MITSUBISHI MATERIALS

MS6015/MS7025/ MS9025

MS SERIES - PVD COATED GRADES FOR HIGH PRECISION AND SMALL PARTS MACHINING

TOOL NEWS **B275A**

Transformation of Machining on Swiss-Type Automatic Lathes

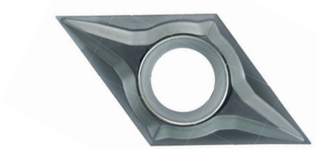
The first parts to be machined on swiss-type automatic lathes were watch components. Their use soon expanded to machining electrical parts for home appliances, printers as well as automobile component applications such as sensors and electrification technology parts. The high precision capability of swiss-type lathes has also lent itself to the machining of parts essential to daily life. These parts include robotic and medical implants as well as simple, but essential, parts for water taps. Expanding the type of applications is not the only modern advancement, even higher precision, productivity and quality has become necessary.

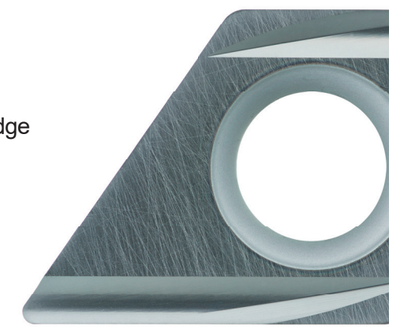
Due to changes in materials and component geometries, various problems have arisen that need solutions:

- Complex workpiece shapes
- Ever more difficult-to-cut materials
- Tighter dimensional tolerances

MITSUBISHI MATERIALS is committed to product development and the commercialization of new tools that have the cutting capability and machine tool adaptability that customers desire.

- Development of new coatings adapted to workpiece materials and machining methods
- Optimization of welding, wear and fracture resistance
- High precision machining enabled by developments of high quality cutting edge geometries





MS Series - PVD Coated Grades for High Precision and Small Parts Machining

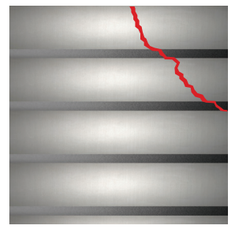
MS7025

Dramatically improved welding and wear resistance in low feed machining with a more precise nano-multilayer coating

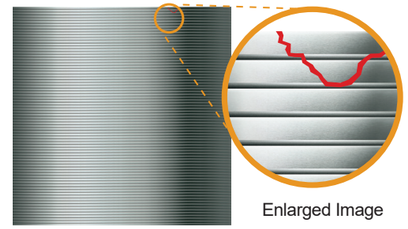
Features

Nano-Multilayer Coating

By combining the high lubrication layer with excellent welding resistance, and the high hardness layer with a greater wear resistance that suppresses the progress of wear at the nano-level, the film damage is significantly reduced and the welding and wear resistance are dramatically improved.



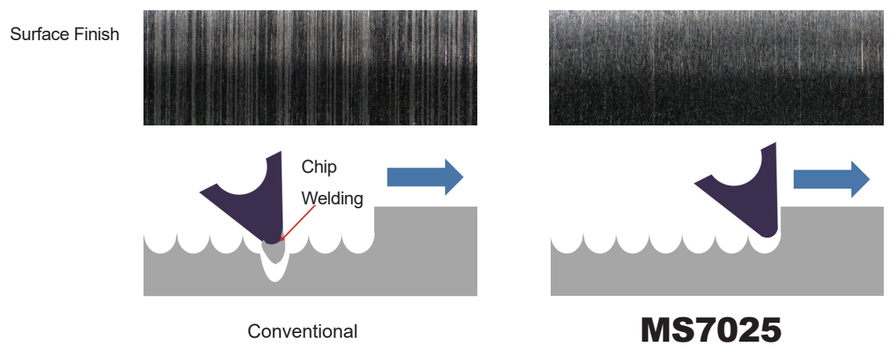
Conventional Multilayer Coating



Nano-multilayer Coating

Effects of the High Lubrication Layer

The nano-level, high lubrication layer suppresses built-up edge caused by chip welding which tends to occur in low feed machining and in addition reduces machining marks on the component surface.

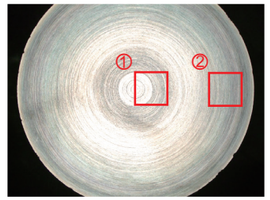


Cutting Performance

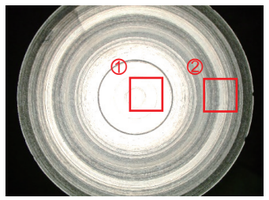
Comparison of End Face Machined Surfaces Using 3D Analysis

Achieves stable machining even during end face machining where the cutting speed is liable to change.

Material : AISI 1045

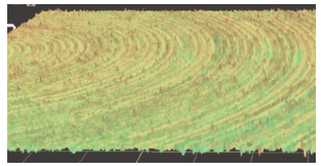


MS7025

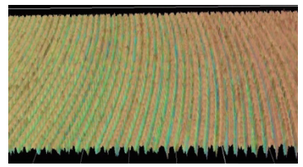


Conventional

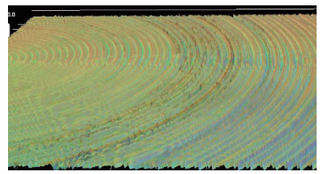
①

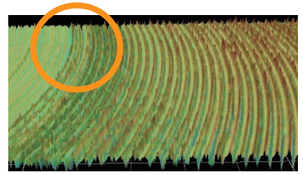


②



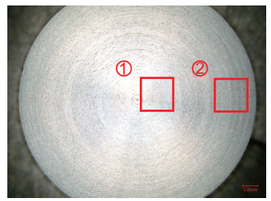
Good Surface Finish



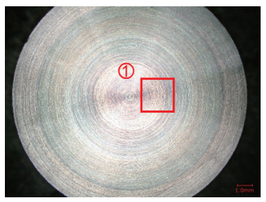


Changes in surface quality caused by machining marks

Material : AISI 304



MS7025

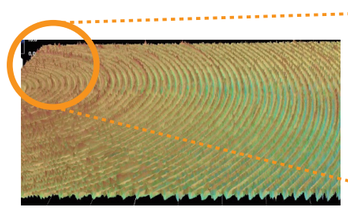


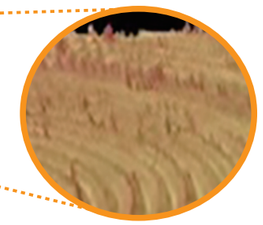
Conventional

①

②

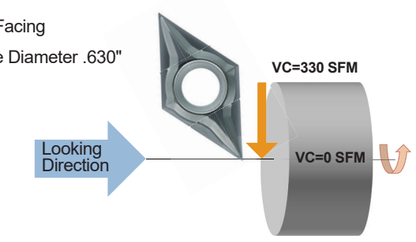
Good Surface Finish





Roughness can occur in the low speed area (near the center)

Image of Facing
Workpiece Diameter .630"

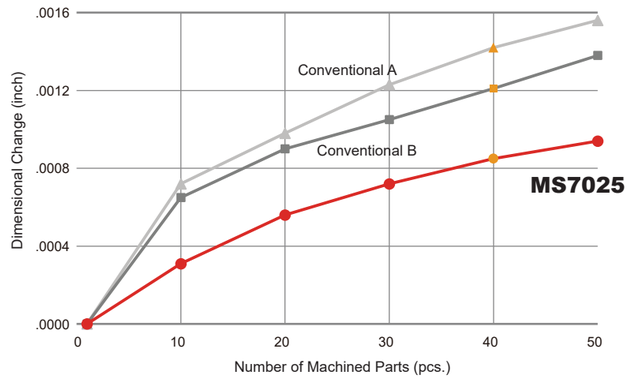


<Cutting Conditions>
Material : Notation Above
Inserts : DCGT32.50.5
Cutting Speed : vc = Max. 330 SFM
Feed per Rev. : f = .0008 IPR
Depth of Cut : ap = .008 inch
Cutting Mode : Wet Cutting (Oil)

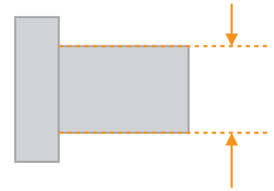
Comparison of Dimensional Change in Low Feed Machining

When machining at low feed rate conditions, dimensional changes are reduced and the quality of the machined surface is improved.

Material : AISI 440C

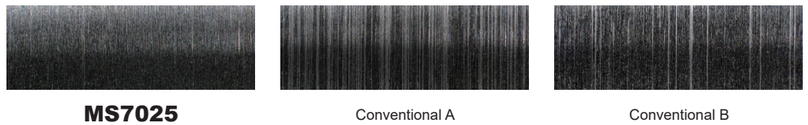


Dimensional Change
The amount of dimensional change is based on the first component machined



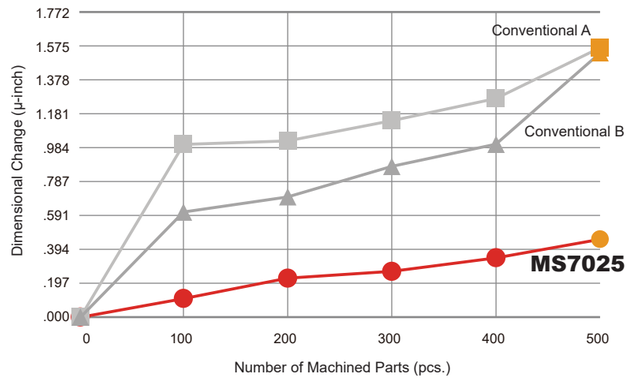
<Cutting Conditions>
Material : AISI 440C
Inserts : DCGT32.50.2
Cutting Speed : vc = 230 SFM
Feed per Rev. : f = .0008 IPR
Depth of Cut : ap = .059 inch
Cutting Mode : Wet Cutting (Oil)

After 40 pieces machining



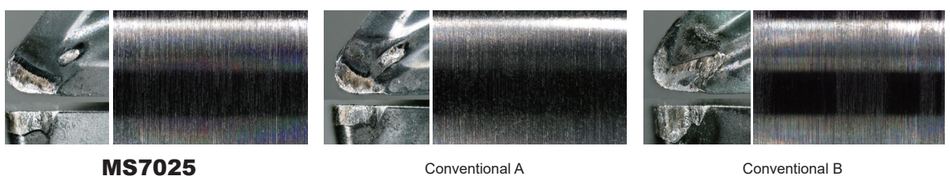
MS7025 Conventional A Conventional B

Material : ELCH2S



<Cutting Conditions>
Material : ELCH2S
Inserts : DCGT32.50.5
Cutting Speed : vc = 785 SFM
Feed per Rev. : f = .0012 IPR
Depth of Cut : ap = .012 inch
Workpiece Material Length : .591 inch
Cutting Mode : Wet Cutting (Oil)

After 500 pieces machining



MS7025 Conventional A Conventional B

MS Series - PVD Coated Grades for High Precision and Small Parts Machining

MS9025

Effective reduction of notch wear with a balance of wear and fracture resistance.

Features

Improved Cemented Carbide

Thermal conductivity has been improved by optimizing the grain size and therefore reducing the boundary contact between the WC particles. This optimization reduces the temperature of the cutting edge during machining.

MS9025

Reducing the cutting edge temperature with improved thermal conductivity.

Conventional

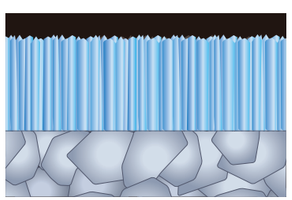
Higher cutting edge temperatures due to more particle boundary contact.

Smooth Surface of The Coating

The even surface of the coating has been achieved by first making the the carbide substrate smooth, then by promoting straight growth of the coating crystals. This leads to excellent welding resistance.

*By Image

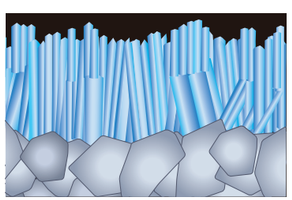
MS9025



Smooth Cemented Carbide

Straight crystal growth.
Smooth carbide surface.
Excellent welding resistance.

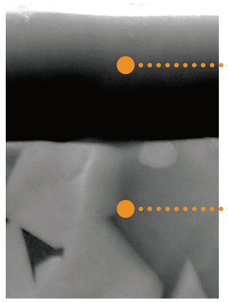
Conventional



Rough Cemented Carbide

Random crystal growth direction.
Performance is variable due to defects and voids in the surface.

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

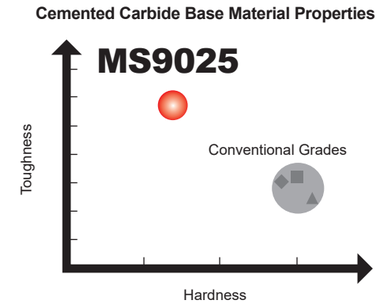


Al-rich (Al,Ti)N

Superior Flank Wear Resistance
Superior Crater Wear Resistance
Excellent Welding Resistance

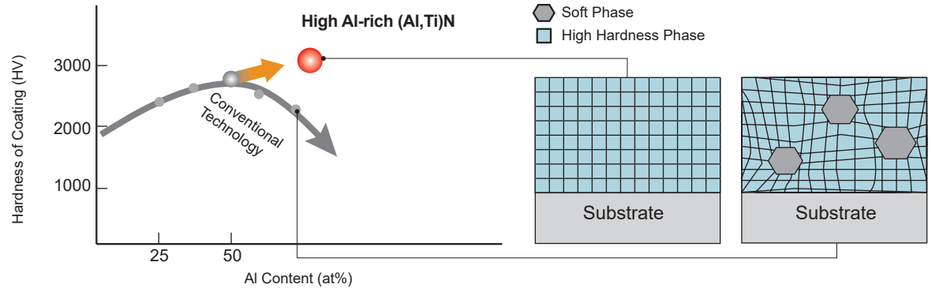
Special Cemented Carbide for MS9025

Superior Fracture Resistance
Excellent Chipping Resistance



High Al and Conventional Coating Comparison

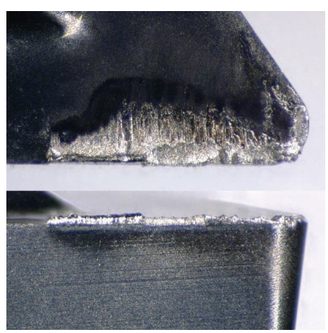
The high Al-rich (Al,Ti)N single layer coating provides stabilization of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance.



Stainless Steel AISI 304, Cutting Edge Comparison

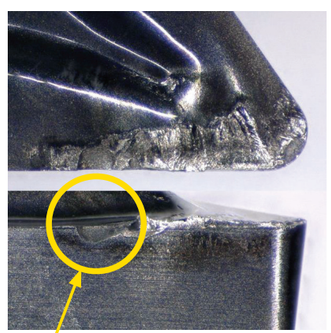
After machining 500 parts

MS9025



VB=.001 inch

Conventional



Notch Wear

VB=.003 inch

<Cutting Conditions>

Material	: AISI 304
Inserts	: DCGT32.50.5
Machining Methods	: External Continuous Cutting
Cutting Speed	: vc =185 SFM
Feed per Rev.	: fr=.0012 IPR
Depth of Cut	: Rough ap =.002 inch Finish ap =.001 inch
Cutting Mode	: Wet Cutting (Oil)

MS Series - PVD Coated Grades for High Precision and Small Parts Machining

MS6015

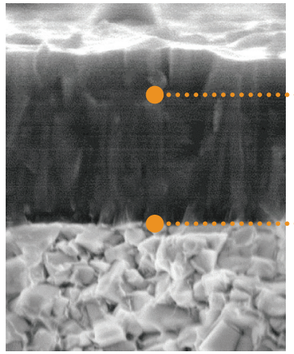
Ideal for turning pure iron, carbon and free cutting steels while also providing excellent dimensional accuracy and good surface finishes.

Features

The unique combination of a special carbide substrate and a new PVD coating that greatly improves wear resistance.

	MS6015	Conventional
Coating	TiCN Multilayer	TiAlN
Hardness (HV)	3000	2800
Wear Coefficient (Carbon steel)	Low	High
Base Material Hardness (HRA)	92.0	92.0
T.R.S (GPa)	2.0	2.0

Ti-C-N Multilayer Coating



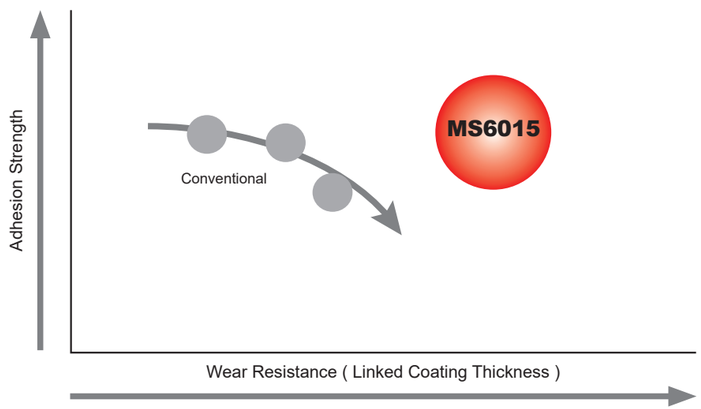
Demonstrates superior wear and welding resistance and provides the best possible results for carbon steel.

Micro multi-layers greatly improves adhesion between the coating layers.

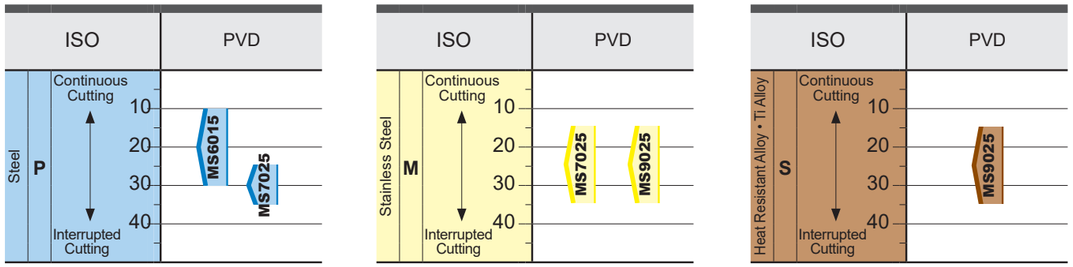
Excellent chip discharge with a reduced coefficient of friction creates a stable component surface finish.

Optimizing the Laminated Structure

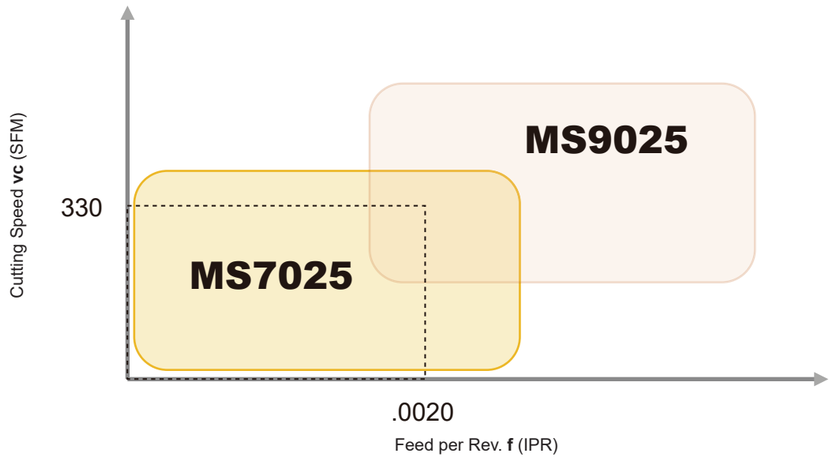
Optimizing the laminated structure enables thickening of the coating which leads to a significant improvement of wear resistance.



Application Range



Application range for Machining Stainless Steel



PVD Coated Grade for High Precision and Small Parts Machining

MS6015/MS7025/MS9025

Ideal Inserts for Turning Small Parts.

Set the corner radius to a minus tolerance.

Order Number

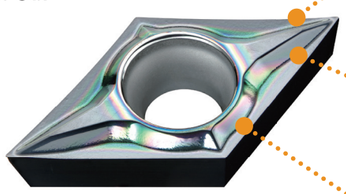
DCGT32.50.5 M R-SN → **50.5M R.008 inch (R.006-R.008 inch)**
DCGT32.51 M -SMG → **51M R.016 inch (R.014-R.016 inch)**

New Chipbreaker System for Front Turning

FS-P, LS-P

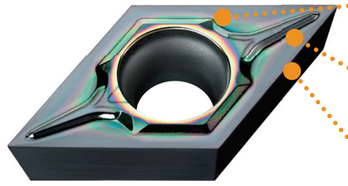
For Micro-Low Depth of Cut

FS-P



For Medium to High Depth of Cut

LS-P



Curved Cutting Edge

The curved cutting edge reduces cutting resistance and enables smooth chip evacuation. It also enables good initial entry to the workpiece and resists vibration and oscillation during machining.

High Chipbreaker Wall

The high chipbreaker wall ensures that the chips separate properly and prevents the workpiece from being damaged when chips are discharged.

Polishing (Mirror-Surface)

Welding resistance and chip evacuation are greatly improved.

Large Pocket

The large pocket enhances chip evacuation during high depths of cut and suppresses chip clogging.

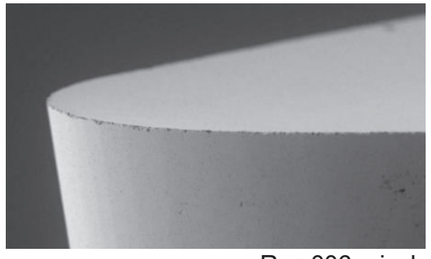
Parallel Cutting Edge

The parallel cutting edge greatly improves fracture resistance during high depths of cut.

Extremely High Quality Cutting Edge

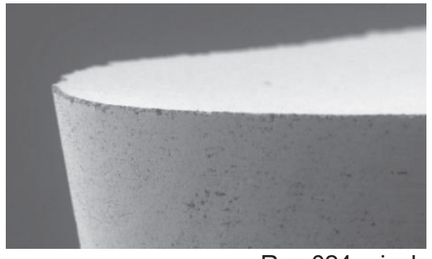
Technology that provides superior dimensional stability and reduces burrs.

MS9025



Rz=.006 µ-inch

Conventional



Rz=.024 µ-inch

New Technology - Controlled Vibration of the Cutting Tool

Using new machine technology to deliberately vibrate the tool in relation to the cutting direction is an effective way of breaking chips.
This reduces production costs by reducing chip entanglement.

Without controlled vibration

With controlled vibration
frequency = 0.5/rev.

With controlled vibration
frequency = 1.5/rev.

Challenge of controlled vibration machining:
Compared to standard machining there is a greater chance of edge chipping due to the extra stress on the cutting edge and the impact of work hardening.

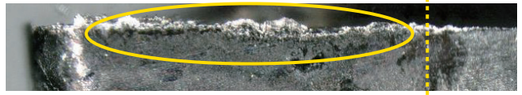
Benefits of using MS9025 for Controlled Vibration Machining

1. Excellent fracture resistance due to the inherent toughness of the base material.
2. Effectively suppresses boundary wear damage during machining of difficult-to-cut materials. This is achieved by the optimized cemented carbide grain size that reduces thermal conductivity and heating of the cutting edge.

After 500 passes at 49 feet per pass

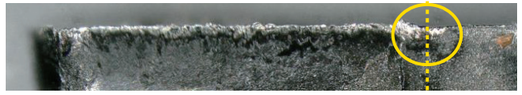
MS9025

Conventional A



Damage across the whole cutting edge.

Conventional B



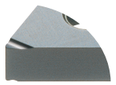
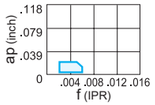
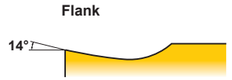
Boundary damage.

<Cutting Conditions>

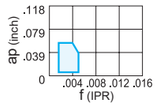
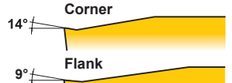
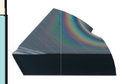
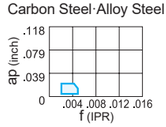
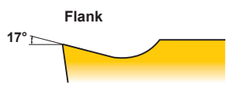
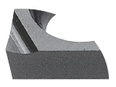
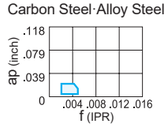
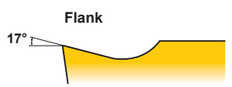
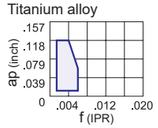
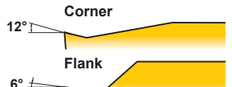
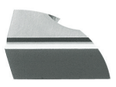
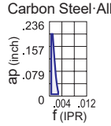
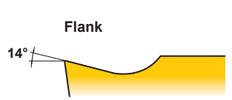
Material	: AISI 304
Inserts	: DCGT32.50.5M
Cutting Speed	: vc =330 SFM
Feed per Rev.	: fr=.0031 IPR
Depth of Cut	: ap =.039 inch
The Number of Vibration	: Mode 1
Cutting Mode	: External Continuous Cutting Wet Cutting (Oil)

Chipbreaker System

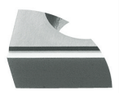
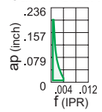
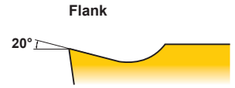
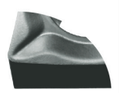
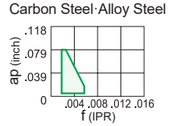
Negative Inserts

Application	Tolerance	Chipbreaker Name and Picture	Features	Cross Section Geometry
Finish Cutting	G	**R/L-FS** 	**Precise finishing** Double-sided chipbreaker. A narrow angled chipbreaker for good control. The sharp edge produces a good surface finish.	Carbon Steel·Alloy Steel   TNGG331LFS

Positive Inserts

Application	Tolerance	Chipbreaker Name and Picture	Features	Cross Section Geometry
Finish Cutting	G	**FS-P** 	**First recommendation for finishing titanium alloys** Ideal for Cobalt chromium alloy and Copper alloy. The sharp edge produces a good surface finish. The curved edge allows smooth chip discharge. Lapping of the top surface gives a mirror finish for improved welding resistance.	Titanium alloy   CCGT32.50.5FS-P
	E G	**R/L-SRF** 	**Finish Cutting - Automatic Lathe Machining** Lead chipbreaker controls chip flow. Sharp cutting edge gives a good surface finish.	Carbon Steel·Alloy Steel   DCGT32.50.2MLSRF
	G	**R/L-F** 	**Chipbreaker for finishing** Lead chipbreaker controls chip flow. Sharp cutting edge gives a good surface finish.	Carbon Steel·Alloy Steel   CCGT03S102L-F
Light Cutting	G	**LS-P** 	**First recommendation for light cutting of titanium alloys** Ideal for titanium alloys and copper alloys. Parallel cutting edge. Achieves stable chip control in a wide range of areas from low to medium depth of cut. Lapping of the top surface gives a mirror finish for improved welding resistance.	Titanium alloy   CCGT32.51MLS-P
	G	**R/L-SS** 	**Chipbreaker for light cutting of automatic lathe machining** A parallel chipbreaker. Excellent chip control at low feed rates.	Carbon Steel·Alloy Steel   CCGT32.50.5RSS

Positive Inserts

Application	Tolerance	Chipbreaker Name and Picture	Features	Cross Section Geometry
Medium Cutting	G	**R/L-SN** 	**General purpose for swiss-type lathe machining** The parallel chipbreaker. Excellent chip control for low to medium feed rates.	Carbon Steel·Alloy Steel   CCGT32.5V3RSN
	G	**SMG** 	**Medium cutting for swiss-type lathes machining** 3D molded chipbreaker provides good chip control. G class insert gives sharp cutting action, allowing high precision machining. Chipbreaker geometry appropriate for copying and back turning. M = minus radius tolerance	Carbon Steel·Alloy Steel   CCGT32.51MSMG

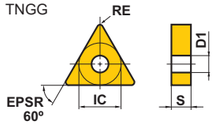
MS6015/MS7025/MS9025

Negative Inserts (With Hole)

G Class

Finish		
R/L-FS		

TNGG



(inch)

Order Number	Cutting Area	MS6015	MS7025	MS9025	IC	S	RE	D1
TNGG330.5RFS	F	●			.375	.187	.008	.150
TNGG330.5LFS	F	●			.375	.187	.008	.150
TNGG331RFS	F	●			.375	.187	.016	.150
TNGG331LFS	F	●			.375	.187	.016	.150
TNGG332RFS	F	●			.375	.187	.031	.150
TNGG332LFS	F	●			.375	.187	.031	.150

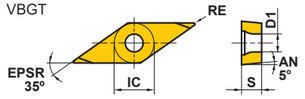
● : USA Stock ★ : Stocked in Japan
(10 inserts in one case)

5° Positive Inserts (With Hole)

G Class

Finish		
FS-P		

VBGT



(inch)

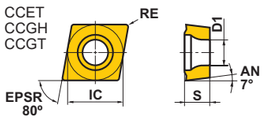
Order Number	Cutting Area	MS6015	MS7025	MS9025	IC	S	RE	D1
VBGT220.2MFS-P	F			★	.250	.125	.004	.114
VBGT220.5MFS-P	F			●	.250	.125	.008	.114
VBGT221MFS-P	F			●	.250	.125	.016	.114
VBGT330.2MFS-P	F			●	.375	.187	.004	.173
VBGT330.5MFS-P	F			●	.375	.187	.008	.173
VBGT331MFS-P	F			●	.375	.187	.016	.173
VBGT332MFS-P	F			●	.375	.187	.031	.173

MS6015/MS7025/MS9025

7° Positive Inserts (With Hole)

E, G Class

Finish	Finish	Finish
FS-P	R/L-SRF	R/L-F
		



(inch)

Order Number	Cutting Area	MS6015	MS7025	MS9025	IC	S	RE*2	D1
CCGT21.50.2MFS-P	F		●	●	.250	.094	.004	.110
CCGT21.50.5MFS-P	F		●	●	.250	.094	.008	.110
CCGT21.51MFS-P	F		●	●	.250	.094	.016	.110
CCGT32.50.2MFS-P	F		●	●	.375	.156	.004	.173
CCGT32.50.5MFS-P	F		●	●	.375	.156	.008	.173
CCGT32.51MFS-P	F		●	●	.375	.156	.016	.173
CCET21.50.2MRSRF	F			●	.250	.094	.004	.110
CCET21.50.2MLSRF	F			●	.250	.094	.004	.110
CCET21.50.5MRSRF	F			●	.250	.094	.008	.110
CCET21.50.5MLSRF	F			●	.250	.094	.008	.110
CCET21.51MRSRF	F			★	.250	.094	.016	.110
CCET21.51MLSRF	F			★	.250	.094	.016	.110
CCET32.50.2MRSRF	F			●	.375	.156	.004	.173
CCET32.50.2MLSRF	F			●	.375	.156	.004	.173
CCET32.50.5MRSRF	F			●	.375	.156	.008	.173
CCET32.50.5MLSRF	F			●	.375	.156	.008	.173
CCET32.51MRSRF	F			●	.375	.156	.016	.173
CCET32.51MLSRF	F			★	.375	.156	.016	.173
CCGT03S101MR-F	F	●			.141	.055	.004	.079
CCGT03S101ML-F	F	●			.141	.055	.004	.079
CCGT03S102MR-F	F	●			.141	.055	.008	.079
CCGT03S102ML-F	F	●			.141	.055	.008	.079
CCGT03S104MR-F	F	●			.141	.055	.016	.079
CCGT03S104ML-F	F	●			.141	.055	.016	.079
CCGT04T001MR-F	F	●			.172	.070	.004	.094
CCGT04T001ML-F	F	●			.172	.070	.004	.094
CCGT04T002MR-F	F	●			.172	.070	.008	.094
CCGT04T002ML-F	F	●			.172	.070	.008	.094
CCGT04T004MR-F	F	●			.172	.070	.016	.094
CCGT04T004ML-F	F	●			.172	.070	.016	.094
CCGH21.50.5MRF	F	●			.250	.094	.008	.110
CCGH21.50.5MLF	F	●			.250	.094	.008	.110
CCGH21.51MRF	F	●			.250	.094	.016	.110
CCGH21.51MLF	F	●			.250	.094	.016	.110

★1 Diameter of inscribed circle is non-ISO standard. (For SCLC type)

★2 Nominal Value (Max.)

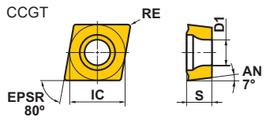
● = NEW

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

7° Positive Inserts (With Hole)

G Class

Light	Light	Medium
LS-P	R/L-SS	R/L-SN
		
Medium		
SMG		
		



(inch)

Order Number	Cutting Area	MS6015	MS7025	MS9025	IC	S	RE*	D1
CCGT21.5V5MLS-P	L			★	.250	.094	.002	.110
CCGT21.50.2MLS-P	L	●	●	●	.250	.094	.004	.110
CCGT21.50.5MLS-P	L	●	●	●	.250	.094	.008	.110
CCGT21.51MLS-P	L		●	●	.250	.094	.016	.110
CCGT32.50.2MLS-P	L	●	●	●	.375	.156	.004	.173
CCGT32.50.5MLS-P	L	●	●	●	.375	.156	.008	.173
CCGT32.51MLS-P	L	●	●	●	.375	.156	.016	.173
CCGT21.50.2MRSS	L	●			.250	.094	.004	.110
CCGT21.50.2MLSS	L	●			.250	.094	.004	.110
CCGT21.50.5MRSS	L	●			.250	.094	.008	.110
CCGT21.50.5MLSS	L	●			.250	.094	.008	.110
CCGT32.50.2MRSS	L	●			.375	.156	.004	.173
CCGT32.50.2MLSS	L	●			.375	.156	.004	.173
CCGT32.50.5MRSS	L	●			.375	.156	.008	.173
CCGT32.50.5MLSS	L	●			.375	.156	.008	.173
CCGT32.51MRSS	L	●			.375	.156	.016	.173
CCGT32.51MLSS	L	●			.375	.156	.016	.173
CCGT21.50.2MRSN	M	●	●	●	.250	.094	.004	.110
CCGT21.50.2MLSN	M	●			.250	.094	.004	.110
CCGT21.50.5MRSN	M	●	●	●	.250	.094	.008	.110
CCGT21.50.5MLSN	M	●			.250	.094	.008	.110
CCGT32.50.2MRSN	M	●	●	●	.375	.156	.004	.173
CCGT32.50.2MLSN	M	●			.375	.156	.004	.173
CCGT32.50.5MRSN	M	●	●	●	.375	.156	.008	.173
CCGT32.50.5MLSN	M	●			.375	.156	.008	.173
CCGT32.51MRSN	M	●	●	●	.375	.156	.016	.173
CCGT32.51MLSN	M	●			.375	.156	.016	.173
CCGT21.50.2MSMG	M	●			.250	.094	.004	.110
CCGT21.50.5MSMG	M	●			.250	.094	.008	.110
CCGT21.51MSMG	M	●			.250	.094	.016	.110
CCGT32.50.2MSMG	M	●			.375	.156	.004	.173
CCGT32.50.5MSMG	M	●			.375	.156	.008	.173
CCGT32.51MSMG	M	●			.375	.156	.016	.173

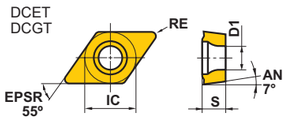
★ Nominal Value (Max.)

MS6015/MS7025/MS9025

7° Positive Inserts (With Hole)

E, G Class

Finish	Finish	Light
FS-P	R/L-SRF	LS-P
		
Light		
R/L-SS		
		



(inch)

Order Number	Cutting Area	MS6015	MS7025	MS9025	IC	S	RE*	D1
DCGT21.50.2MFS-P	F		●	●	.250	.094	.004	.110
DCGT21.50.5MFS-P	F		●	●	.250	.094	.008	.110
DCGT21.51MFS-P	F		●	●	.250	.094	.016	.110
DCGT32.50.2MFS-P	F		●	●	.375	.156	.004	.173
DCGT32.50.5MFS-P	F		●	●	.375	.156	.008	.173
DCGT32.51MFS-P	F		●	●	.375	.156	.016	.173
DCET21.50.2MRSRF	F			●	.250	.094	.004	.110
DCET21.50.2MLSRF	F			★	.250	.094	.004	.110
DCET21.50.5MRSRF	F			●	.250	.094	.008	.110
DCET21.50.5MLSRF	F			★	.250	.094	.008	.110
DCET21.51MRSRF	F			●	.250	.094	.016	.110
DCET21.51MLSRF	F			★	.250	.094	.016	.110
DCET32.50.2MLSRF	F			★	.375	.156	.004	.173
DCET32.50.5MLSRF	F			★	.375	.156	.008	.173
DCET32.51MLSRF	F			●	.375	.156	.016	.173
DCGT32.50.2MRSRF	F		●	●	.375	.156	.004	.173
DCGT32.50.5MRSRF	F		●	●	.375	.156	.008	.173
DCGT32.51MRSRF	F		●	●	.375	.156	.016	.173
DCGT21.5V5MLS-P	L			★	.250	.094	.002	.110
DCGT21.50.2MLS-P	L	●	●	●	.250	.094	.004	.110
DCGT21.50.5MLS-P	L	●	●	●	.250	.094	.008	.110
DCGT21.51MLS-P	L	●	●	●	.250	.094	.016	.110
DCGT32.50.2MLS-P	L	●	●	●	.375	.156	.004	.173
DCGT32.50.5MLS-P	L	●	●	●	.375	.156	.008	.173
DCGT32.51MLS-P	L	●	●	●	.375	.156	.016	.173
DCGT21.50.2MRSS	L	●			.250	.094	.004	.110
DCGT21.50.2MLSS	L	●			.250	.094	.004	.110
DCGT21.50.5MRSS	L	●			.250	.094	.008	.110
DCGT21.50.5MLSS	L	●			.250	.094	.008	.110
DCGT32.50.2MRSS	L	●			.375	.156	.004	.173
DCGT32.50.2MLSS	L	●			.375	.156	.004	.173
DCGT32.50.5MRSS	L	●			.375	.156	.008	.173
DCGT32.50.5MLSS	L	●			.375	.156	.008	.173
DCGT32.51MRSS	L	●			.375	.156	.016	.173
DCGT32.51MLSS	L	●			.375	.156	.016	.173

★ Nominal Value (Max.)

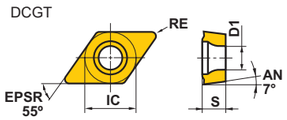
● : USA Stock ★ : Stocked in Japan
(10 inserts in one case)

● = NEW

7° Positive Inserts (With Hole)

G Class

Medium	Medium	
R/L-SN	SMG	
		



(inch)

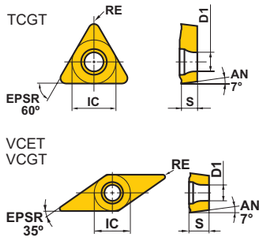
Order Number	Cutting Area	MS6015	MS7025	MS9025	IC	S	RE*	D1
DCGT21.50.2MRSN	M	●	●	●	.250	.094	.004	.110
DCGT21.50.2MLSN	M	●	●	●	.250	.094	.004	.110
DCGT21.50.5MRSN	M	●	●	●	.250	.094	.008	.110
DCGT21.50.5MLSN	M	●	●	●	.250	.094	.008	.110
DCGT21.51MRSN	M		●	●	.250	.094	.016	.110
DCGT32.50.2MRSN	M	●	●	●	.375	.156	.004	.173
DCGT32.50.2MLSN	M	●	●	●	.375	.156	.004	.173
DCGT32.50.5MRSN	M	●	●	●	.375	.156	.008	.173
DCGT32.50.5MLSN	M	●	●	●	.375	.156	.008	.173
DCGT32.51MRSN	M	●	●	●	.375	.156	.016	.173
DCGT32.51MLSN	M	●	●	●	.375	.156	.016	.173
DCGT21.50.2MSMG	M	●			.250	.094	.004	.110
DCGT21.50.5MSMG	M	●			.250	.094	.008	.110
DCGT21.51MSMG	M	●			.250	.094	.016	.110
DCGT32.50.2MSMG	M	●			.375	.156	.004	.173
DCGT32.50.5MSMG	M	●			.375	.156	.008	.173
DCGT32.51MSMG	M	●			.375	.156	.016	.173

★ Nominal Value (Max.)

MS6015/MS7025/MS9025

7° Positive Inserts (With Hole)

E, G Class



Finish	Finish	Finish
R/L-F	FS-P	R/L-SRF
		
Light		
LS-P		
		

(inch)

Order Number	Cutting Area	MS6015	MS7025	MS9025	IC	S	RE*	D1
TCGT1.210.2MRF	F	●			.156	.063	.004	.091
TCGT1.210.2MLF	F	●			.156	.063	.004	.091
TCGT1.210.5MRF	F	●			.156	.063	.008	.091
TCGT1.210.5MLF	F	●			.156	.063	.008	.091
TCGT1.211MRF	F	●			.156	.063	.016	.091
TCGT1.211MLF	F	●			.156	.063	.016	.091
VCGT220.2MFS-P	F		●	★	.250	.125	.004	.110
VCGT220.5MFS-P	F		●	★	.250	.125	.008	.110
VCGT221MFS-P	F			★	.250	.125	.016	.110
VCET1.51.50.5MRSRF	F			★	.187	.094	.008	.094
VCET1.51.50.5MLSRF	F			★	.187	.094	.008	.094
VCET1.51.51MRSRF	F			★	.187	.094	.016	.094
VCET1.51.51MLSRF	F			★	.187	.094	.016	.094
VCET220.2MRSRF	F			★	.250	.125	.004	.110
VCET220.2MLSRF	F			★	.250	.125	.004	.110
VCET220.5MRSRF	F			●	.250	.125	.008	.110
VCET220.5MLSRF	F			★	.250	.125	.008	.110
VCET221MRSRF	F			★	.250	.125	.016	.110
VCET221MLSRF	F			★	.250	.125	.016	.110
VCGT220.2MLS-P	L		●	●	.250	.125	.004	.110
VCGT220.5MLS-P	L		●	●	.250	.125	.008	.110
VCGT221MLS-P	L		●	●	.250	.125	.016	.110
VCGT2.520.2MLS-P	L			★	.313	.125	.004	.134
VCGT2.520.5MLS-P	L			●	.313	.125	.008	.134
VCGT2.521MLS-P	L			●	.313	.125	.016	.134

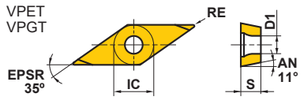
★ Nominal Value (Max.)

● = NEW

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

11° Positive Inserts (With Hole)

E, G Class



Finish	Finish	
FS-P	R/L-SRF	
		

(inch)

Order Number	Cutting Area	MS6015	MS7025	MS9025	IC	S	RE	D1
VPGT1.51.50.2MFS-P	F			★	.187	.094	.004★1	.095
VPGT1.51.50.5MFS-P	F			★	.187	.094	.008★1	.095
VPGT220.2MFS-P	F			●	.250	.125	.004★1	.112
VPGT220.5MFS-P	F			●	.250	.125	.008★1	.112
VPET22V3RSRF	F			★	.250	.125	.001★2	.112
VPET22V3LSRF	F			★	.250	.125	.001★2	.112
VPET1.51.50.2MRSRF	F			★	.187	.094	.004★1	.095
VPET1.51.50.2MLSRF	F			★	.187	.094	.004★1	.095
VPET1.51.50.5MRSRF	F			★	.187	.094	.008★1	.095
VPET1.51.50.5MLSRF	F			★	.187	.094	.008★1	.095
VPET220.2MRSRF	F			★	.250	.125	.004★1	.112
VPET220.2MLSRF	F			★	.250	.125	.004★1	.112
VPET220.5MRSRF	F			●	.250	.125	.008★1	.112
VPET220.5MLSRF	F			★	.250	.125	.008★1	.112

★1 Nominal Value (Max.)
★2 Nominal Value (Med.)

● = NEW

Recommended Cutting Conditions

(inch)

	Material	Properties	Cutting Area		Chipbreaker	Grade	Cutting Speed **vc** (SFM)	Feed per Rev. **f** (IPR)	Depth of Cut **ap**
P	Pure Iron Free Cutting Steel	—	●	F	R/L-FS	MS6015	490(165—655)	.0004—.0059	.004—.020
			●	F	R/L-F	MS6015	490(165—655)	.0004—.0059	.004—.020
			◐	L	LS-P	MS6015	490(165—655)	.0004—.0059	.012—.118
			◐	L	R/L-SS	MS6015	490(165—655)	.0004—.0059	.008—.039
			◐	M	R/L-SN	MS6015	490(165—655)	.0004—.0059	.004—.020
			◐	M	SMG	MS6015	490(165—655)	.0004—.0059	.004—.079
	Soft Magnetic Iron	—	●	F	R/L-FS	MS6015	655(490—820)	.0004—.0059	.004—.020
			●	F	FS-P	MS7025	655(330—985)	.0004—.0024	.008—.028
			●	F	R/L-F	MS6015	655(490—820)	.0004—.0059	.004—.020
			◐	F	R-SRF	MS7025	655(330—985)	.0004—.0024	.004—.020
			◐	L	LS-P	MS6015	655(490—820)	.0004—.0059	.004—.020
			◐	L	LS-P	MS7025	655(330—985)	.0004—.0024	.004—.020
			◐	L	R/L-SS	MS6015	655(490—820)	.0004—.0059	.008—.039
			◐	M	R/L-SN	MS6015	655(490—820)	.0004—.0059	.004—.020
			◐	M	R/L-SN	MS7025	655(330—985)	.0004—.0024	.004—.020
			◐	M	SMG	MS6015	655(490—820)	.0004—.0059	.004—.079
	Carbon Steel Alloy Steel	180—280HB	●	F	R/L-FS	MS6015	330(165—490)	.0004—.0059	.004—.020
			●	F	FS-P	MS7025	295(130—425)	.0004—.0024	.008—.028
			●	F	R/L-F	MS6015	330(165—490)	.0004—.0059	.004—.020
			◐	L	LS-P	MS6015	330(165—490)	.0004—.0059	.012—.118
			◐	L	LS-P	MS7025	295(130—425)	.0004—.0024	.012—.118
			◐	L	R/L-SS	MS6015	330(165—490)	.0004—.0059	.008—.039
			◐	M	R/L-SN	MS6015	330(165—490)	.0004—.0059	.004—.020
			◐	M	R/L-SN	MS7025	295(130—425)	.0004—.0024	.004—.020
			◐	M	SMG	MS6015	330(165—490)	.0004—.0059	.004—.079

(inch)

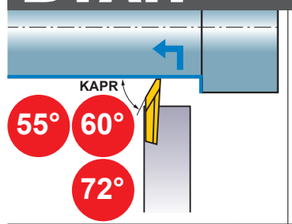
	Material	Properties	Cutting Area		Chipbreaker	Grade	Cutting Speed **vc** (SFM)	Feed per Rev. **f** (IPR)	Depth of Cut **ap**
M	Austenitic Stainless Steel	—	●	F	FS-P	MS7025	195(130—330)	.0004—.0031	.008—.028
			●	F	FS-P	MS9025	330(195—490)	.0016—.0059	.008—.028
			●	F	R-SRF	MS7025	195(130—330)	.0004—.0031	.004—.020
			◐	F	R/L-SRF	MS9025	330(195—490)	.0016—.0059	.004—.020
			◐	L	LS-P	MS7025	195(130—330)	.0004—.0031	.012—.118
			◐	L	LS-P	MS9025	330(195—490)	.0020—.0059	.012—.118
			◐	M	R-SN	MS7025	195(130—330)	.0004—.0031	.004—.197
			◐	M	R-SN	MS9025	330(195—490)	.0020—.0059	.004—.197
	Ferritic and Martensitic Stainless Steel	—	●	F	FS-P	MS7025	195(130—330)	.0004—.0031	.008—.028
			◐	F	R-SRF	MS7025	195(130—330)	.0004—.0031	.004—.020
			◐	L	LS-P	MS7025	195(130—330)	.0004—.0031	.012—.118
			◐	M	R/L-SN	MS7025	195(130—330)	.0004—.0031	.004—.197
	Electromagnetic Stainless Steel (SUS440C, SUS420J2 etc.)	Hardness 230HBW	●	F	FS-P	MS9025	330(165—590)	.0016—.0047	.008—.071
			●	F	FS-P	MS7025	260(130—525)	.0008—.0031	.008—.071
			◐	F	R/L-SRF	MS9025	330(165—590)	.0016—.0047	.004—.020
			◐	F	R-SRF	MS7025	260(130—525)	.0012—.0031	.004—.020
			◐	L	LS-P	MS9025	330(165—590)	.0016—.0059	.012—.118
			◐	L	LS-P	MS7025	260(130—525)	.0008—.0039	.012—.118
			◐	M	R-SN	MS9025	330(165—590)	.0004—.0039	.004—.197
			◐	M	R-SN	MS7025	260(130—525)	.0004—.0039	.004—.197
	Precipitation Hardening Stainless Steel (SUS630, SUS631 etc.)	<450HB	●	F	FS-P	MS7025	195(130—260)	.0004—.0039	.004—.055
			●	F	FS-P	MS9025	230(165—330)	.0012—.0059	.004—.055
			◐	F	R-SRF	MS7025	195(130—260)	.0004—.0039	.004—.020
			◐	F	R/L-SRF	MS9025	230(165—330)	.0012—.0059	.004—.020
			◐	L	LS-P	MS7025	195(130—260)	.0016—.0039	.008—.118
			◐	L	LS-P	MS9025	230(165—330)	.0016—.0059	.008—.118
			◐	M	R-SN	MS7025	195(130—260)	.0012—.0039	.012—.118
			◐	M	R-SN	MS9025	230(165—330)	.0016—.0059	.012—.118
S	Heat Resistant Alloys (SUH etc.)	—	●	F	FS-P	MS9025	260(130—460)	.0016—.0047	.008—.055
			◐	F	R/L-SRF	MS9025	260(130—460)	.0020—.0047	.004—.020
			◐	L	LS-P	MS9025	260(130—460)	.0016—.0059	.012—.118
			◐	M	R-SN	MS9025	260(130—460)	.0004—.0039	.004—.197

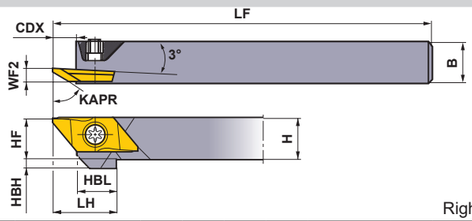
Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✲ : Unstable Cutting

BACK TURNING TOOLS (FOR GANG TYPE TOOL POSTS)

INCH STANDARD

BTAH





Right hand tool holder shown.

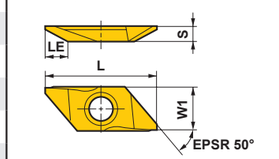
Order Number	Stock R	Stock L	Insert Number		Dimensions (inch) H	B	LF	LH	HF	WF2	HBH	HBL	CDX	* Clamp Screw	Wrench
BTAHR/L-062	●	●	BTAT	5528○○R/L-B	.375	.375	4.724	.591	.375	.138	.125	.374	.217	NS402W	NKY15S
BTAHR/L-082	●	●		6035○○R/L-B 605000RX	.500	.500	4.724	.591	.500	.138	—	.374	.217	NS403W	NKY15S
BTAHR/L-102	●			7235○○R-SMB	.625	.625	4.724	.591	.625	.138	—	.374	.217	NS403W	NKY15S

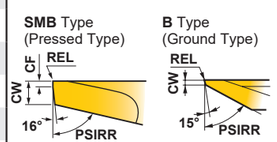
* Clamp Torque (lbf-in) : NS402W=6.2, NS403W=6.2

Note 1) Please use right hand insert for right hand holder and left hand insert for left hand holder.
Note 2) Set the maximum depth of cut at under 60% of the effective cutting edge length (LE).

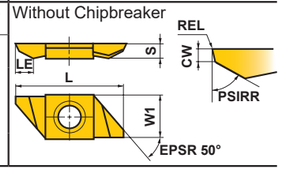
INSERTS

Order Number	Hand	Coated VP15TF	Coated MS6015	Dimensions(inch) PSIRR/L *	REL	CF	L	W1	CW	S	LE * (inch)	Geometry
BTAT7235V5R-SMB	R	●		72°	.002	.012	.787	.315	.055	.098	.138	With Chipbreaker
BTAT723501MR-SMB	R	●		72°	.004*	.012	.787	.315	.055	.098	.138	
BTAT723502MR-SMB	R	●		72°	.008*	.012	.787	.315	.055	.098	.138	
BTAT552800R-B	R	●	●	55°	.000	.000	.787	.315	.020	.098	.110	
BTAT552800L-B	L	●		55°	.000	.000	.787	.315	.020	.098	.110	
BTAT552801R-B	R	●	●	55°	.004	.000	.787	.315	.020	.098	.110	
BTAT552801L-B	L	●		55°	.004	.000	.787	.315	.020	.098	.110	
BTAT603500R-B	R	●	●	60°	.000	.000	.787	.315	.020	.098	.138	
BTAT603500L-B	L	●		60°	.000	.000	.787	.315	.020	.098	.138	
BTAT603501MR-B	R		●	60°	.004*	.000	.787	.315	.020	.098	.138	
BTAT603501R-B	R	●	●	60°	.004	.000	.787	.315	.020	.098	.138	
BTAT603501L-B	L	●		60°	.004	.000	.787	.315	.020	.098	.138	
BTAT605000RX	R	●		60°	.000	.000	.787	.315	.049	.098	.197	Without Chipbreaker





Right hand insert shown.

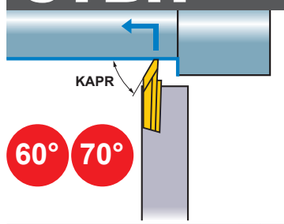


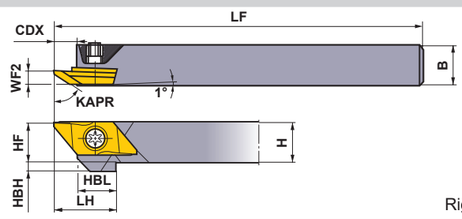
* Numeric value set insert on holder.
* REL: Nominal Value (Max.)
Note 1) REL, PSIRR dimensions for Right Hand Tool and RER, PSIRL dimensions for Left Hand Tool.

● : USA Stock
<5 inserts in one case>

INCH STANDARD

CTBH





Right hand tool holder shown.

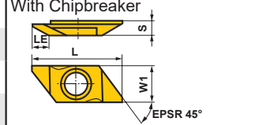
Order Number	Stock R	Stock L	Insert Number		Dimensions (inch) H	B	LF	LH	HF	WF2	HBH	HBL	CDX	* Clamp Screw	Wrench
CTBHR/L-062	●	●	BTBT	60450○R/L-B	.375	.375	4.724	.768	.375	.133	.125	.472	.295	NS402W	NKY15S
CTBHR/L-082	●	●		606000R/L	.500	.500	4.724	.768	.500	.133	—	.472	.295	NS403W	NKY15S
CTBHR/L-102	●	●		7055○○R-SMB	.625	.625	4.724	.768	.625	.133	—	.472	.295	NS403W	NKY15S

* Clamp Torque (lbf-in) : NS402W=6.2, NS403W=6.2

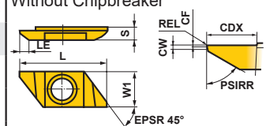
Note 1) Please use right hand insert for right hand holder and left hand insert for left hand holder.
Note 2) Set the maximum depth of cut at under 60% of the effective cutting edge length (LE).

INSERTS

Order Number	Hand	Coated VP15TF	Coated MS6015	Dimensions(inch) PSIRR/L *	REL	CF	L	W1	CW	S	CDX	LE *	Geometry
BTBT7055V5R-SMB	R	●		70°	.002	.012	.984	.370	.053	.138	.256	.217	With Chipbreaker
BTBT705501MR-SMB	R	●		70°	.004*	.012	.984	.370	.053	.138	.256	.217	
BTBT705502MR-SMB	R	●		70°	.008*	.012	.984	.370	.053	.138	.256	.217	
BTBT604500R-B	R	●	●	60°	.000	.008	.984	.370	.028	.138	.217	.177	
BTBT604500L-B	L	●		60°	.000	.008	.984	.370	.028	.138	.217	.177	
BTBT604501MR-B	R		●	60°	.004*	.012	.984	.370	.028	.138	.217	.177	
BTBT604501R-B	R	●	●	60°	.004	.012	.984	.370	.028	.138	.217	.177	
BTBT604501L-B	L	●		60°	.004	.012	.984	.370	.028	.138	.217	.177	
BTBT606000R	R	●		60°	.000	.008	.984	.370	.028	.138	.276	.236	Without Chipbreaker
BTBT606000L	L	●		60°	.000	.008	.984	.370	.028	.138	.276	.236	



Right hand insert shown.



Right hand insert shown.

* Numeric value set insert on holder.
* REL: Nominal Value (Max.)
Note 1) REL, PSIRR dimensions for Right Hand Tool and RER, PSIRL dimensions for Left Hand Tool.

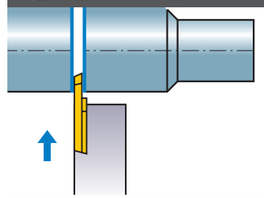
RECOMMENDED CUTTING CONDITIONS

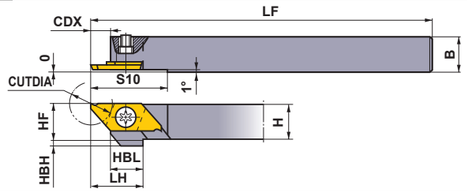
	Material	Properties	Grade	Cutting Speed (SFM)	Feed (IPR)
P	Carbon Steel · Alloy Steel	Hardness 180HB–280HB	**MS6015/VP15TF**	165–490	.0004–.006
	Free Cutting Steel	–	**MS6015**	100–590	.0004–.006
M	Stainless Steel	Hardness ≤200HB	**VP15TF**	165–395	.0008–.004
N	Non-Ferrous Metal	–	**MS6015**	230–755	.0012–.006

CUTTING OFF TOOLS (FOR GANG TYPE TOOL POSTS)

INCH STANDARD

CTAH



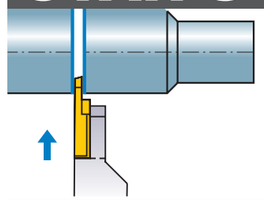


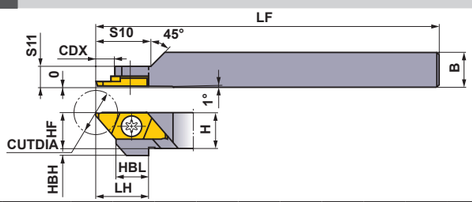
Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number	H	B	HF	LF	LH	CDX	HBH	HBL	S10	CUTDIA (inch)	Clamp Screw *2	Wrench
CTAHR/L-062	●	●	CTAT ○○○○	.375	.375	.375	4.724	.591	.217	.125	.374	.866	.472 (.315)*1	NS402W	NKY15S
CTAHR/L-082	●	●	CTAT ○○○○	.500	.500	.500	4.724	.591	.217	—	.374	.866	.472 (.315)*1	NS402W	NKY15S
CTAHR/L-102	●	●	CTAT ○○○○	.625	.625	.625	4.724	.591	.217	—	.374	.866	.472 (.315)*1	NS403W	NKY15S

*1 When the width of cutting off (CW) is .028 inch.
*2 Clamp Torque (lbf-in) : NS402W=6.2, NS403W=6.2

CTAH-S





Right hand tool holder only.

Order Number	Stock R	Insert Number	H	B	HF	LF	LH	CDX	HBH	HBL	S10	S11	CUTDIA (inch)	Clamp Screw *2	Wrench
CTAHR-062S	●	CTAT ○○○○	.375	.375	.375	3.150	.591	.217	.125	.374	.630	.217	.472 (.315)*1	NS401	NKY25R
CTAHR-082S	●	CTAT ○○○○	.500	.500	.500	3.150	.591	.217	—	.374	.630	.217	.472 (.315)*1	NS401	NKY25R

*1 When the width of cutting off (CW) is .028 inch.
*2 Clamp Torque (lbf-in) : NS401=31

RECOMMENDED CUTTING CONDITIONS

	Material	Properties	Grade	Cutting Speed (SFM)	Feed (IPR)
P	Carbon Steel · Alloy Steel	Hardness 180HB—280HB	**MS6015/VP15TF**	165—490	.0008—.0035
P	Free Cutting Steel	—	**MS6015**	100—590	.0004—.0035
M	Stainless Steel	Hardness ≤200HB	**VP15TF**	165—395	.0008—.0019
N	Non-Ferrous Metal	—	**MS6015**	230—755	.0012—.0043

● : USA Stock
<5 inserts in one case>

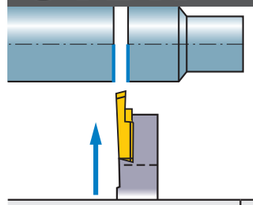
INSERTS

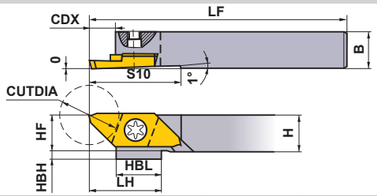
Holder	Setting Geometry	Breaker	Geometry	Insert Geometry	Order Number	Hand	Coated VP15TF	Coated MS6015	CW	CDX	RER/L	L	W1	S	LBB	CUTDIA (inch)
Right Hand (R)	16°	With Chipbreaker	S, L, W1, EPSR 50°	REL, CDX, LBB, CW ± .002, RER	CTAT07080V5RR-B	R	●		.028	.177	.002	.787	.315	.098	.059	.315
					CTAT10120V5RR-B	R	●	●	.039	.264	.002	.787	.315	.098	.059	.472
					CTAT15120V5RR-B	R	●	●	.059	.264	.002	.787	.315	.098	.059	.472
					CTAT20120V5RR-B	R	●	●	.079	.264	.002	.787	.315	.098	.059	.472
	16°			REL, CDX, LBB, CW ± .002, RER, Strong Edge Type	CTAT15120V5RR-BX	R	●		.059	.264	.002	.787	.315	.098	.059	.472
					CTAT20120V5RR-BX	R	●		.079	.264	.002	.787	.315	.098	.059	.472
	0°			REL, CDX, LBB, CW ± .002, RER	CTAT10120V5RN-B	N	●	●	.039	.264	.002	.787	.315	.098	.059	.472
					CTAT15120V5RN-B	N	●	●	.059	.264	.002	.787	.315	.098	.059	.472
					CTAT20120V5RN-B	N	●	●	.079	.264	.002	.787	.315	.098	.059	.472
	0°			REL, CDX, LBB, CW ± .002, RER, Strong Edge Type	CTAT15120V5RN-BX	N	●		.059	.264	.002	.787	.315	.098	.059	.472
					CTAT20120V5RN-BX	N	●		.079	.264	.002	.787	.315	.098	.059	.472
	16°			REL, CDX, LBB, CW ± .002, RER	CTAT10110V5RL-B	L	●		.039	.264	.002	.787	.315	.098	.059	.433
					CTAT15110V5RL-B	L	●		.059	.264	.002	.787	.315	.098	.059	.433
					CTAT20110V5RL-B	L	●		.079	.264	.002	.787	.315	.098	.059	.433
	20°	Without		REL, CDX, LBB, CW ± .002, RER	CTAT1012000RR	R	●	●	.039	.264	.000	.787	.315	.098	.138	.472
					CTAT1512000RR	R	●	●	.059	.264	.000	.787	.315	.098	.138	.472
					CTAT2012000RR	R	●	●	.079	.264	.000	.787	.315	.098	.138	.472
Left Hand (L)	16°	With Chipbreaker		REL, LBB, CDX, CW ± .002, RER	CTAT07080V5LL-B	L	●		.028	.177	.002	.787	.315	.098	.059	.315
					CTAT10120V5LL-B	L	●		.039	.264	.002	.787	.315	.098	.059	.472
					CTAT15120V5LL-B	L	●		.059	.264	.002	.787	.315	.098	.059	.472
					CTAT20120V5LL-B	L	●		.079	.264	.002	.787	.315	.098	.059	.472
	0°			REL, LBB, CDX, CW ± .002, RER	CTAT10120V5LN-B	N	●	●	.039	.264	.002	.787	.315	.098	.059	.472
					CTAT15120V5LN-B	N	●	●	.059	.264	.002	.787	.315	.098	.059	.472
					CTAT20120V5LN-B	N	●	●	.079	.264	.002	.787	.315	.098	.059	.472
	16°			REL, LBB, CDX, CW ± .002, RER	CTAT10110V5LR-B	R	●	●	.039	.264	.002	.787	.315	.098	.059	.433
					CTAT15110V5LR-B	R	●	●	.059	.264	.002	.787	.315	.098	.059	.433
					CTAT20110V5LR-B	R	●	●	.079	.264	.002	.787	.315	.098	.059	.433
	20°	Without	Right hand insert shown.	REL, LBB, CDX, CW ± .002, RER	CTAT1012000LL	L	●		.039	.264	.000	.787	.315	.098	.138	.472
					CTAT1512000LL	L	●		.059	.264	.000	.787	.315	.098	.138	.472
					CTAT2012000LL	L	●		.079	.264	.000	.787	.315	.098	.138	.472

CUTTING OFF TOOLS (FOR GANG TYPE TOOL POSTS)

METRIC STANDARD

CTBH



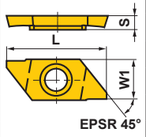
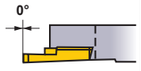
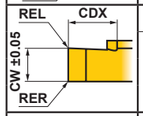
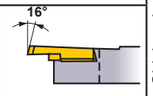
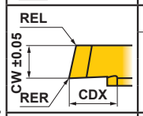
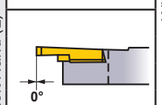
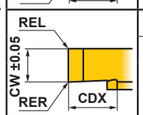
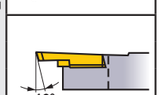
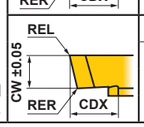


Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H	B	HF	LF	LH	CDX	HBH	HBL	S10	CUTDIA (mm)	* Clamp Screw	Wrench
CTBHR/L1010-160	●	●	CTBT	○○○○	10	10	10	120	19.5	7.5	2	9.5	25	16	NS402W	NKY15S
CTBHR/L1212-160	●	●		○○○○	12	12	12	120	19.5	7.5	—	9.5	25	16	NS403W	NKY15S
CTBHR/L1616-160	●	●		○○○○	16	16	16	120	19.5	7.5	—	9.5	25	16	NS403W	NKY15S

* Clamp Torque (lbf-in) : NS402W=6.2, NS403W=6.2

INSERTS

Holder	Setting Geometry	Chipbreaker	Geometry	Insert Geometry	Order Number	Hand	Coated VP15TF	Coated MS6015	Dimensions (mm) CW	CDX	RER/L	L	W1	S	CUTDIA (mm)
Right Hand (R)		With Chipbreaker			**CTBT15160V5RR-B**	R	●	●	1.5	9.2	0.05	25	9.4	3.5	16
					CTBT20160V5RR-B	R	●	●	2.0	9.2	0.05	25	9.4	3.5	16
					**CTBT20160V5RN-B**	N	●	●	2.0	9.2	0.05	25	9.4	3.5	16
Left Hand (L)					**CTBT20160V5LL-B**	L	●		2.0	9.2	0.05	25	9.4	3.5	16
					**CTBT20160V5LN-B**	N	●	●	2.0	9.2	0.05	25	9.4	3.5	16
					**CTBT20145V5LR-B**	R	●	●	2.0	9.2	0.05	25	9.4	3.5	14.5

Right hand insert shown.

RECOMMENDED CUTTING CONDITIONS

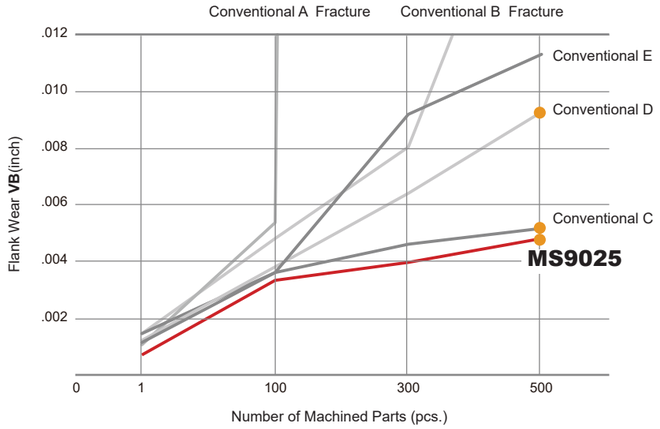
	Material	Properties	Grade	Cutting Speed (SFM)	Feed (IPR)
P	Carbon Steel · Alloy Steel	Hardness 180HB—280HB	**MS6015/VP15TF**	165—490	.0008 —.0035
	Free Cutting Steel	—	**MS6015**	100—590	.0004 —.0035
M	Stainless Steel	Hardness ≤200HB	**VP15TF**	165—395	.0008 —.0019
N	Non-Ferrous Metal	—	**MS6015**	230—755	.0012 —.0043

● : USA Stock

<5 inserts in one case>

Cutting Performance

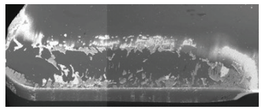
Stainless Steel AISI 440C, Wear Resistance Comparison



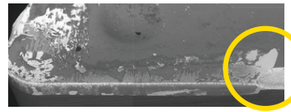
<Cutting Conditions>

Material	: AISI 440C
Inserts	: DCGT32.50.5
Machining Methods	: External Continuous Cutting
Cutting Speed	: vc =330 SFM
Feed per Rev.	: fr=.0031 IPR
Depth of Cut	: ap =.039 inch
Cutting Mode	: Wet Cutting (Oil)

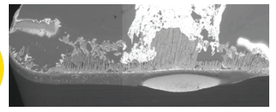
Taken after machining 500 Parts



MS9025

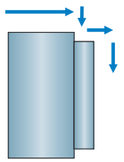
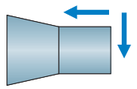
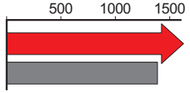


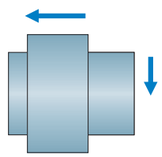
Conventional C : Flaking



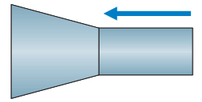
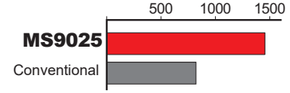
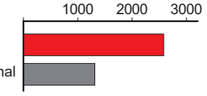
Conventional D : Base material exposure

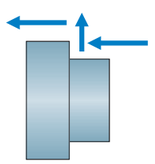
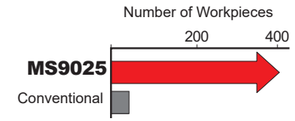
Application Examples

Insert		DCGT21.50.5MFS-P (MS7025)	DCGT32.50.5MFS-P (MS7025)
Workpiece		AISI 440C 	AISI 430F 
Component		Valve	Shaft Parts
Application		External and Face Turning	External and Face Turning
Cutting Conditions	Cutting Speed **vc** (SFM)	190	425
	Feed per Rev. **f** (IPR)	.0016	.0012
	Depth of Cut **ap** (inch)	.006	.022
Cutting Mode		Wet Cutting (Oil)	Wet Cutting (Oil)
Results		Number of Workpieces 500 1000 1500 Conventional  Compared to conventional products, the dimensional accuracy is stable and high machining quality is maintained.	Chip control has been improved and the quality of the machined surface is also good.

Insert		DCGT32.50.5MFS-P (MS7025)
Workpiece		AISI 430 
Component		Machine Parts
Application		External and Face Turning
Cutting Conditions	Cutting Speed **vc** (SFM)	330
	Feed per Rev. **f** (IPR)	.0024
	Depth of Cut **ap** (inch)	.010
Cutting Mode		Wet Cutting (Oil)
Results		By suppressing chip welding, cutting edge damage is reduced and the surface quality can be improved.

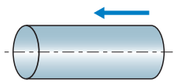
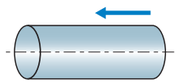
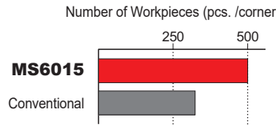
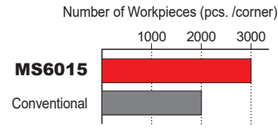
The application examples are from customers workpieces and can therefore differ from the recommended cutting conditions.

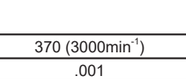
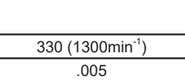
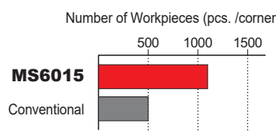
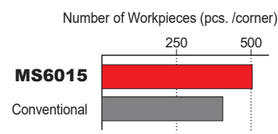
Insert		DCGT32.50.5MLS-P (MS9025)	DCGT21.50.2MFS-P (MS9025)
Workpiece		AISI 420 Stainless Steel 	AISI 440C Electromagnetic Stainless Steel 
Component		Solenoid Parts	Brake Parts
Application		External Continuous Turning	External Continuous Turning
Cutting Conditions	Cutting Speed **vc** (SFM)	385	125
	Feed per Rev. **f** (IPR)	.0039	.0020
	Depth of Cut **ap** (inch)	.008	.008
Cutting Mode		Wet Cutting (Oil)	Wet Cutting (Oil)
Results		Number of Workpieces 500 1000 1500 **MS9025** Conventional  Improved wear resistance and tool life increased by a factor of 1.7.	Number of Workpieces 1000 2000 3000 Conventional  Improved welding resistance and double tool life when compared to a conventional tool.

Insert		DCGT32.51MLS-P (MS9025)
Workpiece		JIS SUH3 Heat Resistant Alloy 
Component		Valve
Application		External and Face Continuous Turning
Cutting Conditions	Cutting Speed **vc** (SFM)	260
	Feed per Rev. **f** (IPR)	.0047-.0059
	Depth of Cut **ap** (inch)	.012-.020
Cutting Mode		Wet Cutting (Oil)
Results		Number of Workpieces 200 400 **MS9025** Conventional  Conventional products tend to deteriorate more during machining whilst MS9025 provides stability with 5 times longer tool life.

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

Application Examples

Insert (Grade)		DCGT32.50.5MSMG (MS6015)	DCGT32.50.2MRSN (MS6015)
Workpiece		Iron-based Soft Magnetic Material (ELCH2) 	Free Cutting Steel (AISI 12L14) 
Cutting Conditions	Cutting Speed **vc** (SFM)	645 (4500min^{-1})	410 (5000min^{-1})
	Feed per Rev. **f** (IPR)	.004	.002
	Depth of Cut **ap** (inch)	.004	.012
Cutting Mode		Wet Cutting (Water-insoluble)	Wet Cutting (Water-insoluble)
Machine		Swiss-Type Lathes	Swiss-Type Lathes
Results		 An excellent finished surface and 1.4 times longer life compared with conventional products. Stable SMG breaker and chip discharge management.	 MS6015 has minimal welding and maintains secure dimensional accuracy.

Insert (Grade)		DCGT32.50.5MRSN (MS6015)	DCGT32.50.5MSMG (MS6015)
Workpiece		Carbon Steel (AISI 1045) 	Mild Steel (AISI 1015) 
Cutting Conditions	Cutting Speed **vc** (SFM)	370 (3000min^{-1})	330 (1300min^{-1})
	Feed per Rev. **f** (IPR)	.001	.005
	Depth of Cut **ap** (inch)	.039	.051
Cutting Mode		Wet Cutting (Water-insoluble)	Wet Cutting (Water-insoluble)
Machine		Swiss-Type Lathes	Swiss-Type Lathes
Results		 MS6015 has superior wear resistance and achieves double tool life when compared with conventional products.	 MS6015 has superior welding resistance and achieves 1.3 times longer tool life compared with conventional products.

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

Memo

MTEC
MACHINING TECHNOLOGY & EDUCATION CENTER

Welcome to our new world-class Machining Technology and Education Center (MTEC) in Mooresville, NC providing year round support and services to North America.

ABOUT MTEC

TOOLING PROPOSALS & EVALUATION

We will review your current processes or outline a new process. From this review, we will improve productivity, analyze programming methods and output a solution with programming, tooling and time savings.

MACHINING SIMULATION

Using the latest CAD/CAM software and our cutting tool experience, we will outline a new process using proper machining techniques to maximize tool life and productivity.

TECHNICAL SUPPORT

Dedicated local professionals to answer any of your order, product or technical questions.

TRAINING

We are excited to offer several levels of training with goals to reach our highest level--Craftsman Machining Technology. At MTEC NC, we will train using a combination of classroom and hands-on machine time to develop skills and real-world understanding of materials, tools and applications. In addition to multi-day courses, we will have Machining Technology skills seminars, as well as seminars from our partners to complement our apprentice level courses, our journeyman courses, and up to our craftsman level courses.

PROCESS IMPROVEMENTS

Review of the complete part processing and recommend changes of speed, feed, new tooling, reduction of passes, modifying programming and other solutions to reduce cycle time, save money and be proactive.

ONLINE TRAINING

Our FREE e-learning program offers 11 courses in drilling, milling, turning, threading, tool grades and workpiece materials. Once each course is completed, you will be given the opportunity to print a certificate.

- Basic Drilling
- Basic Milling
- Basic Turning
- Advanced Drilling
- Advanced End Milling
- Advanced Turning
- Basic Threading
- Advanced Face Milling
- Basic Workpiece Materials
- Tool Grades
- Advanced Workpiece Materials

TRAINING COURSES

Programs are designed for several levels of skill development – from basic understanding to advance manufacturing with digital solutions, complementing to your valued experience in CNC machining environment. Participate in machining demonstrations with Mitsubishi Materials' skilled engineers. Discover methods to reduce setup and cycle time, optimize programs and enhance your knowledge base.

Information on course schedule, course description, and accommodations

MTECTRAINING.INFO

Follow the QR Code for a virtual facility tour

MITSUBISHI MATERIALS U.S.A.

MITSUBISHI MATERIALS U.S.A. CORPORATION

California Office
(Headquarters)

3535 Hyland Avenue, Suite 200
Costa Mesa, CA 92626
Customer Service: 800.523.0800
Technical Service: 800.486.2341

Chicago Office
(Engineering)

300 N. Martingale Road, Suite 500
Schaumburg, IL 60173
Main: 847.252.6300
Fax: 847.519.1732

MMC Metal de Mexico, S.A. DE C.V.

Av. La Cañada No.16,
Parque Industrial Bernardo
Quintana, El Marques,
Queretaro C.P. 76246 MEXICO
Main: +52.442.221.61.36
Fax: +52.442.221.61.34

North Carolina-MTEC
(Marketing & Technical Center)

105 Corporate Center Drive, Suite A
Mooresville, NC 28117
Main: 980.312.3100
Fax: 704.746.9292

Toronto Office
(Canada Branch)

600 Matheson Blvd. Unit 5 (Office)
Mississauga, ON L5R 4C1
Main: 905.814.0240
Fax: 905.814.0245

Detroit Office
(Moldino CS)

41700 Gardenbrook Road, Suite 120
Novi, MI 48375
Main: 248.308.2620
Fax: 248.308.2627

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.

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