

## Q-COOL 355D

Q-COOL 355D exceeded expectations by quadrupling the runtime per tap on titanium parts, eliminating scrap, reducing usage rates, and improving surface finishes.



### The Challenge

This premier manufacturer of energetic components and complex integrated systems supports the defense, space, and commercial markets. Their state-of-the-art facility has over 110,000 square feet for engineering and analysis, prototype development, testing, qualification and production.

They were running a leading competitor’s clear, full synthetic product with deionized water (DI), and having tapping issues – oversized threads, poor thread quality, chip buildup, trouble holding tolerances, and tap breakage. All these issues resulted in bad parts and increased scrap rates. In addition to experiencing higher usage rates, they noticed heavy residues and deterioration of the paint and seals on the machines.

They contacted the local QualiChem distributor for help. The distributor recommended Q-COOL 355D, which increased tool life, improved surface finishes, reduced usage rates, and eliminated all scrap. The manufacturer was also able to save up to \$500 per drum.

### Process and Equipment

<b>MACHINES</b>	Matsuura 5-Axis Vertical Machining Center
<b>MATERIALS</b>	Aluminum (6061 & 6065-T6) and titanium (6Al-4V)
<b>INCUMBENT PRODUCT</b>	A clear, full synthetic
<b>OPERATIONS</b>	Milling, drilling, tapping and profiling



LEFT: Gas generators (for ejection systems, launch tubes, separation systems, and inflation systems), and space-qualified parachute mortars (for reentry vehicle recovery.) RIGHT: A piston actuator manufactured for mission-critical applications.

### The Solution

#### Q-COOL 355D

##### Neutral pH Heavy Duty Synthetic

Q-COOL 355D is an oil-rejecting water clear coolant that provides excellent in-process corrosion protection for parts and machine tools. It has a neutral pH to prevent staining on sensitive aluminum and aerospace alloys. It runs clean, has excellent bioresistance, and is non-foaming. This product has state-of-the-art additive technology to improve tool life and part quality in severe machining operations.

### The Results

#### Running Q-COOL 355D, the following benefits were realized:

- Increased runtime per tap on titanium parts by more than 300%
- Increased runtime per end mill on titanium parts by 50%
- Improved surface finishes
- Reduced usage rates
- Zero scrap rate
- Cost savings up to \$500 per drum

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For more information or to request a free trial, please contact your local QualiChem Distributor or QualiChem Sales Engineer.





Advanced structures, energetic components and complex integrated systems supporting the space and defense industries are produced in-house.

### The Results – continued

The manufacturer chose QualiChem Q-COOL 355D over their existing coolant after seeing dramatic improvements.

#### Tap Tool Life

**A. Work Material:** Aluminum (6061 & 6065-T6)

**Tap sizes:** 2-56, 2-56 STI, 4-40

**Summary:** Q-COOL 355D increased runtime per tap by 275% with zero scrapped parts, and improved the surface finish of the parts. The incumbent product struggled with tap performance, which caused a 10% scrap rate and buildup on both cut and roll form taps, resulting in oversized threads and holes.

	Incumbent	Q-COOL 355D
<b>RUNTIME/TAP</b>	40 min.	150 min.
<b>SCRAP RATE</b>	10%	0

**B. Work Material:** Titanium (6Al-4V)

**Tap sizes:** 8-32 and 1/4-28

**Summary:** Q-COOL 355D provided a higher level of lubrication, allowing for a 300% increase in tap runtime.

	Incumbent	Q-COOL 355D
<b>RUNTIME/TAP</b>	15 min.	>60 min.

#### End Mill Tool Life

**Work Material:** Titanium (6Al-4V)

**End Mill:** 0.25" diameter Carbide End Mill (6 flute with .060R), 1" depth of cut and 0.025" step over

**A. Operations:** Milling profile, roughing outside profile, and finishing

**Summary:** Q-COOL 355D not only doubled the runtime per end mill, but also improved the surface finish of the parts.

	Incumbent	Q-COOL 355D
<b>RUNTIME/END MILL</b>	72 min.	147 min.
<b>PART CLEANLINESS</b>	Poor surface finish and smearing	Excellent surface finish and clean parts

**B. Operation:** Finishing

**Summary:** Q-COOL 355D increased the runtime per end mill by 50%. After 3 hours, the original end mill was still in the machine and the cutting edge was still good.

	Incumbent	Q-COOL 355D
<b>RUNTIME/END MILL</b>	120 min.	>180 min.

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