

INTRODUCTION TO LUBRICANTS & COOLANTS

Cutting fluids play a significant role in machining operations and impact shop productivity, tool life and quality of work. The primary function of a cutting fluid is temperature control through cooling and lubrication. A fluid's cooling and lubrication properties are critical in maximizing productivity and quality, in addition to keeping expendable tooling costs in line. Cooling and lubrication are also important in achieving the desired size, finish and shape of the workpiece. A secondary function of a cutting fluid is to flush away chips and metal fines from the tool/workpiece interface. Ultimately, this prevents a finished surface from becoming marred and reduces the occurrence of a built-up edge.

Typically, cutting fluids are manufactured with the following bases: mineral, vegetable or synthetic. Additives are added to the base oil to achieve specific performance parameters such as corrosion inhibitors, wetting agents, biocides, extreme pressure additives, and emulsifiers. Cutting fluids fall into two categories: water-soluble coolant or lubricant, each containing its own unique properties.

Water-soluble coolants are cutting fluids engineered to carry heat away from the tool chip interface. Water is the best coolant agent, but has no lubricating ability and is susceptible to contamination. Water-soluble coolants include base oil along with additives to enhance waters' ability to disperse heat. They are generally used in high-speed cutting operations such as turning and milling. Lubricants, non-soluble, are used in metal cutting operations to reduce friction. They are used in low-speed cutting operations such as broaching and tapping.

Cutting fluids are widely utilized to optimize the process of machining operations such as turning, drilling, boring, grinding, milling, drawing, stamping, and sawing. The proper selection of a cutting fluid will provide benefits such as extended tool life, increased speeds and feeds, tighter tolerance capability, and improved finish.



Micro-dispenser being filled with Tri-Cool MD-1 lubricant



Tri-Cool fluids are specially formulated to provide superior performance and long service life in various metal cutting operations on ferrous and non-ferrous metals. They have been designed to meet operator safety concerns. Tri-Cool fluids are safe to use, non-toxic, non-allergenic, and contain no harmful chemicals or additives.

- Maximize production rates
- Maximize operating costs
- Extend machine and tool life
- Increase speeds and feeds
- Increase productivity

TC-1 WATER-SOLUBLE COOLANT



TC-1 is a highly concentrated premium synthetic water-soluble coolant formulated to exceed the demands of spray and flood cooling. It contains a non-chlorine extreme pressure additive for improved tool and surface finish. TC-1 prevents rusting on tool and machine surfaces, even at lower concentrations. It contains a broad spectrum biocide/fungicide for protection against biological growth. TC-1 is non-toxic, non-flammable, non-corrosive, and biodegradable.

Model No.	Size
30656	4 gallon / case
30657	5 gallon pail
30658	55 gallon drum

SUGGESTIVE DILUTION RATIOS

Spray Cooling		Flood Application	
Operation	Dilution Ratio	Operation	Dilution Ratio
Grinding	40:1	Light Machining	32:1
General Machining	32:1	General Machining	20:1
Broach, Tap, Heavy Mach.	20:1	Heavy Machining	10:1

MD-1 MICRO-DROP® VEGETABLE LUBRICANT



MD-1 is a pure vegetable based lubricant that can be used in various metal cutting operations to achieve effective machining productivity on ferrous and non-ferrous metals. MD-1 has a heat stable, non-chlorine extreme pressure additive for improved tool life and surface finish. MD-1 is low misting, to prevent fogging in the shop. It will not stain aluminum requiring post-heat treating. MD-1 is environmentally safe and biodegradable.

Model No.	Size
30648	4 gallon / case
30647	5 gallon pail
30646	55 gallon drum

MD-7 MICRO-DROP® SYNTHETIC LUBRICANT



MD-7 is a pure synthetic based lubricant designed for use in various metal cutting operations. With the use of a Micro-Dispensing system, more effective machining productivity and savings in fluid costs can be achieved, while waste and disposal problems are reduced. MD-7 is non-toxic, non-flammable, non-corrosive, and will not become rancid.

Model No.	Size
30659	4 gallon / case
30662	5 gallon pail
30663	55 gallon drum



TRI-COOL® FLUIDS

APPLICATION GUIDE (Micro-Dispensing lubricants)

All material used for data is 1018 \emptyset = diameter DOC = depth of cut

Process	Parameters	MD-1	MD-7
Milling (using a 1/2" \emptyset 2 flute HSS EM)	Up to 1/16 DOC	•	•
	From 1/16 to 1/4 DOC	•	•
	From 1/4 to 7/16 DOC	•	
Tapping	Up to 1/4 \emptyset	•	•
	From 1/4 \emptyset to 9/16 \emptyset	•	•
	From 9/16 \emptyset to 1 \emptyset	•	
Band Sawing	Up to 1 stock \emptyset	•	•
	From 1 to 3 stock \emptyset	•	•
	From 3 to 4 stock \emptyset	•	

APPLICATION CHART

Process		TC-1	MD-1	MD-7
Machining	Light-Duty	•	•	•
	General	•	•	•
	Heavy-Duty	•	•	
Material	Ferrous	•	•	
	Non-Ferrous	•	•	•
	Plastics		•	•
Application	Spray Cooling	•		
	Flooding	•		
	Micro-Dispensing		•	•
	Manual Application			
Fluid Type	Water Soluble	•		
	Synthetic Based	•		•
	Vegetable Based		•	

