



# TECHNICAL DATA

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## 414 MAXKOOL ULTRA

### DESCRIPTION

MaxKool Ultra is a chlorine free, heavy-duty, low foaming bio-stable, semi-synthetic metal removal fluid that is recommended for use in a multitude of machining and grinding operations on both ferrous and non-ferrous metals including automotive and aerospace grade aluminum alloys.. MaxKool Ultra is particularly recommend for those machining operations that employ the use of high pressure and high speed machines. MaxKool Ultra does not contain any sulfur, chlorine, nitrites, phenols, Diethanolamine (DEA) or heavy metals.

MaxKool Ultra is compatible with all common machine tool components, including paints and seals and provides excellent rejection of foreign contamination, including tramp oils.

### EXCELLENT COOLING AND LUBRICITY:

MaxKool Ultra possesses excellent cooling, extreme pressure, and lubricity properties that are needed for high speed machining operations. MaxKool Ultra 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. MaxKool Ultra also contains lubricity and anti-weld additives that function as extreme pressure agents that provide a film boundary film that reduces 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:

MaxKool Ultra contains an effective low-foaming emulsifier system that allows the product to be mixed with water at varying concentrations. This emulsifier system allows the oil portion of the MaxKool Ultra 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 MaxKool Ultra 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 MaxKool Ultra's rust and corrosion inhibiting additive package. The emulsifier system enhances the rust and corrosion inhibitors' alkaline reserve during use resulting in the MaxKool Ultra being able to resist rancidity, a drop in pH and prevention of the rusting of parts, tools, and machinery.

MaxKool Ultra's emulsifier system contains sequestering agents which combat iron, calcium and magnesium ions in that are commonly found in hard water, thus preventing the formation of hard water soaps, scum, and resins on the machine and the parts.

MaxKool Ultra utilizes a multifunctional rust and corrosion inhibiting additive system that further enhances product's reserve alkalinity, neutralization capability, emulsion stability and low foaming properties. In addition to these enhancements the rust and corrosion inhibiting additive system unlike other types of rust and corrosion inhibiting additive systems commonly used in metalworking fluids will not contribute to the leaching of the cobalt binder from cemented tungsten-carbide and carbide tools.

**EXCELLENT BIORESISTANCE and BIOSTABILITY:**

MaxKool Ultra possesses a high degree of bio-resistance and bio-stability. This means that MaxKool Ultra is less likely to sour and produce odors resulting in longer sump life and less worker complaints.

MaxKool Ultra 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 bio-resistance to the growth of bacteria and fungus in the coolant sump.

In addition MaxKool Ultra's emulsifier and rust and corrosion inhibiting additive systems possess greater resistance and less susceptibility to attack from bacterial growth resulting in less degradation of the fluid during use.

All of these factors result in a very bio-stable 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. MaxKool Ultra 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.

**MaxKool Ultra provides the following benefits during use:**

1. Excellent cooling, lubricity, and extreme pressure protection.
2. Ability to machine at high speeds and feed rates.
3. Improved surface finishes
4. Lower tool tip temperatures and prevention of chips from welding to the tool and the work-piece.
5. Extended tool and wheel life.
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 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 work-piece visibility.
26. Reduced rejection of parts, overall waste volume and spent-fluid disposal costs.
27. Lower maintenance costs and overall operating costs with increased productivity

(Cont.)

### **PRODUCT MAINTENANCE:**

Though the MaxKool Ultra can be used behind the existing coolant charge that was previously used 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 of the system, additional steps involving physical cleaning and/or circulation of bactericides or fungicides may be required to clean and disinfect extremely dirty systems.

Though MaxKool Ultra 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. For example if a 6% dilution is being used adding a premixed makeup dilution of 3% to the sump full. This will keep the concentration at 6% and will generally maintain the proper concentration in the sump.

During initial charge, use and for makeup purposes MaxKool Ultra should always be added to water. Never add straight water or straight MaxKool Ultra directly to the machine's sump. For best results it is recommended that a proportioning device be used. If mixing by hand, always add MaxKool Ultra to water and then agitate.

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. In addition the coolant system free of cleaners, solvents and other contaminants.

### **Monitoring Concentration:**

Concentration can easily be monitored by using a refractive index reading. Take the refractive index reading and multiply it by 1.3    Concentration (%) = Refractive index reading X 1.3

Example:    6% concentration = 4.6 x 1.3 = 5.98%

### **INSTRUCTIONS FOR USE**

1. Determine the size of the sump
2. Take the total system size and multiply by the recommended % of MaxKool Ultra
3. Slowly add the recommended amount of MaxKool Ultra to the water and mix well
4. (Always add MaxKool Ultra to water ***Never in reverse order***)

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**APPLICATION GUIDELINES**

- MaxKool Ultra 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**

Appearance (neat)	Clear, Blue-green
Appearance (5% solution)	Transparent (micro-emulsion)
pH (5% solution)	9.5 ± 0.4
Specific Gravity	8.2 ± 0.2
Falex Pin & Vee Block Test (10% solution)	
Weight before, grams	7.4263
Weight after, grams	7.3681
Weight Loss, grams	0.0582