

Blisk complexity made simple WITH NTK TOOLS

The demanding aircraft industry constantly challenges aerospace manufacturers to look for ways to improve processes, reduce downtime and ultimately increase productivity. Inherent in engine component designs is a high degree of quality and tight tolerances. The work materials – heat resistant super alloys (HRSA) – have poor machinability, adding to the difficulty in machining these parts.

As a cutting tool manufacturer, NTK develops innovative high-quality products to ensure there is no effect on the integrity or surface finish of the part while enabling higher productivity.

Blisk engine components, where the hub and blades are machined from a solid piece of HRSA material (Inconel 718) are complex machining applications requiring tools that are efficient, reliable, and produce parts that meet stringent manufacturing specifications. Now imagine machining these parts at cutting speeds normally reserved for aluminum. This is a reality with our durable solid ceramic end mill, made of SX9 grade SiAlON, which typically runs at speeds of 2,000sfm to 3,000sfm (with a



Modular toolholders for RCGX, RPGX, and VGW style inserts



Solid Ceramic End Mills

minimal speed of 1,000sfm). The intricate flute edge design withstands the extreme heat and pressure generated when machining at high speeds. A customer successfully completed a roughing and semi-finishing pass at 2,000sfm and 0.0012ipt with superior results, drastically reducing the operation time they were seeing with the original tool.

A current customer recorded an amazing 50 minutes of tool life by effectively programming tool paths to use the face of the 12mm end mill for areas of the operation then tilting the end mill to strategically machine with the edge of the ceramic end mill. This is a dramatic result that showcases the capabilities of NTK's Workhorse

SiAlON ceramics. Rough turning operations on the hub area of these Inco 718 parts is where RPGX style inserts in SX9 easily machine through the layer of scale at 900sfm to 1,100sfm with higher feed rates and heavier depths of cut than whisker grades can handle.

To develop a cutting tool material that will allow manufacturers to keep up with production demands, NTK has made a true contribution with the success of BIDE MICS. Round JX1 inserts perform the semi-finishing/finishing profile passes on the area of the blisk profile with cutting speeds of 1,350sfm. BIDE MICS, JX1, or JX3, are effectively applied to any grooving operations using a durable VGW style insert in a stable and rigid holder design which allows the exceptional speeds averaging 1,200sfm and 0.003" feed rates. The resulting machined surface finish is far superior to that

achieved with any whisker, SiAlON, or carbide. NTK's SiAlON's and BIDE MICS insert materials increase machining efficiency without affecting or influencing the quality of the part. Manufacturers truly see the potential with the reductions in production time. **A**

NTK Cutting Tools USA

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