CASE STUDY: 5ME® CRYOGENIC ROUGH MACHINING OF TITANIUM 6AI4V

Objective & Results

Steadily climbing demand for titanium aerospace/defense structure and engine components means that there is a growing need to manufacture more of these parts quickly, economically, and efficiently. Through-the-spindle/through-the-tool LN2 Cryogenic machining technology helped a major aerospace manufacturer to increase material removal rates and reduce cycle times of titanium 6AI4V parts while extending tool life and reducing costs. Cryogenics enabled the customer to manufacture more parts per machine, make them more quickly, and eliminate environmental, health and monetary costs associated with traditional coolants.

Cryogenic Advantages

- Tool Life: Over 60 Minutes
- Over 450 Cubic Inches of Material Removed
- 2x Increase in MRR Compared to Conventional Coolant Machining
- Over 2.5x Increase in Tool Life
- Reduction in manufacturing costs

Testing SOW

- Material: Titanium 6AI4V
- Industry: Aerospace & Defense
- Aero Structure and Aero Engine Components
- BlueZone™ Cryogenic ø1.00", 5-Flute Solid Carbide End Mill

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<th>SFM</th>
<th>IPT</th>
<th>AXIAL DOC</th>
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8 in³/min
Material Removal Rate (MRR)
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5ME® Cryogenics vs Conventional WET Rough Machining at 8 in³/min

- Over 2.5x Increase in Tool Life at 8in³/min MRR
- White layer reduction up to 90%
- Reduced force / heat stresses and part distortion
- Reduced grain boundary distortion, less surface damage, less burrs, and better finish

5ME® Cryogenics vs Conventional WET Rough Machining at 60min Tool Life

- 2x Increase in Material Removal at 60min Tool Life

Offered as both a retrofit for existing machine assets and as an option for new machine purchases, the 5ME Cryogenic System is available on the following:

Horizontal Machining Centers | Vertical Machining Centers | Horizontal Boring Mills | Turret and Ram-Style Lathes

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