

## Aerospace Titanium Machining : 25% Increase in Tool Life

HOCUT® 795 B

### The Challenge

A leading UK provider of forged and heat treated components for the aero-engine, airframe, flight control systems and landing gear markets was looking for a new coolant.

The company decided to compare a number of coolants in machining tests milling titanium (Ti64) wing pylons for Bombardier aircraft.

A Wadkin CNC machine using carbide insert tooling was used for the tests. The water hardness is 190ppm and emulsion strength is 8%.

The company felt that the older technology boron amine type product in use did not provide sufficient tool or sump life and were looking to find the most cost effective option for titanium machining.

The manufacturer was also interested in Quaker Houghton products following the research published by AMRC where both companies have a working relationship in the AGO50B project.

### The Solution

Trials were initially set up for three products: a local boron amine technology coolant, a leading aerospace competitor coolant and HOCUT® 3450. The latter two products were both high ester EP type products with a very high level of lubricity. A total of 6 milling tools were monitored for tool change frequency during the period of the trial.

The plant Engineering Manager was also made aware of the results of the AMRC Coolant Characterization Research Programme where tool-life testing has been carried out on twelve different types of coolant chemistry for titanium machining. HOCUT® technology gave the best performance of all products used in these independent machine tool tests, indicating as much as three times the tool-life achievable in some cases.

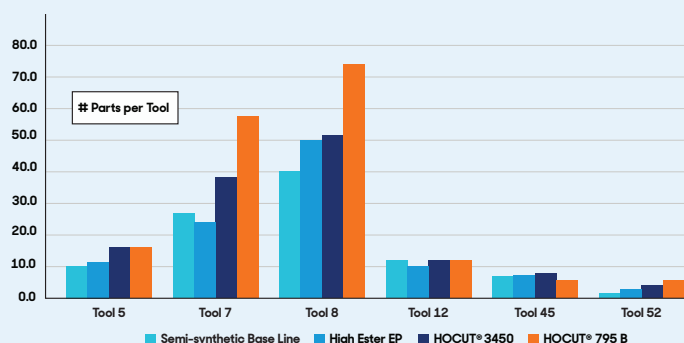
On this evidence Quaker Houghton suggested that HOCUT® 795 B should also be included in the trial as it would show impressive tool and sump life with a commercial advantage.

Trials were run over a 6 week period with tool change frequency being carefully monitored and the level of success measured by the parts per tool.

### The Benefits

- HOCUT® 3450 and HOCUT® 795 B outperformed both competitor products
- HOCUT® 795 B significantly increased tool life for critical tools 5, 7 and 8
- Overall HOCUT® 795 B showed a 25% increase in tool life compared to the incumbent product
- HOCUT® 795 B offers a commercial advantage in price per litre over high ester EP products for titanium machining

### Tool-Life Results



**TOOL-LIFE RESULTS FOR ALL SIX MILLING CUTTERS USED TO MAKE THE COMPONENT**

### The Product

HOCUT® 795 B is a versatile, heavy duty, chlorine-free, soluble metal removal fluid specially formulated to machine Aerospace grade aluminum alloys. HOCUT® 795 B is compatible with hard water, clean running and biostable assuring long, odor-free sump life. It provides high corrosion protection without staining. HOCUT® 795 B is approved for all usage areas defined in BAC-5008, NASA, Sikorsky Helicopter, UTC Aerospace, Vought Aerospace, Pratt & Whitney and Bombardier.

