SINCE 1839
Schaeffer's
SPECIALIZED LUBRICANTS

TECHNICAL DATA

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ISO 9001 CERTIFIED

620 SYNQUENCH ISO 46 and 68

Application

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

Description

Synquench 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 resistane 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 is compatible with iron and steel alloys and most non-ferrous metals and their alloys. Synquench 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 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 referes 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	Fluroelatomer (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

ISO Grade	**46**	**68**
Specific Gravity 60°F	.9103	.91
Viscosity 40°C cSt (ASTM D445)	47.41	61.2-74.8
Viscosity 100°C cSt (ASTM D445)	9.5	12.51-14.32
Viscosity Index (ASTM D2270)	198	200
Pour Point °F/°C (ASTM D97)	-40°/-40°	-30°/-34°
Flash Point °F/°C (ASTM D92)	547°/286°	560°/293°
Fire Point °F/°C (ASTM D92)	670°/354°	640°/337.78°
Autoignition Temperature °F/°C (ASTM E659)	900°/482°	900°/482°
Total Acid Number mg/KOH/g (ASTM D974)	<1	<1
Rust Test (ASTM D664)		
Procedure A (Distilled Water)	Pass	Pass
Procedure B (Salt Water)	Pass	Pass
Copper Strip Corrosion Test (ASTM D130) 3 Hours	1a	1a
Four Ball Wear Test (ASTM D2266) (1 hr/40kg/130°F)		
Wear Scar Diameter, mm	0.45	0.45
Demulsibility (ASTM D1401) Oil/Water/Emulsion	40-40-0	40-40-0
Time, min.	20	20
FZG Failure Stage (ASTM D5182)	>12	>12
Foam Test (ASTM D892)		
Sequence I	0/0	0/0
Sequence II	0/0	0/0
Sequence III	0/0	0/0
Air Release, minutes @ 122°F (ASTM D3427)	6.5	6.5
Pump Wear Test (ASTM D2882)		
Weight Loss, Ring and Vane Combined, mg	10	10

Recommended Hydraulic System Conversion 620 Synquench

Overview

This conversion procedure covers changeover from mineral oil (petroleum); phosphate ester (HFDR types); polyol ester (HFD-U types); polyalkylene glycol (PAG, HFD-U types) and water-based hydraulic fluids to 620 Synquench.

Before starting any changeover procedure, ensure that the materials used for seals, hoses, O-rings, and tank coatings are compatible with 620 Synquench. Check the technical data sheet and this conversion procedure for materials compatibility listing.

General Points

When a hydraulic system is converted over to 620 Synquench it is always important to follow these accepted engineering practices:

- Fluid contamination should be minimized, particularly contamination by excessive amounts of residual hydraulic fluids that may possibly remain during system conversion.
- Make sure 620 Synquench is compatible with the fluid being replaced, as well as with system components, seals, paints and coatings, etc.
- The existing hydraulic fluid should be drained as much as possible and flushed.
- Over time any acid scavengers in use should be removed
- A sample of the fluid in the system after the conversion should be taken to determine the condition of the fluid and to check if the conversion was successful.

Recommended Changeover Procedure from Non-Water Containing Hydraulic Fluids

This changeover procedure is for the conversion of the 620 Synquench from the following previous fluids that had previously been used in the hydraulic system:

- Petroleum base. Synthetic blend and PAO synthetic base fluids
- Phosphate ester and polyol ester based fire resistant hydraulic fluids
- Polyalkylene glycol (PAG) base fire resistant hydraulic fluids.

Procedure

1. Operate the system until the normal working system operating temperature is reached.
2. Relieve all pressure in the system and disconnect any electrical supplies.
3. Drain the previously used non-water containing hydraulic fluid from the system including all filters, header tanks, pumps, valves, cylinders, accumulators, lines, reservoir, and oil coolers while the fluid is warm.
4. To remove as much of the existing oil as possible, wipe any reservoir, tank, or accessible space with a clean, dry rag.
5. Install new filters and clean any filter housings.
6. Refill the system reservoir with the minimum quantity of 620 Synquench necessary for proper operation of the system. Turn on the power unit for the system and actuate all cylinders for several cycles, to circulate 620 Synquench throughout the system. Run the system at minimum pressure or zero load for at least 2 hours.
7. Drain the 620 Synquench/non-water containing hydraulic fluid mixture as per steps 1 and 2.
8. Replace any necessary seals, filters, and strainers.
9. If the conversion is being done from a PAG based fluid and should any signs of contamination (e.g., milky colored emulsion or gel like substance) be visible in the flushing fluid, it is recommended that steps 3,4,5 and 6 be repeated until the contamination has been removed or is no longer visible.
10. Completely refill the system reservoir with 620 Synquench and operate the system until the normal working temperature or pressure is reached. Filter elements should be checked periodically and replaced if necessary, following the conversion to 620 Synquench. Monitor for any differential pressure drops across the filter elements. Top off oil levels as necessary.
11. Take an oil sample of the new oil charge for analysis.

Initial Operation After Conversion From Non-Water Based Hydraulic Fluids

During the initial operating period, dirt deposits in the hydraulic system can be loosened and suspended during fluid changeover. The filter elements and any screens should be checked and monitored after 50 hours of operation and at regular intervals as a precautionary measure.

Non-water containing hydraulic fluids and the 620 Synquench in general are miscible and compatible with each other but residual non-water containing hydraulic fluids can influence the properties of the 620 Synquench.

- For petroleum base, synthetic blend and PAO based hydraulic fluids it is recommended a residual oil content of <5% so as to not to jeopardize the fire resistance performance of 620 Synquench.
- For phosphate ester fire resistant type fluids, it is recommended a residual oil content of <2.5% to avoid the carcinogenic, mutagenic and toxic to reproduction properties associated with phosphate ester base fluids.
- Polyol Ester and PAG based Water free fire-resistant hydraulic fluids can have a clear limit of residual fluid (no separation, gel like substances, emulsions). This must be judged on a case-by-case basis.

Recommended Changeover Procedure from Water-Containing Hydraulic Fluids

Water-based fire-resistant hydraulic fluids like water glycol (HFC) and invert emulsion fluids (HFB) do not mix with 620 Synquench. It is detrimental to have a significant amount of residual water containing fluids in the 620 Synquench for any extended period. This recommended conversion procedure is intended to minimize the amount of residual water based fire-resistant hydraulic fluid present following a conversion to 620 Synquench.

1. Operate the system until the normal working system operating temperature is reached.
2. Relieve all pressure in the system and disconnect any electrical supplies.
3. Drain the previously used water containing hydraulic fluid from the system including all filters, header tanks, pumps, valves, cylinders, accumulators, lines, reservoir, and oil coolers while the fluid is warm.
4. To remove as much of the existing oil as possible, wipe any reservoir, tank, or accessible space with a clean, dry rag.
5. Install new filters and clean any filter housings.
6. Refill the system reservoir with the minimum quantity of 620 Synquench necessary for proper operation of the system. Turn on the power unit for the system and actuate all cylinders for several cycles, to move the 620 Synquench throughout the system. Ideally, the flushing should be continued for a 24-hour period with periodic actuation of the cylinders. When not feasible run the system at minimum pressure or zero load for at least several hours.
7. Drain the 620 Synquench flush as per steps 1 and 3.
8. Steps 1 through 7 should be repeated until the water contamination in the 620 Synquench is <0.2% (<2000ppm). If needed a centrifuge or a vacuum dehydrator can be used.
9. Completely refill the system reservoir with 620 Synquench and operate the system until the normal working temperature or pressure is reached. Filter elements should be checked periodically and replaced if necessary, following the conversion to 620 Synquench. Monitor for any differential pressure drops across the filter elements. Top off oil levels if necessary.
10. Take an oil sample of the new oil charge for analysis.

Initial Operation After Conversion From Water Based Hydraulic Fluids

During the initial operating period, dirt deposits in the hydraulic system can be loosened and suspended during fluid changeover. The filter elements and any screens should be checked and monitored after 50 hours of operation and at regular intervals as a precautionary measure. It is also recommended to pull an oil sample after 50 hours of operation and at regular intervals as a precautionary measure to monitor for any residual water contamination.