



For more information

Grades for small parts machining

SH7025

Tungaloy Report No. 561-US

Superior surface quality and process security in small part machining







SH7025



Cutting edge sharpness is maintained over a long period of time,
providing light cutting and excellent surface finish

SH7025

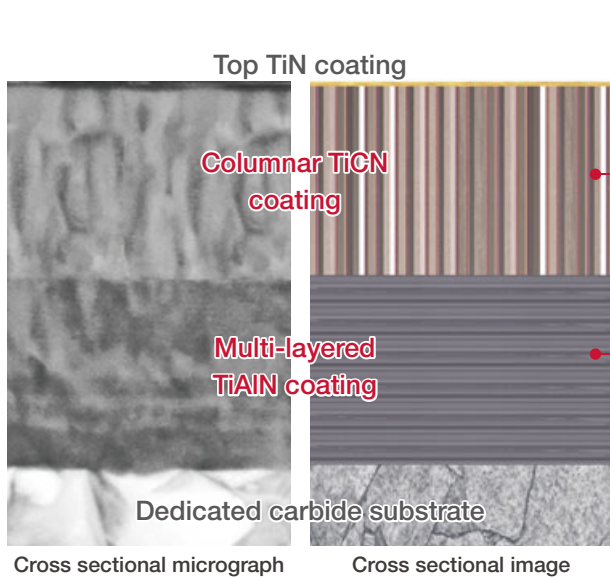
New insert grade for high surface quality



SH7025

- The latest grade with sharp cutting edge designed for small part machining.
- A combination of a columnar-structured TiCN coating and multilayered TiAlN coating provides superior surface quality and process security.

Designed to prevent built-up edge, wear, and edge chipping, SH7025 provides long, predictable tool life and superior surface quality



1 For high surface quality

Built-up edge resistant TiCN coating improves surface finish quality.

2 For extremely long tool life

Wear-resistant columnar-structured TiCN coating ensures long tool life.

3 For superior process security

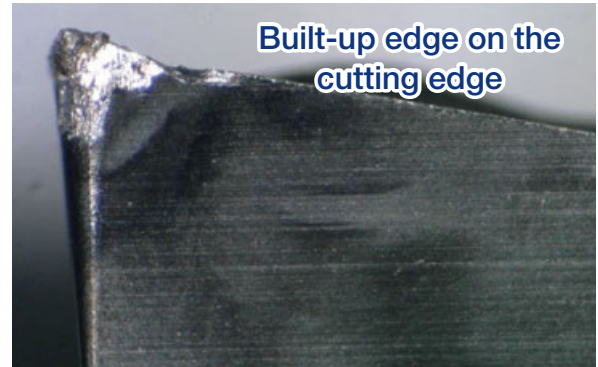
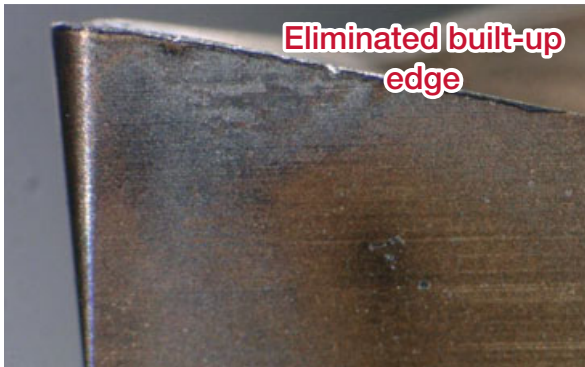
Chipping-resistant multi-layered TiAlN coating provides process security.

1 For high surface quality

Built-up edge resistant TiCN coating improves surface finish quality

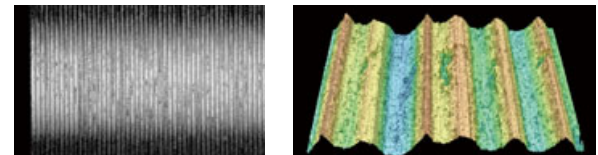
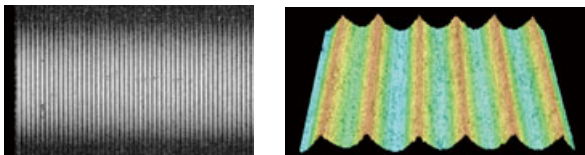
SH7025

Conventional



O.D. surface quality

O.D. surface quality



Actual image

3D surface profile

Actual image

3D surface profile

Surface roughness chart

Surface roughness chart



High quality surface finish!

Poor surface quality due to built-up edge

2 Extremely long tool life

Wear-resistant columnar-structured TiCN coating ensures long tool life

SH7025

Conventional



Columnar-structured TiCN coating slows wear progression

Rapid flank wear progression



Extended tool life

Poor surface quality, creating a pile of part scraps

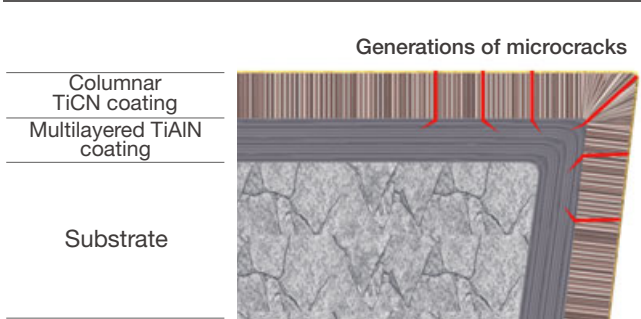
Maintains excellent surface quality with no part scraps

SH7025

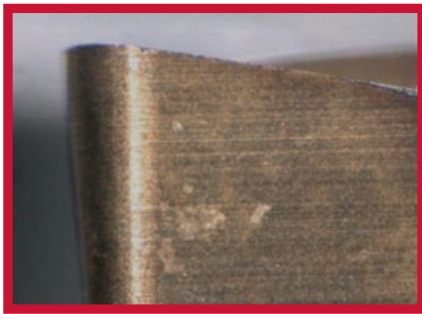
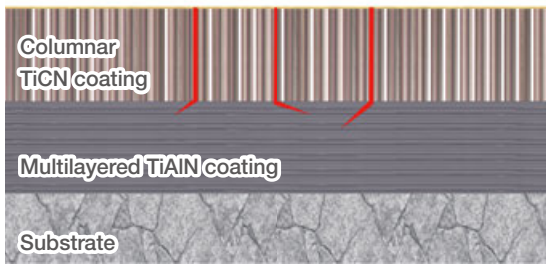
3 Superior process security

Chipping-resistant multi-layered TiAlN coating provides process security.

SH7025

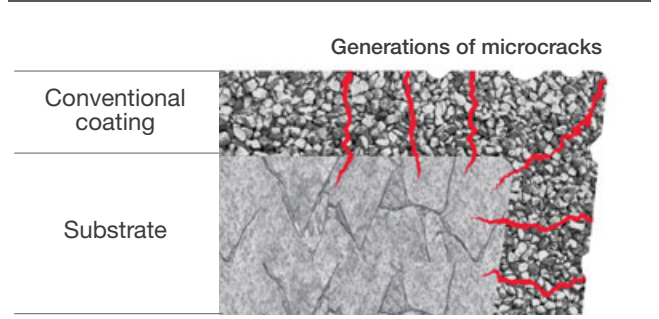


TiAlN coating prevents cracks from further propagation

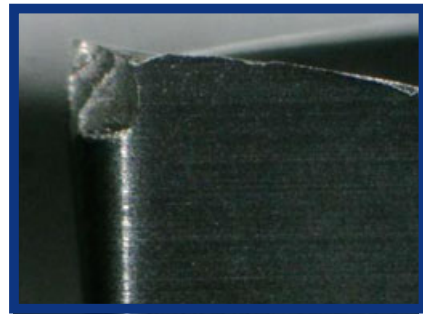
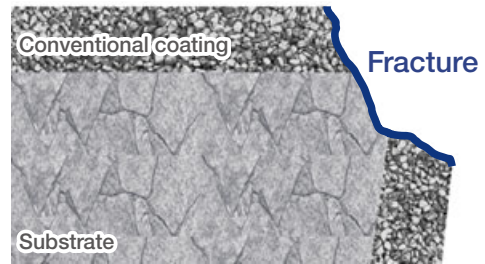


Eliminates fractures and provides security

Conventional



Crack reaches the substrate causing catastrophic failure



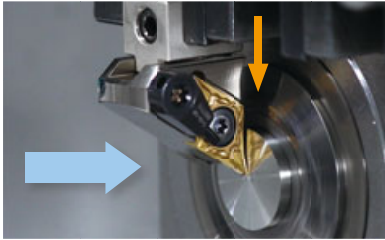
Catastrophic failure

CUTTING PERFORMANCE

3D surface profiling analysis

Face turning

Below images are viewed in this direction



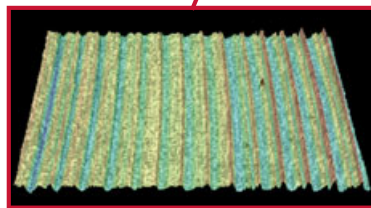
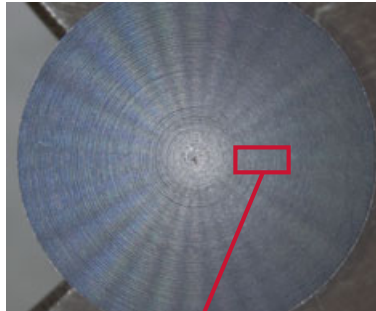
Case 1

P SUJ2 / 100Cr6

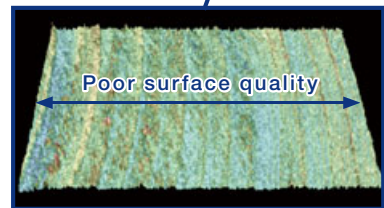
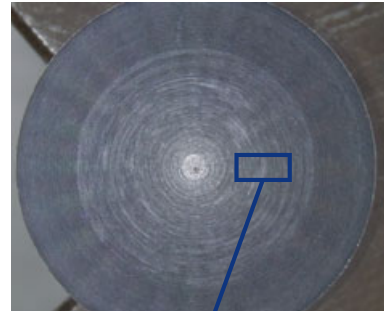
Insert : DCGT 32.50.5
Cutting speed : $V_c = 492$ sfm
Feed : $f = 0.0020$ ipr
Depth of cut : $a_p = 0.012$ "
Coolant : Wet

Provides high quality surface finish

SH7025



Conventional



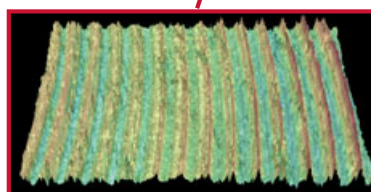
Case 2

M SUS316L / X2CrNiMo17-12-2

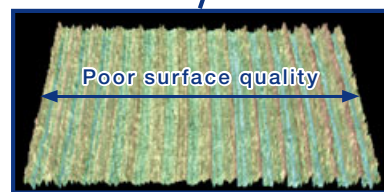
Insert : DCGT 32.50.5
Cutting speed : $V_c = 328$ sfm
Feed : $f = 0.0020$ ipr
Depth of cut : $a_p = 0.012$ "
Coolant : Wet

Provides high quality surface finish

SH7025



Conventional

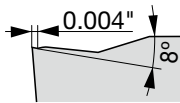


3D pressed-in chipbreaker series dedicated for turning small parts

Now available in SH7025 to ensure consistent and reliable chip control

New

JP First choice chipbreaker for high precision finishing



Eliminates chip nesting and other chip-associated issues that impede the shop's productivity and provides stable chip breaking over a wide range of feed rates and D.O.C.

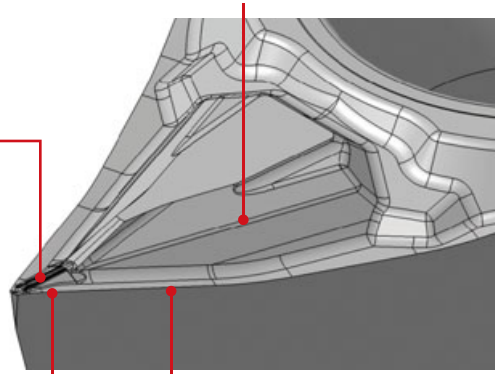
- Effective chip breaking for high part quality
- Versatile geometry designed for a broad application range
- Eliminates burr generation and controls vibration during aggressive D.O.C.

Secondary rake with multiple facets

Guides and redirects chips generated during machining at great cutting depths

A protrusion extending towards the nose radius

Provides excellent chip control in finish to super-finish cutting



Cutting edge with a steep inclination angle

- For better chip evacuation
- For reduced cutting loads

Primary rake with variable angles

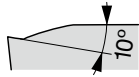
Controls the generation of burrs and vibration when machining at a maximum cutting depth capability

■ Chip control

JP	Competitor	JP	Competitor	JP	Competitor
P Insert : DCGT 32.50 FN-JP Workpiece material : 1045 Cutting speed : Vc = 262 sfm Feed : f = 0.0008 ipr Depth of cut : ap = 0.020" Coolant : Wet		P Insert : DCGT 32.50 FN-JP Workpiece material : 1045 Cutting speed : Vc = 262 sfm Feed : f = 0.0012 ipr Depth of cut : ap = 0.118" Coolant : Wet		M Insert : DCGT 32.50 FN-JP Workpiece material : 304SS Cutting speed : Vc = 262 sfm Feed : f = 0.012 ipr Depth of cut : ap = 0.0020" Coolant : Wet	

JP chipbreaker provides superior chip control over a broad range of applications from super-finishing with light D.O.C. to aggressive cutting depth.

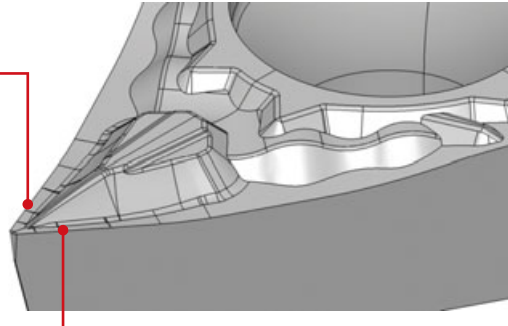
JS First choice chipbreaker for finish cutting



Chipbreaker geometry that allows light cutting action and excellent chip breaking

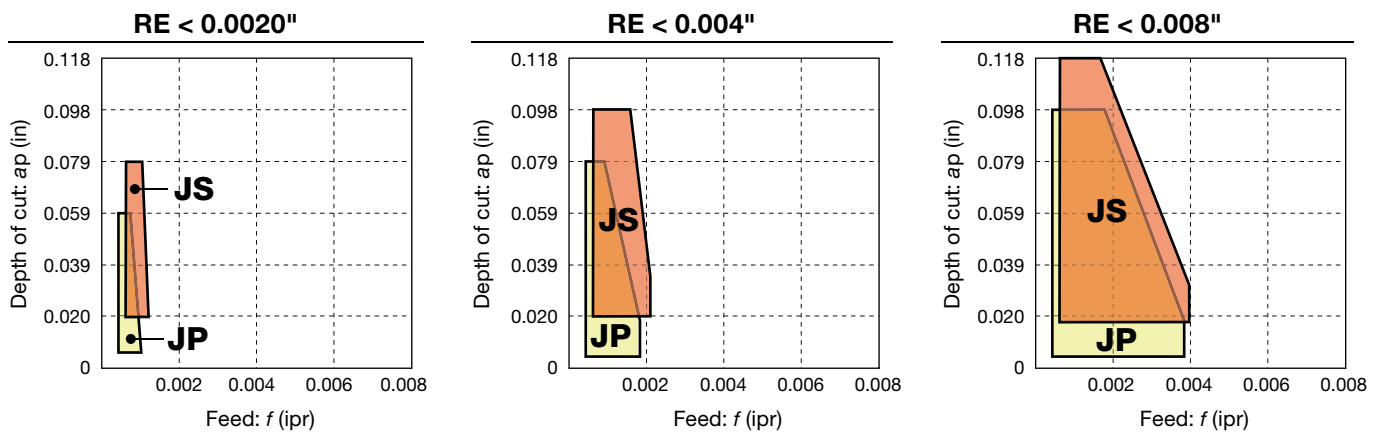
- A steep cutting edge inclination angle for better chip control and reduced cutting load
- A unique protrusion that extends towards the radius effectively controls chip flow from small to large cutting depths

Cutting edge with a steep inclination angle
Provides good chip evacuation and reduced cutting loads



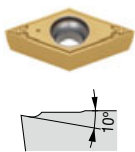
Rake with variable angles and steep protrusion
Provides stable chip control in the small to large cutting depth range and also maintains cutting edge integrity and sharpness over extended period of time

■ Chip control range

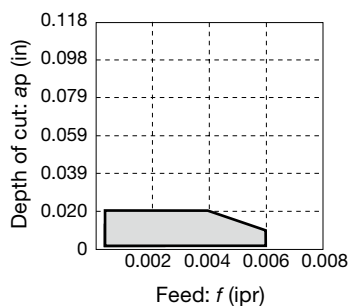


■ Complementary chipbreakers

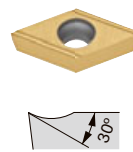
01



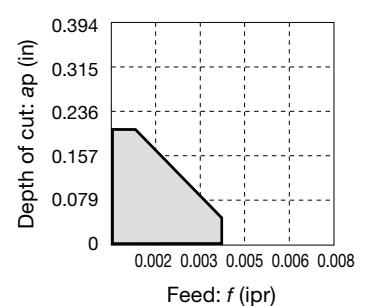
Pressed-in chipbreaker for high part quality that provides good chip control in the light D.O.C. range.



J10




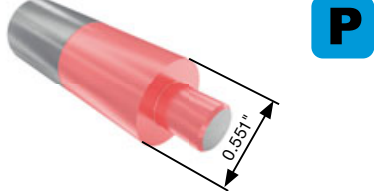
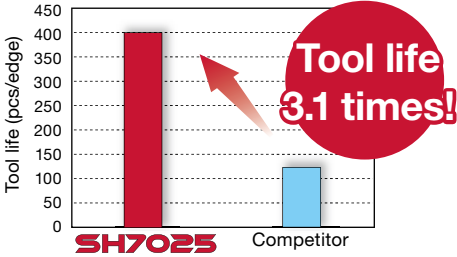
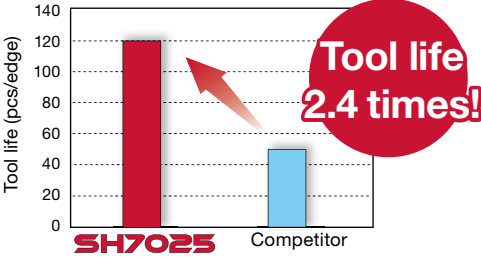
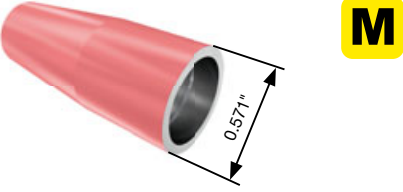
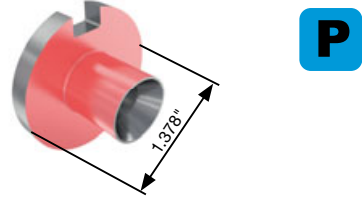
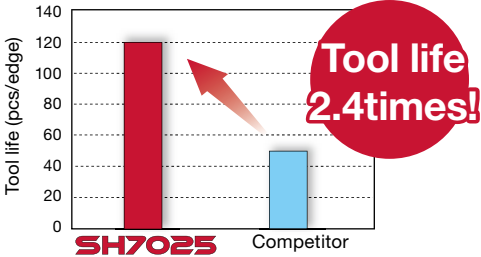
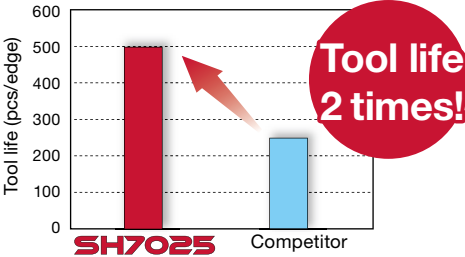
Ground-in chipbreaker that demonstrates good chip control when machining at varying cutting depths.



STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Chip-breaker	Grade	Cutting speed Vc (sfm)	Depth of cut ap (in)	Feed: f (ipr)			
						RE < 0.0012"	RE < 0.004"	RE < 0.008"	RE < 0.016"
P	Carbon steel Alloy steel	JP	SH7025	33 - 656	0.0020 - 0.0980	0.0008 - 0.0012	0.0008 - 0.0020	0.0008 - 0.0040	-
		JS	SH7025	33 - 656	0.0200 - 0.1180	0.0008 - 0.0012	0.0008 - 0.0020	0.0008 - 0.0040	0.0020 - 0.0080
M	Stainless steel	JP	SH7025	33 - 656	0.0020 - 0.0980	0.0008 - 0.0012	0.0008 - 0.0020	0.0008 - 0.0040	-
		JS	SH7025	33 - 656	0.0200 - 0.1180	0.0008 - 0.0012	0.0008 - 0.0020	0.0008 - 0.0040	0.0020 - 0.0080

PRACTICAL EXAMPLES

Workpiece type		Guide for linear motion bearing	Spool pin
Insert		DCGT 32.50.5 FN-JP	DCGT 32.50.5 FN-JP
Grade		SH7025	SH7025
		316SS	4140
Workpiece material			
Cutting conditions	Cutting speed: V_c (sfm)	492	492
	Feed : f (ipr)	0.0012	0.0012
	Depth of cut : a_p (in)	0.004	0.0020
	Machining	External and face turning	External and face turning
	Coolant	Wet	Wet
Results		 <p>SH7025 grade insert eliminated built-up edge while substantially extending tool life.</p>	 <p>SH7025 significantly prolonged tool life over the competitor grade with no part scraps.</p>
Workpiece type		Pin	Flange
Insert		DCGT 32.50 FN-JP	DCGT 32.50.5 FN-JS
Grade		SH7025	SH7025
		Stainless steel	1215
Workpiece material			
Cutting conditions	Cutting speed: V_c (sfm)	6,562	4,265
	Feed : f (ipr)	0.0020	0.0012 - 0.0020
	Depth of cut : a_p (in)	0.020	0.118
	Machining	External turning	External and face turning
	Coolant	Wet	Wet
Results		 <p>SH7025 eliminated insert fracture that caused part surface deterioration and provided long, predictable tool life.</p>	 <p>SH7025 provided slower flank wear progression and eliminated part surface deterioration.</p>

Other processing examples



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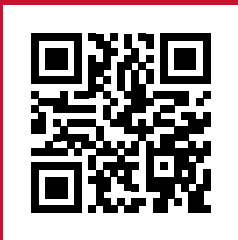
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