

# ISO Turning Inserts for Difficult-to-cut Materials



Item  
Expansion

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



**MP9005  
MP9015  
MP9025  
MT9005  
MT9015**

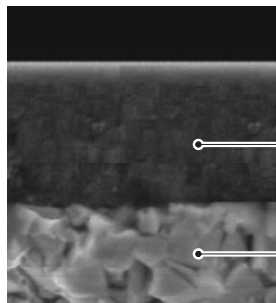
**+ FS/LS  
MS/RS**



Please refer to the last page for more information on certified environmentally friendly products.

# ISO Turning Inserts for Difficult-to-cut Materials

## PVD Coated Grade MP9005/MP9015/MP9025



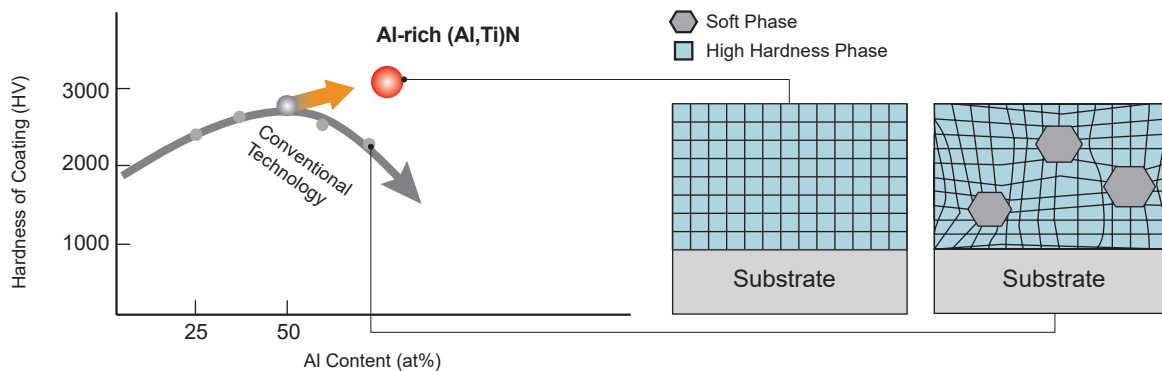
Al-rich (Al,Ti)N Single Layer Coating Technology

Special Cemented Carbide Substrate

**MP9005/MP9015/MP9025**

### Al-rich and Conventional Coating Comparison

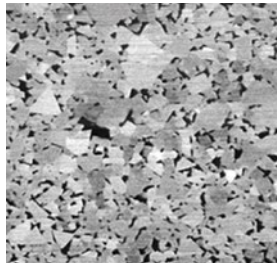
The Al-rich (Al,Ti)N single layer coating provides stabilization of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance.



ISO Grade	Grade	Concept	Application
<b>S01</b>	<b>MP9005</b>	Top-quality grade focusing on wear resistance.	Heat Resistant Alloys Finish-Medium Cutting
<b>S10</b>	<b>MP9015</b>	First recommendation for general applications.	Heat Resistant Alloys Medium-Rough Cutting
<b>S30</b>	<b>MP9025</b>	Prevents severe damage for increased stability.	Heat Resistant Alloys Interrupted • Light-Rough Cutting

# Carbide Grade (Non Coated)

## MT9005/MT9015

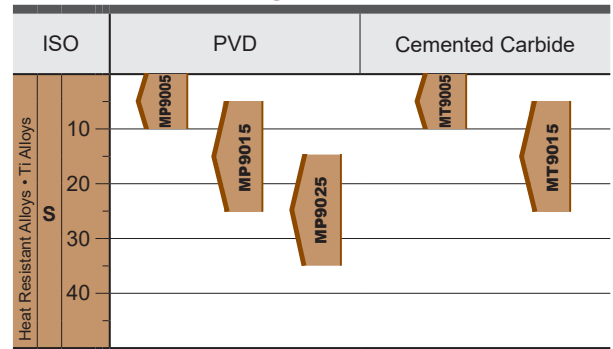


**MT9005**



**MT9015**

### Application Range

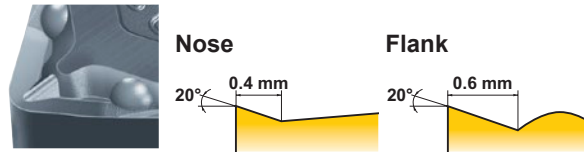


ISO Grade	Grade	Concept	Application
<b>S01</b>	<b>MT9005</b>	Cemented carbide with unmatched resistance to heat and plastic deformation.	Titanium Alloys High Speed Cutting
<b>S10</b>	<b>MT9015</b>	Cemented carbide with sharp cutting edge, excellent wear and fracture resistance.	Titanium Alloys General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

# Chip Breaker System Negative Inserts

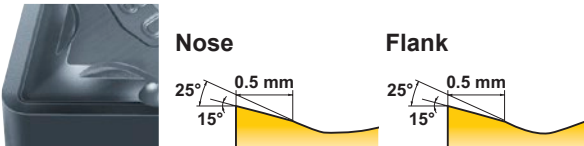
## LS Breaker for Light Cutting

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



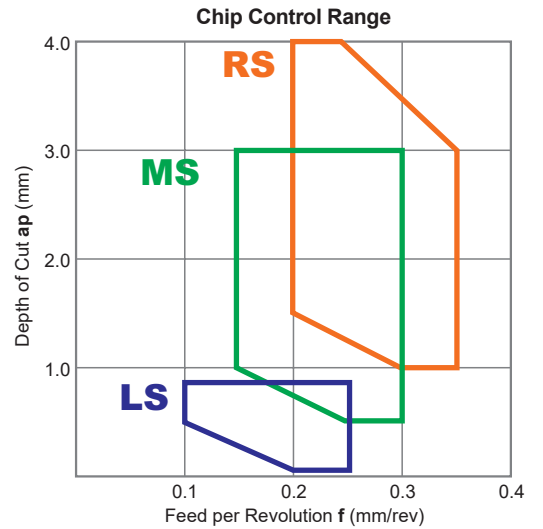
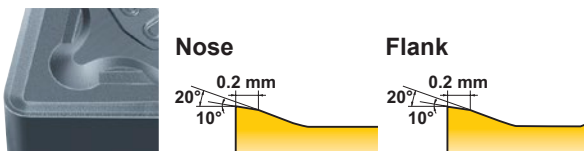
## MS Breaker Newly Designed for Medium Cutting

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



## RS Breaker for Rough Cutting

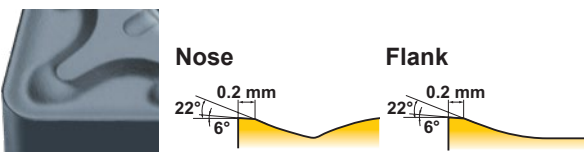
During low speed cutting the positive land controls chip welding and abrasion at the depth of cut line.



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

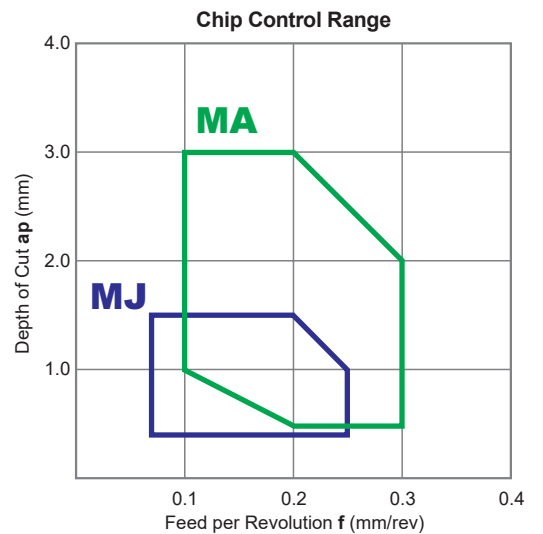
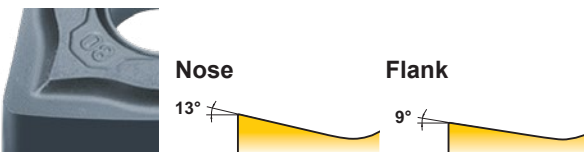
## MA Breaker Multi-assist Breaker

Suitable for medium cutting range.



## MJ Breaker Sub Breaker

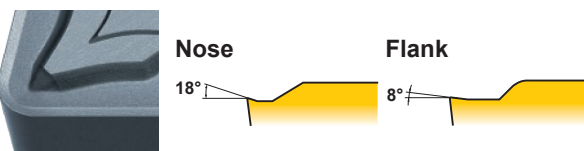
Alternative chip breaker of the main chip breakers LS and MS. Excellent notch wear resistance for light to medium cutting.



## Positive Inserts

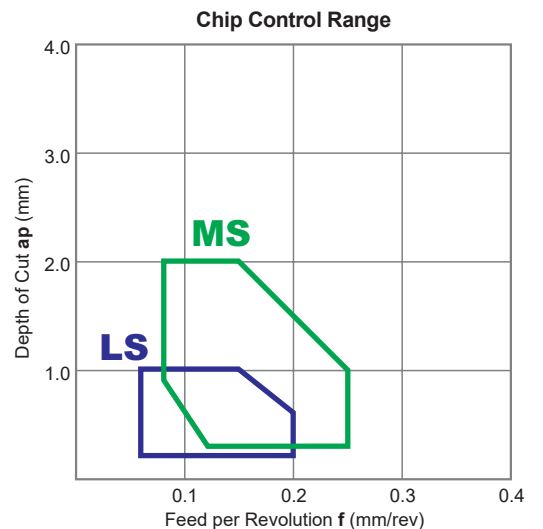
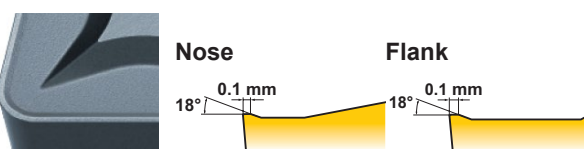
### LS Breaker for Light Cutting

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



### MS Breaker for Medium Cutting

The wide chip pocket controls increases in cutting resistance as well as reducing vibration and chip jamming even at large depths of cut.



The chip breaker control range was tested for optimum chip evacuation when cutting Inconel 718 with a DCMT11T304 insert.

# Precision Chip Breaker System

## Negative Inserts

**NEW**

### FS Breaker for Finish Cutting

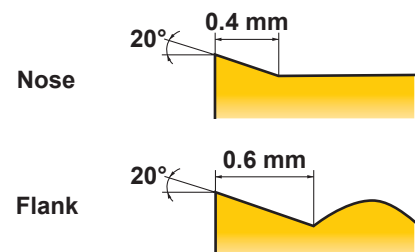
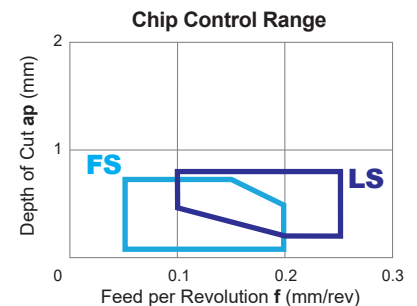
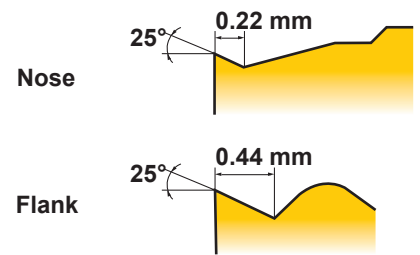


Excellent chip breaking even at very small depths of cut. The large rake angle and precision grade enables excellent sharpness.

### LS Breaker for Light Cutting



Enhanced chip disposal for depths of cut smaller than the corner R. Precision grade with excellent sharpness.

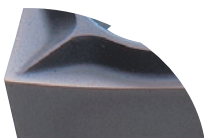


## Positive Inserts

### FS/FS-P Breaker for Finish Cutting

#### FS

#### First Recommendation for Finish Cutting of Difficult-to-cut Materials



Ideal for heat resistant, titanium and cobalt chromium alloys. The sharp cutting edge gives excellent surface finishes. Highly effective chip discharge is realised due to the curved cutting edges.

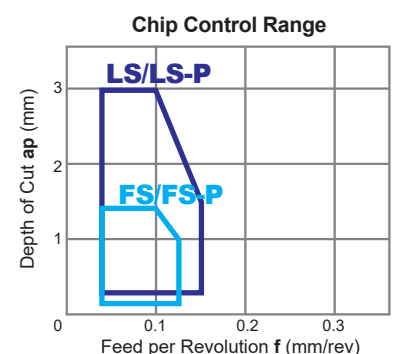
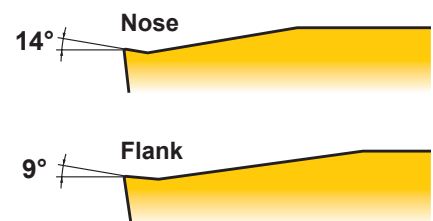
#### FS-P

#### First Recommendation for Finish Cutting of Titanium Alloys



Mirror-surface

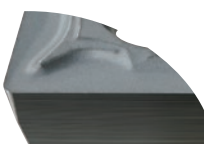
Ideal for titanium and copper alloys. The sharp cutting edge gives excellent surface finishes. Highly effective chip discharge is realised due to the curved cutting edges. The polished mirror finish of the insert surfaces drastically improves welding resistance and extends tool life.



### LS/LS-P Breaker for Light Cutting

#### LS

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



Ideal for heat resistant, titanium and cobalt chromium alloys. Designed with parallel cutting edges. Achieves stable chip control over a wide range of applications from small to medium depths of cut.

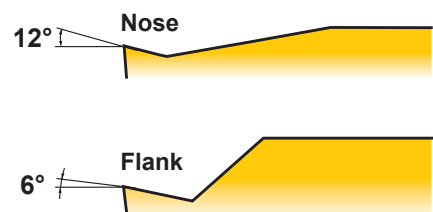
#### LS-P

#### First Recommendation for Light Cutting of Titanium Alloys



Mirror-surface

Ideal for titanium and copper alloys. Designed with parallel cutting edges. Achieves stable chip control over a wide range of applications from small to medium depths of cut. The polished mirror finish of the insert surfaces drastically improves welding resistance and extends tool life.

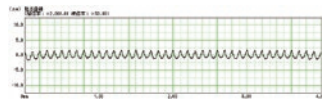
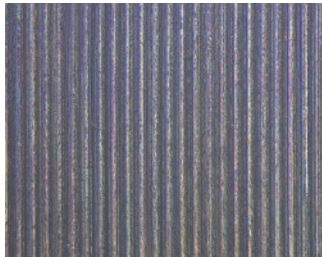




## Cutting Performance

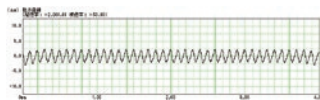
### Comparison of Finished Surface of Inconel 718

Excellent machining and chip breaking abilities provide good surface finishes.



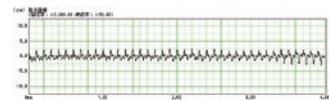
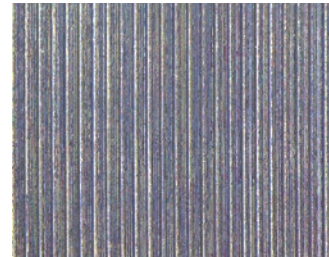
Rz 3.0312  $\mu\text{m}$

**MP9005**  
**FS** Breaker



Rz 4.8944  $\mu\text{m}$

Conventional A

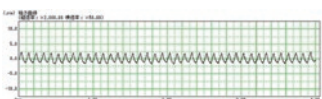
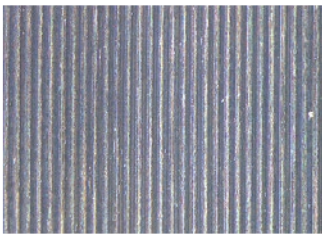


Rz 4.2160  $\mu\text{m}$

Conventional B

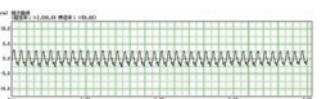
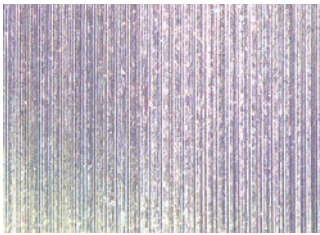
<Cutting Conditions>

Workpiece Material	: Inconel 718
Inserts	: CNGG120404
Cutting Speed	: $v_c = 50 \text{ m/min}$
Feed per Rev.	: $f = 0.1 \text{ mm/rev}$
Depth of Cut	: $a_p = 0.2 \text{ mm}$
Cutting Mode	: Wet Cutting



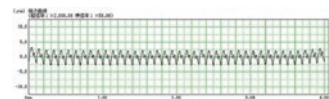
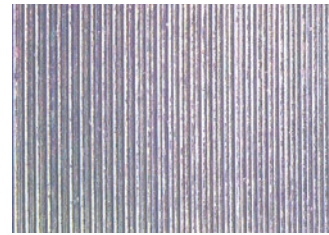
Rz 3.7020  $\mu\text{m}$

**MP9005**  
**LS** Breaker



Rz 5.4880  $\mu\text{m}$

Conventional A



Rz 5.4120  $\mu\text{m}$

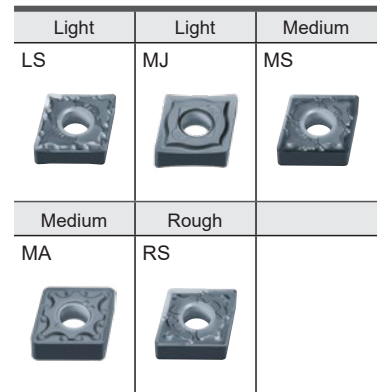
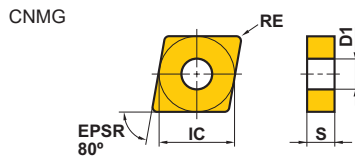
Conventional B

<Cutting Conditions>

Workpiece Material	: Inconel 718
Inserts	: CNGG120404
Cutting Speed	: $v_c = 50 \text{ m/min}$
Feed per Rev.	: $f = 0.1 \text{ mm/rev}$
Depth of Cut	: $a_p = 0.5 \text{ mm}$
Cutting Mode	: Wet Cutting

# Negative Inserts (With Hole)

## M Class



(mm)

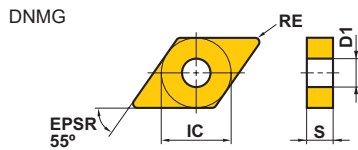
Order Number	Cutting Area	MP9005	MP9015	MP9025	MT9015	IC	S	RE	D1
CNMG090304-LS	L	●	●	●		9.525	3.18	0.4	3.81
CNMG090308-LS	L	●	●	●		9.525	3.18	0.8	3.81
CNMG120402-LS	L	●	●	●	●	12.7	4.76	0.2	5.16
CNMG120404-LS	L	●	●	●	●	12.7	4.76	0.4	5.16
CNMG120408-LS	L	●	●	●	●	12.7	4.76	0.8	5.16
CNMG120404-MJ	L	●	●			12.7	4.76	0.4	5.16
CNMG120408-MJ	L	●	●			12.7	4.76	0.8	5.16
CNMG120412-MJ	L	●	●			12.7	4.76	1.2	5.16
CNMG120416-MJ	L	●	●			12.7	4.76	1.6	5.16
CNMG090304-MS	M	●	●	●		9.525	3.18	0.4	3.81
CNMG090308-MS	M	●	●	●		9.525	3.18	0.8	3.81
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
CNMG160612-MS	M	●	●	●	●	15.875	6.35	1.2	6.35
CNMG160616-MS	M	●	●	●	●	15.875	6.35	1.6	6.35
CNMG120404-MA	M		●	●		12.7	4.76	0.4	5.16
CNMG120408-MA	M		●	●		12.7	4.76	0.8	5.16
CNMG120412-MA	M		●	●		12.7	4.76	1.2	5.16
CNMG120416-MA	M		●	●		12.7	4.76	1.6	5.16
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
CNMG160612-RS	R		●	●	●	15.875	6.35	1.2	6.35
CNMG160616-RS	R		●	●	●	15.875	6.35	1.6	6.35
CNMG190612-RS	R		●	●	●	19.05	6.35	1.2	7.93
CNMG190616-RS	R		●	●	●	19.05	6.35	1.6	7.93

● : Inventory maintained in Japan. (10 inserts in one case)

# ISO Turning Inserts for Difficult-to-cut Materials

## Negative Inserts (With Hole)

### M Class



Light	Light	Medium
LS	MJ	MS
Medium	Rough	
MA	RS	

(mm)

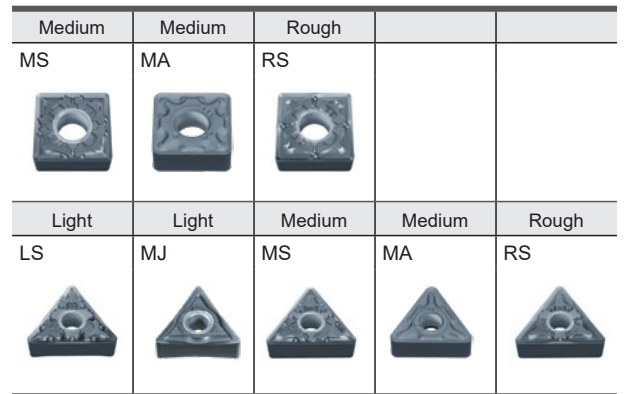
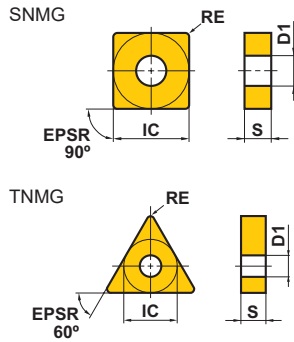
Order Number	Cutting Area	MP9005	MP9015	MP9025	MT9015	IC	S	RE	D1
DNMG150402-LS	L	●	●	●	●	12.7	4.76	0.2	5.16
DNMG150404-LS	L	●	●	●	●	12.7	4.76	0.4	5.16
DNMG150408-LS	L	●	●	●	●	12.7	4.76	0.8	5.16
DNMG150604-LS	L	●	●	●	●	12.7	6.35	0.4	5.16
DNMG150608-LS	L	●	●	●	●	12.7	6.35	0.8	5.16
DNMG150404-MJ	L	●	●			12.7	4.76	0.4	5.16
DNMG150408-MJ	L	●	●			12.7	4.76	0.8	5.16
DNMG150412-MJ	L	●	●			12.7	4.76	1.2	5.16
DNMG150416-MJ	L	●	●			12.7	4.76	1.6	5.16
DNMG150604-MJ	L	●	●			12.7	6.35	0.4	5.16
DNMG150608-MJ	L	●	●			12.7	6.35	0.8	5.16
DNMG150612-MJ	L	●	●			12.7	6.35	1.2	5.16
DNMG150616-MJ	L	●	●			12.7	6.35	1.6	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
DNMG150604-MS	M	●	●	●	●	12.7	6.35	0.4	5.16
DNMG150608-MS	M	●	●	●	●	12.7	6.35	0.8	5.16
DNMG150612-MS	M	●	●	●	●	12.7	6.35	1.2	5.16
DNMG150404-MA	M		●	●		12.7	4.76	0.4	5.16
DNMG150408-MA	M		●	●		12.7	4.76	0.8	5.16
DNMG150412-MA	M		●	●		12.7	4.76	1.2	5.16
DNMG150604-MA	M		●	●		12.7	6.35	0.4	5.16
DNMG150608-MA	M		●	●		12.7	6.35	0.8	5.16
DNMG150612-MA	M		●	●		12.7	6.35	1.2	5.16
DNMG150408-RS	R		●	●	●	12.7	4.76	0.8	5.16
DNMG150412-RS	R		●	●	●	12.7	4.76	1.2	5.16
DNMG150416-RS	R		●	●	●	12.7	4.76	1.6	5.16
DNMG150608-RS	R		●	●	●	12.7	6.35	0.8	5.16
DNMG150612-RS	R		●	●	●	12.7	6.35	1.2	5.16
DNMG150616-RS	R		●	●	●	12.7	6.35	1.6	5.16

● : Inventory maintained in Japan. (10 inserts in one case)



# Negative Inserts (With Hole)

## M Class



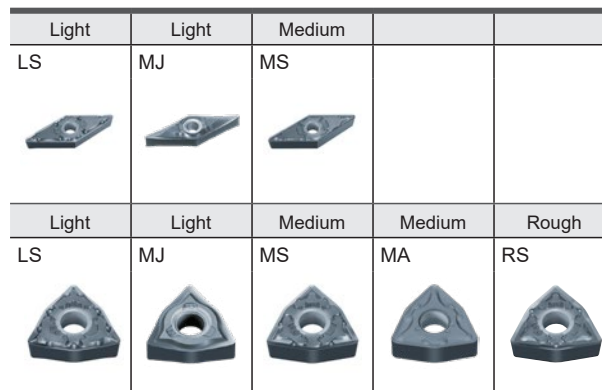
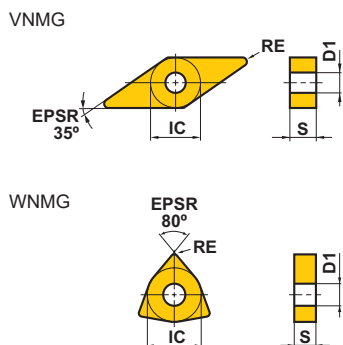
(mm)

Order Number	Cutting Area	MP9005	MP9015	MP9025	MT9015	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
SNMG150612-MS	M	●	●	●	●	15.875	6.35	1.2	6.35
SNMG150616-MS	M	●	●	●	●	15.875	6.35	1.6	6.35
SNMG190612-MS	M	●	●	●	●	19.05	6.35	1.2	7.93
SNMG120404-MA	M		●	●		12.7	4.76	0.4	5.16
SNMG120408-MA	M		●	●		12.7	4.76	0.8	5.16
SNMG120412-MA	M		●	●		12.7	4.76	1.2	5.16
SNMG120416-MA	M		●	●		12.7	4.76	1.6	5.16
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
SNMG150616-RS	R		●	●	●	15.875	6.35	1.6	6.35
SNMG190612-RS	R		●	●	●	19.05	6.35	1.2	7.93
SNMG190616-RS	R		●	●	●	19.05	6.35	1.6	7.93
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-MJ	L	●	●			9.525	4.76	0.4	3.81
TNMG160408-MJ	L	●	●			9.525	4.76	0.8	3.81
TNMG160412-MJ	L	●	●			9.525	4.76	1.2	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
TNMG220408-MS	M	●	●	●	●	12.7	4.76	0.8	5.16
TNMG220412-MS	M	●	●	●	●	12.7	4.76	1.2	5.16
TNMG160404-MA	M		●	●		9.525	4.76	0.4	3.81
TNMG160408-MA	M		●	●		9.525	4.76	0.8	3.81
TNMG160412-MA	M		●	●		9.525	4.76	1.2	3.81
TNMG220408-MA	M		●	●		12.7	4.76	0.8	5.16
TNMG220412-MA	M		●	●		12.7	4.76	1.2	5.16
TNMG220416-MA	M		●	●		12.7	4.76	1.6	5.16
TNMG270616-MA	M		●	●		15.875	6.35	1.6	6.35
TNMG330924-MA	M		●	●		19.05	9.52	2.4	7.93
TNMG160408-RS	R		●	●	●	9.525	4.76	0.8	3.81
TNMG160412-RS	R		●	●	●	9.525	4.76	1.2	3.81
TNMG220408-RS	R		●	●	●	12.7	4.76	0.8	5.16
TNMG220412-RS	R		●	●	●	12.7	4.76	1.2	5.16

# ISO Turning Inserts for Difficult-to-cut Materials

## Negative Inserts (With Hole)

### M Class



(mm)

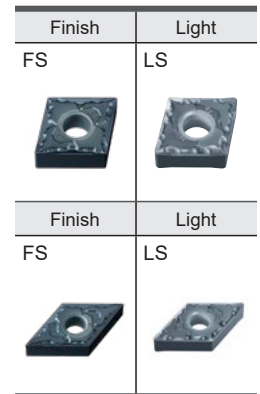
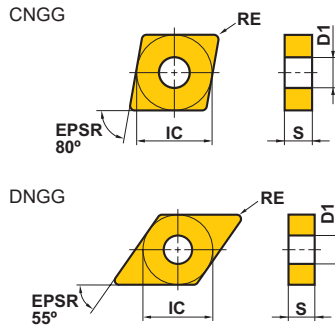
Order Number	Cutting Area	MP9005	MP9015	MP9025	MT9015	IC	S	RE	D1
VNMG160402-LS	L	●	●	●	●	9.525	4.76	0.2	3.81
VNMG160404-LS	L	●	●	●	●	9.525	4.76	0.4	3.81
VNMG160408-LS	L	●	●	●	●	9.525	4.76	0.8	3.81
VNMG160404-MJ	L	●	●			9.525	4.76	0.4	3.81
VNMG160408-MJ	L	●	●			9.525	4.76	0.8	3.81
VNMG160412-MJ	L	●	●			9.525	4.76	1.2	3.81
VNMG160404-MS	M	●	●	●	●	9.525	4.76	0.4	3.81
VNMG160408-MS	M	●	●	●	●	9.525	4.76	0.8	3.81
WNMG080402-LS	L	●	●	●	●	12.7	4.76	0.2	5.16
WNMG080404-LS	L	●	●	●	●	12.7	4.76	0.4	5.16
WNMG080408-LS	L	●	●	●	●	12.7	4.76	0.8	5.16
WNMG080408-MJ	L	●	●			12.7	4.76	0.8	5.16
WNMG080412-MJ	L	●	●			12.7	4.76	1.2	5.16
WNMG080416-MJ	L	●	●			12.7	4.76	1.6	5.16
WNMG080404-MS	M	●	●	●	●	12.7	4.76	0.4	5.16
WNMG080408-MS	M	●	●	●	●	12.7	4.76	0.8	5.16
WNMG080412-MS	M	●	●	●	●	12.7	4.76	1.2	5.16
WNMG080404-MA	M		●	●		12.7	4.76	0.4	5.16
WNMG080408-MA	M		●	●		12.7	4.76	0.8	5.16
WNMG080412-MA	M		●	●		12.7	4.76	1.2	5.16
WNMG080416-MA	M		●	●		12.7	4.76	1.6	5.16
WNMG080408-RS	R		●	●	●	12.7	4.76	0.8	5.16
WNMG080412-RS	R		●	●	●	12.7	4.76	1.2	5.16
WNMG080416-RS	R		●	●	●	12.7	4.76	1.6	5.16
WNMG100612-RS	R		●	●	●	15.875	6.35	1.2	6.35

● : Inventory maintained in Japan. (10 inserts in one case)

# Negative Inserts (With Hole)

## G Class

**NEW**



(mm)

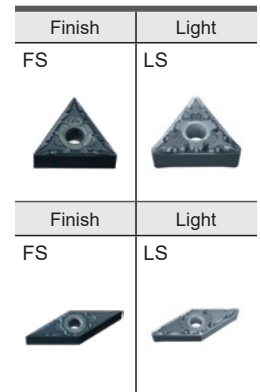
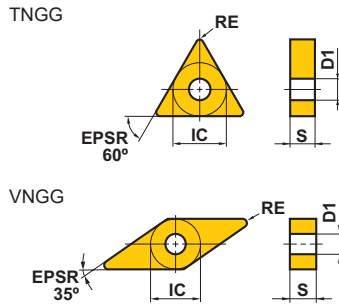
Order Number	Cutting Area	MP9005	MP9015	MP9025	MT9015	IC	S	RE	D1
CNGG1204V5-FS	F	●	●		●	12.7	4.76	0.05	5.16
CNGG120401-FS	F	●	●	●	●	12.7	4.76	0.1	5.16
CNGG120402-FS	F	●	●	●	●	12.7	4.76	0.2	5.16
CNGG120404-FS	F	●	●	●	●	12.7	4.76	0.4	5.16
CNGG120408-FS	F	●	●	●	●	12.7	4.76	0.8	5.16
CNGG120402-LS	L	●	●	●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

# ISO Turning Inserts for Difficult-to-cut Materials

## Negative Inserts (With Hole)

G Class

**NEW**



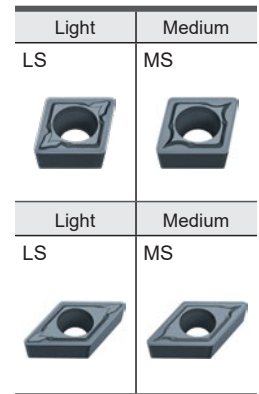
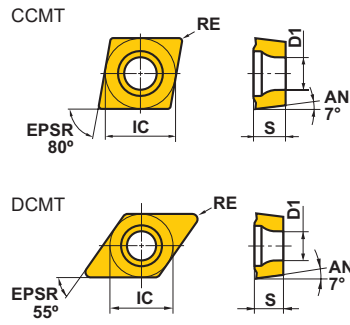
(mm)

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

● : Inventory maintained in Japan. (10 inserts in one case)

# 7° Positive Inserts (With Hole)

## M Class



(mm)

Order Number	Cutting Area	MP9005	MP9015	MP9025	MT9005	IC	S	RE	D1
CCMT060202-LS	L	●	●	●	●	6.35	2.38	0.2	2.8
CCMT060204-LS	L	●	●	●	●	6.35	2.38	0.4	2.8
CCMT09T302-LS	L	●	●	●	●	9.525	3.97	0.2	4.4
CCMT09T304-LS	L	●	●	●	●	9.525	3.97	0.4	4.4
CCMT09T308-LS	L	●	●	●	●	9.525	3.97	0.8	4.4
CCMT060202-MS	M	●	●	●	●	6.35	2.38	0.2	2.8
CCMT060204-MS	M	●	●	●	●	6.35	2.38	0.4	2.8
CCMT060208-MS	M	●	●	●	●	6.35	2.38	0.8	2.8
CCMT09T302-MS	M	●	●	●	●	9.525	3.97	0.2	4.4
CCMT09T304-MS	M	●	●	●	●	9.525	3.97	0.4	4.4
CCMT09T308-MS	M	●	●	●	●	9.525	3.97	0.8	4.4
CCMT120404-MS	M	●	●	●	●	12.7	4.76	0.4	5.5
CCMT120408-MS	M	●	●	●	●	12.7	4.76	0.8	5.5
CCMT120412-MS	M	●	●	●	●	12.7	4.76	1.2	5.5
DCMT070202-LS	L	●	●	●	●	6.35	2.38	0.2	2.8
DCMT070204-LS	L	●	●	●	●	6.35	2.38	0.4	2.8
DCMT11T302-LS	L	●	●	●	●	9.525	3.97	0.2	4.4
DCMT11T304-LS	L	●	●	●	●	9.525	3.97	0.4	4.4
DCMT11T308-LS	L	●	●	●	●	9.525	3.97	0.8	4.4
DCMT070204-MS	M	●	●	●	●	6.35	2.38	0.4	2.8
DCMT070208-MS	M	●	●	●	●	6.35	2.38	0.8	2.8
DCMT11T304-MS	M	●	●	●	●	9.525	3.97	0.4	4.4
DCMT11T308-MS	M	●	●	●	●	9.525	3.97	0.8	4.4
DCMT11T312-MS	M	●	●	●	●	9.525	3.97	1.2	4.4



# ISO Turning Inserts for Difficult-to-cut Materials

## 7° Positive Inserts (With Hole)

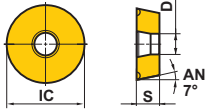
M Class

Medium

Standard



RCMT



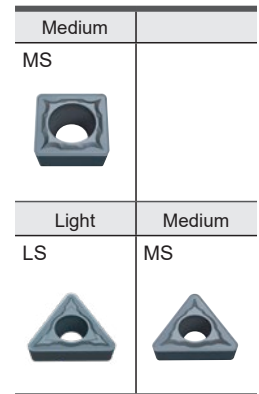
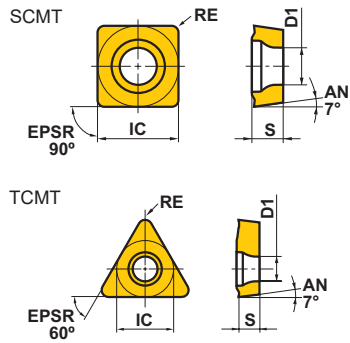
(mm)

Order Number	Cutting Area	MP9005	MP9015	MP9025	MT9005	MT9015	IC	S	RE	D1
<b>RCMT0602M0</b>	M	●	●	●	●	●	6	2.38	—	2.8
<b>RCMT0803M0</b>	M	●	●	●	●	●	8	3.18	—	3.4
<b>RCMT10T3M0</b>	M	●	●	●	●	●	10	3.97	—	4.4
<b>RCMT1204M0</b>	M	●	●	●	●	●	12	4.76	—	4.4
<b>RCMT1606M0</b>	M	●	●	●	●	●	16	6.35	—	5.5

● : Inventory maintained in Japan. (10 inserts in one case)

# 7° Positive Inserts (With Hole)

## M Class



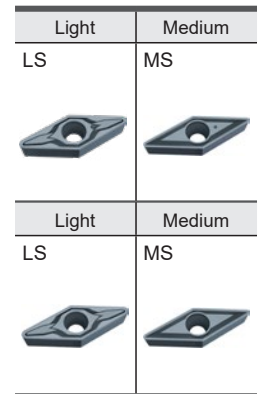
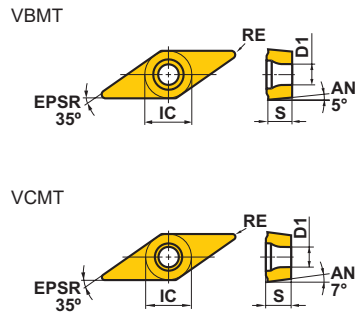
(mm)

Order Number	Cutting Area	MP9005	MP9015	MP9025	MT9005	IC	S	RE	D1
SCMT09T304-MS	M	●	●	●	●	9.525	3.97	0.4	4.4
SCMT09T308-MS	M	●	●	●	●	9.525	3.97	0.8	4.4
SCMT120404-MS	M	●	●	●	●	12.7	4.76	0.4	5.5
SCMT120408-MS	M	●	●	●	●	12.7	4.76	0.8	5.5
SCMT120412-MS	M	●	●	●	●	12.7	4.76	1.2	5.5
TCMT090202-LS	L	●	●	●	●	5.56	2.38	0.2	2.5
TCMT110202-LS	L	●	●	●	●	6.35	2.38	0.2	2.8
TCMT090204-MS	M	●	●	●	●	5.56	2.38	0.4	2.5
TCMT090208-MS	M	●	●	●	●	5.56	2.38	0.8	2.5
TCMT110204-MS	M	●	●	●		6.35	2.38	0.4	2.8
TCMT110208-MS	M	●	●	●		6.35	2.38	0.8	2.8
TCMT16T304-MS	M	●	●	●	●	9.525	3.97	0.4	4.4
TCMT16T308-MS	M	●	●	●	●	9.525	3.97	0.8	4.4
TCMT16T312-MS	M	●	●	●	●	9.525	3.97	1.2	4.4

# ISO Turning Inserts for Difficult-to-cut Materials

## 5° and 7° Positive Inserts (With Hole)

### M Class



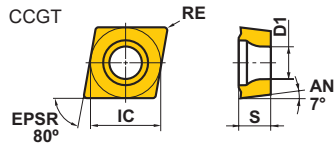
(mm)

Order Number	Cutting Area	MP9005	MP9015	MP9025	MT9005	IC	S	RE	D1
VBMT110302-LS	L	●	●	●	●	6.35	3.18	0.2	2.9
VBMT110304-LS	L	●	●	●	●	6.35	3.18	0.4	2.9
VBMT110308-LS	L	●	●	●	●	6.35	3.18	0.8	2.9
VBMT160404-LS	L	●	●	●	●	9.525	4.76	0.4	4.4
VBMT160408-LS	L	●	●	●	●	9.525	4.76	0.8	4.4
VBMT160402-MS	M	●	●	●	●	9.525	4.76	0.2	4.4
VBMT160404-MS	M	●	●	●	●	9.525	4.76	0.4	4.4
VBMT160408-MS	M	●	●	●	●	9.525	4.76	0.8	4.4
VBMT160412-MS	M	●	●	●	●	9.525	4.76	1.2	4.4
VCMT110302-LS	L	●	●	●	●	6.35	3.18	0.2	2.8
VCMT110304-LS	L	●	●	●	●	6.35	3.18	0.4	2.8
VCMT160404-LS	L	●	●	●	●	9.525	4.76	0.4	4.4
VCMT160408-LS	L	●	●	●	●	9.525	4.76	0.8	4.4
VCMT110302-MS	M	●	●	●	●	6.35	3.18	0.2	2.8
VCMT110304-MS	M	●	●	●	●	6.35	3.18	0.4	2.8
VCMT110308-MS	M	●	●	●	●	6.35	3.18	0.8	2.8
VCMT160404-MS	M	●	●	●	●	9.525	4.76	0.4	4.4
VCMT160408-MS	M	●	●	●	●	9.525	4.76	0.8	4.4

● : Inventory maintained in Japan. (10 inserts in one case)

# 7° Positive Inserts (With Hole)

## G Class



Finish	Finish	Light	Light
FS	FS-P	LS	LS-P

(mm)

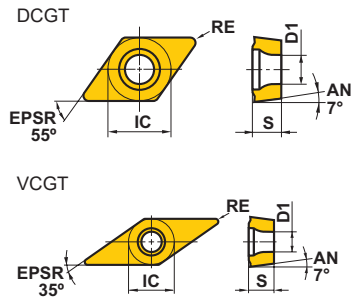
Order Number	Cutting Area	MP9005	MP9015	MP9025	MT9005	IC	S	RE*	D1
CCGT060201M-FS	F	●	●	●		6.35	2.38	0.1	2.8
CCGT060202M-FS	F	●	●	●		6.35	2.38	0.2	2.8
CCGT09T301M-FS	F	●	●	●		9.525	3.97	0.1	4.4
CCGT09T302M-FS	F	●	●	●		9.525	3.97	0.2	4.4
CCGT09T304M-FS	F	●	●	●		9.525	3.97	0.4	4.4
CCGT060201M-FS-P	F				●	6.35	2.38	0.1	2.8
CCGT060202M-FS-P	F				●	6.35	2.38	0.2	2.8
CCGT09T301M-FS-P	F				●	9.525	3.97	0.1	4.4
CCGT09T302M-FS-P	F				●	9.525	3.97	0.2	4.4
CCGT09T304M-FS-P	F				●	9.525	3.97	0.4	4.4
CCGT060201M-LS	L	●	●	●		6.35	2.38	0.1	2.8
CCGT060202M-LS	L	●	●	●		6.35	2.38	0.2	2.8
CCGT09T301M-LS	L	●	●	●		9.525	3.97	0.1	4.4
CCGT09T302M-LS	L	●	●	●		9.525	3.97	0.2	4.4
CCGT09T304M-LS	L	●	●	●		9.525	3.97	0.4	4.4
CCGT060201M-LS-P	L				●	6.35	2.38	0.1	2.8
CCGT060202M-LS-P	L				●	6.35	2.38	0.2	2.8
CCGT09T301M-LS-P	L				●	9.525	3.97	0.1	4.4
CCGT09T302M-LS-P	L				●	9.525	3.97	0.2	4.4
CCGT09T304M-LS-P	L				●	9.525	3.97	0.4	4.4

\* Nominal Value ( Max. )

# ISO Turning Inserts for Difficult-to-cut Materials

## 7° Positive Inserts (With Hole)

### G Class



Finish	Finish	Light	Light
FS	FS-P	LS	LS-P
Light		Light	
LS	LS-P		

(mm)

Order Number	Cutting Area	MP9005	MP9015	MP9025	MT9005	IC	S	RE*	D1
DCGT070201M-FS	F	●	●	●		6.35	2.38	0.1	2.8
DCGT070202M-FS	F	●	●	●		6.35	2.38	0.2	2.8
DCGT070204M-FS	F	●	●	●		6.35	2.38	0.4	2.8
DCGT11T301M-FS	F	●	●	●		9.525	3.97	0.1	4.4
DCGT11T302M-FS	F	●	●	●		9.525	3.97	0.2	4.4
DCGT11T304M-FS	F	●	●	●		9.525	3.97	0.4	4.4
DCGT070201M-FS-P	F				●	6.35	2.38	0.1	2.8
DCGT070202M-FS-P	F				●	6.35	2.38	0.2	2.8
DCGT070204M-FS-P	F				●	6.35	2.38	0.4	2.8
DCGT11T301M-FS-P	F				●	9.525	3.97	0.1	4.4
DCGT11T302M-FS-P	F				●	9.525	3.97	0.2	4.4
DCGT11T304M-FS-P	F				●	9.525	3.97	0.4	4.4
DCGT070201M-LS	L	●	●	●		6.35	2.38	0.1	2.8
DCGT070202M-LS	L	●	●	●		6.35	2.38	0.2	2.8
DCGT070204M-LS	L	●	●	●		6.35	2.38	0.4	2.8
DCGT11T301M-LS	L	●	●	●		9.525	3.97	0.1	4.4
DCGT11T302M-LS	L	●	●	●		9.525	3.97	0.2	4.4
DCGT11T304M-LS	L	●	●	●		9.525	3.97	0.4	4.4
DCGT070201M-LS-P	L				●	6.35	2.38	0.1	2.8
DCGT070202M-LS-P	L				●	6.35	2.38	0.2	2.8
DCGT070204M-LS-P	L				●	6.35	2.38	0.4	2.8
DCGT11T301M-LS-P	L				●	9.525	3.97	0.1	4.4
DCGT11T302M-LS-P	L				●	9.525	3.97	0.2	4.4
DCGT11T304M-LS-P	L				●	9.525	3.97	0.4	4.4
VCGT110301M-LS	L	●	●	●		6.35	3.18	0.1	2.8
VCGT110302M-LS	L	●	●	●		6.35	3.18	0.2	2.8
VCGT110304M-LS	L	●	●	●		6.35	3.18	0.4	2.8
VCGT130301M-LS	L	●	●	●		7.94	3.18	0.1	3.4
VCGT130302M-LS	L	●	●	●		7.94	3.18	0.2	3.4
VCGT130304M-LS	L	●	●	●		7.94	3.18	0.4	3.4
VCGT110301M-LS-P	L				●	6.35	3.18	0.1	2.8
VCGT110302M-LS-P	L				●	6.35	3.18	0.2	2.8
VCGT110304M-LS-P	L				●	6.35	3.18	0.4	2.8
VCGT130301M-LS-P	L				●	7.94	3.18	0.1	3.4
VCGT130302M-LS-P	L				●	7.94	3.18	0.2	3.4
VCGT130304M-LS-P	L				●	7.94	3.18	0.4	3.4

\* Nominal Value ( Max. )

● : Inventory maintained in Japan. (10 inserts in one case)



## Recommended Cutting Conditions

### Negative Inserts

(mm)

Workpiece Material	Cutting Conditions	Cutting Area	Chip Breaker	Grade	Cutting Speed (m/min)	Feed per Rev. (mm/rev)	Depth of Cut $a_p$	
M Precipitation Hardening Stainless Steel (JIS SUS630)	Stable Cutting	Light Cutting	LS	MP9005	125–175	0.10–0.25	0.2–0.8	
		Medium Cutting	MS	MP9005	115–160	0.15–0.30	0.5–3.0	
	General Cutting	Light Cutting	LS	MP9015	120–165	0.10–0.25	0.2–0.8	
		Medium Cutting	MS	MP9015	110–150	0.15–0.30	0.5–3.0	
		Rough Cutting	RS	MP9015	100–140	0.20–0.35	1.0–4.0	
	Unstable Cutting	Light Cutting	LS	MP9025	80–95	0.10–0.25	0.2–0.8	
		Medium Cutting	MS	MP9025	75–90	0.15–0.30	0.5–3.0	
		Rough Cutting	RS	MP9025	70–85	0.20–0.35	1.0–4.0	
	S Titanium Alloys (Ti-6Al-4V)	Stable Cutting	Light Cutting	LS	MT9015	40–85	0.10–0.25	0.2–0.8
			Medium Cutting	MS	MT9015	40–80	0.15–0.30	0.5–3.0
			Rough Cutting	RS	MT9015	35–75	0.20–0.35	1.0–4.0
		General Cutting	Light Cutting	LS	MT9015	40–85	0.10–0.25	0.2–0.8
Medium Cutting			MS	MT9015	40–80	0.15–0.30	0.5–3.0	
Rough Cutting			RS	MT9015	35–75	0.20–0.35	1.0–4.0	
Unstable Cutting		Light Cutting	LS	MT9015	40–85	0.10–0.25	0.2–0.8	
		Medium Cutting	MS	MT9015	40–80	0.15–0.30	0.5–3.0	
		Rough Cutting	RS	MT9015	35–75	0.20–0.35	1.0–4.0	
Ni Based Heat Resistant Alloys (Inconel 718, Hastelloy, WSPALLOY) Co Based Heat Resistant Alloys (Tribaloy, Stellite)		Stable Cutting	Light Cutting	LS	MP9005	30–110	0.10–0.25	0.2–0.8
				MJ	MP9005	30–110	0.07–0.25	0.4–1.5
			Medium Cutting	MS	MP9005	30–100	0.15–0.30	0.5–3.0
	Rough Cutting		RS	MP9015	20–75	0.20–0.35	1.0–4.0	
	General Cutting	Light Cutting	LS	MP9015	25–85	0.10–0.25	0.2–0.8	
			MJ	MP9015	25–85	0.07–0.25	0.4–1.5	
		Medium Cutting	MS	MP9015	25–80	0.15–0.30	0.5–3.0	
			MA	MP9015	25–80	0.10–0.30	0.5–3.0	
	Rough Cutting	RS	MP9015	20–75	0.20–0.35	1.0–4.0		
	Unstable Cutting	Light Cutting	LS	MP9025	20–30	0.10–0.25	0.2–0.8	
			MS	MP9025	20–30	0.15–0.30	0.5–3.0	
		Medium Cutting	MA	MP9025	20–30	0.10–0.30	0.5–3.0	
RS			MP9025	15–25	0.20–0.35	1.0–4.0		

Note 1) When cutting conditions are unstable, please refer to page 3 for recommended chip breaker and grade.

Note 2) Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.

Note 3) MC7015, MC7025 and MP7035 grade are also recommended for precipitation hardening stainless steel.

# ISO Turning Inserts for Difficult-to-cut Materials

## Recommended Cutting Conditions

### Positive Inserts

								(mm)
Workpiece Material	Cutting Conditions	Cutting Area	Chip Breaker	Grade	Cutting Speed (m/min)	Feed per Rev. (mm/rev)	Depth of Cut ap	
<b>M</b> Precipitation Hardening Stainless Steel (JIS SUS 630)	Stable Cutting	Light Cutting	LS	MP9015	105–140	0.06–0.20	0.2–1.0	
		Medium Cutting	MS	MP9015	85–120	0.08–0.25	0.3–2.0	
	General Cutting	Light Cutting	LS	MP9015	105–140	0.06–0.20	0.2–1.0	
		Medium Cutting	MS	MP9015	85–120	0.08–0.25	0.3–2.0	
	Unstable Cutting	Light Cutting	LS	MP9025	70–85	0.06–0.20	0.2–1.0	
		Medium Cutting	MS	MP9025	60–70	0.08–0.25	0.3–2.0	
<b>S</b> Titanium Alloys (Ti-6Al-4V)  Ni Based Heat Resistant Alloys (Inconel 718, Hastelloy, Waspaloy)  Co Based Heat Resistant Alloys (Tribaloy, Stellite)	Stable Cutting	Light Cutting	LS	MT9005	40–80	0.06–0.20	0.2–1.0	
		Medium Cutting	MS	MT9005	35–65	0.08–0.25	0.3–2.0	
	General Cutting	Light Cutting	LS	MT9005	40–80	0.06–0.20	0.2–1.0	
		Medium Cutting	MS	MT9005	35–65	0.08–0.25	0.3–2.0	
	Unstable Cutting	Light Cutting	LS	MT9005	40–80	0.06–0.20	0.2–1.0	
		Medium Cutting	MS	MT9005	35–65	0.08–0.25	0.3–2.0	
	Stable Cutting	Light Cutting	LS	MP9005	25–95	0.06–0.20	0.2–1.0	
		Medium Cutting	MS	MP9005	20–80	0.08–0.25	0.3–2.0	
	General Cutting	Light Cutting	LS	MP9015	20–75	0.06–0.20	0.2–1.0	
		Medium Cutting	MS	MP9015	20–60	0.08–0.25	0.3–2.0	
	Unstable Cutting	Light Cutting	LS	MP9025	15–25	0.06–0.20	0.2–1.0	
		Medium Cutting	MS	MP9025	15–20	0.08–0.25	0.3–2.0	

### RCMT

							(mm)
Workpiece Material	Cutting Conditions	Cutting Area	Grade	Cutting Speed (m/min)	Feed per Rev. (mm/rev)	Depth of Cut ap	
<b>M</b> Precipitation Hardening Stainless Steel (JIS SUS 630)	Stable Cutting	Medium Cutting	MP9015	85–120	0.25–0.45	1.5–3.0	
	General Cutting	Medium Cutting	MP9015	85–120	0.25–0.45	1.5–3.0	
	Unstable Cutting	Medium Cutting	MP9025	60–70	0.25–0.45	1.5–3.0	
<b>S</b> Titanium Alloys (Ti-6Al-4V)  Ni Based Heat Resistant Alloys (Inconel 718, Hastelloy, Waspaloy)  Co Based Heat Resistant Alloys (Tribaloy, Stellite)	Stable Cutting	Medium Cutting	MT9005	35–65	0.25–0.45	1.5–3.0	
	General Cutting	Medium Cutting	MT9005	35–65	0.25–0.45	1.5–3.0	
	Unstable Cutting	Medium Cutting	MT9015	30–60	0.25–0.45	1.5–3.0	
	Stable Cutting	Medium Cutting	MP9005	20–80	0.25–0.45	1.5–3.0	
	General Cutting	Medium Cutting	MP9015	20–60	0.25–0.45	1.5–3.0	
	Unstable Cutting	Medium Cutting	MP9025	15–20	0.25–0.45	1.5–3.0	

Note 1) When cutting conditions are unstable, please refer to page 3 for recommended chip breaker and grade.

Note 2) Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.

Note 3) MC7015, MC7025 and MP7035 grade are also recommended for precipitation hardening stainless steel.

## Precision Negative Inserts

(mm)

Workpiece Material	Cutting Conditions	Cutting Area	Chip Breaker	Grade	Cutting Speed (m/min)	Feed per Rev. (mm/rev)	Depth of Cut $a_p$	
Titanium Alloys (Ti-6Al-4V)	Stable Cutting	Finish Cutting	FS	MT9015	45–95	0.05–0.20	0.1–0.7	
		Light Cutting	LS	MT9015	40–85	0.10–0.25	0.2–0.8	
	General Cutting	Finish Cutting	FS	MT9015	45–95	0.05–0.20	0.1–0.7	
		Light Cutting	LS	MT9015	40–85	0.10–0.25	0.2–0.8	
	Unstable Cutting	Finish Cutting	FS	MT9015	45–95	0.05–0.20	0.1–0.7	
		Light Cutting	LS	MT9015	40–85	0.10–0.25	0.2–0.8	
	Ni Based Heat Resistant Alloys (Inconel 718, Hastelloy, WASPALOY) Co based Heat Resistant Alloys (Tribaloy, Stellite)	Stable Cutting	Finish Cutting	FS	MP9005	60–120	0.05–0.20	0.1–0.7
			Light Cutting	LS	MP9005	55–110	0.10–0.25	0.2–0.8
		General Cutting	Finish Cutting	FS	MP9015	45–95	0.05–0.20	0.1–0.7
			Light Cutting	LS	MP9015	40–85	0.10–0.25	0.2–0.8
		Unstable Cutting	Finish Cutting	FS	MP9025	35–50	0.05–0.20	0.1–0.7
			Light Cutting	LS	MP9025	30–45	0.10–0.25	0.2–0.8

## Precision Positive Inserts

(mm)

Workpiece Material	Cutting Conditions	Cutting Area	Chip Breaker	Grade	Cutting Speed (m/min)	Feed per Rev. (mm/rev)	Depth of Cut $a_p$	
Precipitation Hardening Stainless Steel (JIS SUS 630)	Stable Cutting	Finish Cutting	FS	MP9005	110–150	0.04–0.12	0.2–1.4	
		Light Cutting	LS	MP9015	105–140	0.04–0.15	0.3–3.0	
	General Cutting	Finish Cutting	FS	MP9015	105–140	0.04–0.12	0.2–1.4	
		Light Cutting	LS	MP9015	105–140	0.04–0.15	0.3–3.0	
	Unstable Cutting	Finish Cutting	FS	MP9025	70–85	0.04–0.12	0.2–1.4	
		Light Cutting	LS	MP9025	70–85	0.04–0.15	0.3–3.0	
Titanium Alloys (Ti-6Al-4V)	Stable Cutting	Finish Cutting	FS-P	MT9005	40–80	0.04–0.12	0.2–1.4	
		Light Cutting	LS-P	MT9005	40–80	0.04–0.15	0.3–3.0	
	General Cutting	Finish Cutting	FS-P	MT9005	40–80	0.04–0.12	0.2–1.4	
		Light Cutting	LS-P	MT9005	40–80	0.04–0.15	0.3–3.0	
	Unstable Cutting	Finish Cutting	FS-P	MT9005	40–80	0.04–0.12	0.2–1.4	
		Light Cutting	LS-P	MT9005	40–80	0.04–0.15	0.3–3.0	
	Ni Based Heat Resistant Alloys (Inconel 718, Hastelloy, WASPALOY) Co based Heat Resistant Alloys (Tribaloy, Stellite)	Stable Cutting	Finish Cutting	FS	MP9005	25–95	0.04–0.12	0.2–1.4
			Light Cutting	LS	MP9005	25–95	0.04–0.15	0.3–3.0
		General Cutting	Finish Cutting	FS	MP9015	20–75	0.04–0.12	0.2–1.4
			Light Cutting	LS	MP9015	20–75	0.04–0.15	0.3–3.0
		Unstable Cutting	Finish Cutting	FS	MP9025	15–25	0.04–0.12	0.2–1.4
			Light Cutting	LS	MP9025	15–25	0.04–0.15	0.3–3.0

## For Effective Use of Large Corner Radius

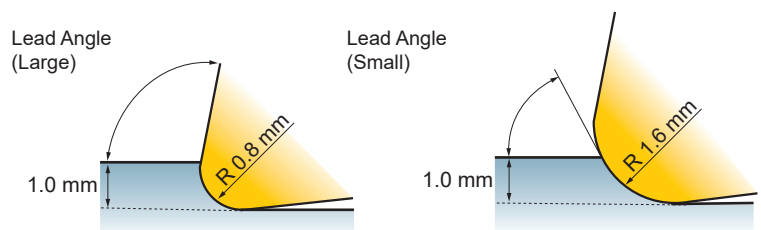
By setting the depth of cut smaller than the corner radius value, notching during cutting of heat resistant alloys can be greatly reduced.

### Corner Radius > 1.5 x Depth of Cut

Depth of cut : 1.0mm. Corner radius over 1.5mm is recommended.

#### Point

A smaller lead angle is the key to reduced notching.



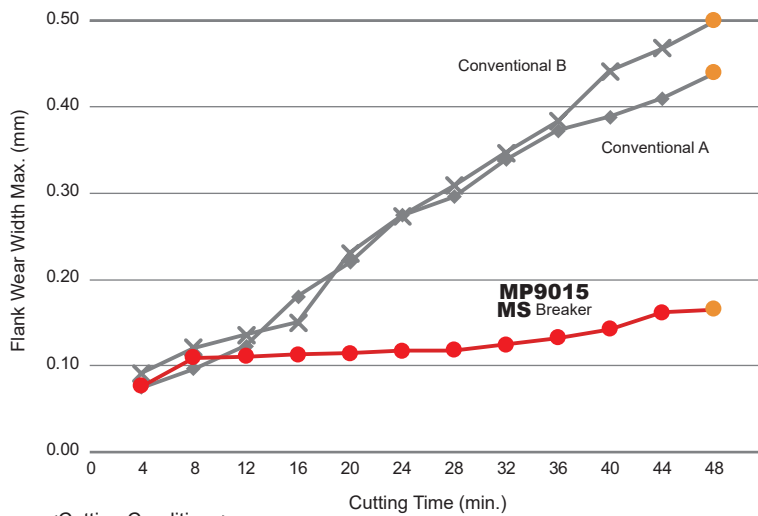
# Memo

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A series of horizontal dashed lines for writing, spanning the width of the page.

## Cutting Performance

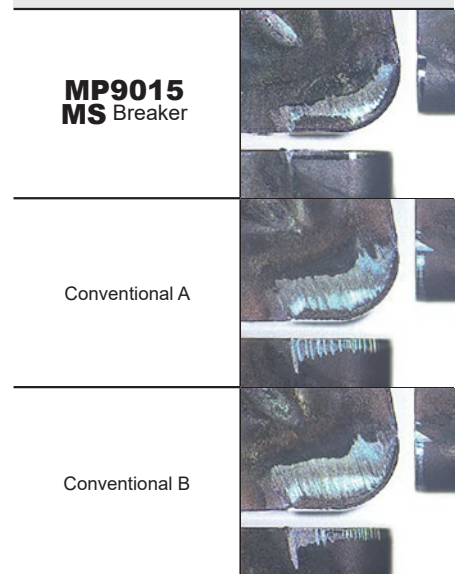
### Comparison in Continuous Machining of Precipitation Hardening Stainless Steel SUS 630



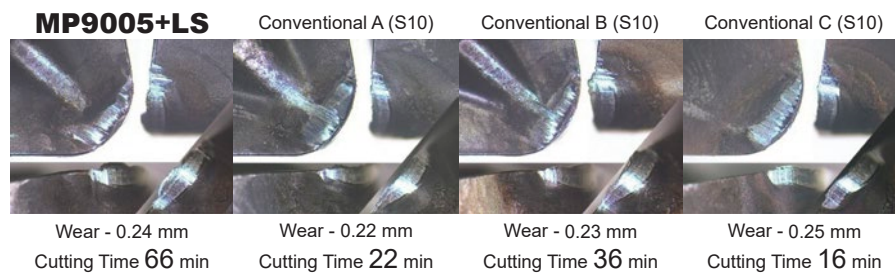
<Cutting Conditions>

Workpiece Material : JIS SUS 630  
 Inserts : CNMG120408-  
 Machining Methods : External Continuous Cutting  
 Cutting Speed :  $vc=120$  m/min  
 Feed per Rev. :  $f=0.2$  mm/rev  
 Depth of Cut :  $ap=1.5$  mm  
 Cutting Mode : Wet Cutting

Cutting Time : 48min (Wear Photo)



### Achieved double tool life when machining Inconel 718 during continuous machining



<Cutting Conditions>

Workpiece Material : Inconel 718  
 Inserts : CNMG120408-  
 Cutting Speed :  $vc=50$  m/min  
 Feed per Rev. :  $f=0.15$  mm/rev  
 Depth of Cut :  $ap=0.5$  mm  
 Cutting Mode : Wet Cutting

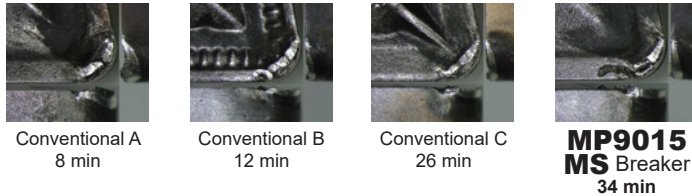
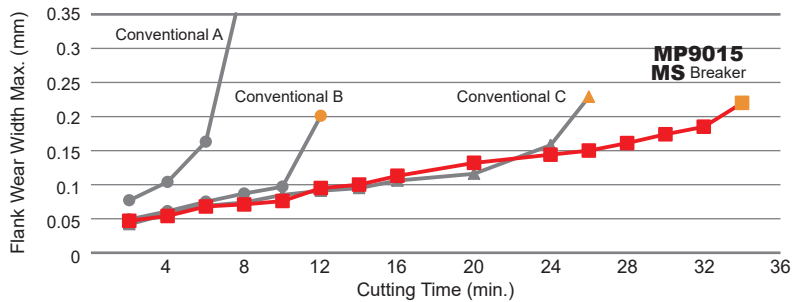
### Comparison of Wear Resistance by Work Material

Materials and Cutting Conditions	Chip Breaker	Conventional A	Conventional B
<b>Workpiece Material : Co-Cr-Mo Alloy</b> Inserts : DCGT11T304M-LS Grade : MP9005 Cutting Speed : $vc=40$ m/min Feed per Rev. : $f=0.05$ mm/rev Depth of Cut : $ap=0.2$ mm Cutting Mode : Wet Cutting (Water-soluble) Machine : CNC Automatic Lathes Cutting Time : 12 min.			
<b>Workpiece Material : Inconel 718</b> Inserts : DCGT11T304M-LS Grade : MP9015 Cutting Speed : $vc=60$ m/min Feed per Rev. : $f=0.05$ mm/rev Depth of Cut : $ap=0.5$ mm Cutting Mode : Wet Cutting (Water-soluble) Machine : CNC Automatic Lathes Cutting Time : 20 min.			
<b>Workpiece Material : Ti-6Al-4V ELI</b> Inserts : DCGT11T304M-LS-P Grade : MT9005 Cutting Speed : $vc=80$ m/min Feed per Rev. : $f=0.05$ mm/rev Depth of Cut : $ap=3.0$ mm Cutting Mode : Wet Cutting (Water-insoluble) Machine : Automatic Lathes			
	35 Pieces (Non-coat)	35 Pieces (PVD)	15 Pieces (PVD)



## Cutting Performance

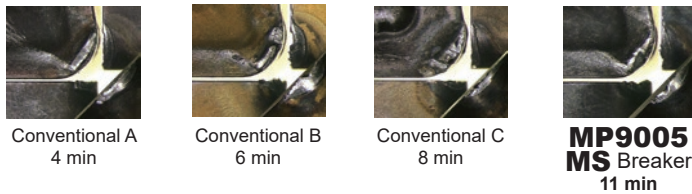
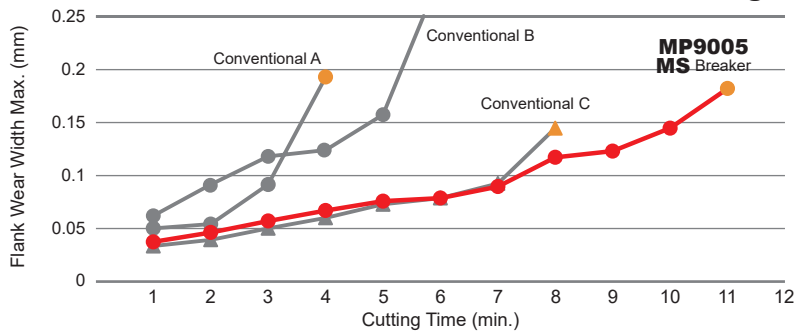
### Inconel 718, $vc=60$ m/min Continuous Machining



**Tool Life Increase 28%**

<Cutting Conditions>  
 Workpiece Material : Inconel 718  
 Inserts : CNMG120408-  
 Cutting Speed :  $vc=60$  m/min  
 Feed per Rev. :  $f=0.15$  mm/rev  
 Depth of Cut :  $ap=0.75$  mm  
 Cutting Mode : Wet Cutting

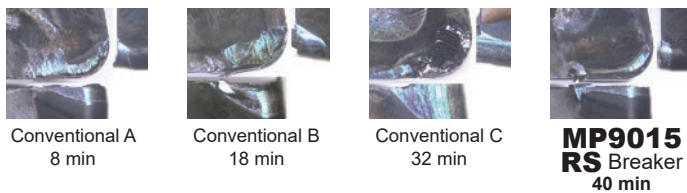
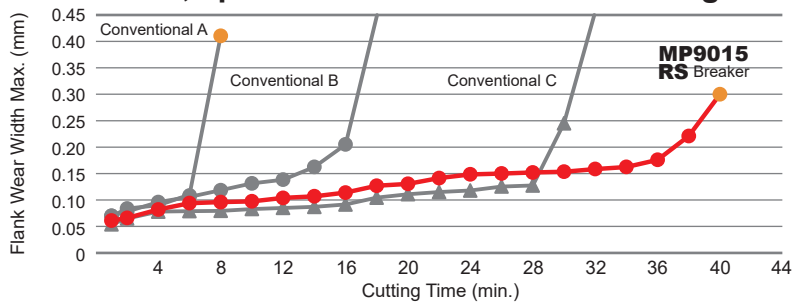
### Inconel 718, $vc=100$ m/min Continuous Machining



**Tool Life Increase 37%**

<Cutting Conditions>  
 Workpiece Material : Inconel 718  
 Inserts : CNMG120408-  
 Cutting Speed :  $vc=100$  m/min  
 Feed per Rev. :  $f=0.15$  mm/rev  
 Depth of Cut :  $ap=0.5$  mm  
 Cutting Mode : Wet Cutting

### Inconel 718, $ap=2.0$ mm Continuous Machining

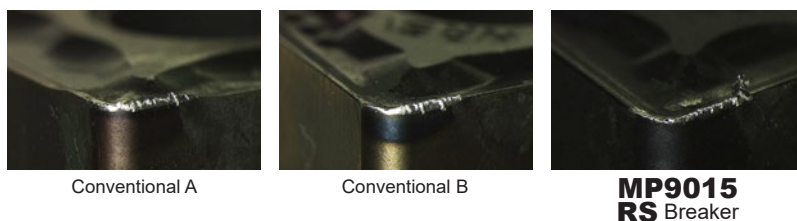


**Tool Life Increase 33%**

<Cutting Conditions>  
 Workpiece Material : Inconel 718  
 Inserts : CNMG120408-  
 Cutting Speed :  $vc=40$  m/min  
 Feed per Rev. :  $f=0.2$  mm/rev  
 Depth of Cut :  $ap=2.0$  mm  
 Cutting Mode : Wet Cutting

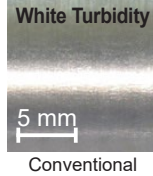
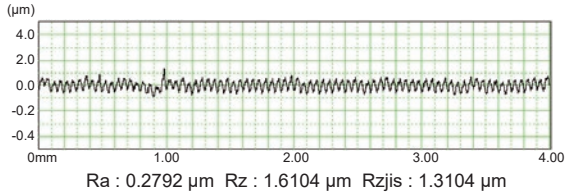
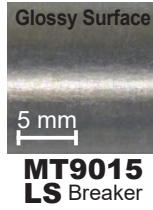
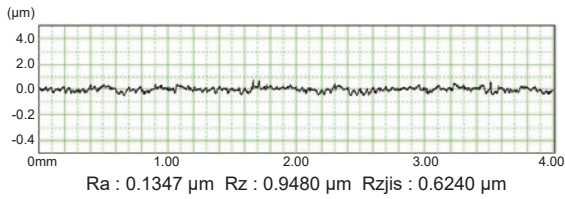
### WASPALLOY Continuous Machining

MP9015 with RS breaker displayed the least damage.



<Cutting Conditions>  
 Workpiece Material : WASPALLOY  
 Inserts : CNMG120408-  
 Cutting Speed :  $vc=29$  m/min  
 Feed per Rev. :  $f=0.22$  mm/rev  
 Depth of Cut :  $ap=4.0$  mm  
 Cutting Time : 7 min  
 Cutting Mode : Wet Cutting

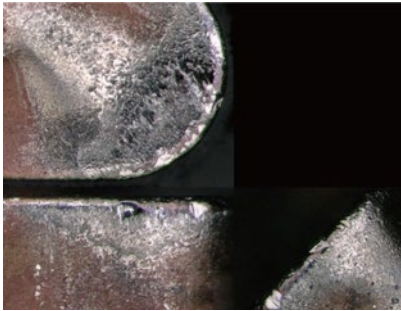
## Titanium Alloy, Comparison of Surface Finish (Depth of Cut : 0.25 mm)



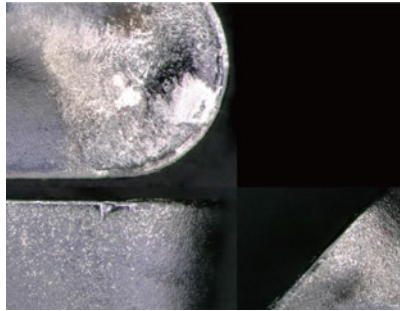
<Cutting Conditions>

Workpiece Material : Ti-6Al-6V(325HB)  
 Inserts : CNMG120408-  
 Cutting Speed : vc=70 m/min  
 Feed per Rev. : f=0.05 mm/rev  
 Depth of Cut : ap=0.25 mm  
 Cutting Mode : Wet Cutting

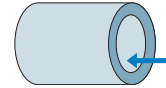
## MP9015 with LS breaker displayed the least damage.



Conventional



MP9015 LS Breaker



<Cutting Conditions>

Workpiece Material : Heat Resistant Cast Steel  
 Inserts : DCMT11T304-  
 Cutting Speed : vc=100 m/min  
 Feed per Rev. : f=0.1 mm/rev  
 Depth of Cut : ap=0.25 mm  
 Cutting Mode : Wet Cutting

## Chip Control when Back Turning

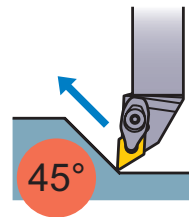
Non-tangling of chips when back turning Inconel 718.



MS Breaker  
New Design



Conventional



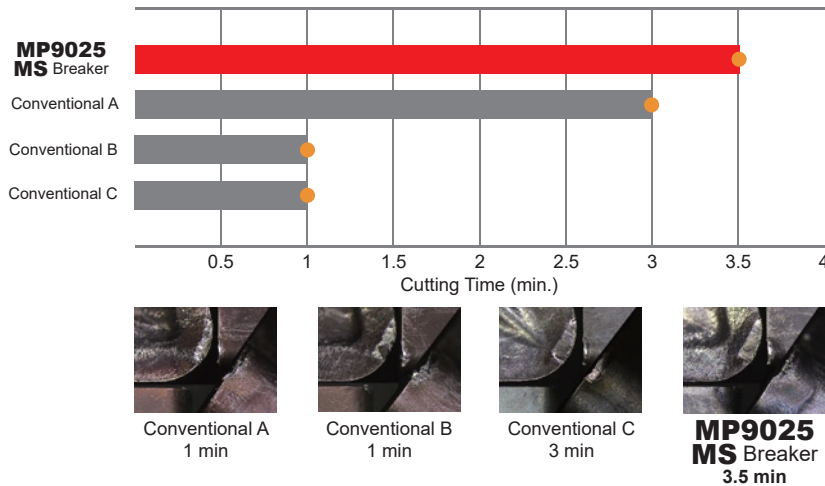
<Cutting Conditions>

Workpiece Material : Inconel 718  
 Inserts : DNMG150408-  
 Cutting Speed : vc=40 m/min  
 Feed per Rev. : f=0.2 mm/rev  
 Depth of Cut : ap=1.0 mm  
 Cutting Mode : Wet Cutting

# ISO Turning Inserts for Difficult-to-cut Materials

## Cutting Performance

### Inconel 718, $vc=30$ m/min Interrupted Machining



<Cutting Conditions>

Workpiece Material : Inconel 718  
 Inserts : CNMG120408-○○  
 Cutting Speed :  $vc=30$  m/min  
 Feed per Rev. :  $f=0.10$  mm/rev  
 Depth of Cut :  $ap=0.25$  mm  
 Cutting Mode : Wet Cutting

**Tool Life Increase 16%**

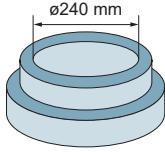
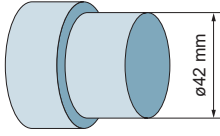
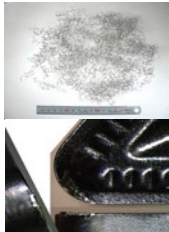

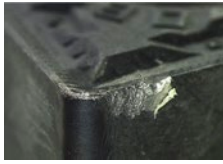

## Application Examples

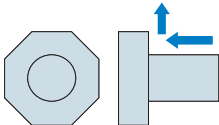
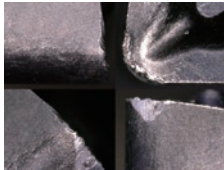
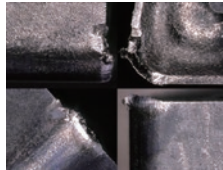
Inserts (Grade)		DCGT11T304M-LS (MP9015)	DCGT11T302M-LS (MP9015)
Workpiece		JIS SUS 430 (Forgings)	JIS SUS 630 (17-4PH)
Cutting Conditions	Cutting Speed $vc$ (m/min)	80	60
	Feed per Rev. $f$ (mm/rev)	0.08	0.04
	Depth of Cut $ap$ (mm)	0.3	0.3
Cutting Mode		Wet Cutting (Water-insoluble Coolants)	Wet Cutting (Water-insoluble Coolants)
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 stable machining to be performed. It also exhibited excellent wear conditions after turning.	Even when machining at 1.5 times the conditions of conventional products, dimensional tolerances and surface finishes were maintained. Wear was minimal, therefore machining could continue and cost reductions were realised.

Inserts (Grade)		DCGT11T302M-FS-P (MT9005)	DCGT070201M-FS (MP9015)
Workpiece		Ti-6Al-4V ELI	JIS SUS 304
Cutting Conditions	Cutting Speed $vc$ (m/min)	65	80
	Feed per Rev. $f$ (mm/rev)	0.06	0.05
	Depth of Cut $ap$ (mm)	0.75	0.3
Cutting Mode		Wet Cutting (Water-insoluble Coolants)	Wet Cutting (Water-insoluble Coolants)
Machine		CNC Automatic Lathes	CNC Automatic Lathes
Results		Compared to conventional PVD coated products, the MT9005 uncoated grade provided exceptional surface finishes even after double the number of components. Wear was minimal, therefore machining could continue.	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 normal cutting speeds.

The above application examples are customer's applications, so it can be different from the recommended conditions.

## Application Examples

Inserts (Grade)		<b>DNMG150408-MS (MP9005)</b>	<b>CNMG120408-RS (MP9015)</b>
Workpiece	Inconel 718 (Ni Based Heat Resistant Alloy)	 <p>45HRC Ageing Treatment</p>	
	HAYNES Alloy 25 (Co Based Heat Resistant Alloy)		
Component	Disk - Aerospace Component	Cover Plate - Aerospace Component	
Application	Internal Turning	External Turning	
Cutting Conditions	Cutting Speed <b>vc</b> (m/min)	60	34
	Feed per Rev. <b>f</b> (mm/rev)	0.15	0.20
	Depth of Cut <b>ap</b> × <b>ae</b> (mm)	0.25 × 15	1.5 × 42 (3 Pass)
Cutting Mode	Wet Cutting	Wet Cutting	
Results	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Conventional (S10)</p>  </div> <div style="text-align: center;"> <p><b>MP9005+MS</b></p>  </div> </div> <p>MP9005 - Enabled stable machining with less wear, longer tool life and without chip tangling.</p>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Conventional (S10)</p>  </div> <div style="text-align: center;"> <p><b>MP9015+RS</b></p>  </div> </div> <p>The MP9015 grade did show some notch wear but it was much less than the conventional grade that wore enough to expose the substrate.</p>	

Inserts (Grade)		<b>CNMG120408-MA (MP9025)</b>
Workpiece	Inconel 718	
Component	Flange	
Application	External Turning and Facing	
Cutting Conditions	Cutting Speed <b>vc</b> (m/min)	35
	Feed per Rev. <b>f</b> (mm/rev)	0.15
	Depth of Cut <b>ap</b> (mm)	0.5
Cutting Mode	Wet Cutting	
Results	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Conventional</p>  <p>1 Piece</p> </div> <div style="text-align: center;"> <p><b>MP9025</b></p>  <p>2.5 Pieces</p> </div> </div> <p>An MP9025 grade insert completed 2.5 components whereas a conventional grade fractured during machining of the first component.</p>	

The above application examples are customer's applications, so it can be different from the recommended conditions.



ISO Turning Inserts for Difficult-to cut Materials

# MP9005/MP9015/MP9025 MT9005/MT9015

## Environmentally Friendly Product

This product has been certified as an environmentally friendly product in the machine tool industry by the Japan Cutting & Wear-resistant Tool Association. This is a product unique to the industry, in harmony with the environment, and with the aim of fulfilling the social responsibilities of the machine tool industry.

The Japan Cutting & Wear-resistant Tool Association evaluates the product's environmental impact during the manufacturing and usage stages and issues a certification according to the evaluation score.



## MP9025

Subject : Negative Inserts (M Class)

## For People, Society and the Earth

More information about MITSUBISHI MATERIALS' efforts to address social and environmental issues can be found in the website below or by scanning the QR code.

<https://mmc.disclosure.site/en/>



### 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.

## MITSUBISHI MATERIALS CORPORATION

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(Tools specifications subject to change without notice.)