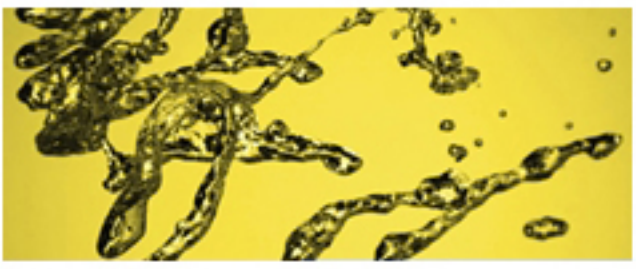
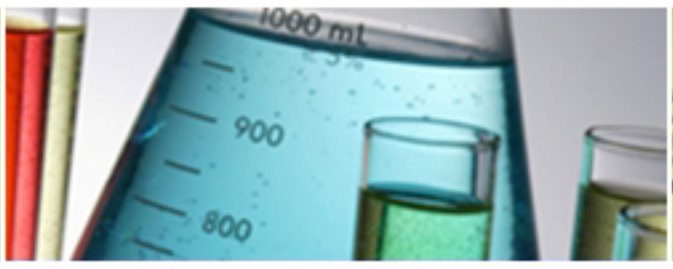
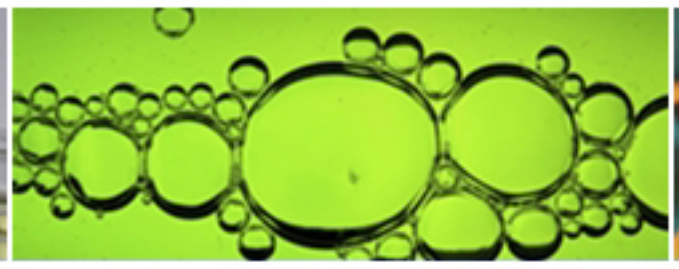
QUINTOLUBRIC®

Fire-Resistant Hydraulic Fluids


Water Additive Concentrates (HFA fluids)	Water Glycol Fluids (HFC fluids)	Polyol Ester Fluids (HFD fluids)
Synthetic Water Additives ■ QUINTOLUBRIC 807-IS ■ QUINTOLUBRIC N 807-AL **Longwall Hydraulic Fluids** ■ QUINTOLUBRIC 814-01 ■ QUINTOLUBRIC 814-02 ■ QUINTOLUBRIC 814-03 ■ QUINTOLUBRIC 818-02	■ QUINTOLUBRIC 702-46 RD ■ QUINTOLUBRIC 777-46 ■ QUINTOLUBRIC 777-68	**Synthetic Polyol Esters** ■ QUINTOLUBRIC 888-46 ■ QUINTOLUBRIC 888-68 ■ QUINTOLUBRIC 822-450 ■ QUINTOLUBRIC 822-300 CM ■ QUINTOLUBRIC 822-EHC **Vegetable Ester Based Fluid** ■ QUINTOLUBRIC 855
Mining ■ Additional Products for the Mining Industry		

Quaker has long been known for delivering innovative solutions to industry problems. In the mid-1970's, QUINTOLUBRIC® polyol esters offered a cost effective alternative to phosphate ester fluids. These early polyol ester fluids have evolved into the current QUINTOLUBRIC® 888 Series fluids. QUINTOLUBRIC® 888-46 and QUINTOLUBRIC® 888-68 are now industrial standards that offer performance advantages over other polyol esters and are recognized by pump manufacturers around the world for quality and dependability. Quaker's Fluid Power product line offers innovative technology in the following market segments:

- HFA Fluids (High Water Content Fluids)
- HFC Fluids (Water Glycol Fluids)
- HFD-U Fluids (Synthetic Esters; Anhydrous)

From longwall mining to die casting to steel rolling, there is a QUINTOLUBRIC® fluid designed to meet your specific needs.

Quaker



QUINTOLUBRIC®

Fire-Resistant Hydraulic Fluids




Aluminum	Steel/Primary Metals	Automotive	Mining	Tunneling
QUINTOLUBRIC 888-46	QUINTOLUBRIC 888-46	QUINTOLUBRIC 888-46	QUINTOLUBRIC 814-01	QUINTOLUBRIC 888-46
QUINTOLUBRIC 888-68	QUINTOLUBRIC 888-68	QUINTOLUBRIC 888-68	QUINTOLUBRIC 814-02	QUINTOLUBRIC 888-68
QUINTOLUBRIC 855	QUINTOLUBRIC 855	QUINTOLUBRIC 855	QUINTOLUBRIC 814-03	QUINTOLUBRIC 855
QUINTOLUBRIC 702-46-RD	QUINTOLUBRIC 702-46-RD	QUINTOLUBRIC 702-46-RD	QUINTOLUBRIC 818-02	QUINTOLUBRIC 822-450
QUINTOLUBRIC 822-450	QUINTOLUBRIC 822-450	QUINTOLUBRIC 822-450		
QUINTOLUBRIC 777-46	QUINTOLUBRIC 777-46	QUINTOLUBRIC 777-46		
QUINTOLUBRIC 777-68	QUINTOLUBRIC 777-68	QUINTOLUBRIC 777-68		
QUINTOLUBRIC 807-IS	QUINTOLUBRIC 807-IS	QUINTOLUBRIC 807-IS		
QUINTOLUBRIC N 807-AL	QUINTOLUBRIC N 807-AL	QUINTOLUBRIC N 807-AL		

Marine/Offshore	Bearing	Heavy Duty Equipment	Tube & Pipe	Power Generation
QUINTOLUBRIC 888-46	QUINTOLUBRIC 888-46	QUINTOLUBRIC 888-46	QUINTOLUBRIC 888-46	QUINTOLUBRIC 888-46
QUINTOLUBRIC 888-68	QUINTOLUBRIC 888-68	QUINTOLUBRIC 888-68	QUINTOLUBRIC 888-68	QUINTOLUBRIC 888-68
QUINTOLUBRIC 855	QUINTOLUBRIC 855	QUINTOLUBRIC 855	QUINTOLUBRIC 855	QUINTOLUBRIC 822-300 CM
QUINTOLUBRIC 702-46-RD	QUINTOLUBRIC 702-46-RD	QUINTOLUBRIC 777-46	QUINTOLUBRIC 702-46-RD	QUINTOLUBRIC 822-EHC
QUINTOLUBRIC 777-46	QUINTOLUBRIC 822-450	QUINTOLUBRIC 777-68	QUINTOLUBRIC 822-450	
QUINTOLUBRIC 777-68	QUINTOLUBRIC 777-46		QUINTOLUBRIC 777-46	
	QUINTOLUBRIC 777-68		QUINTOLUBRIC 777-68	
	QUINTOLUBRIC 807-IS		QUINTOLUBRIC 807-IS	
	QUINTOLUBRIC N 807-AL		QUINTOLUBRIC N 807-AL	

Our Services

Quaker supports customers with its Q-Trak sampling (North America only) and analysis program. Q-Trak is designed to help QUINTOLUBRIC® fluid users get the most from their fluid and equipment. Testing regimens have been developed for each QUINTOLUBRIC® product that will assist customers in maintaining both the fluid and hydraulic components in top operating condition.

For HFA Fluids Q-Trak reports the following:

- Concentration
- pH
- Bacteria
- Fungi
- Recommended Actions

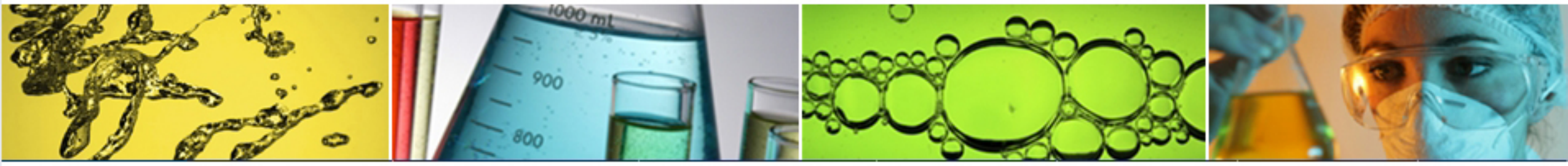
For HFD Fluids Q-Trak reports the following:

- Viscosity
- Moisture content (%)
- Particle Count
- Acid Number
- Recommended Actions

Results are typically transmitted within 3-4 days of receipt of sample.

Our staff of experienced chemists, field engineers and support staff have a record of proven performance in developing and commercializing technically advantaged custom formulations for our customers.

Product Name	Description
Synthetic Water Additive	
QUINTOLUBRIC 807-IS	■ Synthetic water hydraulic additive concentrate for use is systems designed to run on water, soluble oil or other low viscosity hydraulic fluids. ■ Compatible with most soluble oils. Provides lubrication and corrosion protection.
QUINTOLUBRIC 807-AL	■ Semi-synthetic water additive concentrate. ■ Formulated for use in systems designed to run on water, soluble oil or other low viscosity hydraulic fluids.
Longwall Hydraulic Fluids	
QUINTOLUBRIC 814-01	■ Concentrate that forms a semi-synthetic, micro-emulsion when added to water of the correct quality. ■ Primarily used in longwall hydraulic systems. ■ Exceeds all OEM specifications for use in new longwall systems. ■ Usual dosage 4 to 5%.
QUINTOLUBRIC 814-02	■ Concentrate that forms a semi-synthetic, micro-emulsion when added to water of the correct quality. ■ Primarily used in longwall hydraulic systems. ■ Approved for use in all Joy new longwall equipment. Usual dosage 2%.
QUINTOLUBRIC 814-03	■ Concentrate that forms a semi-synthetic, micro-emulsion when added to water of the correct quality. ■ Primarily used in longwall hydraulic systems. ■ Approved for use in all Joy new longwall equipment. Usual dosage 3%.
QUINTOLUBRIC 818-02	■ Concentrate that forms a fully synthetic solution when added to water of the correct quality. ■ Primarily used in longwall hydraulic systems. ■ Exceeds all OEM specifications for use in new longwall systems. ■ Tolerant of very severe waters. Usual dosage 2%.
Water Glycol Fluids	
QUINTOLUBRIC 702-46 RD	■ Premium water glycol hydraulic fluid. ■ Offers excellent lubrication and fire resistance.
QUINTOLUBRIC 777-46	■ Innovative water glycol fluid. Low water content improves lubricity without sacrificing fire resistance. ■ Unique additive package allows the fluid to pass FZG stage 12 - performance on par with anhydrous fluids.
QUINTOLUBRIC 777-68	■ Innovative water glycol fluid. Low water content improves lubricity without sacrificing fire resistance. ■ Unique additive package allows the fluid to pass FZG stage 12 - performance on par with anhydrous fluids.
Synthetic Polyol Esters	
QUINTOLUBRIC 888-46	■ ISO VG 46 synthetic polyol ester fire resistant hydraulic fluid. ■ Based on a global formulation ensuring uniform quality and performance wherever it is produced and sold. ■ Factory Mutual Approved as a less hazardous fluid.
QUINTOLUBRIC 888-68	■ ISO VG 68 synthetic polyol ester fire resistant hydraulic fluid. Based on a global formulation ensuring uniform quality and performance wherever it is produced and sold. ■ Factory Mutual Approved as a less hazardous fluid.
QUINTOLUBRIC 822-450	■ ISO VG 100 synthetic polyol ester fire resistant hydraulic fluid. ■ Factory Mutual Approved as a less hazardous fluid.
QUINTOLUBRIC 822-300 CM	■ ISO VG 68 synthetic ester fluid designed to meet the rigors of high temperature applications. ■ Will operate in systems where reservoir temperatures reach 200° F.
QUINTOLUBRIC 822-EHC	■ Thermally stable fluid formulated for use in power generating equipment.
Vegetable Ester Based Fluid	
QUINTOLUBRIC 855	■ ISO VG 68 fluid based on naturally occurring esters (vegetable oils). ■ Has superior oxidation stability and is Factory Mutual approved as a less hazardous fluid.



HFA-Water Additives

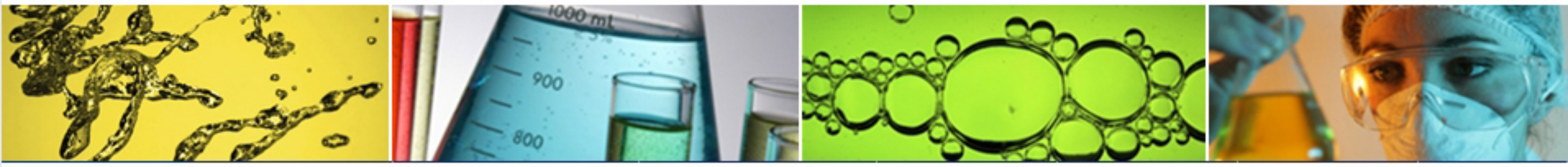
HFA or high water content fluids (HWCF's) are hydraulic fluids that combine the excellent fire resistant properties of water with lubrication and corrosion protection from an additive concentrate. Because water is the major component (90% or more) of an HFA fluid, hydraulic equipment using this type of fluid must be capable of operating with a low viscosity fluid. Water hydraulic equipment, while able to operate with water as the hydraulic medium, will benefit from the use of an HFA concentrate. HFA concentrates lubricate valves, improve seal life, inhibit corrosion in components and piping, and control bacterial and fungal growth in the system. HFA fluids are ideal for use in steel mills, underground longwall mining equipment, and any other hydraulic system designed for water hydraulic equipment.

Quaker markets low mineral oil containing HFA-E fluids (QUINTOLUBRIC® 807 and 814 Series) and synthetic HFA-S fluids (QUINTOLUBRIC® 807 and 818 Series) that are globally available and give outstanding performance in stability, corrosion protection and bio-resistance.

Product Name	Description
Synthetic Water Additives	
QUINTOLUBRIC® 807-IS	Synthetic water hydraulic additive concentrate for use is systems designed to run on water, soluble oil or other low viscosity hydraulic fluids. Compatible with most soluble oils. Provides lubrication and corrosion protection.
QUINTOLUBRIC® N 807-AL	Semi-synthetic water additive concentrate. Formulated for use in systems designed to run on water, soluble oil or other low viscosity hydraulic fluids.
Longwall Hydraulic Fluids	
QUINTOLUBRIC® 814-01	Concentrate that forms a semi-synthetic, micro-emulsion when added to water of the correct quality. Primarily used in longwall hydraulic systems. Exceeds all OEM specifications for use in new longwall systems. Usual dosage 4 to 5%.
QUINTOLUBRIC® 814-02	Concentrate that forms a semi-synthetic, micro-emulsion when added to water of the correct quality. Primarily used in longwall hydraulic systems. Approved for use in all Joy new longwall equipment. Usual dosage 2%.
QUINTOLUBRIC® 814-03	Concentrate that forms a semi-synthetic, micro-emulsion when added to water of the correct quality. Primarily used in longwall hydraulic systems. Approved for use in all Joy new longwall equipment. Usual dosage 3%.
QUINTOLUBRIC® 818-02	Concentrate that forms a fully synthetic solution when added to water of the correct quality. Primarily used in longwall hydraulic systems. Exceeds all OEM specifications for use in new longwall systems. Tolerant of very severe waters. Usual dosage 2%.

ISO 6743/4 specifies two types of HFA fluids:

- **HFA-E:** Oil in water emulsions: water content greater than 80%.
- **HFA-S:** Synthetic aqueous solutions, water content >90%;
  common in-use concentrations range from 1-5%



HFC-Water Glycols

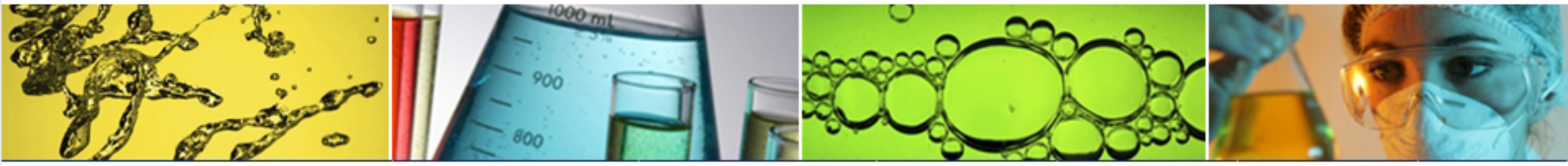
HFC or water glycol fluids are the most widely used fire resistant hydraulic fluids because of their price-quality and their combination of fire resistant properties with reasonable lubrication performance.

Quaker markets HFC fluids (QUINTOLUBRIC® 702 Series) and HFC-E fluids (QUINTOLUBRIC® 777 Series) that are globally available and give outstanding performance in fire resistance and lubrication.

Product Name	Description
QUINTOLUBRIC® 702-46 RD	Premium water glycol hydraulic fluid. Offers excellent lubrication and fire resistance.
QUINTOLUBRIC® 777-46	Innovative water glycol fluid. Low water content improves lubricity without sacrificing fire resistance. Unique additive package allows the fluid to pass FZG stage 12 - performance on par with anhydrous fluids.
QUINTOLUBRIC® 777-68	Innovative water glycol fluid. Low water content improves lubricity without sacrificing fire resistance. Unique additive package allows the fluid to pass FZG stage 12 - performance on par with anhydrous fluids.

ISO 6743/4 specifies HFC fluids as:

- **Aqueous monomer and/or polymer (polyglycol) solutions:** Water content greater than 35% by weight.
- **HFC-E**: Fluids are a new type of fire resistant hydraulic fluids containing 20% water instead of 35% or more water by weight. This type of fluid combines the good fire resistant properties of HFC fluids with the lubrication performance normally associated with anhydrous fluids. HFC-E fluids are ideal for use in hydraulic systems designed for HFC fluids where end users are looking for a higher level of lubrication performance.



HFD-Anhydrous Synthetics

HFD fluids are fire resistant hydraulic fluids that do not contain water. HFD fluids are usually based on synthetic base stocks or esters that combine reasonable to good fire resistant properties with excellent lubrication performance. HFD fluids are designed to operate in oil hydraulic equipment.

Quaker was the first company to offer HFD-U fluids and has been the market leader in this type of technology. Quaker's current HFD-U fluids are based on both synthetic organic compounds and naturally occurring esters.

QUINTOLUBRIC ®888 Series synthetic polyol esters and QUINTOLUBRIC® 855, which is based on natural esters are industry leaders in ester based technology. Quaker HFD-U fluids are readily biodegradable and have low aquatic toxicity, making them ideal for use where environmental protection is required. Quaker HFD-U fluids are globally available and give outstanding performance in fire resistance, lubrication and long service life.

As the market leader in ester based fire resistant hydraulic fluid technology and having more than 35 years and millions of gallons of experience with the application of these fluids in the Steel, Non-Ferrous, Mining, Automotive and Power generation industry, Quaker is often recommended by OEM's as the preferred supplier for HFD-U fluids.

Product Name	Description
Synthetic Polyol Esters	
QUINTOLUBRIC® 888-46	ISO VG 46 synthetic polyol ester fire resistant hydraulic fluid. Based on a global formulation ensuring uniform quality and performance wherever it is produced and sold. Factory Mutual Approved as a less hazardous fluid.
QUINTOLUBRIC® 888-68	ISO VG 68 synthetic polyol ester fire resistant hydraulic fluid. Based on a global formulation ensuring uniform quality and performance wherever it is produced and sold. Factory Mutual Approved as a less hazardous fluid.
QUINTOLUBRIC® 822-450	ISO VG 100 synthetic polyol ester fire resistant hydraulic fluid. Factory Mutual Approved as a less hazardous fluid.
QUINTOLUBRIC® 822-300 CM	ISO VG 68 synthetic ester fluid designed to meet the rigors of high temperature applications. Will operate in systems where reservoir temperatures reach 200° F.
QUINTOLUBRIC® 822-EHC	Thermally stable fluid formulated for use in power generating equipment.
Vegetable Ester Based Fluid	
QUINTOLUBRIC® 855	ISO VG 68 fluid based on naturally occurring esters (vegetable oils). Has superior oxidation stability and is Factory Mutual approved as a less hazardous fluid.

QUINTOLUBRIC polyol ester fluids are typically compatible with other HFD-U type fluids with similar chemistries as well as mineral oils. Due to the diversity of currently available HFD-type fluids, we recommend that compatibility testing be performed for every major fluid change over. QUINTOLUBRIC polyol ester fluids are not miscible with water and not compatible with water-based fluids. Please consult your local Quaker representative before mixing any polyol ester fluid.

ISO 6743/4 specifies two types of HFD fluids:

- **HFD-R:** Anhydrous fluids with phosphate ester base
- **HFD-U:** Anhydrous fluids based on other compounds

QUINTOLUBRIC® Fluid Power Products

Material Compatibility

MATERIAL	HWCF HFA	Water Glycols HFC	Vegetable Oil HFD-U	Polyol Esters HFD-U
Metals, Ferrous				
Metals, Bronze	2	2	2	2
Metals, Zinc				
Metals, Cadmium				
Metals, Lead				
Metals, Brass, Copper				
Metals, Aluminum, Un-anodised				
Metals, Aluminum, Anodised				
Rubber, Neoprene				
Rubber, Buna "N"				
Rubber, Butyl				
Rubber, E.P.R.				
Rubber, Polyurethane	3	3		
Rubber, Silicone				
Rubber, Teflon				
Rubber, Viton				
Filter Media, Cellulosic, Phenolic Treated				
Filter Media, Fiberglass				

	Compatible
	Low or Marginal Compatibility
	Not Compatible
2	Bronze with lead content over 20% limited to 50°C
3	Compatibility marginally good, some sources better than others

Quaker

quakerchem.com
quintolubric.com

QUINTOLUBRIC® 888-46

Fire Resistant Hydraulic Fluid

FM APPROVED

APPLICATIONS

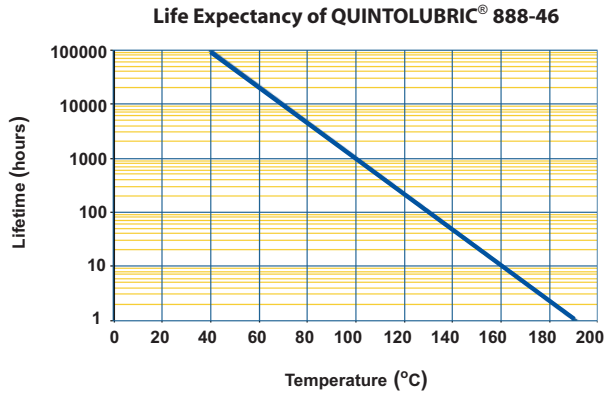
QUINTOLUBRIC® 888-46 was designed to replace anti-wear, mineral oil-based hydraulic fluids used in applications where fire hazards exist. QUINTOLUBRIC® 888-46 can also be used in environmentally sensitive hydraulic applications without compromising the overall hydraulic system operations. This fluid does not contain water, mineral oil, or phosphate ester, and is based on high-quality, synthetic, organic esters and carefully selected additives to achieve excellent hydraulic fluid performance. QUINTOLUBRIC® 888-46 offers the lubrication level of premium, anti-wear hydraulic oils, and can be used with hydraulic components from all major manufacturers.

BENEFITS

- Fire-resistant
  - High ignition temperature and low heat release
  - Properties that limit the spread of fire
  - Excellent shear stability
  - Approved by Factory Mutual Approvals
- Non-toxic / non-toxic to aquatic life
- Non-irritating
- Fully biodegradable
- Simple waste treatment

PERFORMANCE

Properly maintained QUINTOLUBRIC® 888-46 has a useful life comparable to that of mineral oil fluids. Specific fluid lifetime depends primarily on temperature as shown in the graph.



TYPICAL PROPERTIES

PROPERTIES (Test Method)	888-46 (014113)
Appearance	Yellow to amber fluid
Kinematic Viscosity (ASTM D 445) **At 0°C** **At 20°C** **At 40°C** **At 100°C**	 349 mm^2 /s or cSt 116 mm^2 /s or cSt 49.7 mm^2 /s or cSt 9.7 mm^2 /s or cSt
Viscosity Index (ASTM D 2270)	185
Density at 15°C (ASTM D 1298)	0.92 g/cm3
Acid Number (ASTM D 974)	2.0 mg KOH/g
Pour Point (ASTM D 97)	< -20°C (< -4°F)
Foam Test at 25°C (ASTM D 892) Sequence I	50-0 ml-ml
Corrosion Protection ISO 4404-2 ASTM D 665 A ASTM D 130	 Pass Pass 1a
Flash Point (ASTM D 92)	300°C (572°F)
Fire Point (ASTM D 92)	360°C (680°F)
Auto Ignition Temperature (DIN 51794)	>400°C (>752°F)
Air Release (ASTM D 3427)	7 min.
Fire Resistance (FM Approvals)	Approved
Pump Test (ASTM D 2882)	<5 mg wear
Gear Lubrication (DIN 51354-2)	>12 FZG load stage
Water Separability (ASTM D 1401)	41-39-0 (30) ml-ml-ml (min.)

Quaker

QUINTOLUBRIC® 888-46

Fire Resistant Hydraulic Fluid

COMPATIBILITY

The following chart contains our recommendations regarding the use of QUINTOLUBRIC® 888-46 with commonly used elastomers. The elastomer applications listed are "Static," which refers to trapped nonmoving seals such as O-rings in valve sub-plates and rigid, low pressure hose connections; "Mild-Dynamic," whose applications include accumulator bladders and hose linings where the hoses are exposed to high pressure and light flexing; and "Dynamic," which refers to cylinder rod seals, pump shaft seals and constantly flexing hydraulic hose.

Elastomers

ISO 1629	DESCRIPTION	STATIC	MILD DYNAMIC	DYNAMIC
NBR	Medium to high nitrile rubber (Buna N, >30% acrylonitrile)	C	C	C
FPM	Fluoroelastomer (Viton®)	C	C	C
CR	Neoprene	S	S	S
IIR	Butyl rubber	S	N	N
EPDM	Ethylene propylene rubber	N	N	N
AU	Polyurethane	C	C	C
PTFE	Teflon®	C	C	C

C = Compatible
S = Satisfactory for short term use, but replacement with a completely compatible elastomer is recommended at the earliest convenience.
N = Not Compatible

Metals

QUINTOLUBRIC® 888-46 is compatible with iron and steel alloys and most nonferrous metals and their alloys. It is not compatible with lead, cadmium, zinc, and alloys containing high levels of these metals. Suitable substitutes for these materials are available and should be used.

Paints and Coatings

QUINTOLUBRIC® 888-46 is compatible with multi-component epoxy coatings. It is not compatible with zinc-based coatings. Specific coating and application recommendations can be obtained from coating manufacturers or directly from Quaker Chemical.

Fluids

QUINTOLUBRIC® 888-46 is compatible and miscible with nearly all mineral oil and polyolester-type hydraulic fluids and with some, but not all, phosphate esters. It is not miscible or compatible with water-containing fluids. For conversion recommendations, please contact Quaker.

ENGINEERING DATA

PROPERTIES	METHOD	QUINTOLUBRIC® 888-46
Specific Heat at 20°C	ASTM D 2766	2.06 kJ/kg °C .49 Btu/lb °F
Coefficient of Thermal Expansion at 20°C	ASTM D 1903	6×10^{-4} per °C
Vapor Pressure At 20°C At 66°C	ASTM 02551	3.2×10^{-6} mmHg 7.5×10^{-6} mm Hg
Bulk Modulus at 20°C At 210 bar At 3,000 psi		1.87×10^{5} N/cm² 266,900 psi
Thermal Conductivity at 19°C	ASTM D 2717	0.167 J/sec/m/°C
Dielectric Breakdown Voltage	ASTM D 877	30 kV

*Country-specific MSDS are available.

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quintolubric.com
quakerchem.com

QUINTOLUBRIC® 888-68

Fire Resistant Hydraulic Fluid

FM APPROVED

U.S. Department of Labor MSHA Mine Safety & Health Administration

APPLICATIONS

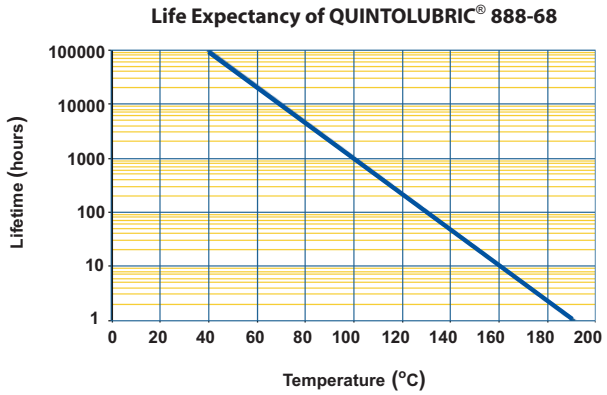
QUINTOLUBRIC® 888-68 was designed to replace anti-wear, mineral oil-based hydraulic fluids used in applications where fire hazards exist. QUINTOLUBRIC® 888-68 can also be used in environmentally sensitive hydraulic applications without compromising the overall hydraulic system operations. This fluid does not contain water, mineral oil, or phosphate ester, and is based on high-quality, synthetic, organic esters and carefully selected additives to achieve excellent hydraulic fluid performance. QUINTOLUBRIC® 888-68 offers the lubrication level of premium, anti-wear hydraulic oils, and can be used with hydraulic components from all major manufacturers.

BENEFITS

- Fire-resistant
  - High ignition temperature and low heat release
  - Properties that limit the spread of fire
  - Excellent shear stability
  - Approved by Factory Mutual Approvals
- Non-toxic / non-toxic to aquatic life
- Non-irritating
- Fully biodegradable
- Simple waste treatment

PERFORMANCE

Properly maintained QUINTOLUBRIC® 888-68 has a useful life comparable to that of mineral oil fluids. Specific fluid lifetime depends primarily on temperature as shown in the graph.



TYPICAL PROPERTIES

PROPERTIES (Test Method)	888-68 (013725)
Appearance	Yellow to amber fluid
Kinematic Viscosity (ASTM D 445) **At 0°C** **At 20°C** **At 40°C** **At 100°C**	 485 mm^2 /s or cSt 150 mm^2 /s or cSt 68 mm^2 /s or cSt 14 mm^2 /s or cSt
Viscosity Index (ASTM D 2270)	215
Density at 15°C (ASTM D 1298)	0.92 g/cm3
Acid Number (ASTM D 974)	1.5 mg KOH/g
Pour Point (ASTM D 97)	< -20°C (< -4°F)
Foam Test at 25°C (ASTM D 892) Sequence I	50-0 ml-ml
Corrosion Protection ISO 4404-2 ASTM D 665 A ASTM D 130	 Pass Pass 1a
Flash Point (ASTM D 92)	304°C (579°F)
Fire Point (ASTM D 92)	360°C (680°F)
Auto Ignition Temperature (DIN 51794)	>400°C (>752°F)
Air Release (ASTM D 3427)	7 min.
Fire Resistance (FM Approvals)	Approved
Pump Test (ASTM D 2882)	<5 mg wear
Gear Lubrication (DIN 51354-2)	>12 FZG load stage
Water Separability (ASTM D 1401)	42-38-0 (30) ml-ml-ml (min.)

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QUINTOLUBRIC® 888-68

Fire Resistant Hydraulic Fluid

COMPATIBILITY

The following chart contains our recommendations regarding the use of QUINTOLUBRIC® 888-68 with commonly used elastomers. The elastomer applications listed are "Static," which refers to trapped nonmoving seals such as O-rings in valve sub-plates and rigid, low pressure hose connections; "Mild-Dynamic," whose applications include accumulator bladders and hose linings where the hoses are exposed to high pressure and light flexing; and "Dynamic," which refers to cylinder rod seals, pump shaft seals and constantly flexing hydraulic hose.

Elastomers

ISO 1629	DESCRIPTION	STATIC	MILD DYNAMIC	DYNAMIC
NBR	Medium to high nitrile rubber (Buna N, >30% acrylonitrile)	C	C	C
FPM	Fluoroelastomer (Viton®)	C	C	C
CR	Neoprene	S	S	S
IIR	Butyl rubber	S	N	N
EPDM	Ethylene propylene rubber	N	N	N
AU	Polyurethane	C	C	C
PTFE	Teflon®	C	C	C

C = Compatible
S = Satisfactory for short term use, but replacement with a completely compatible elastomer is recommended at the earliest convenience.
N = Not Compatible

Metals

QUINTOLUBRIC® 888-68 is compatible with iron and steel alloys and most nonferrous metals and their alloys. It is not compatible with lead, cadmium, zinc, and alloys containing high levels of these metals. Suitable substitutes for these materials are available and should be used.

Paints and Coatings

QUINTOLUBRIC® 888-68 is compatible with multi-component epoxy coatings. It is not compatible with zinc-based coatings. Specific coating and application recommendations can be obtained from coating manufacturers or directly from Quaker Chemical.

Fluids

QUINTOLUBRIC® 888-68 is compatible and miscible with nearly all mineral oil and polyolester-type hydraulic fluids and with some, but not all, phosphate esters. It is not miscible or compatible with water-containing fluids. For conversion recommendations, please contact Quaker.

ENGINEERING DATA

PROPERTIES	METHOD	QUINTOLUBRIC® 888-68
Specific Heat at 20°C	ASTM D 2766	2.06 kJ/kg °C .49 Btu/lb °F
Coefficient of Thermal Expansion at 20°C	ASTM D 1903	6×10^{-4} per °C
Vapor Pressure At 20°C At 66°C	ASTM 02551	3.2×10^{-6} mmHg 7.5×10^{-6} mm Hg
Bulk Modulus at 20°C At 210 bar At 3,000 psi		1.87×10^{5} N/cm² 266,900 psi
Thermal Conductivity at 19°C	ASTM D 2717	0.167 J/sec/m/°C
Dielectric Breakdown Voltage	ASTM D 877	30 kV

*Country-specific MSDS are available.

Quaker

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