

## 620M SYNQUENCH FRH MARINE ISO 46

### Application

Synquench FRH Marine is a readily biodegradable, non-toxic, synthetic ester base, fire resistant hydraulic fluid (type HFD-U) recommended for all hydraulic units, machines or plants operating in hazard conditions where open flames or high temperatures are present and a risk of fire caused by a fluid leakage is high. Synquench FRH Marine reduces the flammability risk in comparison to mineral based hydraulic fluids due to the product's higher flammability and higher ignition temperatures, which reduce the risk of fire by leakage of the fluid.

Synquench FRH Marine meets the requirements for Factory Mutual's Class II less hazardous fluid rating.

### Description

Synquench FRH Marine is formulated using select high purity organic ester base fluids that have high oxidation and thermal stability and a non-zinc, ashless, multifunctional additive system. This combination imparts the following performance benefits and advantages:

- Excellent lubricity characteristics
- A natural high shear stable viscosity index (>190), which allows the product to exhibit multi-grade characteristics without the use of a viscosity index improver or modifier
- Increased hydraulic efficiency and minimum difficulty in operating over a wide operating temperature range
- Excellent wear protection properties and high scuffing load characteristics
- Extended pump and bearing life
- Low acid numbers and hydroxyl values that provide resistance to the formation of varnish and laquer deposits.
- High flash, fire and autoignition points
- Excellent thermal and oxidation stability
- Excellent resistance to fluid ageing
- Excellent demulsibility characteristics
- Excellent hydrolytic stability
- Excellent yellow metal compatibility
- Excellent rust and corrosion protection
- Excellent anti-foaming and air release properties
- Long service life
- Readily biodegradability (>60% OCED 301-B Test Method)

### Materials Compatibility

#### Metals

Synquench FRH Marine is compatible with iron and steel alloys and most non-ferrous metals and their alloys. Synquench FRH Marine is not compatible with lead and cadmium and has limited compatibility with alloys containing high levels of lead and cadmium.

## Elastomers

The following chart provides recommendations regarding the use of Synquench FRH Marine with commonly used elastomers. These elastomer applications are listed as “Static”, which refers to trapped nonmoving seals such as O-Rings found in valve sub-plates and rigid low pressure hose connections; Mid-Dynamic, which includes the inside of accumulator bladders and hose linings, where the hose is exposed to high pressure and light flexing; and Dynamic, which refers to cylinder rod seals, pump shaft seals and constantly flexing hydraulic hoses

Elastomer Type	Description	Static	Mild Dynamic	Dynamic
NBR	Medium to high nitrile (Buna N >25% acrylonitrile)	Compatible	Compatible	Compatible
FPM	Fluroelastomer (Viton®)	Compatible	Compatible	Compatible
FKM	Fluro-Rubbers	Compatible	Compatible	Compatible
CR	Neoprene	Satisfactory	Satisfactory	Satisfactory
IIR	Butyl Rubber	Satisfactory	Not Compatible	Not Compatible
EPDM, EPR, EPT, EPM	Ethylene propylene rubbers	Not Compatible	Not Compatible	Not Compatible
PU	Polyurethane	Compatible	Compatible	Compatible
PTFE	(Teflon®)	Compatible	Compatible	Compatible
POM	Polyacetyl	Satisfactory	Satisfactory	Satisfactory

## TYPICAL PROPERTIES

<b>ISO Grade</b>	<b>46</b>
Specific Gravity 60°F	.9103
Viscosity 40°C cSt (ASTM D445)	47.41
Viscosity 100°C cSt (ASTM D445)	9.5
Viscosity Index (ASTM D2270)	198
Pour Point °F/°C (ASTM D97)	-40°/-40°
Flash Point °F/°C (ASTM D92)	547°/286°
Fire Point °F/°C (ASTM D92)	670°/354°
Autoignition Temperature °F/°C (ASTM E659)	900°/482°
Total Acid Number mg/KOH/g (ASTM D974)	<1
Rust Test (ASTM D664)	
Procedure A (Distilled Water)	Pass
Procedure B (Salt Water)	Pass
Copper Strip Corrosion Test (ASTM D130) 3 Hours	1a
Four Ball Wear Test (ASTM D2266) (1 hr/40kg/130°F)	
Wear Scar Diameter, mm	0.45
Demulsibility (ASTM D1401) Oil/Water/Emulsion	40-40-0
Time, min.	20
FZG Failure Stage (ASTM D5182)	>12
Foam Test (ASTM D892)	
Sequence I	0/0
Sequence II	0/0
Sequence III	0/0
Air Release, minutes @ 122°F (ASTM D3427)	6.5
Pump Wear Test (ASTM D2882)	
Weight Loss, Ring and Vane Combined, mg	10