



MP2050 &
CS300

**GET TOUGH ON
AEROSPACE AND POWER
GENERATION MILLING**

SECO 



NEW MILLING TECHNOLOGY MAKES PRODUCTIVITY SOAR

Aerospace and power generation components present some of today's toughest machining challenges. Applications often include difficult-to-machine materials such as nickel-based superalloys and stainless steels that must exhibit exceptional mechanical and chemical properties at elevated temperatures.

To boost your productivity, Seco now offers new milling technology specifically designed for these difficult-to-machine materials. The new carbide grade MP2050 and ceramic grade CS300 provide the optimized wear resistance and toughness you need to aggressively machine nickel-based superalloys and stainless steels.

CS300 ceramic inserts can reduce machining time by up to eight times compared to traditional inserts, allowing you to reach the highest possible productivity levels. While for martensitic stainless steels, the MP2050 grade features a special substrate that continues to perform even when an insert's coating is worn.



AEROSPACE AND POWER GENERATION MATERIALS

Aerospace and power generation applications require high performance materials that provide continuous stability in even the hottest and most corrosive conditions. While austenitic and martensitic stainless steels and nickel-based superalloys offer many advantages in these applications, their properties create unique challenges that make them difficult to machine.

STAINLESS STEELS

Austenitic and martensitic stainless steels have sticky and abrasive characteristics that lead to unstable machining conditions due to chip adhesion and cutting edge build up. They also have high tensile strength and are heat resistant.

SUPERALLOYS

Heat-resistant superalloys are commonly classified as "difficult-to-machine" alloys. The classification covers a broad range of nickel-based, iron-based and cobalt-based alloys developed specifically for applications demanding exceptional mechanical and chemical properties at elevated temperatures.

The most common nickel-based superalloy is Inconel 718. It is a precipitation hardenable nickel chromium alloy that contains significant amounts of iron, niobium and molybdenum along with lesser amounts of aluminum and titanium.

Practically all superalloys are difficult materials to machine due to their strength, low thermal conductivity, abrasiveness and tendency to work harden whenever a tool makes a cut. The machined surface of the component is deformed slightly during the cut, leaving it substantially harder than the original material, which results in notching and chipping during subsequent machining passes. The toughness of these alloys also results in chips that are difficult to break, especially in turning applications.

All of these factors dictate that a correct combination of tool, tool geometry, cutting data and tool path is essential for good machining results. In addition, these alloys' low thermal conductivity causes heat build-up which makes correct coolant application necessary.



OVERCOME UNSTABLE MACHINING CONDITIONS

The new MP2050 carbide insert grade is developed specifically for martensitic stainless steels. It effectively machines such strong, sticky materials with the perfect balance of toughness and wear resistance.

The MP2050 insert grade features a completely new substrate and a post treatment applied to its coating that effectively prevents chip adhesion and significantly slows cutting edge build up. The grade's extremely tough substrate also enhances wear predictability, and even if an MP2050 grade insert's coating wears off, the substrate prevents the immediate, unexpected failure of the entire insert.

KEY ADVANTAGES

- High process stability and predictability
- Reduced tool costs through longer tool life
- High resistance to thermal cracking
- Withstands plastic deformation
- Effective chip control

PRODUCT RANGE

- Round inserts in sizes 10, 12, 16 and 20
- Square Shoulder
 - Turbo size 10 and 12 (two corner radii options)
 - Square T4 08 and 12 (two corner radii options)
 - Square 6 08 (R 0.8 mm)
- Face Milling
 - ONMU 05 and 09
- High Feed
 - HF2 LP05 and LP06
 - HF4 LO06
 - HF6 218.21-230
 - 218.19-160

APPLICATION AREAS

MP2050 is ideal for milling materials such as austenitic and martensitic stainless steels, as well as titanium. It excels in applications involving interrupted cuts, long tool overhangs and weak fixturing.

- Jet engine casings
- Turbine blades
- Unstable machining conditions





SHORTEN CYCLE TIMES AND PRODUCE MORE PARTS WITH CS300

The new CS300 ceramic grade was developed specifically to tackle the challenges of milling nickel-based superalloy materials. The flat, solid round SiAlON-type silicon nitride inserts are custom designed and feature protection chamfer edges. They pair with new RN/RP cutter bodies for increased strength and process stability necessary for more aggressive machining operations.

Designed to optimize performance of the ceramic inserts, the new cutter bodies use Seco's compact Wedge locks instead of conventional insert clamps to allow more inserts per cutter body diameter. Plus, to ensure optimum chip evacuation and heat control, each Wedge lock features internal coolant channels that pinpoint jet streams of air precisely into the cutting zone.

KEY ADVANTAGES

- Increased toughness, more suitable for interrupted machining
- Wedge lock insert clamping
- High notch wear resistance
- Shorter cycle times through higher milling feed rates
- Fast and efficient chip evacuation
- Higher part quality and process stability via effective thermal control
- Reduce cost per part due to longer tool life
- Increased productivity per insert cutting edge
- Superior part tolerances and surface finishes



PRODUCT RANGE

Cutter bodies:

- RP 1204 Pocketing
 - 32 mm – 50 mm diameters/ $a_{p_{max}} = 6$ mm
 - Ramping capability
- RN 1207 and RN 1204 Facing
 - 32 mm – 125 mm diameters/ $a_{p_{max}} = 6$ mm (inch range 2", 2.5" and 3")

Inserts:

- SiAlON grade
- 3 insert types
- Edges per insert (up to 8 on RN_1207 and RN_1204 bodies, up to 4 on RP_1204 body)
- T-prep chamfers
- Clearance angles (RN – 0 degrees, RP – 11 degrees)

APPLICATION AREAS

Seco's new ceramic grades are specifically designed for aggressive milling of aerospace and power generation turbine engine components including:

- Jet engine casings
- Blades
- Blisks
- Discs
- Shafts

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