

# MS9025

PVD COATED CARBIDE GRADE FOR HIGH PRECISION  
AND SMALL PARTS MACHINING



# MS9025

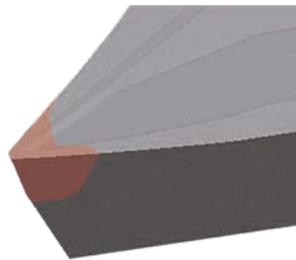
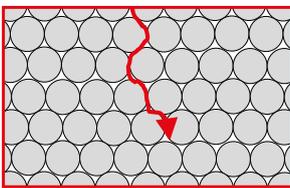
## EFFECTIVE REDUCTION OF NOTCH WEAR WITH A BALANCE OF WEAR AND FRACTURE RESISTANCE

### IMPROVED CEMENTED CARBIDE

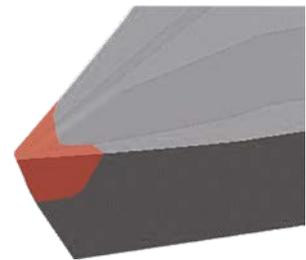
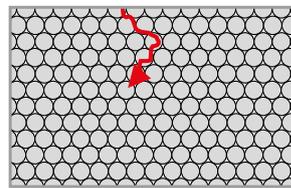
Thermal conductivity has been improved by optimising the grain size and therefore reducing the boundary contact between the WC particles. This optimisation reduces the temperature of the cutting edge during machining.

Reducing the cutting edge temperature by improved thermal conductivity.

Higher cutting edge temperatures due to more particle boundary contact.



MS9025



Conventional

### SMOOTH SURFACE OF THE COATING

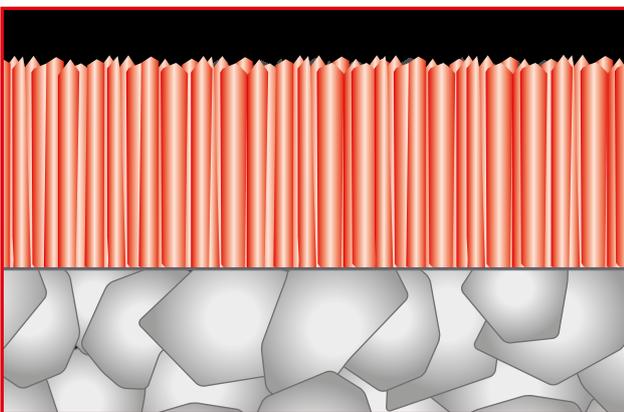
The even surface of the coating has been achieved by first making the the carbide substrate smooth then by promoting straight growth of the coating crystals. This leads to excellent welding resistance.

#### Smooth Cemented Carbide

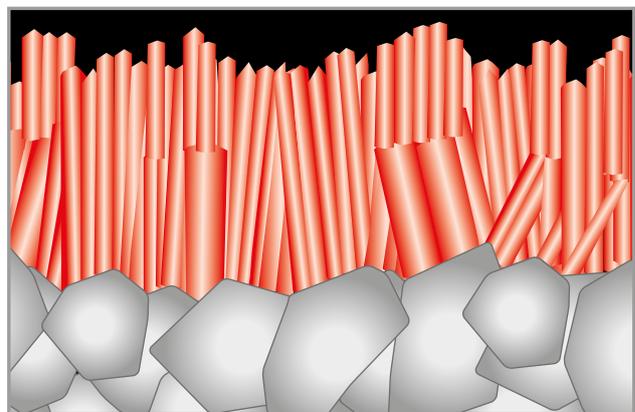
- Straight crystal growth
- Smooth carbide surface
- Excellent welding resistance

#### Rough Cemented Carbide

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



MS9025



Conventional

# MS9025

## 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.

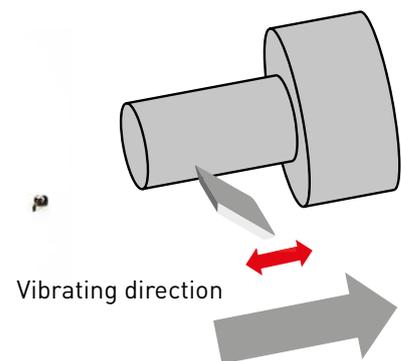
Without controlled vibration



With controlled vibration frequency = 0.75/rev



With controlled vibration frequency = 1.25/rev



Challenges of controlled vibration machining:

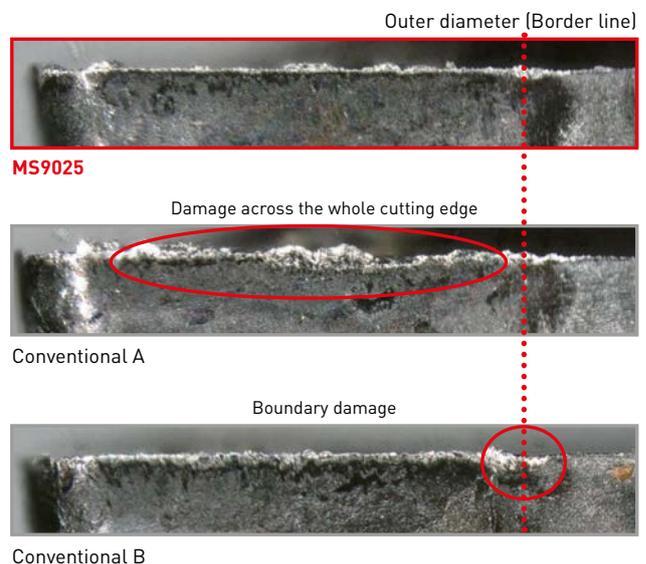
Compared to standard machining there is a greater chance of chipping due to the extra stress on the cutting edge and also because of the consequences of work hardening.

### 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 increases thermal conductivity and heating of the cutting edge.

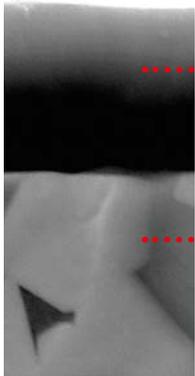
#### After 500 passes at 15 m per pass

Workpiece material	DIN X5CrNi18-10 (1.4301)
Inserts	DCGT11T302M
Vc (m/min)	100
f (mm/rev.)	0.08
ap (mm)	1.0
The number of vibration	D = 1.25/rev.
Cutting mode	External Continuous cutting Wet cutting (Oil)

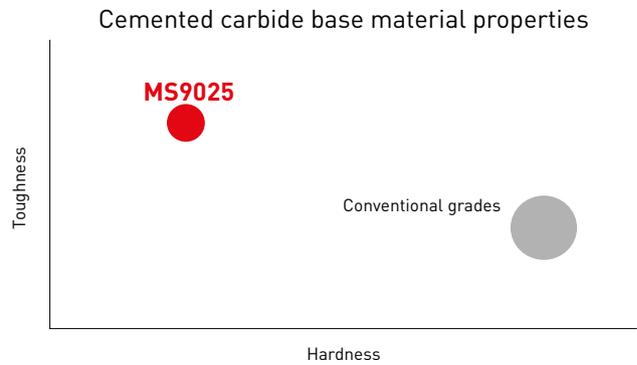


# MS9025

## HIGH AL-RICH (AL,TI)N SINGLE LAYER COATING TECHNOLOGY

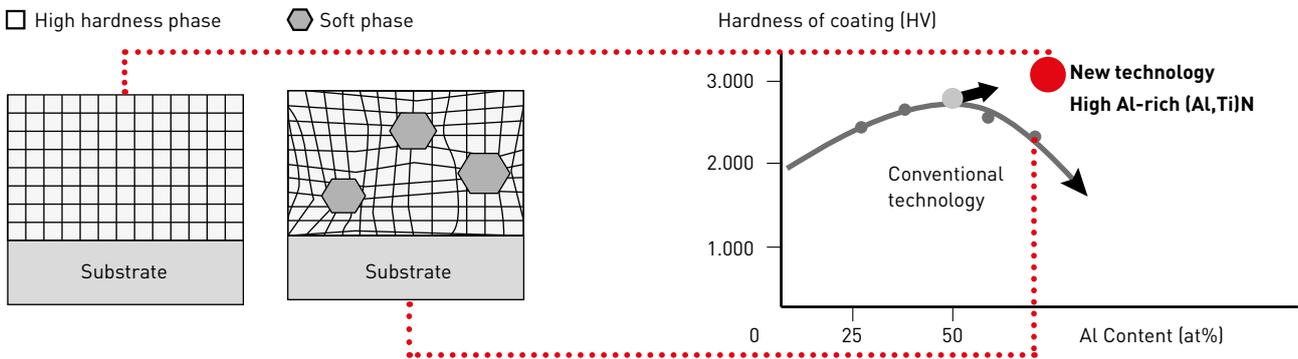


- Al-rich (Al,Ti)N**
  - Superior flank wear resistance
  - Superior crater wear resistance
  - Excellent welding resistance
- Special cemented carbide for MS9025**
  - Superior fracture resistance
  - Excellent chipping resistance



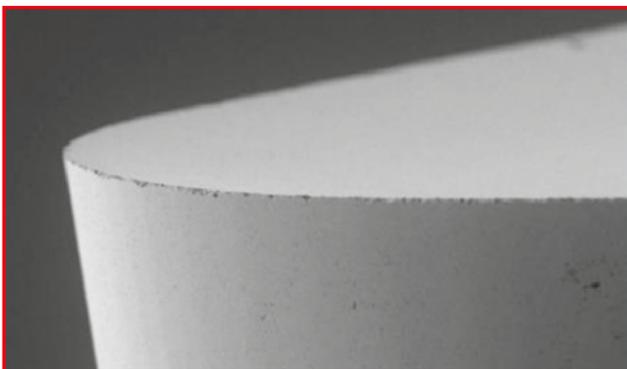
### HIGH AL AND CONVENTIONAL COATING COMPARISON

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.



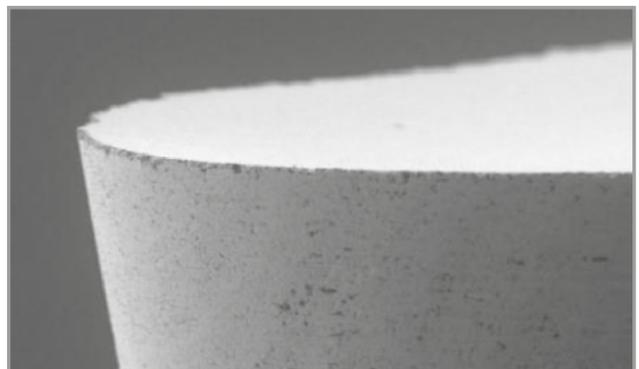
### EXTREMELY HIGH QUALITY CUTTING EDGE

Technology that provides superior dimensional stability and reduces burrs.



MS9025

Rz = 0.14 μm



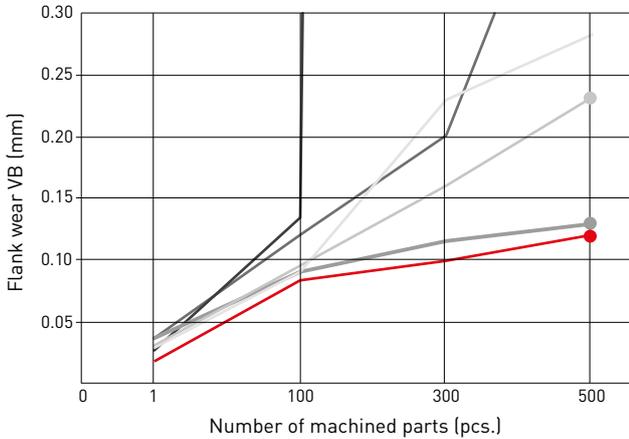
Conventional

Rz = 0.61 μm

# MS9025

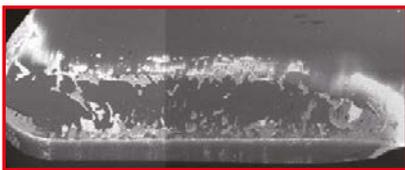
## CUTTING PERFORMANCE

### STAINLESS STEEL X105CRM017 (DIN 1.4125), WEAR RESISTANCE COMPARISON



Workpiece material	X105CrMo17 (DIN 1.4125)
Inserts	DCGT11T302
Vc (m/min)	100
f (mm/rev.)	0.08
ap (mm)	1.0
Cutting mode	External Continuous cutting Wet cutting (Oil)

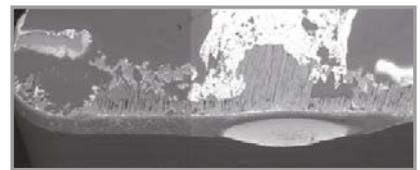
#### After machining 500 parts



MS9025



Conventional C: Flaking



Conventional D: Base material exposure

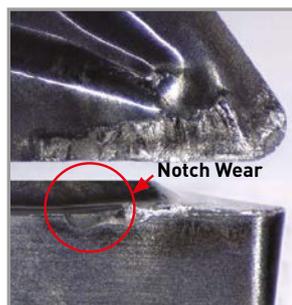
### STAINLESS STEEL DIN X5CRNI18-10 (1.4301), CUTTING EDGE COMPARISON

#### After machining 500 parts



MS9025

VB = 0.03 mm



Conventional

VB = 0.07 mm

Workpiece material	X5CrNi18-10 (DIN 1.4301)
Inserts	DCGT11T302
Vc (m/min)	57
f (mm/rev.)	0.03
ap (mm)	Rough: 0.05 Finish: 0.02
Cutting mode	External Continuous cutting Wet cutting (Oil)

# MS9025

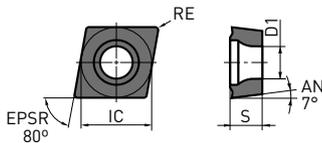
## 7° POSITIVE INSERTS (WITH HOLE)

M

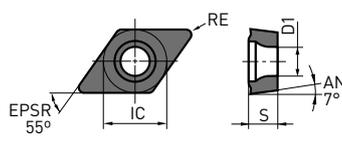
S

### G Class

#### CCGT



#### DCGT



#### CHIPBREAKER IDENTIFICATION

APPLICATION



FS-P, R-SRF

LS-P

R-SN

Order number				MS9025	IC	S	RE	D1
	F	L	M					
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

# MS9025

Order number		MS9025	IC	S	RE	D1
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

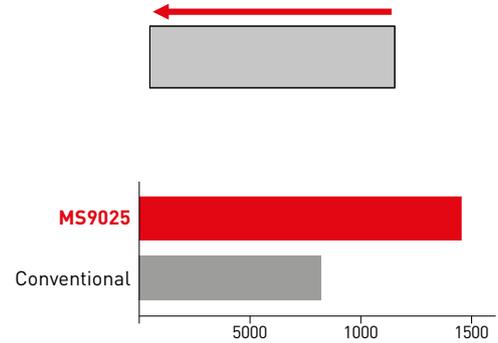
## RECOMMENDED CUTTING CONDITIONS

Cutting conditions: ●: Stable cutting ●: General cutting ⊕: Unstable cutting

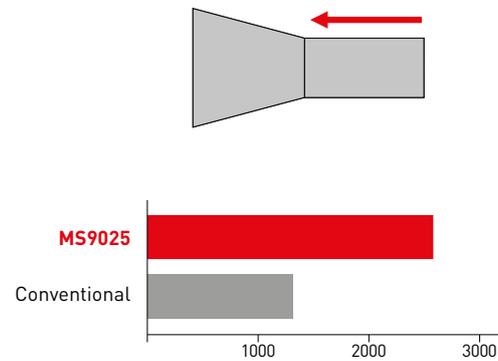
Material	Hardness	Conditions		Grade	Vc	f	ap	
M Electromagnetic stainless steels (SUS440C, SUS420J2 etc.)	230HBW	●	F	FS-P	MS9025	100 (50-180)	0.04-0.12	0.2-1.4
		●	F	R-SRF	MS9025	100 (50-180)	0.05-0.12	0.1-0.5
		●	L	LS-P	MS9025	100 (50-180)	0.04-0.15	0.3-3.0
		●	M	R-SN	MS9025	100 (50-180)	0.01-0.10	0.1-5.0
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

# APPLICATION EXAMPLES

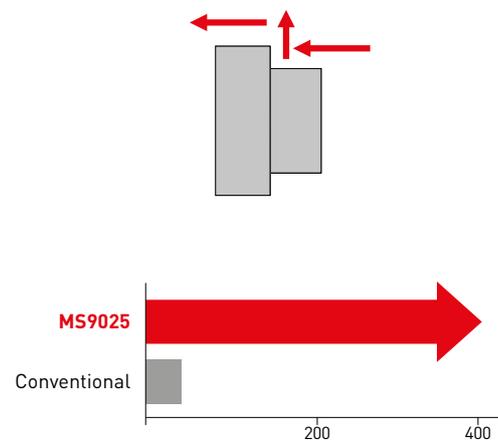
Workpiece material	JIS SUS420J2 Stainless steel
Insert	DCGT11T302M-LS-P
Component	Solenoid parts
Application	External continuous turning
Vc (m/min)	117
f (mm/rev)	0.1
ap (mm)	0.2
Cutting mode	Wet cutting (Oil)
Result	Improved wear resistance and tool life increased by a factor of 1.7.



Workpiece material	JIS SUS440C Electromagnetic stainless steel
Insert	DCGT070201M-FS-P
Component	Brake parts
Application	External continuous turning
Vc (m/min)	38
f (mm/rev)	0.05
ap (mm)	0.2
Cutting mode	Wet cutting (Oil)
Result	Improved welding resistance and double tool life when compared to a conventional tool.



Workpiece material	SUH3 Heat resistant alloy
Insert	DCGT11T304M-LS-P
Component	Valve
Application	External and face, continuous turning
Vc (m/min)	80
f (mm/rev)	0.12-0.15
ap (mm)	0.3-0.5
Cutting mode	Wet cutting (Oil)
Result	Conventional products tend to produce a worsening surface finish during processing. However, the machined surface produced by MS9025 is stable even with a tool life of 5 times or more.



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







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