Renewable Lubricants, Inc.
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Bio-Ultimax 1500 Dielectric Hydraulic Fluid

(AW ISO 22, 32, 46, 68)

Bio-Ultimax™ 1500 Dielectric Hydraulic Fluids are readily biodegradable biosynthetic-blend hydraulic fluids designed for demanding applications requiring high dielectric strength (>35 kV) and wide temperature performance. Engineered with patented Stabilized™ technology, these fluids provide exceptional thermal shear stability, oxidation resistance, and anti-wear protection. Ideal for aerial lift buckets, mobile and stationary hydraulic systems, and environments where electrical insulating properties and environmental compliance are critical. Compatible with conventional hydraulic seals and components, Bio-Ultimax™ 1500 is a high-performance, environmentally friendly alternative to petroleum-based fluids.

Benefits

- Readily biodegradable, environmentally non-toxic, not bioaccumulative
- Dielectric strength >35 kV for electrical insulating safety
- Excellent oxidation stability and rust protection in fresh and saltwater
- Extended high-temp performance with superior flash/fire safety
- High viscosity index enhances shear stability and energy efficiency
- Compatible with conventional seals, filters, and systems
- Zinc-free, environmentally friendly additive system
- Proven anti-wear performance up to 10,000 psi operation
- Meets and exceeds OEM and Federal performance requirements

Application / New Filling

- Designed for use in hydraulic vane, piston, and gear-type pumps in aerial utility equipment and mobile hydraulics
- OEM compatible: Genie-Terex, Altec, Parker-Denison, Eaton-Vickers, Rexroth, Sauer-Sundstrand
- Contact Renewable Lubricants, Inc. for new system filling procedures

Specifications and Approvals

- DIN 51524 Part 2 and 3 (HLP/HVLP)
- Parker-Denison HF-0/T6H20C, HF-1, HF-2
- Eaton-Vickers M-2950-S (35VQ-25), I-286-S (V-104C)
- Rexroth, Sauer-Sundstrand, GM LS-2
- US Steel 126, 127, 136

- API GL-1, GL-2, GL-3 (ashless)
- AGMA Non-EP gear oil compatible
- Federal Spec A-A-59354 (replaces MIL-H-46001D)
- EPA VGP 2013 Compliant (Environmentally Acceptable Lubricant)
- ASTM D-5864 Ultimate Biodegradable, OECD 301B Readily Biodegradable
- ISO 14001:1996 Environmental Management System
- USDA Biobased and BioPreferred Certified
- Ecotoxicity LC50/EC50 >2000 ppm (fish, daphnia, algae)
- Altec Approved

Bio-Ultimax™ 1500 Dielectric Hydraulic Fluid ISO 22, 32, 46, 68

The test data below show that the Bio-Ultimax™ 1500 Dielectric Hydraulic Fluids provide high performance in a wide variety of stationary and transportation equipment, that operate in broad ranges of environmental conditions. In equipment operating outside, wear from poor cold temperature pumpability, surge loads, moisture, and dusty environments are more prominent. Bio-Ultimax™ 1500 Dielectric Hydraulic Fluids are formulated to improve performance in equipment that requires excellent antiwear, demulsibility, and cold temperature pumpability as low as -40^{0}C. They meet and exceed ISO 11158 HV and have **Genie-Terex and Altec Equipment OEM approvals.**

TYPICAL SPECIFICATIONS	METHOD	ISO 22	ISO 32	ISO 46	ISO 68	Spec.Requirements
Specific Gravity @ 15.6°C	ASTM D-287	**0.87**	**0.88**	**0.88**	**0.89**	Report
Viscosity @ 40°C	ASTM D-445	**20.7**	**31.1**	**44.5**	**64.2**	Note 1
Viscosity @ 100°C	ASTM D-445	**5.16**	**6.9**	**9.37**	**12.2**	Note 1
Viscosity @ -15°C, Brookfield	ASTM D-2983	**350 cP**	**500 cP**	**650 cP**	**1,200 cP**	Note 1
Viscosity @ -25°C, Brookfield	ASTM D-2983	**850 cP**	**1,150 cP**	**1,400 cP**	**3,400 cP**	Note 1
Viscosity @ -30°C MRV TP1	ASTM D-4684	**1950 cP**	**2,600 cP**	**3,400 cP**	**7,200 cP**	10W= <60,000
Viscosity @ -35°C MRV TP1	ASTM D-4684	**3350 cP**	**4,500 cP**	**6,200 cP**	**12,000 cP**	5W= <60,000
Viscosity Index	ASTM D-2270	**196**	**192**	**201**	**191**	90 (min)
Dielectric Strength, KV (Avg)	ASTM D-877	**47**	**54**	**47**	**45**	35 (min)
Pour Point	ASTM D-97	**-50°C**	**-46°C**	**-40°C**	**-36°C**	Note 1
Flash Point (COC)	ASTM D-92	**211°C**	**239°C**	**240°C**	**245°C**	198°C (min)
Fire Point (COC)	ASTM D-92	**238°C**	**261°C**	**263°C**	**269°C**	218°C (min)
Hydrolytic Stability	ASTM D-2619					
Copper Wt. Loss (mg)		**<0.02**	**<0.02**	**<0.02**	**<0.02**	0.2
Copper Appearance		**1B**	**1B**	**1B**	**1B**	Report
Water Layer		**3**	**3**	**3**	**3**	4
Foam Sequence I, II, III (10 min)	ASTM D-892	**<30/0 Foam**	**<30/0 Foam**	**<30/0 Foam**	**<30/0 Foam**	150/0, 80/0, 150/0
Rust Prevention	ASTM D-665					
Distilled Water		**Pass**	**Pass**	**Pass**	**Pass**	Pass
Syn. Sea Water		**Pass**	**Pass**	**Pass**	**Pass**	Pass
Copper Corrosion Strip 3hr @ 100°C	ASTM D-130	**1A**	**1A**	**1A**	**1A**	DIN 51524 2(Max)
Rotary Bomb Oxidation, (minutes)	ASTM D-2272	**>400**	**>400**	**>400**	**>350**	USS 120 (min)

Oxidation Stability (Pressure Differential Scanning Calorimeter) min	ASTM D-5483 Modified	**70.0 (165°C)**	**70.0 (165°C)**	**70.0 (165°C)**	**70.0 (165°C)**	Note 2
Neutralization Number mg KOH/g	ASTM D-974	**<0.4**	**<0.4**	**<0.4**	**<0.4**	1.5 (Max)
Swell of Synthetic NBR-L Rubber, % (Avg.)	DIN 53538, Part 1					
Volume Change (%)		**9**	**7**	**5**	**5**	0 to 12 (ISO 68) 0 to 10)
Shore A Hardness Change (%)		**-6**	**-5**	**-4**	**-4**	0 to -7
Filterability						
A-No Water (s) (Max)	Denison TP 02100	**90**	**150**	**270**	**340**	600 (max)
B-2% Water (s) (Max)	HF-0 Requirement	**115**	**175**	**300**	**450**	2xA (max)
Demulsibility, ML Oil/Water/Emulsion	ASTM D-1401	**40/40/0 (10 minutes)**	**40/40/0 (10 minutes)**	**40/40/0 (10 minutes)**	**40/40/0 (10 minutes)**	40/37/3 (30 minutes)
4-Ball Wear, 1h, 167°F, 1200 RPM, 40 kg	ASTM D-4172	**0.3 – 0.4**	**0.3 – 0.4**	**0.3 – 0.4**	**0.3 – 0.4**	USS 127 0.5 (Max)
FZG Test	DIN 51354	**11**	**12**	**12**	**12**	US.Steel 10 (min)
Biodegradation Classification	ASTM D-5864 OECD 301B	Ultimate PW1 Readily	Ultimate PW1 Readily	Ultimate PW1 Readily	Ultimate PW1 Readily	Ultimate PW1 Readily
Environmentally Friendly	ISO 15380	yes	yes	yes	yes	meets/exceeds
USDA Biobased Tested	New Carbon	yes	yes	yes	yes	meets/exceeds >50%
Environmental Management System	ISO 14001:1996	yes	yes	yes	yes	meets/exceeds
Ecotoxicity LC-50/EC-50	EPA 560/6-82002, 003	meets/exceeds	meets/exceeds	meets/exceeds	meets/exceeds	meets/exceeds
Product Item #		**81090**	**81050**	**81060**	**81070**	

F.O.B: Hartville, Ohio
Availability: 1 Gallon, 5 Gallon Pail, Drum, Totes, Bulk