



FR Fluid-Glycol

FR Fluid-Glycol is a water-glycol based fire-resistant hydraulic fluid developed for use in industrial hydraulic systems operating in areas subject to fire hazards. It contains sufficient water to snuff out a fire resulting from ignition of a fluid leak. It is suitable for use in hydraulic systems operating at 2,000 to 3,000 psi, and can withstand intermittent pressure spikes up to 5,000 psi.

FR Fluid-Glycol is formulated with diethylene glycol, 40% water and select additives that provide lubricity, wear protection and corrosion protection. It has good antiwear properties to ensure long life for hydraulic pumps and motors. Special rust and corrosion inhibitors provide corrosion protection in both the liquid phase and the vapor phase. The high water content provides fire resistance if the fluid comes into contact with an ignition source. This product contains less than 60 parts per billion (ppb) phenols, and does not contain any nitrites or nitrosamines. It is compatible with other water-glycol type fire-resistant hydraulic fluids..

FR Fluid-Glycol is compatible with most hydraulic pumps, including vane, piston and gear pumps. It is safe to use with most packing and seal materials except polyurethane and silicone. Cork shaft seals should be replaced with Buna N or other synthetic rubber. Leather packing should be avoided and zinc or cadmium-plated components should not be used.

Applications

Hydraulic systems on equipment operating in areas subject to fire hazards, such as in:

- Steel and aluminum mills
- Molding and metal die casting machinery
- Welding machines
- Foundries
- Furnace charging equipment
- Open hearth and basic oxygen furnace (B.O.F.) equipment
- Power transmission plants
- Underground mines

FR Fluid-Glycol meets the requirements of the following OEM specifications:

- Denison Hydraulics HF-4
- Ford M6C1C

**Water-Glycol Based
Fire-Resistant
Hydraulic Fluid**

Contact Information

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Caution: FR Fluid-Glycol should **not** be used in systems where operating temperatures exceed 175°F (79°C). This product contains water and should not be stored at temperatures over 130°F (54°C). In addition, this product is **not** recommended for use as a conventional antifreeze coolant for automotive or industrial applications.

Features/Benefits

- Fire-resistant for safety
- Excellent wear protection for hydraulic pumps and motors
- Excellent rust and corrosion protection
- Good foam resistance
- Glycol content protects against freezing
- Compatible with other water-glycol fluids
- Dyed red for easy identification

FR Fluid-Glycol

Typical Properties

ISO Grade	32/46
Specific Gravity @ 60°F	1.08
Density, lbs/gal @ 60°F	9.00
Color, Visual	Red
Freezing Point, °C (°F)	-55 (-48)
Viscosity,	
cSt @ 40°C	39.3
cSt @ 100°C	8.5
SUS @ 100°F	198
SUS @ 210°F	54.7
Viscosity Index	185
Four-Ball Wear, ASTM D4172, Scar Diameter, mm	0.48
pH (neat)	9.7
Rust Test, ASTM D665 A&B	Pass
Water, wt %	40

Typical properties are average values only and do not constitute a specification. Minor variations that do not affect product performance are to be expected during normal manufacture, and at different blending locations. Product formulations are subject to change without notification.

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Care and Maintenance of FR Fluid-Glycol

All water-containing fire-resistant fluids require close maintenance of the water content to ensure safe operation. To keep FR Fluid-Glycol operating at maximum efficiency, the water content and alkalinity level (pH) should be checked routinely and adjusted as necessary to maintain good fire resistance, corrosion protection and proper viscosity.

Water content can be determined with the use of a refractometer and Brix scale provided by the refractometer manufacturer, or by Karl Fisher titration. Digital refractometers are available that will give a direct reading of the water content. The viscosity of the fluid is an indirect measure of the water content of the fluid. Table 1 below shows the amounts of water or glycol to be added at different viscosities to maintain the proper water content for FR Fluid-Glycol.

Alkalinity is determined by measuring the pH of the fluid. The pH should be adjusted as necessary to maintain a pH level of 9.6. Alkalinity may be adjusted by adding small amounts of morpholine to the makeup water. Consult with your morpholine supplier for the proper amount to be added.

Table 1
Recommended Water / Glycol Addition

Viscosity Range SUS @ 100°F	Fluid to be Added	Gallons to be Added per 100 Gallons of FR Fluid-Glycol
140 – 160	Concentrate	10
160 – 180	Concentrate	5
180 – 220	None	0
220 – 300	Water	5
300 – 350	Water	10
350 – 410	Water	15

Health and Safety Information

For recommendations on safe handling and use of this product, please refer to the Material Safety Data Sheet via <http://w3.conocophillips.com/NetMSDS>.

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