SINCE 1839
Schaeffer MANUFACTURING COMPANY

ISO 9001 CERTIFIED

TECHNICAL DATA

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# 511 ULTRAKOOL SS™

## DESCRIPTION:

UltraKool SS™ is a premium multi-purpose semi-synthetic, very low foaming, biostable, non-staining metalworking fluid that is recommended for a multitude of machining and grinding operations on both ferrous and non-ferrous metals. UltraKool SS™' is particularly recommend for those machining operations that employ the use of high pressure and high speed machines. UltraKool SS™ does not contain any sulfur, chlorine, nitrites, phenols, Diethanolamine (DEA) or heavy metals.

## EXCELLENT COOLING AND LUBRICITY:

UltraKool SS™ possesses excellent cooling, extreme pressure, and lubricity properties that are needed for high speed machining operations. UltraKool SS™ contains surface-active ingredients, which enable the fluid to wet the metal surfaces of the tool and the work-piece in order to provide a protective film for lubricating the tool and the work-piece interface. UltraKool SS™ also contains lubricity and anti-weld additives that function as extreme pressure agents that reduce the coefficient of friction between the tool and the work-piece 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 work-piece. This in turn results in greater dimensional accuracy, higher turning speeds and feeds, prevention of the chips from welding to the cutting tools, improved surface finish and extended tool life.

## ADDITIONAL PERFORMANCE FEATURES:

UltraKool SS™ contains an effective low-foaming emulsifier system that allows the UltraKool SS™ to be mixed with water at varying concentrations. This emulsifier system allows the oil portion of the UltraKool SS™ 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 work-piece 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 greatly reduced.

This emulsifier system also provides a detergent action that allows the UltraKool SS™ 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.

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

UltraKool SS™'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.

Continued on Next Page

## EXCELLENT BIORESISTANCE and BIOSTABILITY:

UltraKool SS™ possess a high degree of bioresistance and biostability. This means that UltraKool SS™ is less likely to sour and produce odors resulting in longer sump life and less worker complaints.

UltraKool SS™ 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 UltraKool SS™'s emulsifier system possesses less susceptibility to attack from bacterial growth resulting in 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".

## EXTREMELY LOW FOAMING CHARACTERISTICS:

Excessive foaming of a cutting fluid especially in high pressure machining operations during use can result in an insufficient amount of the cutting fluid being available at the tool-work-piece interface and in maintenance problems due to metalworking fluid overflow from the sump. UltraKool SS™ contains a highly effective antifoam additive system that allows the product to exhibit very low foaming characteristics. The antifoam additive system provides rapid foam collapse and a high degree of stability during use. This results in a sufficient amount of the cutting fluid being available to the tool-work-piece interface, greater visibility of the work-piece and a vast reduction in maintenance problems due to coolant overflow.

## WASTETREATABILITY:

UltraKool SS™ is a water waste treatable product that can be safely discharged into the normal flow of the wastewater from the plant per the permitting requirements of the plant. The only time UltraKool SS™ 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 UltraKool SS™. 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 15:1 mixture of UltraKool SS™. 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 Ultra Kool SS is ready to be discharged into the plant waste effluent.

## BENEFITS:

UltraKool SS™ provides the following benefits during use:

1. Excellent cooling and lubricity for extended tool and wheel life.
2. Excellent extreme pressure protection.
3. Ability to machine at high speeds and feed rates.
4. Improved surface finishes
5. Lower tool tip temperatures and prevention of chips from welding to the tool and the work-piece.
6. Resistance to the formation of gummy residues.
7. Superior rust and corrosion inhibition on all ferrous and nonferrous metals.
8. Excellent retention of the product's alkalinity reserve.
9. Excellent machine and tool cleanliness.
10. Excellent rejection of tramp oil contamination.
11. Excellent protection from rancidity and Monday Morning Smell.
12. Very low foaming tendencies.
13. Long term emulsion stability.
14. Exceptional parts finish.
15. Chlorine, nitrate and phenol free
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 to remove and filter chips and grit 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 work-piece visibility.
26. Reduced overall waste volume and spent-fluid disposal costs.
27. Reduced rejection of parts.
28. Lower maintenance costs.
29. Increased productivity and lower overall operating costs.

## PRODUCT MAINTENANCE:

Though UltraKool SS™ can be added to the existing coolant charge in the system at the dilution rate that is being used for the existing fluid, it is recommended that prior to changeover that the system be thoroughly cleaned to remove any existing 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 metalworking fluid machine sump cleaner such as Schaeffer's 611 SumpFlush™ Machine Cleaner and following the directions that are listed on the products technical data or product data sheet. 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.

Though UltraKool SS™ is formulated to provide long sump life, the product with proper monitoring and maintenance to prevent bacterial/fungal growth, rancidity, and rusting problems will result in a more stable quality of finished parts over a sustained period of time.

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.

During use and for makeup purposes UltraKool SS™ 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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## Monitoring Concentration:

Concentration can easily be monitored by using a refractive index reading. Take the refractive index reading and multiply it by 2.2

Concentration (%) = Refractive index reading X 2.2

Example:

6.6% concentration (1:15) = 3 x 2.2

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

## APPLICATION GUIDELINES

- UltraKool SS™ 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

## TYPICAL PROPERTIES

| | |
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| Appearance | Light Amber color |
| Emulsion pH @ 5% (20:1 dilution) | 9.2 |
| Falex Pin & Vee Block Test ASTM D-3233 Method B<br>10:1 dilution (10% dilution) | 4,500 Lb-f |
| Microtap Torque Test (1215 Steel, 550 rpm, 15mm depth, Torque 650 Ncm) 10:1 dilution (10% dilution)-<br>% Efficiency | 100% |
| Average Ncm | 330.3 |
| 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 | |
| 40ºC, 200 ppm (% oil/ % cream) | 0/0 (Clear) |
| 40ºC, 200 ppm (% oil/ % cream) | 0/0 (Slightly hazy) |
| Warring Blender Foam Test of 10:1 dilution | |
| Foam Break, seconds | 2 seconds |
| Foam height | 10mm foam height |