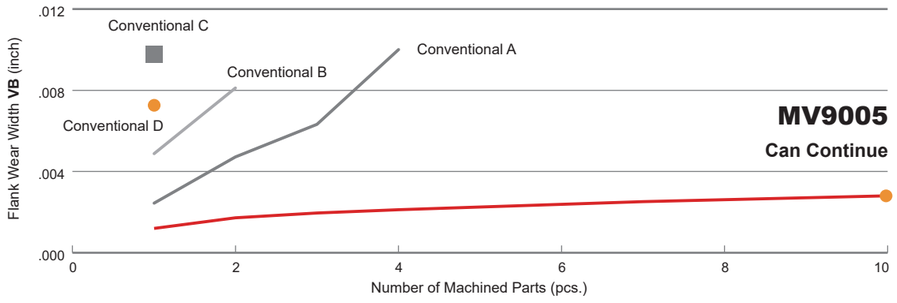
MV9005 MS Br

Conventional A

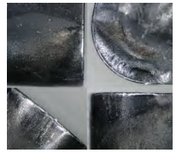
<Cutting Conditions>
Workpiece Material : Rene41
(Ni Based Heat Resistant Alloys)
Inserts : CNMG433◌◌
Cutting Speed : vc=100 SFM
Feed per Rev. : f=.004 IPR
Depth of Cut : ap=.020 inch
Cutting Mode : Wet Cutting

Comparison when machining a nickel-based super alloy containing cobalt

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

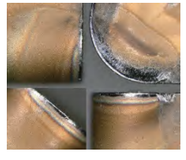


10 Parts



MS9005 MS Br

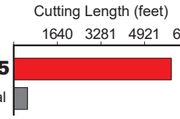
1 Parts



Conventional D

<Cutting Conditions>
Workpiece Material : Nickel-base super alloy containing cobalt
Inserts : CNMG433◌◌
Cutting Speed : vc=130 SFM
Feed per Rev. : f=.006 IPR
Depth of Cut : ap=.059 inch
Cutting Mode : Wet Cutting

Examples of Usage

Insert		CNMG433MS	CNMG433MS
Workpiece Material		Nickel-base super alloy containing cobalt 	Inconel718 
Component		Aerospace Component	Aerospace Component
Application		Face	Turning
Cutting Conditions	Cutting Speed vc (SFM)	130	Conventional 260, **MV9005** 330
	Feed per Rev. f (IPR)	.006	Conventional .010, **MV9005** .012
	Depth of Cut ap (inch)	.059	.006-.014
Cutting Mode		Wet Cutting	Wet Cutting
Results		Cutting Length (feet) 1640 3281 4921 6562 **MV9005** Conventional  Notch wear is suppressed, and it is possible to significantly extend the tool life.	Cutting conditions improve machining efficiency by 50% compared to conventional products. Wear is also suppressed and stable machining is achieved.

Insert		CNMG433MS
Workpiece Material		Inconel718
Component		Aerospace Component
Application		Internal
Cutting Conditions	Cutting Speed vc (SFM)	Conventional 260, **MV9005** 330
	Feed per Rev. f (IPR)	Conventional .006, **MV9005** .007
	Depth of Cut ap (inch)	.006-.014
Cutting Mode		Wet Cutting
Results		Machining efficiency is 50% higher than conventional products. Wear is suppressed even under increased cutting conditions, enabling stable machining.

The application examples are from customers workpieces and can therefore differ from the recommended cutting conditions.

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FOR YOUR SAFETY

- Don't handle inserts and chips without gloves.
- Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage.
- Please use safety covers and wear safety glasses.
- When using compounded cutting oils, please take fire precautions.
- When attaching inserts or spare parts, please use only the correct wrench or driver.
- When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

www.mmc-carbide.com/us

Tools specifications subject to change without notice.

B271A-US-2024.4