



Renewable Lubricants, Inc.

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Bio-SynXtra™ MA Fluids

Multi-Application (ISO-32, 46, 68, 100, 150, 220)

STABILIZED™
by Renewable Lubricants

"Biobased Lubricants that Perform Like Synthetics"

Bio-SynXtra™ MA Fluids are specially designed, biodegradable¹ biosynthetic formulas that replace most conventional HLP and HVLP mineral oil based hydraulic, turbine, circulating, compressor, gear, heat transfer, and many other lubricants for **multi-application (MA)**. Their multi-application performance extends fluid and equipment life, and helps in reducing maintenance, oil change intervals, inventory, and cost. These full synthetic fluids are biobased enhanced with Saturated Synthetic Esters HEES to improve lubricity, seal conditioning, anti-wear performance and provide low carbon tendency for longer service life in high performance enclosed systems. In addition, these ashless (zinc free) biodegradable¹ fluids provide excellent anti-wear (AW), anti-rust, anti-oxidation, anti-foam, and demulsibility properties. They are highly inhibited against moisture and rusting in both fresh and sea water and pass both A and B Sequences of ASTM D-665 Turbine Oil Rust Test. **(Excellent for marine and mining applications where one MA fluid can be used to reduce inventory, or where transportation and storage space is a concern).**

Compressors: Bio-SynXtra MA Fluids are formulated to provide superior lubricating qualities for most compressors, especially portable and stationary rotary compressors (screw and sliding vane) as well as in single-stage, two-stage, and multistage reciprocating compressors (water-cooled and air-cooled), vacuum pumps, and centrifugal compressors. While specific manufacturer recommendations vary, the ISO 32, 46 and 68 grades are most commonly used for rotary compressors, while higher viscosity grades are preferred for reciprocating units (meets and exceeds DIN 51506 VDL requirements).

Hydraulic & Gear: Bio-SynXtra MA Fluids are recommended for use in High-Pressure vane, piston, and gear-type hydraulic pumps and have shown to have exceptional anti-wear performance in ASTM D-4172 Four Ball Wear Test. They meet or exceed the requirements for Parker-Denison HF-O, HF-1, HF2, Eaton-Vickers M-2950-S (35VQ-25) and I-286-S (V-104C), Rexroth, Sauer-Sundstrand, US Steel 126, 136, and 127, DIN 51524 Part 2 and 3. They also meet the requirements for ashless GL-1, GL-2, GL-3, DIN 51517 Part 3, and AGMA Non or Mild EP gear oils for reduction units, bearings, and gear sets. Bio-SynXtra MA Fluids meets and exceeds Federal Specifications A-A-59354 Superseding MIL-H-46001D.

Turbines: Bio-SynXtra MA Fluids meet or exceeds the requirements of OEM Turbine R&O Oil, AW Turbine R&O, Steam Turbine R&O and Gas Turbine R&O Oils. ISO Grades 32 and 46 provide the Class I (SHC) electrical conductivity required in ASTM D-4308 and low volatility for required ASTM-E659 Autoignition Temperature above 310°C for Gas Turbines. The products are zinc free and may also be used in pump system with silver lined bearings and reduction units where original equipment manufactures (OEM) require Turbine R&O fluids. Meets or Exceeds: Westinghouse, Dresser, ABB, Fiat Aviazione, Siemens, MIL L 17331, TLV901304, AFNOR NFE 48-600 HL & 48-603 HL, DIN 51515 & 51524 Part 1, U.S. Steel 120, British BS 489, GE GEK 32568F, Cincinnati Landis P-38/55/54, Brown Boveri HTGD 90117, Solar ES 9-224, Alstom HTGD 90117, and MIL-H-17672C.

(Use a Viscosity Sufficient for OEM Application)

¹ Based on previous Biodegradability studies and ASTM D-7373 Calculations, Bio-SynXtra™ MA Fluids are Ultimate/Readily Biodegradable >60% within 28 days in ASTM D-5864 Aerobic Aquatic Biodegradation of Lubricants, and Readily Biodegradable >80% within 21 days. in German Blue Angel CEC L-33-T-82 and CEC L-33-A-934 tests.

Patented Product: US Patent 6,383,992, US Patent 6,534,454 with additional Pending and Foreign Patents
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Availability F.O.B. :Hartville, Ohio, USA 1 Gallon 5 Gallon Pail Drum Totes Bulk

Page 2. Bio-SynXtra MA Fluids

Bio-SynXtra™ MA Fluids meet the Environmental Protection Agency (EPA) 2013 Vessel General Permit (VGP) guidelines for Environmentally Acceptable Lubricants (EALs), and should be used in hydraulic systems where **LOW TOXICITY**, **BIODEGRADABILITY** and **NON-BIOACCUMULATION** properties are required. They exceed the acute toxicity (LC-50 / EC-50 >100 ppm / >100 mg/L) criteria adopted by the US EPA VGP. Bio-Ultimax™ Hydraulic Fluids are **ENVIRONMENTALLY ACCEPTED LUBRICANTS (EALs)** that are formulated with renewable biobased resources. We believe Earth's environmental future rests in the use of renewable materials.

Elastomer Compatibility: Bio-SynXtra MA Fluids are **recommended** for use with fluorocarbon (Viton), Teflon, fluorosilicone, polysulfide, Hydrogenated NBR (HNBR), low nitrile Buna-N and high nitrile Buna-N. They are compatible with same seals, materials and components that are designed to operate on mineral oil based formulations.

Benefits:

➤ Reduced danger of fire and explosions	➤ Lower maintenance costs
➤ Outstanding oxidation and thermal stability	➤ Extended service life
➤ Low pour point	➤ Low varnish forming tendencies
➤ Excellent rust protection	➤ High viscosity index
➤ Excellent demulsibility	➤ Low toxicity and energy conserving
➤ Excellent antiwear properties	➤ More Biodegradable

Maximum oil change intervals can be obtained through proper maintenance and RLI's oil analysis program. Under good operating conditions ISO Grades 32, 46, and 68 could extend service life up to 8,000 hours in rotary screw compressors.

Typical Data						
ISO Grades	32	46	68	100	150	220
AGMA Grades	N/A	1	2	3	4	5
VISCOSITIES:						
@100°C., cSt. (D-445)	6.3	8.2	11.5	16.0	22.0	32.1
@40°C., cSt. (D-445)	31.9	44.0	65.4	97.9	142.0	212.5
Viscosity Index (D-2270)	152	163	172	175	183	196
Flash Point, COC, °C (D-92)	230	235	240	242	243	245
Pour Point, °C (D-97)	-40	-39	-37	-35	-33	-32
Cu Corrosion 3hr @ 100°C (D-130)	1A	1A	1A	1A	1A	1A
Acid Number (D-974)	.30	.30	.30	.30	.30	.30
4-Ball Wear, mm (D-4172)	.40	.40	.40	.40	.40	.40
FZG Test A/8.3/90 (DIN 51354 Part 2)	11	12	12	12	12	12
Demulsibility (D-1401) <10 min	40/40/0	40/40/0	40/40/0	40/40/0	40/40/0	40/40/0
Steam Demulsibility, (IP 19) sec. avg.	100-200	100-200	100-200	---	---	---
Foam Sequence I, II, III (D-892)	0 Foam	0 Foam	0 Foam	0 Foam	0 Foam	0 Foam
Rust Prevention (D-665 A & B)	Pass	Pass	Pass	Pass	Pass	Pass
Dielectric Strength (D-877 kV avg.)	42	42	40	40	40	40
TOST (ASTM-943 Hrs. 2.0 NNA)	10,000+	10,000+	10,000+	10,000+	8,000+	8,000+
Rotary Bomb Oxidation Stability (D-2272), Minutes	>1200	>1200	>1200	>1200	>850	>850
RLI Product Item #	82800	82810	82820	82830	82840	82850