

ISOTURN **GROOV**ETURN

TURNING/GROOVING JULY 2011 • METRIC

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New Product Announcement

**IC806 – A New PVD
Coated Grade for
Turning and Grooving
High Temperature Alloys**



New Product Announcement

Important Features

ISCAR is introducing the IC806 - a new complimentary SUMO TEC PVD coated grade for machining high temperature alloys, especially Inconel 718

New grade for Inconel machining

Inconel 718 belongs to a family of nickel based superalloys which are used extensively for applications where withstanding high temperatures and high corrosion resistance is required. Inconel 718 is widely used in the aerospace industry in components which are placed in the hot section of the engine and in additional sectors of the oil industry. The microstructure of Inconel 718 is made of an austenitic structure possessing high tensile and yield strength.

The major problems encountered when machining Inconel 718 are characterized by very high temperatures on the cutting edge of the insert due to the abrasive elements in the material composition (high Nickel content of 50-55% and Chrome 17-21%) which causes high wear rates, chipping, notching and insert breakage.

These factors contribute to reduced tool life and high deformation of the cutting edge even at low cutting speeds.

Another complexity associated with Inconel is its tendency to malform consequently due to its metallurgical sensitivity to residual stresses and self hardening effects during the cutting operation. ISCAR's aim is to effectively machine this unique material, and has therefore successfully developed the IC806, which is a sub micron grade with superior wear resistant properties and advanced PVD TiAlN. ISCAR's new Sumo-Tech coating exhibits better results compared to competitor's grades as well as other ISCAR grades.

IC806 has a hard submicron substrate with PVD coating and a special post coating treatment which provides substantially improved tool life and better reliability.

1. **Substrate**

A very hard submicron grain size.

2. **New SUMO TEC PVD coating**

Improves toughness

Improves flaking & chipping resistance

Provides very reliable and repeatable results

Recommendations

1. Turning Inconel 718 at moderate to high cutting speeds
2. Stable to slightly unstable conditions



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TEST REPORT

	ISCAR IC907	ISCAR IC806
Workpiece Material	INCONEL 718	
Operation	Groove-Turn	
Insert	GIPY 5.00-2.50	
Vc m/min	30	60
f mm/rev	0.10	0.12
ap (mm)	1	
Parts/Edge	2	2

Productivity increase 120%

Jet Engine Parts Machining with IC806 Grade



Frontal Spool   Material: Inconel 718	External Machining CNMG 432-TF IC806 Vc=70 m/min ap=2-3 mm f=0.15 mm/rev	 IC806
	GIF 8.00E-0.80 IC806 Vc=70 m/min ap=2.5 mm f=0.20 mm/rev	 IC806
Rear Hub   Material: Inconel 718	External Machining CNMG 432-TF IC806 Vc=60 m/min ap=3 mm f=0.20 mm/rev	 IC806
	GIPY 6.00-3.00 IC806 Vc=60 m/min ap=1 mm f=0.15 mm/rev	 IC806

Cutting Conditions

ISO	Material	Condition	Hardness HB	Material No.	NEW		
					IC806	IC807	IC808
S	High temp. alloys Ni or Co based	Annealed	250	33	50-80	40-50	30-40
		Cured	350	34	40-70	35-45	25-35
		Cast	320	35	30-65	30-40	15-30



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Grade Application Range on (ISO-S) High Temperature Alloys

