

#265 GLYGO TORQUE FLUID

Glygo Torque Fluid is a premium anti-wear water glycol polymer thickened type fire resistant fluid that is designed for use in hydraulic systems operating up to 150°F/66°C and at system pressures of 2000 psi (13,789.6 kPa) or greater.

Glygo Torque Fluid is formulated utilizing a blend of water and high molecular weight polyoxyalkene glycols. Glygo Torque fluid contains a sufficient amount of water to “snuff out” ignition which could occur is a high pressure leak in the hydraulic system comes into contact with a high temperature source. Into this blend is formulated is a patented concentrated anti-wear additive system that provides the Glygo Torque Fluid with the following performance benefits.

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

Glygo Torque Fluid 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, Glygo Torque Fluid possesses excellent mechanical shear stability, which results in the Glygo Torque Fluid not being susceptible to viscosity breakdown even under the severe mechanical shearing action of pumps, control valves and servo-valves used in hydraulic systems.

Glygo Torque Fluid possesses excellent low temperature properties. These excellent low temperatures permit the hydraulic pumps to be safely started at temperatures as low as -10°F/-23°C. In addition the Glygo Torque Fluid can be repeatedly frozen and thawed without any loss whatsoever of 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.

Glygo Torque Fluid is compatible with all hydraulic system metals with the exception of zinc, cadmium and nonanodized aluminum. Glygo Torque Fluid is also compatible with a wide variety of seal and gasket materials such as natural rubbers, Buna N, Buna S, Neoprene, Viton®, Teflon, Silicone, Fluorosilicone, Ethylene-Propylene and PNF. Glygo Torque Fluid however is not compatible with cork, paper, leather and synthetic fiber type seals.

All conventional types of hydraulic system filters with the exception of those employing diatomaceous earth can be used with Glygo Torque Fluid.

Glygo Torque Fluid 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.

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Glygo Torque Fluid is relatively nontoxic, harmless and will 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.

When Glygo Torque Fluid 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 filtration 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 reduced pressure for 30 minutes.
 - c. Drain thoroughly and wipe the pump clean.
 - d. Fill the system with fresh charge of Glygo Torque Fluid 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 Glygo Torque Fluid to decrease.
 - c. Flush system at reduced pressure with Glygo Torque Fluid.
 - d. Drain thoroughly and wipe pump clean.
 - e. Fill the system with fresh charge of Glygo Torque Fluid and operate at a normal manner.
7. To replace synthetic fluids,
 - a. Flush system with Glygo Torque Fluid at reduced pressure.
 - b. Drain thoroughly and wipe pump clean.
 - c. Fill the system with a fresh charge of Glygo Torque Fluid 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 Glygo Torque Fluid.
9. Water-glycol base hydraulic fluids require an operating temperature below 150°F/66°C.

Water Control and Makeup

It is necessary to maintain the water level of Glygo Torque Fluid within acceptable limits. Excessive amounts of water will reduce the fluid's viscosity and its ability to lubricate and prevent pump slippage. An insufficient amount of 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 Glygo Torque Fluid are: (1) indirectly by viscosity determination through the use of portable viscosity gauges and (2) by the use of a Brix Refractometer. The water level of Glygo Torque Fluid 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 Glygo Torque Fluid.

The attached tables can be used to determine the amount of water required to adjust the fluid to acceptable limits. Only distilled, or deionized, reverse osmosis water with a maximum hardness of 5 ppm should be used as makeup. The use of hard tap water, well water, spring water or boiler feed water should be avoided since these waters will react with the additive system in the Glygo Torque Fluid causing fluid haziness and the formation of soap-like insoluble material.

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Alkalinity Control

Glygo Torque Fluid contains an alkaline corrosion inhibitor called morpholine. The fluid is blended to contain a surplus of the additive which is called alkaline reserve. Morph line will slowly evaporate from the fluid in order to provide vapor phase protection. The hotter the system operating temperature the greater the evaporation loss of the morpholine.

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's operating temperatures are maintained at 120°F/49°C to 135°F/57°C or lower and a normal amount of Glygo Torque Fluid added as makeup, no alkalinity adjustment are 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 Glygo Torque Fluid 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 Glygo Torque Fluid 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 millimeters in titration.

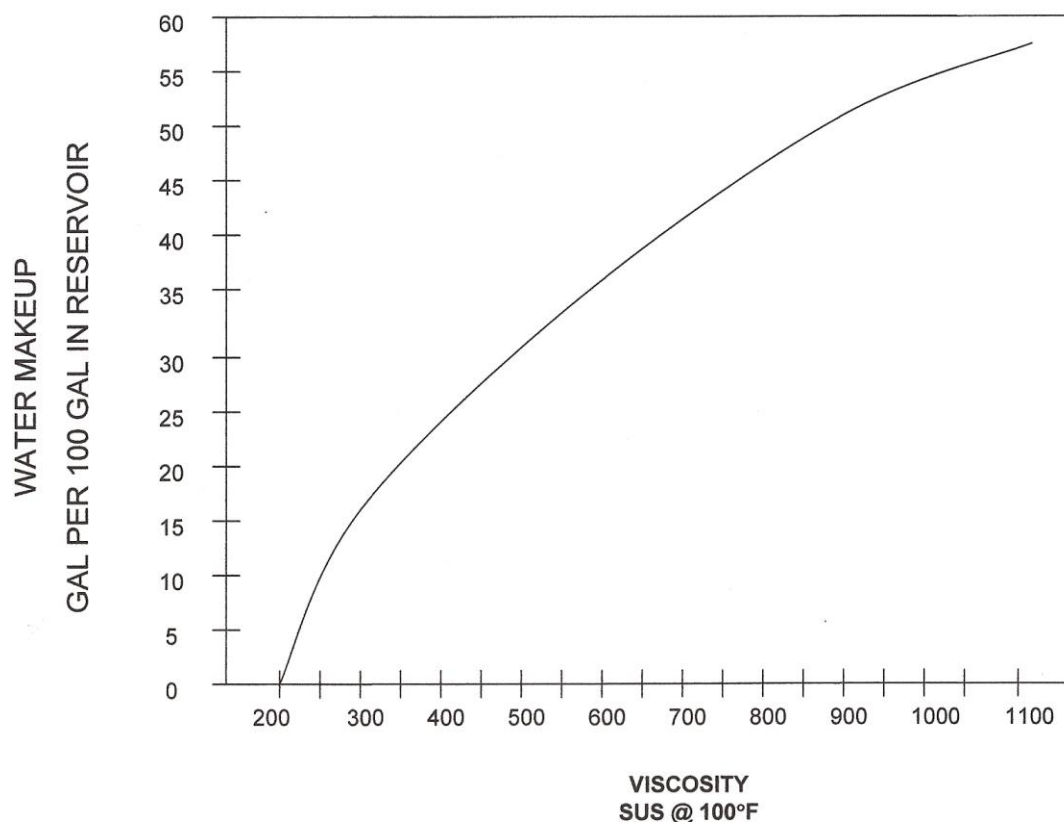
Fluid Maintenance

Glygo Torque Fluid 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	46
Specific Gravity 60°F	1.0817
Viscosity 100°F/37.78°C SUS (ASTM D-445)	190.0-210.0
Viscosity 100°F/38°C cSt (ASTM D-445)	41.4-50.6
Viscosity 104°F/40°C cSt (ASTM D-445)	35.90-39.95
Viscosity Index (ASTM D-2270)	180
Pour Point (ASTM D-97)	<-40°F/-40°C
pH	9.3-9.7
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., 150°F	
Total Wear, mg.	15-20
Four Ball Wear Test (ASTM D-4172)	
Mean Scar Diameter, mm	0.5
Wick Flame Test	Pass
Temperature Pressure Spray Ignition Test	Pass
Autoignition Temperature Test	Pass
Total Acid Number (ASTM D-664)	3.4

VISCOSITY CORRECTION CHART



REFRACTOMETER METHOD-

Water adjustment gallons per 100 gallons of fluid (Liters per 378.5 Liters)

Refractive Index Degrees Brix	Water Make Up Gallons	Water Make Up Liters
42-44.15	None	None
45	2	7.57
46	4	15
47	7	26.5
48	10	38
49	12	45.4
50	14	53