

Technology

# Selecting the Right Turning Insert for HRSA Materials

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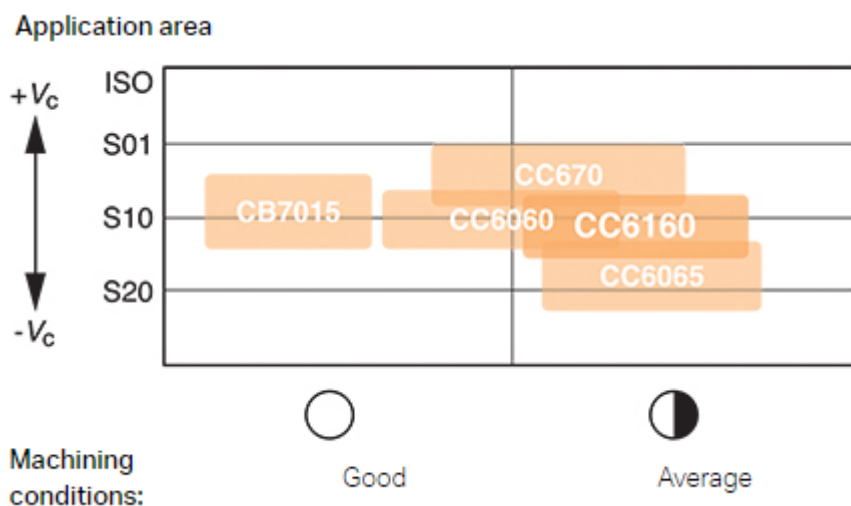
Challenging machining places high demands on insert grades for turning heat resistant super alloys (HRSA) and titanium. Machinability of HRSA-materials increases in difficulty according to the following sequence: iron based materials, nickel based materials and cobalt based materials. All the materials have high strength at high temperatures and produce segmented chips during cutting which create high and dynamic cutting forces.

Poor heat conductivity and high hardness generate high temperatures during machining. The high strength, work hardening and adhesion hardening properties create notch wear at maximum depth of cut and an extremely abrasive environment for the cutting edge.

Carbide grades should have good edge toughness and good adhesion of the coating to the substrate to provide good resistance to plastic deformation. In general, use inserts with a large entering angle (round inserts) and select a positive insert geometry. In turning and milling, ceramic grades can be used, depending on the application.

How do you find the right solution for your HRSA or titanium turning operation?

The Sandvik Coromant grade assortment for HRSAs includes CVD and PVD coated carbide grades, ceramic and cubic boron nitride (CBN) grades for various machining conditions. Use the information below to find the right grade for your production requirements.



To learn more about the different grades available for your HRSA turning operations, see below a short description and link to the products.

**CC6160:** SiAlON based ceramic designed to optimize performance in nickel-based materials under relatively stable conditions and offer high security and predictable wear as a result of high notch resistance. View assortment of **CC6160**.

**CC6060:** SiAlON based ceramic for optimized performance in pre-machined materials under stable conditions. View assortment of **CC6060**.

**CC670:** Whisker-reinforced, alumina-based ceramic with excellent bulk toughness designed for turning

and grooving. View assortment of **CC670**.

**CC6065**: SiAlON based ceramic that offers good toughness and security in toughness-demanding operations. View assortment of **CC6065**.

**CB7015**: CBN grade used for finishing operations in heat resistant super alloys. View assortment of **CB7015**.

**GC1105**: PVD-coated carbide grade with high hardness and good plastic deformation resistance. View assortment of **GC1105**.

**S05F**: CVD-coated grade for high speed finishing or long cuts at lower speeds. View assortment of **S05F**.

**GC1115**: PVD-coated carbide grade with high hardness and good resistance against plastic deformation combined with good edge-line security. View assortment of **GC1115**.

### High speed turning

There is a growing demand for aerospace engine parts that can withstand extreme temperatures, beyond the capability of Inconel and other high performing super alloys. While powder metallurgic materials can be tailored to handle substantially higher temperatures, they are more difficult to machine than Inconel 718.

The new ceramic grades CC6220 and CC6230 are developed to machine demanding materials where whisker ceramic and SiAlONs fall short. Their ability to handle high cutting speeds contributes to reduced cost per component.

CC6220 and CC6230 excel in demanding materials in intermediate stage machining. They take productivity to a new level compared to whisker ceramics and SiAlONs both when it comes to cutting speed and feed. Both grades are specifically developed for turbine discs in HRSA material, such as Inconel 718 and powder metallurgical nickel-based alloys.

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