

PVD Coated Grade for High Precision and Small Parts Machining

MS9025

New
Products

Improved Cutting Edge Delivers Next Generation Small Parts Machining



PVD Coated Grade for High Precision and Small Parts Machining

MS9025

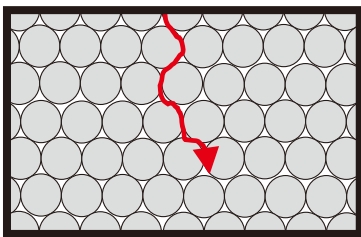
Effective reduction of notch wear with a balance of wear and fracture resistance.

Features

Improved Cemented Carbide

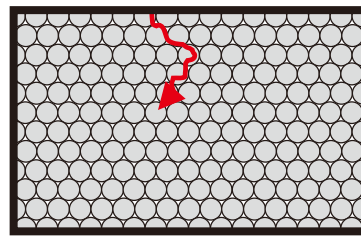
Thermal conductivity has been improved by optimising the grain size and therefore reducing the boundary contact between the WC particles. This optimisation reduces the temperature of the cutting edge during machining.

MS9025



Reducing the cutting edge temperature by improved thermal conductivity.

Conventional

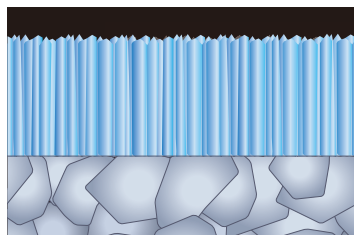


Higher cutting edge temperatures due to more particle boundary contact.

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.

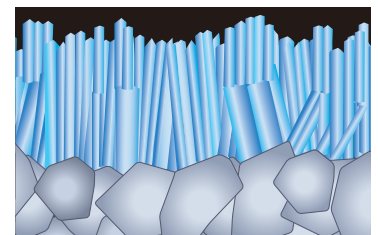
MS9025



Smooth Cemented Carbide

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

Conventional



Rough Cemented Carbide

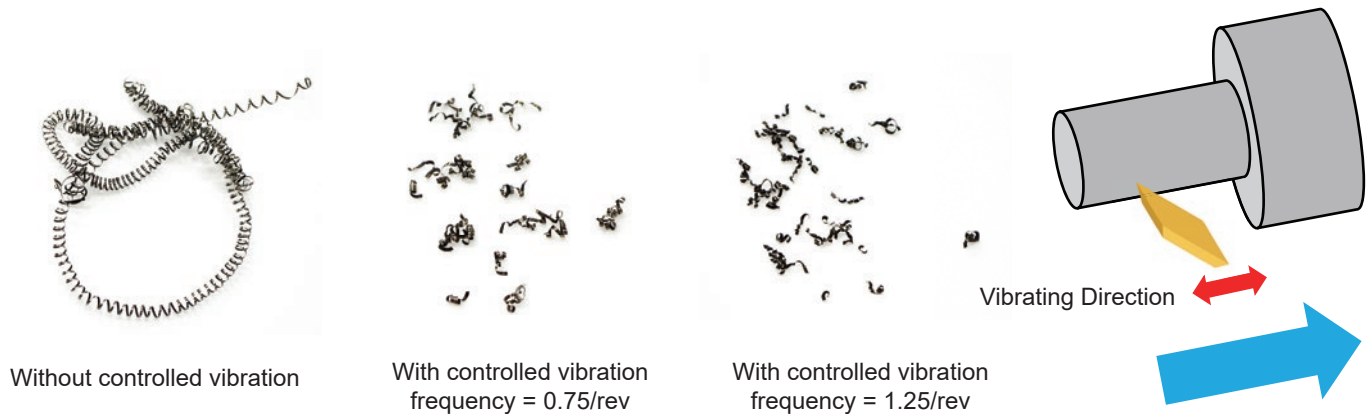
Random crystal growth direction.
Performance is variable due to defects and voids in the surface.

*By Image

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.



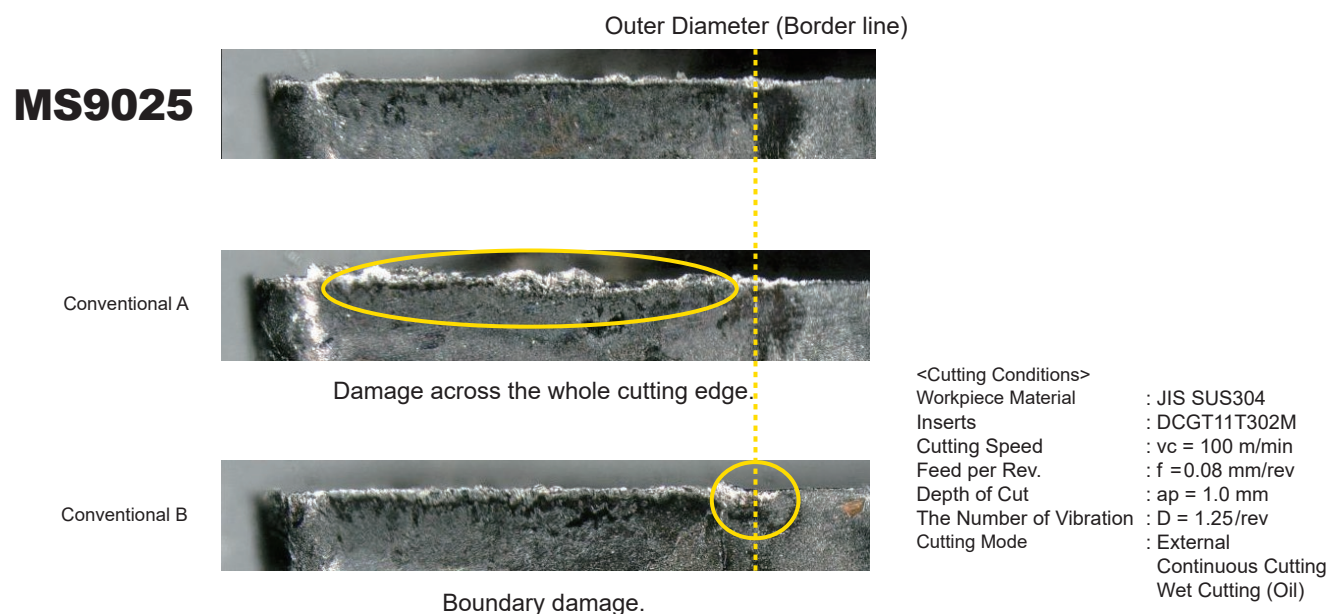
Challenges of controlled vibration machining:

Compared to standard machining there is a greater chance of edge chipping due to the extra stress on the cutting edge and also because of the impact of work hardening.

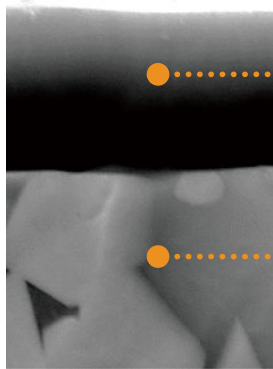
Benefits of using MS9025 for Controlled Vibration Machining

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 optimised cemented carbide grain size that reduces thermal conductivity and heating of the cutting edge.

After 500 passes at 15m per pass



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



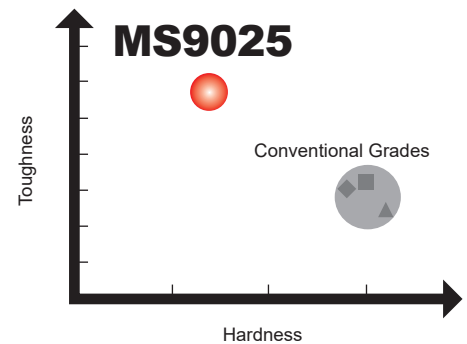
Al-rich (Al,Ti)N

- Superior Flank Wear Resistance
- Superior Crater Wear Resistance
- Excellent Welding Resistance

Special Cemented Carbide for MS9025

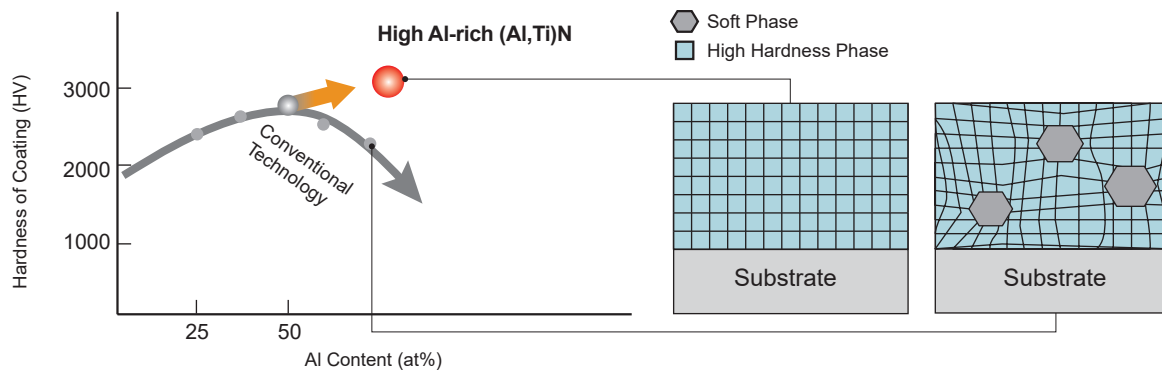
- Superior Fracture Resistance
- Excellent Chipping Resistance

Cemented Carbide Base Material Properties



High Al and Conventional Coating Comparison

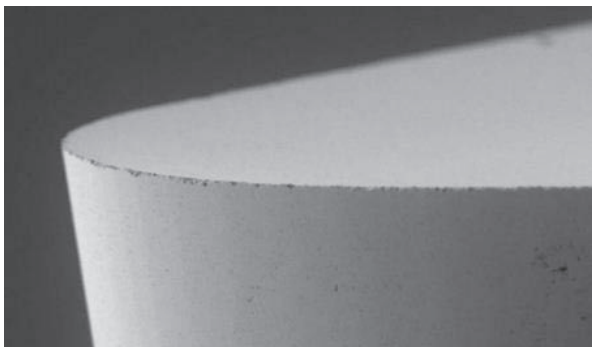
The high Al-rich (Al,Ti)N single layer coating provides stabilization of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance.



Extremely High Quality Cutting Edge

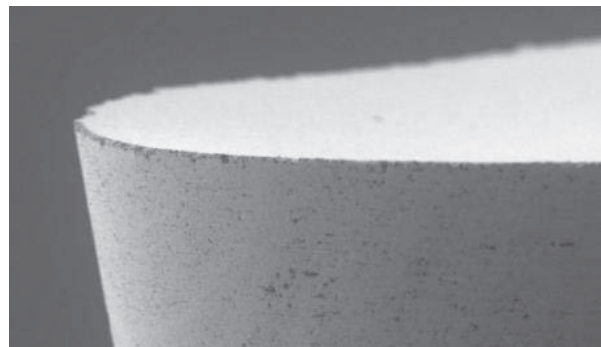
Technology that provides superior dimensional stability and reduces burrs.

MS9025



Rz=0.14 μm

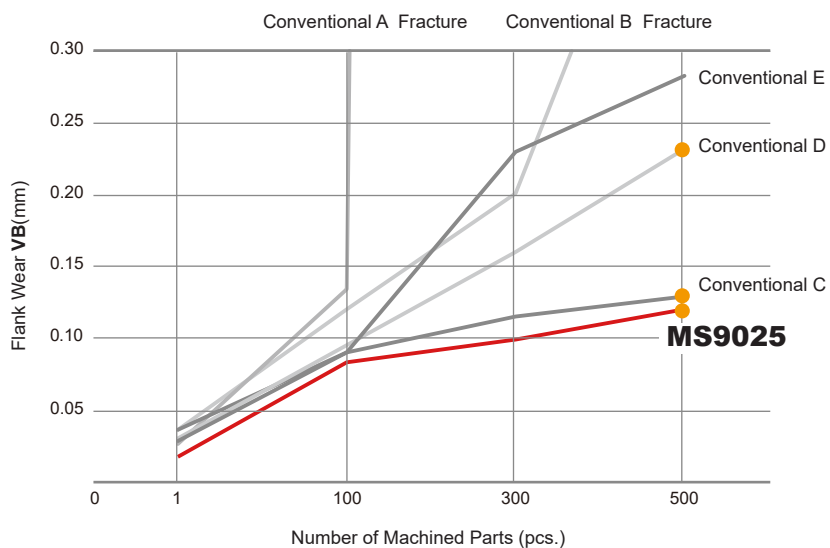
Conventional



Rz=0.61 μm

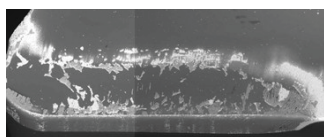
Cutting Performance

Stainless Steel SUS440C, Wear Resistance Comparison

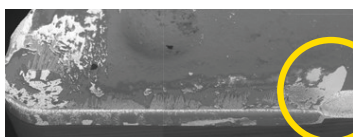


<Cutting Conditions>
 Workpiece Material : JIS SUS440C
 Inserts : DCGT11T302
 Machining Methods : External Continuous Cutting
 Cutting Speed : $v_c = 100$ m/min
 Feed per Rev. : $f = 0.08$ mm/rev
 Depth of Cut : $a_p = 1.0$ mm
 Cutting Mode : Wet Cutting (Oil)

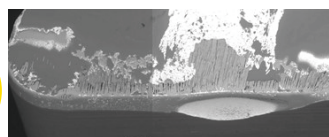
Taken after machining 500 Parts



MS9025



Conventional C : Flaking

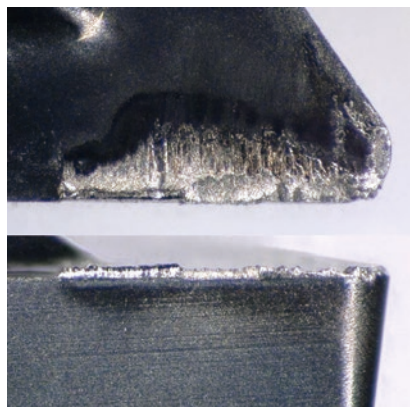


Conventional D : Base material exposure

Stainless Steel SUS304, Cutting Edge Comparison

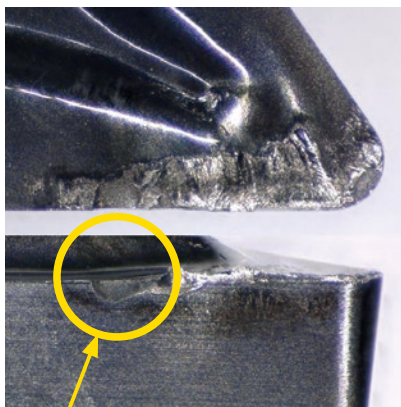
After machining 500 parts

MS9025



VB=0.03mm

Conventional



Notch Wear

VB=0.07mm

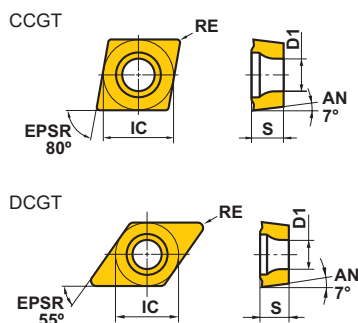
<Cutting Conditions>
 Workpiece Material : JIS SUS304
 Inserts : DCGT11T302
 Machining Methods : External Continuous Cutting
 Cutting Speed : $v_c = 57$ m/min
 Feed per Rev. : $f = 0.03$ mm/rev
 Depth of Cut : Rough $a_p = 0.05$ mm
 Finish $a_p = 0.02$ mm
 Cutting Mode : Wet Cutting (Oil)



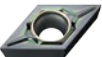

MS9025

NEW

7° Positive Inserts (With Hole)

G Class



Finish	Light	Medium	
FS-P	LS-P	R-SN	
			
Finish	Finish	Light	Medium
FS-P	R-SRF	LS-P	R-SN
			

(mm)

Order Number	Cutting Area	MS9025	IC	S	RE	D1
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-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
CCGT060201MR-SN	M	●	6.35	2.38	0.1	2.8
CCGT060202MR-SN	M	●	6.35	2.38	0.2	2.8
CCGT09T301MR-SN	M	●	9.525	3.97	0.1	4.4
CCGT09T302MR-SN	M	●	9.525	3.97	0.2	4.4
CCGT09T304MR-SN	M	●	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
DCGT11T301MR-SRF	F	●	9.525	3.97	0.1	4.4
DCGT11T302MR-SRF	F	●	9.525	3.97	0.2	4.4
DCGT11T304MR-SRF	F	●	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
DCGT070201MR-SN	M	●	6.35	2.38	0.1	2.8
DCGT070202MR-SN	M	●	6.35	2.38	0.2	2.8
DCGT070204MR-SN	M	●	6.35	2.38	0.4	2.8
DCGT11T301MR-SN	M	●	9.525	3.97	0.1	4.4
DCGT11T302MR-SN	M	●	9.525	3.97	0.2	4.4
DCGT11T304MR-SN	M	●	9.525	3.97	0.4	4.4

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

Recommended Cutting Conditions

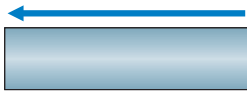
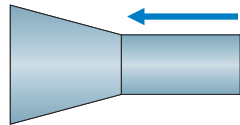
(mm)

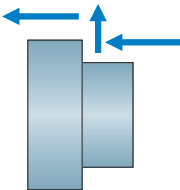
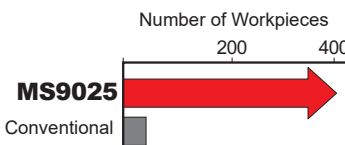
	Workpiece Material	Properties	Cutting Area		Chip Breaker	Grade	Cutting Speed vc (m/min)	Feed per Rev. f (mm/rev)	Depth of Cut ap
M	Electromagnetic Stainless Steels (SUS440C, SUS420J2 etc.)	Hardness 230HBW	●	F	FS-P	MS9025	100(50—180)	0.04—0.12	0.2—1.4
			●	F	R-SRF	MS9025	100(50—180)	0.05—0.12	0.1—0.5
			●	L	LS-P	MS9025	100(50—180)	0.04—0.15	0.3—3.0
			●	M	R-SN	MS9025	100(50—180)	0.01—0.10	0.1—5.0
S	Heat Resistant Alloys (SUH etc.)	—	●	F	FS-P	MS9025	80(40—140)	0.04—0.12	0.2—1.4
			●	F	R-SRF	MS9025	80(40—140)	0.05—0.12	0.1—0.5
			●	L	LS-P	MS9025	80(40—140)	0.04—0.15	0.3—3.0
			●	M	R-SN	MS9025	80(40—140)	0.01—0.10	0.1—5.0

Cutting Conditions (Guide) :

● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

Application Examples

Insert		DCGT11T302M-LS-P	DCGT070201M-FS-P
Workpiece	<div>JIS SUS420J2 Stainless Steel</div> <div></div>		<div>JIS SUS440C Electromagnetic Stainless Steel</div> <div></div>
	Component		Brake Parts
	Application		External Continuous Turning
	Cutting Conditions	Cutting Speed vc (m/min)	117
Feed per Rev. f (mm/rev)		0.1	0.05
Depth of Cut ap (mm)		0.2	0.2
Cutting Mode		Wet Cutting (Oil)	Wet Cutting (Oil)
Results	<div><div>Number of Workpieces</div><div>500010001500</div><div>MS9025<div><div></div></div></div><div>Conventional<div><div></div></div></div></div> <div>Improved wear resistance and tool life increased by a factor of 1.7.</div>		<div><div>Number of Workpieces</div><div>100020003000</div><div>MS9025<div><div></div></div></div><div>Conventional<div><div></div></div></div></div> <div>Improved welding resistance and double tool life when compared to a conventional tool.</div>

Insert		DCGT11T304M-LS-P	
Workpiece		SUH3 Heat Resistant Alloy	
			
Component		Valve	
Application		External and Face Continuous Turning	
Cutting Conditions	Cutting Speed vc (m/min)	80	
	Feed per Rev. f (mm/rev)	0.12-0.15	
	Depth of Cut ap (mm)	0.3-0.5	
Cutting Mode		Wet Cutting (Oil)	
Results		Number of Workpieces	
			
Conventional products tend to have a worsened surface during processing. On the other hand, the machined surface of MS9025 is stable even with a tool life of 5 times or more.			

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

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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