

9000 Series Grades for Difficult-to-cut Materials

Item
Expansion

The new high Al-rich (Al,Ti)N single layer coating significantly reduces edge fracturing.

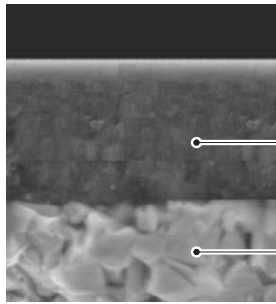


**MP9005
MP9015
MT9005
MT9015** + **FS/LS
MS/RS**

9000 Series Grades for Difficult-to-cut Materials

PVD Coated Grade

MP9005/MP9015



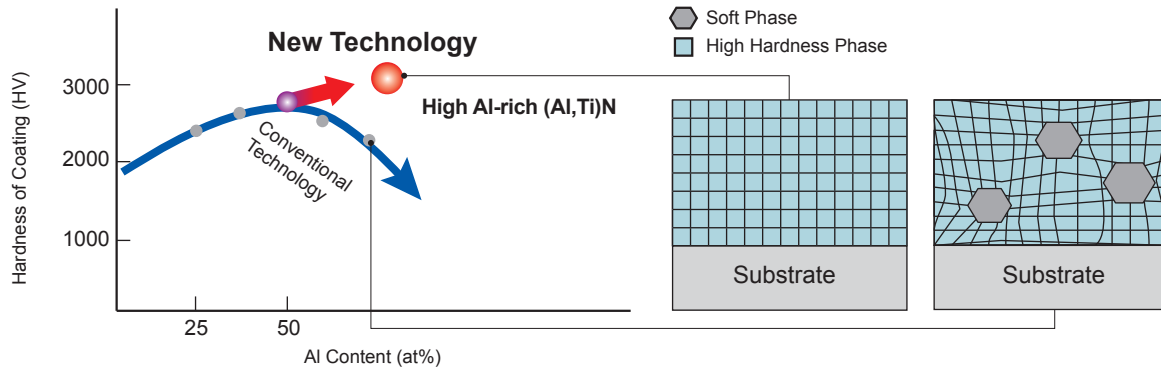
MP9005/MP9015

High Al-rich (Al,Ti)N Single Layer Coating Technology

Special Cemented Carbide Substrate

High Al and Conventional Coating Comparison

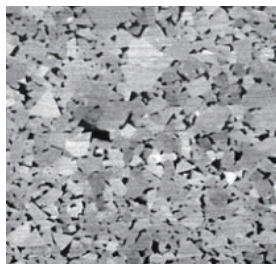
The new technology high Al-rich (Al,Ti)N single layer coating provides stabilization of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance.



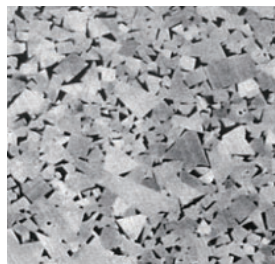
ISO Grade	Grade	Concept	Application
S01	MP9005	Top-quality grade focusing on wear resistance.	Heat Resistant Alloys Finish-Medium Cutting
S10	MP9015	First recommendation for general applications.	Heat Resistant Alloys Medium-Rough Cutting

Carbide Grade (Non Coated)

MT9005/MT9015



MT9005



MT9015

Application Range

ISO	PVD	Cemented Carbide
Heat Resistant Alloy • Ti Alloy	MP9005	MT9005
10	MP9015	MT9015
20		
30		
40		

ISO Grade	Grade	Concept	Application
S01	MT9005	New cemented carbide with unmatched resistance to heat and plastic deformation.	Titanium Alloys High Speed Cutting
S10	MT9015	New cemented carbide with sharp cutting edge, excellent wear and fracture resistance.	Titanium Alloys General Cutting

New Chip Breaker System

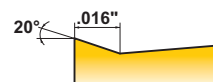
Negative Inserts

LS Breaker for Light Cutting

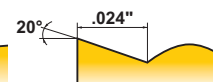
Enhanced chip disposal for depths of cut smaller than the corner R.



Nose



Flank

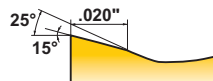


MS Breaker Newly Designed for Medium Cutting

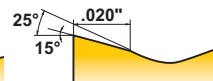
The large 2-step rake angle generates chips smoothly and without tangling during low feed cutting.



Nose



Flank

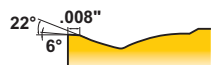


MA Breaker for Medium Cutting

Alternative chip breaker
When the LS breaker and MS breaker cutting edge is fractured.
When the MS breaker and RS breaker forms continuous chips.



Nose



Flank



NEW MJ Breaker Sub Breaker

Alternative chip breaker of main chip breaker LS and MS.
Excellent notch wear resistance for light to medium cutting.



Nose



Flank

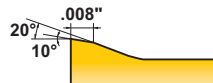


RS Breaker for Rough Cutting

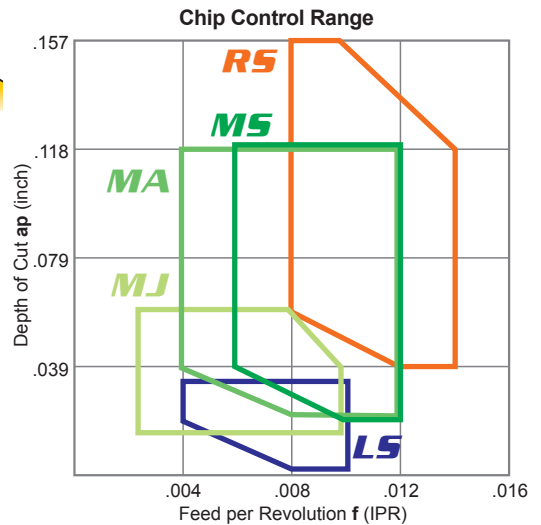
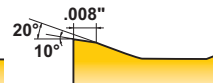
During low speed cutting the positive land controls chip welding and abrasion at the depth of cut line.



Nose



Flank



The chip breaker control range was tested for optimum chip evacuation when cutting Inconel718 with a CNMG43200 insert.

Positive Inserts

LS Breaker for Light Cutting

Prevents welding of the insert and controls white turbidity of the surface finish.



Nose



Flank

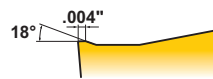


MS Breaker for Medium Cutting

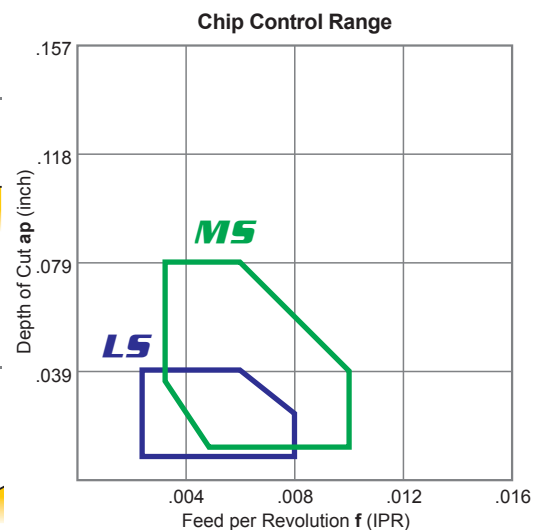
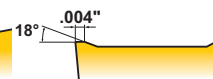
The wide chip pocket reduces cutting resistance, vibration and chip jamming at large depths of cut.



Nose



Flank



The chip breaker control range was tested for optimum chip evacuation when cutting Inconel718 with a DCMT32.5100 insert.

New Precision Chip Breaker System Positive Inserts

Set the corner radius to a minus tolerance

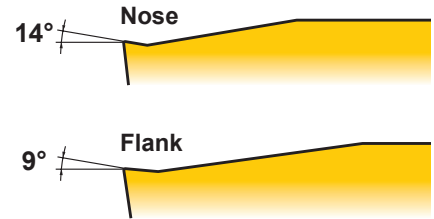
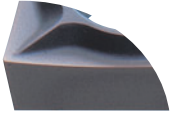
CCGT21.51MLS → 1M RE .015 inch (RE .014-.016 inch)

FS/FS-P Breaker for Finish Cutting

NEW FS

First Recommendation for Finishing Difficult-to-cut Materials

Ideal for heat resistant alloys, titanium alloys, and cobalt chromium alloys. Sharp cutting edges provide excellent surface precision and finish. Highly efficient chip discharge is possible due to curved cutting edges.



NEW FS-P

Mirror Finish

First Recommendation for Finishing of Titanium Alloys

Ideal for titanium alloys and copper alloys. Sharp cutting edges provide excellent surface precision and finish. Highly efficient chip discharge is possible due to curved cutting edges. Polished (mirror-surface) finish of insert surfaces drastically improves welding resistance extending tool life.

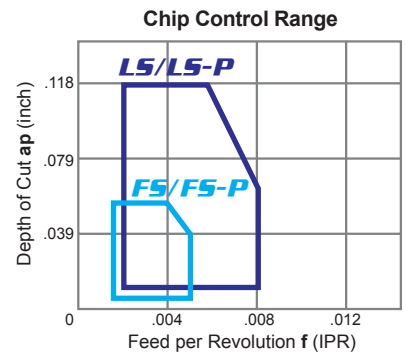


LS/LS-P Breaker for Light Cutting

NEW LS

First Recommendation for Light Cutting of Difficult-to-cut Materials

Ideal for heat resistant alloys, titanium alloys, and cobalt chromium alloys. Designed with straight parallel cutting edges with high depth of cut capabilities. Achieves stable chip control over a wide depth of cut range.

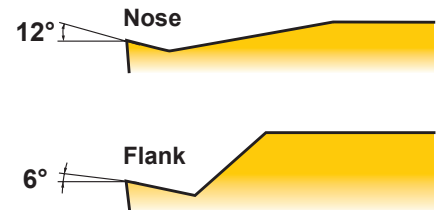


NEW LS-P

Mirror Finish

First Recommendation for Light Cutting of Titanium Alloys

Ideal for titanium alloys and copper alloys. Designed with straight parallel cutting edges with high depth of cut capabilities. Achieves stable chip control over a wide depth of cut range. Polished (mirror-surface) finish of insert surfaces drastically improves welding resistance.



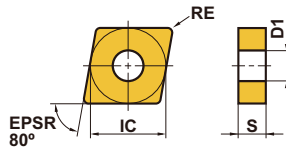
Cutting Performance






Materials and Cutting Conditions	New Chip Breaker	Conventional A	Conventional B
Work Material : Co-Cr-Mo Alloy Inserts : DCGT32.51MLS Grade : MP9005 Cutting Speed : 130 SFM Feed per Rev. : .002 IPR Depth of Cut : .008 inch Cutting Mode : Wet Cutting (Water Based) Machine : CNC Automatic Lathes Cutting Time : 12 min.			
Work Material : Inconel718 Inserts : DCGT32.51MLS Grade : MP9015 Cutting Speed : 195 SFM Feed per Rev. : .002 IPR Depth of Cut : .020 inch Cutting Mode : Wet Cutting (Water Based) Machine : CNC Automatic Lathes Cutting Time : 20 min.			
Work Material : Ti-6Al-4V ELI Inserts : DCGT32.51MLS-P Grade : MT9005 Cutting Speed : 260 SFM Feed per Rev. : .002 IPR Depth of Cut : .118 inch Cutting Mode : Wet Cutting (Oil) Machine : Automatic Lathes			
	35 Pieces (Non-coat)	35 Pieces (PVD)	15 Pieces (PVD)

Negative Inserts (With Hole)

M Class

CNMG



Light	Medium	Medium
LS	MS	MA
		
Medium	Rough	
MJ	RS	
		

(inch)

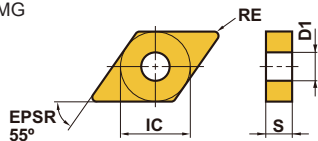
Order Number	Cutting Area	MP9005	MP9015	MT9015	IC	S	RE	D1
NEW CNMG321LS	L	●	●		.375	.125	.016	.150
NEW CNMG322LS	L	●	●		.375	.125	.031	.150
NEW CNMG430.5LS	L	●	●	●	.500	.187	.008	.203
CNMG431LS	L	●	●	●	.500	.187	.016	.203
CNMG432LS	L	●	●	●	.500	.187	.031	.203
NEW CNMG321MS	M	●	●		.375	.125	.016	.150
NEW CNMG322MS	M	●	●		.375	.125	.031	.150
CNMG431MS	M	●	●	●	.500	.187	.016	.203
CNMG432MS	M	●	●	●	.500	.187	.031	.203
CNMG433MS	M	●	●	●	.500	.187	.047	.203
CNMG543MS	M	●	●	●	.625	.250	.047	.250
CNMG544MS	M	●	●	●	.625	.250	.063	.250
NEW CNMG431MA	M		●		.500	.187	.016	.203
NEW CNMG432MA	M		●		.500	.187	.031	.203
NEW CNMG433MA	M		●		.500	.187	.047	.203
NEW CNMG434MA	M		●		.500	.187	.063	.203
NEW CNMG431MJ	M	●	●		.500	.187	.016	.203
NEW CNMG432MJ	M	●	●		.500	.187	.031	.203
NEW CNMG433MJ	M	●	●		.500	.187	.047	.203
NEW CNMG434MJ	M	●	●		.500	.187	.063	.203
CNMG432RS	R		●	●	.500	.187	.031	.203
CNMG433RS	R		●	●	.500	.187	.047	.203
CNMG434RS	R		●	●	.500	.187	.063	.203
CNMG543RS	R		●	●	.625	.250	.047	.250
CNMG544RS	R		●	●	.625	.250	.063	.250
CNMG643RS	R		●	●	.750	.250	.047	.312
CNMG644RS	R		●	●	.750	.250	.063	.312

9000 Series Grades for Difficult-to-cut Materials

Negative Inserts (With Hole)

M Class

DNMG



Light	Medium	Medium
LS	MS	MA
Medium	Rough	
MJ	RS	

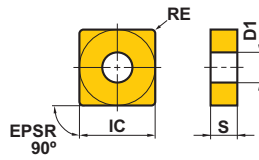
(inch)




Order Number	Cutting Area	MP9005	MP9015	MT9015	IC	S	RE	D1
NEW DNMG430.5LS	L	●	●	●	.500	.187	.008	.203
DNMG431LS	L	●	●	●	.500	.187	.016	.203
DNMG432LS	L	●	●	●	.500	.187	.031	.203
DNMG441LS	L	●	●	●	.500	.250	.016	.203
DNMG442LS	L	●	●	●	.500	.250	.031	.203
DNMG431MS	M	●	●	●	.500	.187	.016	.203
DNMG432MS	M	●	●	●	.500	.187	.031	.203
DNMG433MS	M	●	●	●	.500	.187	.047	.203
DNMG441MS	M	●	●	●	.500	.250	.016	.203
DNMG442MS	M	●	●	●	.500	.250	.031	.203
DNMG443MS	M	●	●	●	.500	.250	.047	.203
NEW DNMG431MA	M		●		.500	.187	.016	.203
NEW DNMG432MA	M		●		.500	.187	.031	.203
NEW DNMG433MA	M		●		.500	.187	.047	.203
NEW DNMG441MA	M		●		.500	.250	.016	.203
NEW DNMG442MA	M		●		.500	.250	.031	.203
NEW DNMG443MA	M		●		.500	.250	.047	.203
NEW DNMG431MJ	M	●	●		.500	.187	.016	.203
NEW DNMG432MJ	M	●	●		.500	.187	.031	.203
NEW DNMG433MJ	M	●	●		.500	.187	.047	.203
NEW DNMG434MJ	M	●	●		.500	.187	.063	.203
NEW DNMG441MJ	M	●	●		.500	.250	.016	.203
NEW DNMG442MJ	M	●	●		.500	.250	.031	.203
NEW DNMG443MJ	M	●	●		.500	.250	.047	.203
NEW DNMG444MJ	M	●	●		.500	.250	.063	.203
DNMG432RS	R		●	●	.500	.187	.031	.203
DNMG433RS	R		●	●	.500	.187	.047	.203
DNMG434RS	R		●	●	.500	.187	.063	.203
DNMG442RS	R		●	●	.500	.250	.031	.203
DNMG443RS	R		●	●	.500	.250	.047	.203
DNMG444RS	R		●	●	.500	.250	.063	.203

Negative Inserts (With Hole)

M Class

SNMG



Medium	Medium
MS	MA
	
Rough	
RS	
	

(inch)

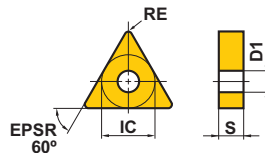
Order Number	Cutting Area	MP9005	MP9015	MT9015	IC	S	RE	D1
SNMG431MS	M	●	●	●	.500	.187	.016	.203
SNMG432MS	M	●	●	●	.500	.187	.031	.203
SNMG433MS	M	●	●	●	.500	.187	.047	.203
SNMG543MS	M	●	●	●	.625	.250	.047	.250
SNMG544MS	M	●	●	●	.625	.250	.063	.250
NEW SNMG643MS	M	●	●		.750	.250	.047	.312
NEW SNMG431MA	M		●		.500	.187	.016	.203
NEW SNMG432MA	M		●		.500	.187	.031	.203
NEW SNMG433MA	M		●		.500	.187	.047	.203
NEW SNMG434MA	M		●		.500	.187	.063	.203
SNMG432RS	R		●	●	.500	.187	.031	.203
SNMG433RS	R		●	●	.500	.187	.047	.203
SNMG434RS	R		●	●	.500	.187	.063	.203
SNMG544RS	R		●	●	.625	.250	.063	.250
NEW SNMG643RS	R		●		.750	.250	.047	.312
SNMG644RS	R		●	●	.750	.250	.063	.312

9000 Series Grades for Difficult-to-cut Materials

Negative Inserts (With Hole)

M Class

TNMG



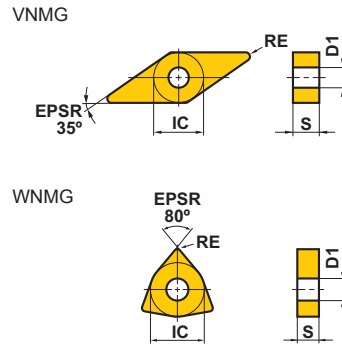
Light	Medium	Medium
LS	MS	MA
Medium	Rough	
MJ	RS	









(inch)

Order Number	Cutting Area	MP9005	MP9015	MT9015	IC	S	RE	D1
NEW 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
TNMG432MS	M	●	●	●	.500	.187	.031	.203
TNMG433MS	M	●	●	●	.500	.187	.047	.203
NEW TNMG331MA	M		●		.375	.187	.016	.150
NEW TNMG332MA	M		●		.375	.187	.031	.150
NEW TNMG333MA	M		●		.375	.187	.047	.150
NEW TNMG432MA	M		●		.500	.187	.031	.203
NEW TNMG433MA	M		●		.500	.187	.047	.203
NEW TNMG434MA	M		●		.500	.187	.063	.203
NEW TNMG544MA	M		●		.625	.250	.063	.250
NEW TNMG666MA	M		●		.750	.375	.094	.312
NEW TNMG331MJ	M	●	●		.375	.187	.016	.150
NEW TNMG332MJ	M	●	●		.375	.187	.031	.150
NEW TNMG333MJ	M	●	●		.375	.187	.047	.150
TNMG332RS	R		●	●	.375	.187	.031	.150
TNMG333RS	R		●	●	.375	.187	.047	.150
TNMG432RS	R		●	●	.500	.187	.031	.203
TNMG433RS	R		●	●	.500	.187	.047	.203

Negative Inserts (With Hole)

M Class



Light	Medium	Medium		
LS	MS	MJ		
				
Light	Medium	Medium	Medium	Rough
LS	MS	MA	MJ	RS
				

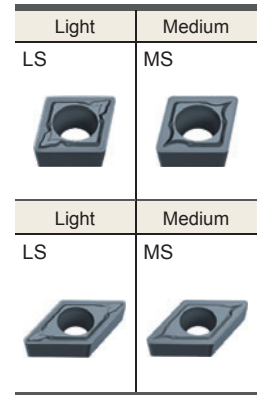
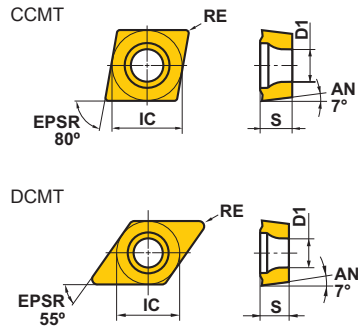
(inch)

Order Number	Cutting Area	MP9005	MP9015	MT9015	IC	S	RE	D1
NEW 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
NEW VNMG331MJ	M	●	●		.375	.187	.016	.150
NEW VNMG332MJ	M	●	●		.375	.187	.031	.150
NEW VNMG333MJ	M	●	●		.375	.187	.047	.150
NEW WNMG430.5LS	L	●	●	●	.500	.187	.008	.203
WNMG431LS	L	●	●	●	.500	.187	.016	.203
WNMG432LS	L	●	●	●	.500	.187	.031	.203
WNMG431MS	M	●	●	●	.500	.187	.016	.203
WNMG432MS	M	●	●	●	.500	.187	.031	.203
WNMG433MS	M	●	●	●	.500	.187	.047	.203
NEW WNMG431MA	M		●		.500	.187	.016	.203
NEW WNMG432MA	M		●		.500	.187	.031	.203
NEW WNMG433MA	M		●		.500	.187	.047	.203
NEW WNMG434MA	M		●		.500	.187	.063	.203
NEW WNMG432MJ	M	●	●		.500	.187	.031	.203
NEW WNMG433MJ	M	●	●		.500	.187	.047	.203
NEW WNMG434MJ	M	●	●		.500	.187	.063	.203
WNMG432RS	R		●	●	.500	.187	.031	.203
WNMG433RS	R		●	●	.500	.187	.047	.203
WNMG434RS	R		●	●	.500	.187	.063	.203
WNMG543RS	R		●	●	.625	.250	.047	.250

9000 Series Grades for Difficult-to-cut Materials

7° Positive Inserts (With Hole)

M Class

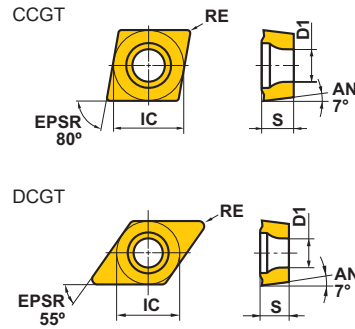


(inch)

Order Number	Cutting Area	MP9005	MP9015	MT9005	IC	S	RE	D1
CCMT21.50.5LS	L	●	●	●	.250	.094	.008	.110
CCMT21.51LS	L	●	●	●	.250	.094	.016	.110
CCMT32.50.5LS	L	●	●	●	.375	.156	.008	.173
CCMT32.51LS	L	●	●	●	.375	.156	.016	.173
CCMT32.52LS	L	●	●	●	.375	.156	.031	.173
CCMT32.51MS	M	●	●	●	.375	.156	.016	.173
CCMT32.52MS	M	●	●	●	.375	.156	.031	.173
DCMT21.50.5LS	L	●	●	●	.250	.094	.008	.110
DCMT21.51LS	L	●	●	●	.250	.094	.016	.110
DCMT32.50.5LS	L	●	●	●	.375	.156	.008	.173
DCMT32.51LS	L	●	●	●	.375	.156	.016	.173
DCMT32.52LS	L	●	●	●	.375	.156	.031	.173
DCMT21.51MS	M	●	●	●	.250	.094	.016	.110
DCMT21.52MS	M	●	●	●	.250	.094	.031	.110
DCMT32.51MS	M	●	●	●	.375	.156	.016	.173
DCMT32.52MS	M	●	●	●	.375	.156	.031	.173

7° Positive Inserts (With Hole)

G Class



(inch)

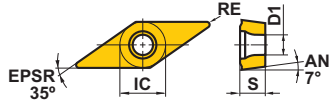
	Order Number	Cutting Area	MP9005	MP9015	MT9005	IC	S	RE	D1
NEW	CCGT21.50.2MFS	F	●	●		.250	.094	.003	.110
NEW	CCGT21.50.5MFS	F	●	●		.250	.094	.007	.110
NEW	CCGT32.50.2MFS	F	●	●		.375	.156	.003	.173
NEW	CCGT32.50.5MFS	F	●	●		.375	.156	.007	.173
NEW	CCGT32.51MFS	F	●	●		.375	.156	.015	.173
NEW	CCGT21.50.2MFS-P	F			●	.250	.094	.003	.110
NEW	CCGT21.50.5MFS-P	F			●	.250	.094	.007	.110
NEW	CCGT32.50.2MFS-P	F			●	.375	.156	.003	.173
NEW	CCGT32.50.5MFS-P	F			●	.375	.156	.007	.173
NEW	CCGT32.51MFS-P	F			●	.375	.156	.015	.173
NEW	CCGT21.50.2MLS	L	●	●		.250	.094	.003	.110
NEW	CCGT21.50.5MLS	L	●	●		.250	.094	.007	.110
NEW	CCGT32.50.2MLS	L	●	●		.375	.156	.003	.173
NEW	CCGT32.50.5MLS	L	●	●		.375	.156	.007	.173
NEW	CCGT32.51MLS	L	●	●		.375	.156	.015	.173
NEW	CCGT21.50.2MLS-P	L			●	.250	.094	.003	.110
NEW	CCGT21.50.5MLS-P	L			●	.250	.094	.007	.110
NEW	CCGT32.50.2MLS-P	L			●	.375	.156	.003	.173
NEW	CCGT32.50.5MLS-P	L			●	.375	.156	.007	.173
NEW	CCGT32.51MLS-P	L			●	.375	.156	.015	.173
NEW	DCGT21.50.2MFS	F	●	●		.250	.094	.003	.110
NEW	DCGT21.50.5MFS	F	●	●		.250	.094	.007	.110
NEW	DCGT32.50.2MFS	F	●	●		.375	.156	.003	.173
NEW	DCGT32.50.5MFS	F	●	●		.375	.156	.007	.173
NEW	DCGT21.50.2MFS-P	F			●	.250	.094	.003	.110
NEW	DCGT21.50.5MFS-P	F			●	.250	.094	.007	.110
NEW	DCGT32.50.2MFS-P	F			●	.375	.156	.003	.173
NEW	DCGT32.50.5MFS-P	F			●	.375	.156	.007	.173
NEW	DCGT21.50.2MLS	L	●	●		.250	.094	.003	.110
NEW	DCGT21.50.5MLS	L	●	●		.250	.094	.007	.110
NEW	DCGT21.51MLS	L	●	●		.250	.094	.015	.110
NEW	DCGT32.50.2MLS	L	●	●		.375	.156	.003	.173
NEW	DCGT32.50.5MLS	L	●	●		.375	.156	.007	.173
NEW	DCGT32.51MLS	L	●	●		.375	.156	.015	.173
NEW	DCGT21.50.2MLS-P	L			●	.250	.094	.003	.110
NEW	DCGT21.50.5MLS-P	L			●	.250	.094	.007	.110
NEW	DCGT21.51MLS-P	L			●	.250	.094	.015	.110
NEW	DCGT32.50.2MLS-P	L			●	.375	.156	.003	.173
NEW	DCGT32.50.5MLS-P	L			●	.375	.156	.007	.173
NEW	DCGT32.51MLS-P	L			●	.375	.156	.015	.173

9000 Series Grades for Difficult-to-cut Materials

7° Positive Inserts (With Hole)

G Class

VCGT



Light
LS



Light
LS-P

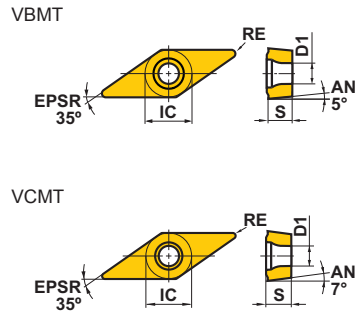






(inch)

Order Number	Cutting Area	MP9005	MP9015	MT9005	IC	S	RE	D1
NEW VCGT220.2MLS	L	●	●		.250	.125	.003	.110
NEW VCGT220.5MLS	L	●	●		.250	.125	.007	.110
NEW VCGT221MLS	L	●	●		.250	.125	.015	.110
NEW VCGT2.520.2MLS	L	●	●		.313	.125	.003	.134
NEW VCGT2.520.5MLS	L	●	●		.313	.125	.007	.134
NEW VCGT2.521MLS	L	●	●		.313	.125	.015	.134
NEW VCGT220.2MLS-P	L			●	.250	.125	.003	.110
NEW VCGT220.5MLS-P	L			●	.250	.125	.007	.110
NEW VCGT221MLS-P	L			●	.250	.125	.015	.110
NEW VCGT2.520.2MLS-P	L			●	.313	.125	.003	.134
NEW VCGT2.520.5MLS-P	L			●	.313	.125	.007	.134
NEW VCGT2.521MLS-P	L			●	.313	.125	.015	.134

5° and 7° Positive Inserts (With Hole)

M Class



Light	Medium
LS	MS
	
Light	Medium
LS	MS
	

(inch)

Order Number	Cutting Area	MP9005	MP9015	MT9005	IC	S	RE	D1
VBMT331LS	L	●	●	●	.375	.187	.016	.173
VBMT332LS	L	●	●	●	.375	.187	.031	.173
VBMT331MS	M	●	●	●	.375	.187	.016	.173
VBMT332MS	M	●	●	●	.375	.187	.031	.173
VCMT220.5LS	L	●	●	●	.250	.125	.008	.110
VCMT221LS	L	●	●	●	.250	.125	.016	.110
VCMT331LS	L	●	●	●	.375	.187	.016	.173
VCMT332LS	L	●	●	●	.375	.187	.031	.173
VCMT331MS	M	●	●	●	.375	.187	.016	.173
VCMT332MS	M	●	●	●	.375	.187	.031	.173

9000 Series Grades for Difficult-to-cut Materials

Gang Type Tool Posts



SVJC-SM

Without Off Set



WF2, HBKW, LF, B, HF, H

Right hand tool holder shown.

Finish	Finish	Light	Light
FP	FM	LS	LS-P
Light		Light	
LP	LM	LS	

(inch)													
Order Number		Stock		Insert Type		H	B	LF	HBKW	HF	WF2	 *	
		R	L									Clamp Screw	Wrench
NEW	SVJCR/L-062B-SM	●	●	VCMT VCGT	22 ⁰⁰	.375	.375	4.500	—	.375	.000	TS255	TKY08R
NEW	SVJCR/L-062.5B-SM	●	●		2.52 ⁰⁰	.375	.375	4.500	.079	.375	.000	TS32	TKY08R
NEW	SVJCR/L-082B-SM	●	●		22 ⁰⁰	.500	.500	4.500	—	.500	.000	TS255	TKY08R
NEW	SVJCR/L-082.5B-SM	●	●		2.52 ⁰⁰	.500	.500	4.500	—	.500	.000	TS32	TKY08R
NEW	SVJCR/L-102B-SM	●	●		22 ⁰⁰	.625	.625	4.500	—	.625	.000	TS255	TKY08R
NEW	SVJCR/L-102.5B-SM	●	●		2.52 ⁰⁰	.625	.625	4.500	—	.625	.000	TS32	TKY08R

* Clamp Torque (lbf-in) : TS255=8.9, TS32=8.9

Order Number		Stock		Insert Type	H	B	LF	HBKW	HF	WF2	* (mm)		
		R	L										
											Clamp Screw	Wrench	
NEW	SVJCR/L1010JX11-SM	●	●	VCMT VCGT	22 ⁰⁰	10	10	120	—	10	0	TS255	TKY08R
NEW	SVJCR/L1010JX13-SM	●	●		2.52 ⁰⁰	10	10	120	2	10	0	TS32	TKY08R
NEW	SVJCR/L1212JX11-SM	●	●		22 ⁰⁰	12	12	120	—	12	0	TS255	TKY08R
NEW	SVJCR/L1212JX13-SM	●	●		2.52 ⁰⁰	12	12	120	—	12	0	TS32	TKY08R
NEW	SVJCR/L1616JX11-SM	●	●		22 ⁰⁰	16	16	120	—	16	0	TS255	TKY08R
NEW	SVJCR/L1616JX13-SM	●	●		2.52 ⁰⁰	16	16	120	—	16	0	TS32	TKY08R

* Clamp Torque (N • m) : TS255=1.0, TS32=1.0

Recommended Cutting Conditions

Negative Inserts

(inch)

Work Material		Cutting Conditions	Cutting Range	Breaker	Grade	vc (SFM)	f (IPR)	ap
S	Titanium Alloys (Ti-6Al-4V)	Stable Cutting	Light Cutting	LS	MT9015	130—280	.004—.010	.008—.031
			Medium Cutting	MS	MT9015	130—260	.004—.010	.020—.157
			Rough Cutting	RS	MT9015	115—245	.008—.014	.039—.157
		General Cutting	Light Cutting	LS	MT9015	130—280	.004—.010	.008—.031
			Medium Cutting	MS	MT9015	130—260	.004—.010	.020—.157
			Rough Cutting	RS	MT9015	115—245	.008—.014	.039—.157
	Ni Based Heat Resistant Alloys (Inconel718, Hastelloy, Waspaloy) Co Based Heat Resistant Alloys (Tribaloy, Stellite)	Stable Cutting	Light Cutting	LS	MP9005	100—360	.004—.010	.008—.031
			Medium Cutting	MS	MP9005	100—330	.004—.010	.020—.157
			Rough Cutting	RS	MP9015	65—245	.008—.014	.039—.157
		General Cutting	Light Cutting	LS	MP9015	80—280	.004—.010	.008—.031
			Medium Cutting	MS	MP9015	80—260	.004—.010	.020—.157
				MA	MP9015	80—260	.004—.012	.020—.118
			Rough Cutting	RS	MP9015	65—245	.008—.014	.039—.157

*When cutting conditions are unstable, please refer to page 2 for recommended chip breaker and grade.

*Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.

Positive Inserts

(inch)

Work Material		Cutting Conditions	Cutting Range	Breaker	Grade	vc (SFM)	f (IPR)	ap
S	Titanium Alloys (Ti-6Al-4V)	Stable Cutting	Finish and Light	LS	MT9005	130—260	.002—.008	.008—0.039
			Medium Cutting	MS	MT9005	115—210	.003—.010	.012—0.079
		General Cutting	Finish and Light	LS	MT9005	130—260	.002—.008	.008—0.039
			Medium Cutting	MS	MT9005	115—210	.003—.010	.012—0.079
		Unstable Cutting	Finish and Light	LS	MT9005	130—260	.002—.008	.008—0.039
			Medium Cutting	MS	MT9005	115—210	.003—.010	.012—0.079
	Ni Based Heat Resistant Alloys (Inconel718, Hastelloy, WASPALOY)	Stable Cutting	Finish and Light	LS	MP9005	80—310	.002—.008	.008—0.039
			Medium Cutting	MS	MP9005	65—260	.003—.010	.012—0.008
		General Cutting	Finish and Light	LS	MP9015	65—245	.002—.008	.008—0.039
			Medium Cutting	MS	MP9015	65—245	.002—.008	.008—0.039
		Unstable Cutting	Finish and Light	LS	MP9015	65—245	.002—.008	.008—0.039
			Medium Cutting	MS	MP9015	65—195	.003—.010	.012—0.079

For Effective Use of Large Corner Radius

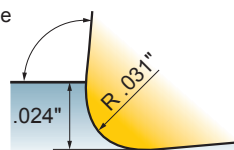
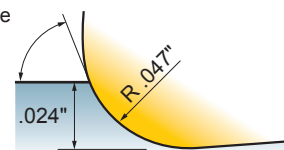
By setting the depth of cut smaller than the corner radius value, notching during cutting of heat resistant alloys can be greatly reduced.

Corner Radius > 1.5 x Depth of Cut

Depth of cut: .024 inch. Corner radius over .035 inch is recommended.

Point

A smaller lead angle is the key to reduced notching.

Lead Angle
(Large)

Lead Angle
(Small)


9000 Series Grades for Difficult-to-cut Materials

Recommended Cutting Conditions

Precision Positive Inserts

(inch)

Work Material		Cutting Conditions	Breaker	Grade	vc (SFM)	f (IPR)	ap
S	Titanium Alloys (Ti-6Al-4V)	Stable Cutting	FS-P	MT9005	130—260	.002—.005	.008—.055
			LS-P	MT9005	130—260	.002—.008	.012—.118
		General Cutting	FS-P	MT9005	130—260	.002—.005	.008—.055
			LS-P	MT9005	130—260	.002—.005	.012—.079
		Unstable Cutting	LS-P	MT9005	100—195	.002—.004	.008—.055
	Cobalt Chromium Alloys (Co-Cr-Mo Alloys)	Stable Cutting	FS	MP9005	130—260	.002—.004	.008—.055
			LS	MP9005	130—260	.002—.006	.012—.079
		General Cutting	FS	MP9015	130—260	.002—.004	.008—.055
			LS	MP9015	130—260	.002—.006	.012—.079
		Unstable Cutting	LS	MP9015	100—165	.002—.004	.012—.039
	Precipitation Hardening Stainless Steels (AISI 630)	Stable Cutting	FS	MP9005	80—310	.002—.005	.008—.055
			LS	MP9005	80—310	.002—.005	.012—.079
		General Cutting	FS	MP9015	65—245	.002—.005	.008—.055
			LS	MP9015	65—245	.002—.005	.012—.079
		Unstable Cutting	LS	MP9015	65—195	.002—.004	.012—.039

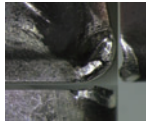
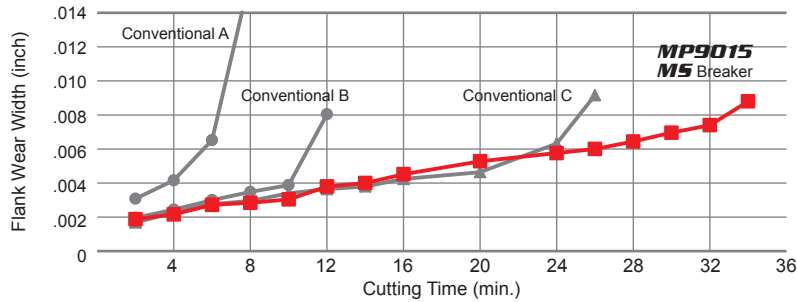
Application Examples

Insert (Grade)		DCGT32.51MLS (MP9015)	DCGT32.50.5MLS (MP9015)
Workpiece		AISI 430 (Forgings)	AISI 630 (17-4PH)
Cutting Conditions	Cutting Speed (SFM)	260	195
	Feed per Rev. (IPR)	.0031	.0016
	Depth of Cut (inch)	.012	.012
Cutting Mode		Wet Cutting (Oil)	Wet Cutting (Oil)
Machine		CNC Automatic Lathes	CNC Automatic Lathes
Results		Compared to conventional products with inconsistent tool life, whose unstable chip evacuation can cause entanglement of chips in workpieces, the LS breaker provided stable chip evacuation allowing machining to be performed up to machining constants. It also exhibited excellent wear conditions after turning.	Even when machining at 1.5 times the existing conditions of conventional products, there were no variations in turning surface dimensions. The amount of wear was also extremely small, resulting in longer tool life and cost reduction.

Insert (Grade)		DCGT32.50.5MFS-P (MT9005)	DCGT21.50.2MFS (MP9015)
Workpiece		Ti-6Al-4V ELI	AISI 304
Cutting Conditions	Cutting Speed (SFM)	210	260
	Feed per Rev. (IPR)	.0024	.0020
	Depth of Cut (inch)	.030	.012
Cutting Mode		Wet Cutting (Oil)	Wet Cutting (Oil)
Machine		CNC Automatic Lathes	CNC Automatic Lathes
Results		Compared to conventional PVD coated products, the cemented carbide MT 9005 (uncoated) provided exceptional machined surface roughness even at double the number of cuts. The extremely small amount of wear and stable dimensional precision allowed further machining extension.	Compared to conventional products, the amount of wear was small and chip evacuation was excellent, making it possible to perform machining at 1.5 times the existing conditions.

Cutting Performance

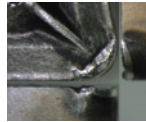
Inconel718, vc=195SFM Continuous Machining



Conventional A
8 min



Conventional B
12 min



Conventional C
26 min



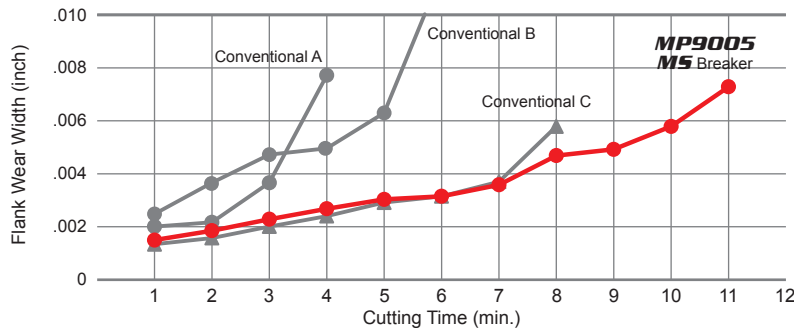
MP9015
MS Breaker, 34 min

**Increased
28%
Tool Life**

<Cutting Conditions>

Work Material : Inconel718
Insert : CNMG43200
Cutting Speed : 195SFM
Feed per Rev. : .006 IPR
Depth of Cut : .030 inch
Cutting Mode : Wet Cutting

Inconel718, vc=330SFM Continuous Machining



Conventional A
4 min



Conventional B
6 min



Conventional C
8 min



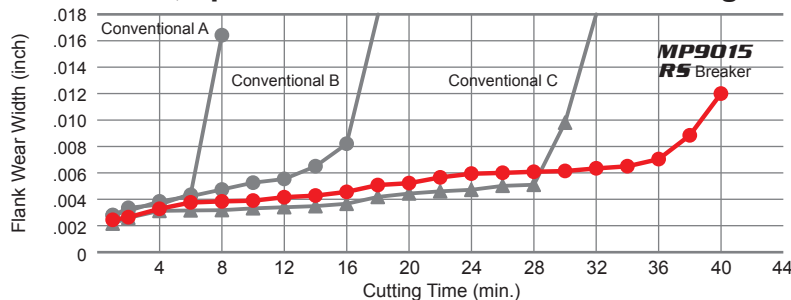
MP9005
MS Breaker, 11 min

**Increased
37%
Tool Life**

<Cutting Conditions>

Work Material : Inconel718
Insert : CNMG43200
Cutting Speed : 330SFM
Feed per Rev. : .006 IPR
Depth of Cut : .020 inch
Cutting Mode : Wet Cutting

Inconel718, ap=.079 inch Continuous Machining



Conventional A
8 min



Conventional B
18 min



Conventional C
32 min



MP9015
RS Breaker, 40 min

**Increased
33%
Tool Life**

<Cutting Conditions>

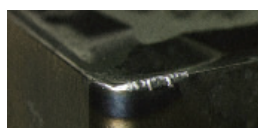
Work Material : Inconel718
Insert : CNMG43200
Cutting Speed : 130SFM
Feed per Rev. : .008 IPR
Depth of Cut : .079 inch
Cutting Mode : Wet Cutting

WASPALLOY Continuous Machining

MP9015 with RS breaker was smallest damage.



Conventional A



Conventional B



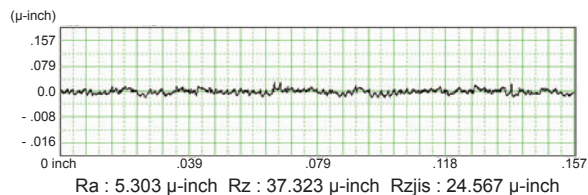
MP9015
RS Breaker

<Cutting Conditions>

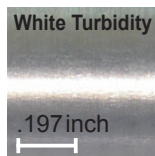
Work Material : WASPALLOY
Insert : CNMG43200
Cutting Speed : 95SFM
Feed per Rev. : .009 IPR
Depth of Cut : .157 inch
Cutting Time : 7 min
Cutting Mode : Wet Cutting

Cutting Performance

Titanium Alloy, Comparison of Surface Finish (Depth of Cut: .01 inch)



.197 inch
MT9015
LS Breaker



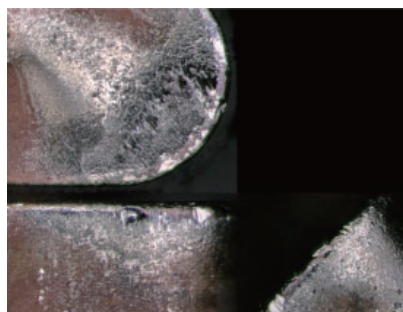
.197 inch
Conventional

Excellent Finish

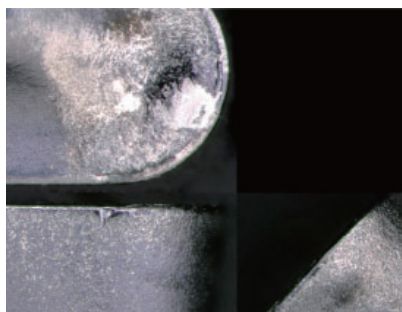
<Cutting Conditions>

Work Material : Ti-6Al-6V(325HB)
Insert : CNMG432
Cutting Speed : 230 SFM
Feed per Rev. : .002 IPR
Depth of Cut : .01 inch
Cutting Mode : Wet Cutting

MP9015 with LS breaker was smallest damage.



Conventional



MP9015 LS Breaker



<Cutting Conditions>

Work Material : Heat Resistant Cast Steel
Insert : DCMT32.51LS
Cutting Speed : 330 SFM
Feed per Rev. : .004 IPR
Depth of Cut : .010 inch
Cutting Mode : Wet Cutting

Chip Control when Back Turning

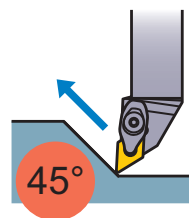
Non-tangling of chips when back turning Inconel718.



MS Breaker
New Design



Conventional



<Cutting Conditions>

Work Material : Inconel718
Insert : DNMG432
Cutting Speed : 130 SFM
Feed per Rev. : .008 IPR
Depth of Cut : .0039 inch
Cutting Mode : Wet Cutting

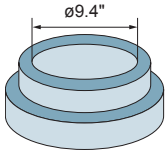
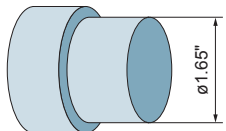




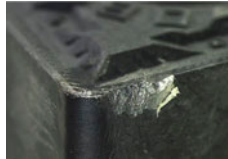
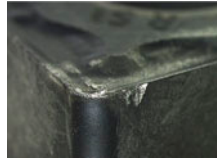
Achieved double tool life when cutting Inconel718 during continuous cutting

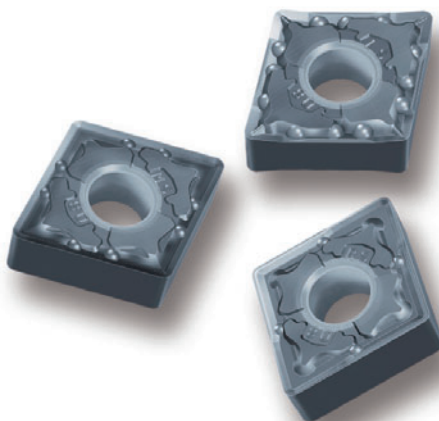
MP9005+LS	Conventional A (S10)	Conventional B (S10)	Conventional C (S10)
Wear - .0094 inch Cutting Time 66 min	Wear - .0087 inch Cutting Time 22 min	Wear - .0091 inch Cutting Time 36 min	Wear - .0098 inch Cutting Time 16 min

<Cutting Conditions>

Inserts : CNMG432
Work Material : Inconel718
Cutting Speed : 165 SFM
Feed per Rev. : .006 IPR
Depth of Cut : .020 inch
Cutting Mode : Wet Cutting

Application Examples

Insert (Grade)		DNMG432MS (MP9005)	CNMG432RS (MP9015)
Workpiece		Inconel718 (Ni Based Alloy)  45HRC Aging Treatment	HAYNES Alloy 25 (Co Based Alloy) 
Component		Disk - Aerospace Component	Cover Plate - Aerospace Component
Application		Internal Turning	External Turning
Cutting Conditions	Cutting Speed (SFM)	195	110
	Feed per Revolution (IPR)	.006	.008
	Depth of Cut $a_p \times a_e$ (inch)	.010 x .591	.059 x 1.654 (3 Pass)
Cutting Mode		Wet Cutting	Wet Cutting
Results		<div> <div>Conventional (S10)</div>   </div> <div> <div>MP9005+MS</div>   </div> <p>MP9005 - Stable machining and less wear with long tool life without chip tangling.</p>	<div> <div>Conventional (S10)</div>  </div> <div> <div>MP9015+RS</div>  </div> <p>Both conventional and MP9015 display notch wear but the conventional grade wear was greater and exposed the substrate.</p>



9000 Series Grades for Difficult-to-cut Materials

MP9005/MP9015
MT9005/MT9015

For your safety

●Don't touch breakers and chips without gloves. ●Please machine within recommended application range, and exchange expired tools with new parts in advance. ●Please use safety cover and wear safety glasses. ●When using compounded cutting oils, please take fire prevention. ●When attaching inserts or spare parts, please use the attached wrench or driver. ●When using tools in revolution machining, please make a trial run to check run-out, vibration, abnormal sounds etc.

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