METATRON™ 610

DESCRIPTION :

Metatron™ 610 is an anti-wear water glycol type fire resistant fluid that is designed for use in hydraulic systems operating up to 50°C/150°F and at system pressures of 2000 psi or greater.

COMPOSITION ANS PERFROMANCE CHARACTERISTICS:

Metatron™ 610 is a blend of water and polyalkylene and high molecular weight glycols. The water content of the **Metatron™ 610** is 35%. Into this combination is further blended is a patented anti-wear additive package and additive system that provide the **Metatron™ 610** with the following performance benefits.

1. Excellent corrosion protection both in the liquid and vapor phase to the metals commonly used in hydraulic systems.
2. Exceptional anti-wear protection and lubricity.
3. Excellent ferrous and non-ferrous rust and corrosion protection.
4. Excellent resistance to oxidation and chemical breakdown.
5. Excellent resistance to thermal degradation.
6. Excellent vapor space inhibition.
7. Excellent anti-foam protection.
8. High reserve alkalinity.

EXCEPTIONAL VISCOSITY-TEMPERATURE PROPERTIES:

Metatron™ 610 also contains a water soluble polymer that provides the fluid with exceptional viscosity-temperature properties. These exceptional viscosity-temperature properties result in maximum hydraulic efficiency and minimum difficulty in operating over a wide range of temperatures. Further, **Metatron™ 610** posses excellent mechanical shear stability, which results in the **Metatron™ 610** not being susceptible to viscosity breakdown under the severe mechanical shearing action of pumps, control valves and servovalves used in hydraulic systems.

Metatron™ 610 has excellent low temperature properties. These excellent low temperatures permit the hydraulic pumps to be safely started at temperatures as low as -23°/10°F. In addition the **Metatron™ 610** can be repeatedly frozen and thawed without any loss whatsoever in its homogeneity. The excellent low temperature properties in conjunction with the fluid's high viscosity index provides the maximum fluid performance over a wide temperature range

resulting in a minimization of pump problems on cold startup and assurance that the adequate viscosity and lubricity are provided during peak operating temperatures and conditions.

COMPATABILITY OF METATRON 610

Metatron™ 610 is compatible with all hydraulic system metals with the exception of zinc, cadmium and nonadonized aluminum. **Metatron™ 610** is also compatible with a wide variety of seal and gasket materials such as natural rubbers, Buna N, Buna S, Neoprene, Viton, Teflon, Silicone, Flurosilicone, Ethylene-Propylene and PNF. It is not however compatible with cork, paper, leather and synthetic fiber type seals.

All conventional type of hydraulic system filters with the exception of those employing diatomaceous earth can be used with **Metatron™ 610**.

Metatron™ 610 is not compatible with many conventional paints and coating systems commonly used in hydraulic sumps and reservoirs. As a general rule all paints and coatings should be removed from the interior reservoir or sump.

NON-TOXIC:

Metatron™ 610 is reactively nontoxic, harmless and does not irritate normal skin, when used in a properly operated hydraulic system. If the hydraulic system produces vapors or mists, proper ventilation should be provided or the mist should be avoided and steps should be taken to repair or modify the system to prevent misting.

INSTALLATION OF METATRON 610

When **Metatron™ 610** is installed in a system previously using other types of hydraulic fluids the following procedures are recommended to assure satisfactory performance.

1. Drain the system completely of the previous fluid and clean thoroughly all system components including pumps, lines, valves, reservoir, filters, strainers and accumulators.
2. Remove paint, galvanizing, zinc and cadmium plating from surfaces, which will come in contact with the fluid.
3. Renew the filter elements. Make certain that sufficient filter capacity in the 60 mesh range is provided. An undersized suction side filter will cause pump cavitation. If extremely fine filtration is required, pressure side filtrations is recommended. Fuller's Earth or Chemical Absorption type filter should be avoided.
4. Replace all cork and leather seals with Neoprene, Buna N or butyl type seals.
5. If petroleum base hydraulic fluid was previously used.

a. Flush the system at reduced pressure with hot water or steam to remove any residue.
b. Cycle the system at reduces pressure for 30 minutes.
c. Drain thoroughly and wipe the pump clean.
d. Fill the system with fresh charge of **Metatron™ 610** and operate in a normal manner.

6. If invert emulsions were previously used,
   a. Flush system at reduced pressure with hot water or steam to remove any residue.
   b. Drain thoroughly. Excessive water left in the system will cause the viscosity of **Metatron™ 610** to decrease.
   c. Flush system at reduced pressure with **Metatron™ 610**.
   d. Drain thoroughly and wipe pump clean.
   e. Fill the system with fresh charge of **Metatron™ 610** and operate at a normal manner.
7. To replace synthetic fluids,
   a. Flush system with **Metatron™ 610** at reduced pressure.
   b. Drain thoroughly and wipe pump clean.
   c. Fill the system with a fresh charge of **Metatron™ 610** and operate in a normal manner.
8. Strainers and filters should be inspected and cleaned frequently after conversion from other types of hydraulic fluids. This recommendation is a precautionary measure to ensure that the system was adequately cleaned prior to the introduction of **Metatron™ 610**.
9. Water-glycol base hydraulic fluids require an operating temperature below 150°F.

WATER CONTROL AND MAKEUP

It is necessary to maintain the water level of **Metatron™ 610** within acceptable limits. Excessive water reduces the fluid's viscosity and its ability to lubricated and prevent pump slippage. Insufficient water will render the fluid non-fire resistant as well as raise its viscosity and bulk density both of which will contribute to pump cavitation.

Two acceptable methods that may be used to control the water level of **Metatron™ 610** are: (1) indirectly by viscosity determination through the use of portable viscosity gauges and (2) by laboratory methods using Karl Fisher titration. The water level of **Metatron™ 610** can not be determined by distillation procedures. The viscosity approach is not applicable to systems containing large amounts of oil or system where the fluid is predominately not **Metatron™ 610**.

The attached table can be used to determine the amount of water required to adjust the fluid to acceptable limits. Only distilled, deionized or controlled boiler feed water should be used as makeup. The use of hard tap water, well or spring water should be avoided since these waters will react with the additive system in the **Metatron™ 610** causing fluid haziness and the formation of soap-like insoluble material.

ALKALINITY CONTROL

Metatron™ 610 contains an alkaline corrosion inhibitor called morpholine. The fluid is blended to contain a surplus of the additive, which is called alkaline reserve. Morpholine will slowly evaporate from the fluid in order to provide vapor phase protection. The hotter the system operating temperature the greater the evaporation loss.

Because of this aspect, it may be necessary from time to time to replenish the morpholine if normal fluid makeup is not sufficient to maintain the alkaline reserve. As a general rule of thumb, if the system operating temperatures are maintained at 248°C/120°F to 266°C/130°F or lower and a normal amount of **Metatron™ 610** is being added as makeup, no alkalinity adjustment is necessary. If the systems are operating at elevated temperatures the morpholine loss may occur at a greater rate than normal new fluid makeup can replenish. When this occurs, supplemental morpholine should be added.

The amount of morpholine in **Metatron™ 610** is a measurement of the alkaline content of the fluid. It is defined technically as the number or milliliters of 0.1N hydrochloric acid necessary to neutralize 100 milliliters of fluid to a pH of 5.5. The normal alkaline reserve of new 130°F ranges from 220 to 280 milliliters of 0.1N hydrochloric acid required to neutralize 100 milliliters of the fluid to a pH of 5.5. In an in service basis, it is safe to continue to operate Glygo Torque Fluid without a morpholine adjustment as long as the alkaline content does not fall below 220 in titration.

FLUID MAINTENANCE

130°F will retain its optimum fire resistance, impart excellent resistance against rusting and corrosion and prolong the service of life of hydraulic components only with good fluid maintenance. Proper water content assures fire resistance. Maintaining the alkalinity reserve provides maximum corrosion protection. Proper filtration of dirt and sludge is essential for a well maintained fire resistant fluid.

TYPICAL PROPERTIES:

ISO Grade	32
Specific Gravity 15°C/60°F	1.082
Viscosity 100°F/37.78°C SUS (ASTM D-445)	182-200
Viscosity 104°F/40°C SUS (ASTM D-445)	168.17-186.57
Viscosity 150°F/65.56°C SUS (ASTM D-445)	82.30-95.00
Viscosity 175°F/79.44°C SUS (ASTM D-445)	63.18-73.63
Viscosity 100°F/37.78°C Cst (ASTM D-445)	38.95-43.00
Viscosity 104°F/40°C Cst (ASTM D-445)	35.90-39.95
Viscosity 150°F/65.56°C Cst (ASTM D-445)	16.17-19.26
Viscosity 175°F/79.44°C Cst (ASTM D-445)	11.43-13.94
Viscosity Index (ASTM D-2270)	200
Pour Point °F/°C (ASTM D-97)	<-40°F/-40°C
PH	8.8-9.8
Rust Test (ASTM D-665)	
Procedure A (Distilled Water)	Pass
Procedure B (Salt Water)	Pass
Copper Strip Corrosion Test (ASTM D-130)	1a
Cast Iron Chip Test	Pass
Foam Test (ASTM D-892)	
Sequence I	0/0
Sequence II	0/0
Sequence III	0/0
Vickers Vane Pump Test (ASTM D-2882)	
2000 psi, 1200 rpm, 100 hr., 66°C/150°F)	
Total Wear, mg.	15-20
Four Ball Wear Test (ASTM D-4172)	
Mean Scar Diameter, mm	.5
Wick Flame Test	Pass
Temperature Pressure Spray Ignition Test	Pass
Autoignition Temperature Test	Pass
Total Acid Number (ASTM D-664)	3.4