

#140S ALUMINUM CUTTING OIL

DESCRIPTION:

Aluminum Cutting Oil is a concentrated high lubricity, semi-synthetic, biostable, low foaming non-staining metalworking fluid that is recommended for use in grinding and other high speed light to heavy duty machining operations of aluminum, aluminum alloys, cast aluminum, mild steels and cast iron. Aluminum Cutting Oil does not contain any active sulfur, chlorine, nitrites, phenols, Diethanolamine (DEA) or heavy metals.

Aluminum Cutting Oil is especially recommended for use in metalworking fluid operations that employ the use of high-pressure machines.

EXCELLENT COOLING AND LUBRICITY:

Aluminum Cutting Oil possesses excellent cooling, extreme pressure, and high lubricity properties that are needed for high speed machining operations. Aluminum Cutting Oil contains surface-active ingredients, which enable the fluid to wet the metal surfaces of the tool and the workpiece in order to provide a protective film for lubricating the tool and the workpiece interface. Aluminum Cutting Oil also contains synthetic lubricity and anti-weld additives that function as extreme pressure agents that reduce the coefficient of friction between the tool and the workpiece interface. This combination of cooling and extreme pressure/lubricity properties effectively transfers heat away from the cutting zone, thus reducing friction between the cutting tool and the workpiece. This in turn results in greater dimensional accuracy, higher turning speeds and feeds, prevention of the chips from welding to the cutting tools and on soft gummy materials like aluminum, control of built-up edges, improved surface finish and extended tool life.

ADDITIONAL PERFORMANCE FEATURES:

Aluminum Cutting Oil contains an effective low-foaming emulsifier system that allows the Aluminum Cutting Oil to be mixed with water at varying concentrations. This emulsifier system allows the oil portion of the Aluminum Cutting Oil to be evenly and uniformly dispersed throughout the coolant mixture. This even and uniform dispersion results in a transparent emulsion that allows the operator the ability to see the workpiece being machined. Further, by being evenly and uniformly dispersed, the smoking and misting characteristics that are associated with the use of soluble cutting fluids is virtually eliminated.

This emulsifier system also provides a detergent action that allows the Aluminum Cutting Oil the ability to break up and dislodge dirt and grit in order to keep the machine and tools clean. This detergent action also assists in flushing of the chips and fines away from the cutting area.

Continued on Next Page

TD-140S (01/07)

The emulsifier system further complements and enhances the performance characteristics of Aluminum Cutting Oil's rust and corrosion inhibiting additive package. The emulsifier system enhances the rust and corrosion inhibitors' alkaline reserve during use resulting in the Aluminum Cutting Oil being able to resist rancidity, a drop in pH and prevention of the rusting of parts, tools, and machinery.

Aluminum Cutting Oil's emulsifier system contains sequestering agents which combat iron, calcium and magnesium ions in hard water up to 400 ppm; thus preventing the formation of hard water soaps, scum, and resins on the machine and the parts.

EXCELLENT BIORESISTANCE and BIOSTABILITY:

Aluminum Cutting Oil contains an effective broad-spectrum anti-microbial agent that allows the Aluminum Cutting Oil to resist bacterial and fungal growth during use. This broad-spectrum anti-microbial agent unlike conventional biocides found in conventional soluble cutting fluids is not readily used up during usage. This means that Aluminum Cutting Oil is less likely to sour and produce odors resulting in longer sump life and less worker complaints.

Aluminum Cutting Oil will reject a very high percentage of tramp oil contamination allowing for easy skimming and removal of the tramp oils from the sumps and reservoirs. This results the elimination of a potential food source for the growth of bacterial and fungus in the sump and greater bioresistance to the growth of bacteria and fungus in the coolant sump.

In addition Aluminum Cutting Oil's emulsifier system possesses less susceptibility to attack from bacterial growth. This result is less degradation of the fluid during use.

All of these factors result in a very biostable coolant that is able to resist extreme biological degradation. This results in long sump life in a properly maintained machine tool and diminishes the possibility of "Monday Morning Odor".

VERY LOW FOAMING CHARACTERISTICS:

Excessive foaming of a cutting fluid especially when used in high pressure machining operations during use can result in an insufficient amount of the cutting fluid being available at the tool-workpiece interface and in maintenance problems due to metalworking fluid overflow in sumps. Aluminum Cutting Oil contains a highly effective non-silicone base antifoam additive system that allows the product to exhibit very low foaming characteristics. The non-silicone base antifoam additive system provides rapid defoaming and a high degree of stability during use. This results in a sufficient amount of the cutting fluid being available to the tool-workpiece interface, greater visibility of the workpiece and a vast reduction in maintenance problems due to coolant overflow.

In addition the antifoam additive will not result in any deposition of residues on the workpiece. This results in less cleaning of the metal parts and ease of painting or further processing of the part after machining.

WASTETREATABILITY:

Aluminum Cutting Oil is a water waste treatable product that can be safely discharged into the normal flow of the wastewater from the plant. The only time Aluminum Cutting Oil cannot be discharged into a wastewater system is if the wastewater treatment facility is not a primary wastewater treatment facility.

Before being discharged into the wastewater system, all tramp oils and metal fines should be removed from the Aluminum Cutting Oil. In some areas, it is necessary to remove all traces of alkalinity before dumping watery wastes. For these areas it is suggested the following procedure be followed:

Skim all tramp oils and remove all metal fines. To the remaining clarified water, neutralize to a pH of 7.0 by the use of muriatic acid. Approximately 2 quarts of muriatic acid should be enough to neutralize 100 gallons of a used 20:1 mixture of Aluminum Cutting Oil. Add a small amount of acid at a time and check the progress using a pH indicator paper or a pH meter. When a pH of 7 is reached, the spent Aluminum Cutting Oil is ready to be discharged into the plant waste effluent.

BENEFITS:

Aluminum Cutting Oil provides the following benefits during use:

1. Excellent cooling and lubricity.
2. Sufficient lubricity to do down-the-hole operations in aluminum, cast irons, most steels including many stainless steels.
3. Prevention of chip welding on soft gummy materials.
4. Excellent extreme pressure protection.
5. Ability to machine at high speeds and feed rates.
6. Improved surface finishes
7. Lower tool tip temperatures and prevention of chips from welding to the tool and the workpiece.
8. Extended tool and wheel life.
9. Resistance to the formation of gummy residues.
10. Superior rust and corrosion inhibition on all ferrous and nonferrous metals.

Continued On Next Page

11. Excellent retention of the products alkalinity reserve.
12. Excellent machine and tool cleanliness.
13. Excellent rejection of tramp oil contamination.
14. Excellent protection from rancidity and Monday Morning Smell.
15. Very low foaming tendencies.
16. Longer coolant sump life
17. Excellent waste treatability in waste water systems.
18. Easily recycled or disposed of using conventional techniques and equipment.
19. Very good settling properties so chips and grit can be removed and filtered from the machine sump.
20. Very low misting properties.
21. Prevents chip “clinkering” and hot chip hoppers.
22. Operator friendly and clean running.
23. Very low carry-off for low, long term operating costs.
24. Mild and pleasant odor.
25. Good workpiece visibility.
26. Reduced overall waste volume and spent-fluid disposal costs.
27. Reduced rejection of parts.
28. Lower maintenance costs.
29. Increased productivity.
30. Lower overall operating costs.

PRODUCT MAINTENANCE:

Prior to charging the system with Aluminum Cutting Oil, it is recommended that the system be thoroughly cleaned to remove residues, machining debris and fines, bioaccumulations, etc. from previously used products. A typical recommended cleaning procedure would involve filling the system with a solution of a commercially available cleaner, circulating the cleaner for 2 to 4 hours, draining it, and then rinsing with hot water until the rinse water is clear. Depending upon the system size and the condition, additional steps involving physical cleaning and/or circulation of bactericides or fungicides such as a bleach solution may be required to clean and disinfect extremely dirty systems.

Continued On Next Page

TD-140S

Page 5

Though Aluminum Cutting Oil is formulated to provide long sump life, the product requires monitoring and maintenance to prevent bacterial/fungal growth, rancidity, and rusting problems. It is recommended that the coolant strength be determined on a daily basis or at least several times per week using a hand held refractometer. Appropriate amounts of coolant should be added to maintain the coolant strength at the recommended level for the machining operation being performed using premixed coolant as makeup. The pH should also be periodically determined and maintained within a range of 8.5 to 9.5. Coolant makeup to the system is generally sufficient to control the pH. Using premixed coolant as makeup will substantially improve and maintain coolant performance. The specific makeup concentration selected should balance the water evaporation rate with the coolant carryout rate. For example if a 20:1 dilution is being used adding a premixed makeup dilution of 40:1 to the sump will generally maintain the proper concentration in the sump.

During use and for makeup purposes Aluminum Cutting Oil should always be added to water. The use of de-ionized, distilled or mineral free water to mix this product will improve sump life, reduce carry-off, and help improve overall product performance.

The coolant system should also be monitored for bacterial/fungal growth using bacterial/fungus dip slides or other suitable test kits. Proper control of the coolant strength and the pH are the best methods to control the level of bacteria and fungus in the coolant mixture.

In order to extend the life of metalworking fluids, foreign materials such as machining debris and fines should be periodically removed by filtration or other suitable means. Since the presence of tramp oils provide a food source for bacterial growth; any tramp oil entering the system should be periodically skimmed from the reservoir or sump.

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Continued On Next Page

APPLICATION GUIDELINES

- Prolonged immersion (greater than 5 hours) of some types of aluminum alloys may cause some slight staining to occur.
- Aluminum Cutting Oil is not recommended for use on very water reactive metals such as magnesium and zirconium.
- In mixed metal situations, concentration control is critical to fight corrosion.
- The recommended concentration for cast iron and cast aluminums is 5% (20:1)

REFRACTOMETER READINGS

Concentration	°Brix*
5:1 (20% dilution)	7
10:1 (10% dilution)	4
15:1 (7% dilution)	3
20:1 (5% dilution)	2.6
30:1 (3% dilution)	2
40:1 (2.5% dilution)	1.2
50:1 (2% dilution)	1

*Readings taken from Chase Brix Refractometer Model #80-109 and using Distilled Water

Note: Due to variances between makes and model of refractometer and in water quality, the above readings should only be used as a guideline. It is recommended that various concentrations be made and the refractometer readings obtained be recorded and used as a baseline for makeup.

RECOMMENDED APPLICATION DILUTION RATES:

APPLICATION:

Automatic turret and engine lathe
Drilling, Milling ,and Turning
Reaming, Boring, and Sawing
Gearhobbing, Hobbing, Shaping, Broaching
Tapping, Threading and Counterbroaching
Grinding

RATIO OF SYNKOOL SS TO WATER

1:20 (5% dilution)
1:20 (5% dilution)
1:20 (5% dilution)
1:20 (5% dilution)
1:20 (5% dilution)
1:30 (3% dilution)

At concentrations below 40:1 (2.5% dilution) the biostability of this product may be compromised leading to shorter sump life.

Typical Properties on Next Page

TYPICAL PROPERTIES

Appearance	Clear, amber color
pH Value (neat)	9.5 to 10.5
Emulsion pH @ 5% (distilled water)	9.3
Falex Pin & Vee Block Test ASTM D-3233 Method B 20:1 dilution	4,500 Lbf
Four Ball E.P. Test ASTM D-2783	
Weld Point, kg 20:1 dilution	250
Tapping Torque Test (1215 Steel) ASTM 5619 5% (20:1) dilution - % Efficiency	107%
Tapping Torque Test (6061 Aluminum, M6x1 HSS-E form tap, 660 rpm) ASTM 5619 5% (20:1) dilution – % Efficiency	100%
Cast Iron Chip Test 20:1 dilution	Pass – No rust
50:1 dilution	Pass – No rust
CI Chip Rust Test IP 287 Breakpoint	2%
Emulsion Stability @ 5% IP 263 40°C, 200 ppm (% oil/ % cream)	0/0 (Clear)
40°C, 200 ppm (% oil/ % cream)	0/0 (Slightly hazy)
Waring Blender Foam Test 200ml of 20:1 dilution agitated for 1 minute	Low Foaming
5% 7075 Aluminum Stain Test 40°C,24 hours	Clean