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## PRODUCT DATA

# LUBRIPLATE BIO-SYNXTREME HF SERIES

## DESCRIPTION

The LUBRIPLATE BIO-SYNXTREME HF Series are high performance hydraulic fluids designed for demanding industrial and marine (Vessel General Permit) applications requiring environmental sensitivity, water solubility, fire resistance, and excellent anti-wear properties over wide temperature ranges. These Polyalkylene glycol (PAG) based fluids, which are available in three viscosity grades, are anhydrous (water-free). LUBRIPLATE BIO-SYNXTREME Hydraulic Fluids do not break down to form sludge, and they do not hydrolyze in the presence of water. Furthermore, because of their high viscosity indices and excellent low temperature characteristics, one viscosity grade fluid may replace two or three viscosity grades.

## ADVANTAGES

- ⇒ **Excellent Anti-Wear Performance** – Exceptional load-carrying capabilities and specially formulated (with no zinc or other metal additives) to provide effective corrosion protection and anti-wear performance in hydraulic systems. Rated as anti-wear (AW) fluids according to ASTM D7043 testing and FZG testing, which means the potential for greater operating reliability, less downtime, and lower maintenance costs.
- ⇒ **Clean, Long-Lasting Operation** – When proper fluid and equipment maintenance procedures are followed, the Bio-Synxtreme HF series offer a long service life and operating reliability, lower maintenance costs, and reduced overall downtime.
- ⇒ **Fire Resistance** – High flash and fire points provide safety in applications calling for fire resistant fluids, thus providing operating confidence and potentially reduced insurance costs. FM approvals, using FM test method 6930, has classified 46 AW and 68 AW Hydraulic Fluids as “Approved Industrial Fluids”.
- ⇒ **All Season Performance** – High viscosity indices and low pour points, allowing year-round usage and eliminating seasonal changeovers.
- ⇒ **Biodegradability** – Readily biodegradable according to OECD 301F.
- ⇒ **Non-Sheening** – Does not cause a sheen or discoloration on the surface of the water or adjoining shorelines that would violate local water quality standards.
- ⇒ **Aquatic Toxicity** – “Practically Non-Toxic” to fish and other aquatic wildlife according to the U.S. Fish and Wildlife Service hazard classification.

## COMPATIBILITY

- ⇒ **Other Hydraulic Fluids** – Not compatible with hydrocarbon-based hydraulic fluids. As with any fluid conversion, recognized industry procedures including system cleanup and flushing should be followed.
- ⇒ **Paints** – PAG-based fluids show some solvency for common oil-based paints but minimal solvency for many epoxy-based paints.
- ⇒ **Elastomers** – Suitable for use with many elastomeric materials used in seals and gaskets. Compatible elastomers are: Viton, Kalrez, Silicone, Polysulfide, EPR, Butyl Rubber, Buna N, Fluoraz, EPDM, Natural Black Rubber, Natural Red Rubber, and Aflas.
- ⇒ **Plastics** – Compatibility should be assessed for any plastic components (such as reservoir sight glasses) exposed to a hydraulic fluid.

	25°C	100°C
Polypropylene	Recommended	Recommended
Polyethylene, Low Density	Recommended	Not Recommended
Homalite Polycarbonate	Not Recommended	Not Recommended
Lucite/Plexiglas Polymethylmethacrylate	Not Recommended	Not Recommended
Polyurethane	Not Recommended	Not Recommended

### PACKAGING AVAILABLE

5 Gallon Pail

55 Gallon Drum

### HF 32

L1020-060

L1020-062

### HF 46

L1021-060

L1021-062

### PACKAGING AVAILABLE

5 Gallon Pail

55 Gallon Drum

### HF 68

L1022-060

L1022-062



## Typical Test Data

PROPERTY	TEST METHOD	TYPICAL RESULTS*		
Performance Properties		32	46	68
FZG Visual Gear Test, Stages Passed	ASTM D5182	12	12	12
Four Ball EP Test Load Wear Index Last Non-seizure, 80 kg (mm scar) Last seizure, 126 kg (mm scar) Weld Load, kg	ASTM D2783	32.94 0.40 2.75 160	33.10 0.40 2.60 160	33.26 0.39 2.53 160
V104 Vane Pump Test (total mg wear)	ASTM D7043	<10	<10	<10
35 VQ Vickers Vane Pump Test Individual Cartridge Wear, mg Average Wear, mg	M-2950-S	Pass 8,8,8 8	***	***
Sonic Shear Stability Initial Viscosity @ 40°C (cSt) Irradiated Viscosity @ 40°C (cSt)	ASTM D5621	36.8 36.9	47.1 47.0	68.9 69.2
Viscosity Properties				
Viscosity @ 40°C (cSt) Viscosity @ 100°C (cSt) Viscosity @ 0°C (cSt)	ASTM D445	35.4 8.0 294	46.0 9.8 390	68.0 13.7 614
Viscosity Index	ASTM D2270	194	200	209
Fire Properties				
Flash Point – Cleveland Open Cup, °C	ASTM D92	271	312	288
Flash Point – Pensky Martens Closed Cup, °C	ASTM D93	218	223	None <sup>1</sup>
Fire Point, °C	ASTM D92	304	316	322
FM Approvals	Test Standard 6930	***	Approved	Approved
Physical – Chemical Properties				
Specific Gravity @ 20°C	ASTM D1298	1.031	1.035	1.041
Foam Test – Sequence I, Initial Volume/ml Sequence II, Initial Volume/ml Sequence III, Initial Volume/ml	ASTM D892	10/0 10/0 10/0	10/0 10/0 10/0	10/0 10/0 10/0
Vapor Pressure (mm HG)	ASTM E1719	<0.01	<0.01	<0.01
Specific Heat (Cal/g/°C)	ASTM E1269	0.476	0.481	0.478
Pour Point, °C	ASTM D97	-59	-51	-51
Ash Content (%)	ASTM D482	0.011	0.008	0.008
Corrosion Protection (TORT)	ASTM D665A	Pass	Pass	Pass
Copper Strip Corrosion	ISO 2160	1b, shiny	1a, shiny	1a, shiny
Aging Behavior (Hrs) Mg KOH/g Hours	DIN 51587	1.14 1,008	0.92 1,008	0.31 1,008
Coefficient of Expansion @ 20°C @ 55°C	ASTM D1903	0.00078 0.00080	0.00080 0.00078	0.00079 0.00078
Weight, lbs/gal. (20°C)		8.57	8.57	8.58

## HYDRAULIC SYSTEM CONVERSION

For best results when converting to a LUBRIPLATE Bio-Synxtreme Hydraulic Fluid, ensure the following:

- The hydraulic system is thoroughly clean and free of contamination from previous fluids
- Oil filters are new
- Paint, plastics, seals and elastomers are compatible
- Standard industry procedures are followed

### Conversion to Hydraulic Fluid:

Installation of LUBRIPLATE Bio-Synxtreme Hydraulic Fluid into systems that previously contained petroleum-based hydraulic fluid should follow the recommended flush procedure:

- Drain previous fluid from the equipment
- Fill the system with LUBRIPLATE HydroFlush Fluid. Run or circulate under minimum load for 30 minutes. LUBRIPLATE HydroFlush Fluid will generally clean varnish and sludge build-up formed from petroleum-based hydraulic fluids
- Thoroughly drain the LUBRIPLATE HydroFlush Fluid from the system
- Inspect the fluid filters and replace as needed
- Fill the equipment with fresh LUBRIPLATE Bio-Synxtreme HF and begin normal operation
- Inspect and change filters as required

Contact your technical representative for assistance and detailed information on conversion procedures.

## ENVIRONMENTAL DATA

### Classified as “Practically Non-Toxic”

U.S. Fish & Wildlife Service Classification Based on inherent properties of the fluid and testing following the:

- U.S. EPA. Ecological Effects Test Guidelines, OPPTS 850.1010, Aquatic Invertebrate Acute Toxicity Test, Freshwater Daphnids
- U.S. EPA. Ecological Effects Test Guidelines, OPPTS 850.1035, Mysid Acute Toxicity Test
- U.S. EPA. Ecological Effects Test Guidelines, OPPTS 850.1075, Fish Acute Toxicity, Freshwater and Marine
- U.S. EPA. Ecological Effects Test Guidelines, OPPTS 850.1000, Special Considerations for Conducting Aquatic Laboratory Studies
- OECD Series on Testing and Assessment, No. 23, Guidance Document on Aquatic Toxicity Testing of Difficult Substances and Mixtures

### Classified as “Environmentally Acceptable”

Issued under the EPA Clean Water Act, the 2013 Vessel General Permit (VGP) regulates incidental discharges to the normal operation of commercial vessels (including vessels being used as a means of transportation) greater than or equal to 79 feet in length. All vessels MUST use an Environmentally Acceptable Lubricant (EAL) in all oil to sea interfaces unless technically infeasible. “Environmentally acceptable lubricants” means lubricants that are “biodegradable” and “minimally-toxic” and are “not bioaccumulative”. The LUBRIPLATE Bio-Synxtreme HF Series meet the EPA’s definition of Environmentally Acceptable Lubricants, making it a solution for VGP compliance for vessel owners and operators.

**Non-Sheening** Passes Static Sheen Test (Bio-Synxtreme HF 46)

Test Method	Description	Results
Appendix 1 to Subpart A of 40 CFR 435	Static Sheen Test @ 23°C, 15 ml sample, distilled water, 15 minutes observation time	Observations: No sheen, No gloss, No color, No increase in reflectivity, No iridescence, No oil slick

### Toxicity Results for Aquatic Species

Product	Fresh Water Species	
	48 h EL50 (mg/L) with water flea (Daphnia magna)	96 h LL50 (mg/L) with Fathead minnow (Pimephales promelas)
Bio-Synxtreme HF 32	750	*
Bio-Synxtreme HF 46	430	297
Bio-Synxtreme HF 68	170	*
Product	Sea Water Species	
	96 h LL50 (mg/L) with Mysid shrimp (Mysidopsis bahia)	96 h LL50 (mg/L) with Sheepshead minnow (Cyprinodon variegatus)
Bio-Synxtreme HF 32	200	>1000
Bio-Synxtreme HF 46	250	>1000
Bio-Synxtreme HF 68	330	>1000

EL50 = Bio-Synxtreme loading rate (mg/L as formulated fluid) associated with effects on 50% of tested population.

LL50 = Bio-Synxtreme loading rate (mg/L as formulated fluid) associated with lethality of 50% of tested population.

\*Not tested. Bio-Synxtreme HF 32 and 68 are expected to have fathead minnow LL50 values similar to that of 46, based on similar results observed across these products for the other species tested.

### Readily Biodegradable

Product	28 Day % Biodegradation
Bio-Synxtreme HF 32	81
Bio-Synxtreme HF 46	72
Bio-Synxtreme HF 68	80