Renewable Lubricants, Inc.
476 Griggy Rd., P.O. Box 474
Hartville, Ohio 44632-0474

Bio-Ultimax™ 1000 Hydraulic Fluids

(AW ISO 32, 46, 68, 100)

Bio-Ultimax™ 1000 Hydraulic Fluids are readily biodegradable biosynthetic formulas that directly replace synthetic and petroleum based hydraulic fluids. These patented biobased hydraulic fluids are formulated to perform in high- and low-pressure hydraulic systems that require Anti-Wear (AW), anti-rust, anti-oxidation, anti-foam, and demulsibility properties. Bio-Ultimax™ Hydraulic Fluids have a long-term history of proven performance with over 20 years of successfully being used in a wide variety of stationary and mobile hydraulic equipment.

Benefits

- Readily biodegradable, environmentally non-toxic, not bioaccumulative
- Excellent oxidation stability and cold temperature performance
- Superior oxidation stability over straight plant/vegetable oil formulations
- Super high viscosity index provides energy efficiency in equipment
- Completely compatible with conventional petroleum hydraulic fluids and systems
- Highly filtered formulation meets or exceeds OEM pump particle count
- Environmentally friendly, zinc free formula
- Formulated with Stabilized technology increasing VI past synthetic levels
- Great demulsification properties, inhibiting moisture and rust in both fresh and salt water
- High dielectric strength

Application / New Filling

- For construction, forestry, marine, and hydro-electric engineering
- Before changing over to Bio-Ultimax 1000, please ask for filling instructions

Specifications and Approvals

- OECD 301 Readily Biodegradable
- ASTM D 5864
- USDA Bio-preferred
- EPA EAL VGP Compliant (USCG approved)
- Vickers (20VQ, 35VQ-25(M-2950-S), V-104C (ASTM D-2882), I-286-S)
- Dennison (T-5D)
- US Steel (126, 136, 127)

F.O.B: Hartville, Ohio

Availability: 1 Gallon, 5 Gallon Pail, Drum, Totes, Bulk

Bio-Ultimax™ 1000 Typical Specifications

The test data below shows that the Bio-Ultimax™ 1000 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™ 1000 Hydraulic Fluids are formulated to improve performance in equipment that requires excellent anti-wear, rapid water separation and cold temperature pumpability as low as -35^{0}C. They are compatible with the same seals, filters, materials and components that are designed to operate on petroleum oil-based formulations.

TYPICAL SPECIFICATIONS	METHOD	ISO 32	ISO 46	ISO 68	ISO 100	Spec. Requirements
Specific Gravity @ 15.6°C	ASTM D-287	0.88	0.88	0.88	0.90	Report
Viscosity @ 40°C	ASTM D-445	30.87	43.8	64.1	92.0	Note 1
Viscosity @ 100°C	ASTM D-445	6.9	9.67	12.5	16.7	Note 1
Viscosity @ -15°C, Brookfield	ASTM D-2983	550 cP	1100 cP	3200cP	4200 cP	Note 1
Viscosity @ -25°C, Brookfield	ASTM D-2983	1,200 cP	3,000 cP	4500 cP	5400 cP	Note 1
Viscosity @ -30°C MRV TP1	ASTM D-4684	4,500 cP	8000 cP	15,000 cP	26,000 cP	10W= <60,000
Viscosity @ -35°C MRV TP1	ASTM D-4684	7,500 cP	11,000 cP	24,000 cP		5W= <60,000
Viscosity Index	ASTM D-2270	184	199	198	199	90 (min)
Pour Point	ASTM D-97	-40°C	-40°C	-39°C	-34°C	Note 1
Flash Point (COC)	ASTM D-92	457°F/236°C	469°F/243°C	483°F/251°C	255°C	198°C (min)
Fire Point (COC)	ASTM D-92	500°F/260°C	514°F/268°C	525°F/274°C	280°C	218°C (min)
Hydrolytic Stability,	ASTM D-2619					
Copper Wt. Loss (mg)		0.0139	0.0208	0.0208	0.0208	0.2
Copper Appearance		1B	1B	1B	1A	Report
Water Layer		3.0	3.0	3.0	3.6	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	1 A	DIN 51524 2(max)
RPVOT, (minutes)	ASTM D-2272	>350	>350	>350	>300	USS 120 (min)
Dielectric Strength (KV) (Avg)	ASTM D-877	46	40	40	40	>35
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 NBR1 Rubber, % (Avg.)	DIN 53538, Part 1	6.0	6.0	6.0	8.0	0 to 12
Volume Change (%)		-4	-4	-4	-4	0 to -7
Shore A Hardness Change (%)						
Filterability	Denison TP 02100	113	268	335	355	600 (max)
A-No Water (s) (Avg)	HF-0 Requirement	187	271	449	470	2xA (max)
B-2% Water (s) (Avg)						
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 (max) (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 A/8,3/90	DIN 51354 Part 2	12	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	yes
USDA Biobased Tested	New Carbon	yes	yes	yes	yes	meets/exceeds (Over 50%)
Environmental Management System	ISO 14001	yes	yes	yes	yes	yes
Ecotoxicity LC-50 / EC-50	EPA 560/6-82-002, 003	meets/exceeds	meets/exceeds	meets/exceeds	meets/exceeds	meets/exceeds
Note 1 Viscosity Sufficient for Application						
Note 2 Not Required						
Product Item #		8100-	8101-	8102-	8103-	