Renewable Lubricants, Inc.
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Bio-SynXtra Marine Hydraulic Fluid HEES

(ISO 15380 HEES, AW ISO 32, 46, 68, 100)

Bio-SynXtra™ Marine Hydraulic Fluids are fully saturated, synthetic hydraulic fluids formulated for marine and offshore applications requiring Environmentally Acceptable Lubricants (EALs). These HEES-class fluids meet EU Ecolabel** and US EPA 2013 Vessel General Permit (VGP) criteria. Their zinc-free, ashless formulations deliver superior anti-wear protection, oxidation stability, filterability, and cold weather performance. With a high viscosity index and rapid demulsibility, these fluids provide long-lasting performance in both stationary and mobile hydraulic systems across a wide range of temperatures and environmental conditions.

Benefits

- Readily biodegradable, environmentally non-toxic, not bioaccumulative
- EU Ecolabel and EPA VGP 2013 compliant
- Fully saturated HEES formula (ISO 15380 compliant)
- Zinc-free, ashless additive technology
- High viscosity index improves mechanical/thermal stability
- Excellent water separation and rust protection in fresh and sea water
- Low volatility, high flash/fire points
- Compatible with Viton, Buna-N, HNBR, Teflon, fluorosilicone, polyurethane seals
- Non-toxic (LC-50/EC-50 >1000 ppm)
- Meets global marine environmental compliance standards

Application / New Filling

- Designed for high-performance marine hydraulic systems operating under varied environmental conditions
- Recommended for use in vane, piston, and gear pumps
- Compatible with Parker-Denison HF-0/HF-1/HF-2, Eaton-Vickers M-2950-S and I-286-S, Rexroth, Sauer-Sundstrand, and GM LS-2 systems
- Ashless gear oil performance for GL-1 to GL-3, and AGMA Non-EP applications
- For full system conversion and filling instructions, consult Renewable Lubricants, Inc.

Specifications and Approvals

- ISO 15380 HEES compliant
- EU Ecolabel performance verified (certificate available based on order volume)
- EPA 2013 Vessel General Permit (VGP) compliant
- USDA BioPreferred Biobased Certified
- ISO 14001 Environmental Management Compliant
- Meets or exceeds:
    - DIN 51524 Part 2 and 3
    - Parker-Denison HF-0, HF-1, HF-2
    - Eaton-Vickers M-2950-S (35VQ-25), I-286-S (V-104C)
    - DIN 51517 Part 3
    - ASTM D-5864, OECD 301B
    - API GL-1, GL-2, GL-3
    - AGMA Non-EP
    - DIN ISO 14635-1 (FZG Load Stage 12)
    - ASTM D 5864 Ultimately Biodegradable
    - OECD 301B Readily Biodegradable

TYPICAL SPECIFICATIONS	METHOD	ISO 32	ISO 46	ISO 68	ISO 100	Spec. Requirements
Viscosity @ 40°C	ASTM D-445	**32.7**	**44.7**	**66.3**	**96.6**	Note 1
Viscosity @ 100°C	ASTM D-445	**6.2**	**8.3**	**11.3**	**15.3**	Note 1
Viscosity @ 0°C	ASTM D-445	**270 cP**	**366 cP**	**564 cP**	**874 cP**	Note 1
Viscosity @ -20°C, Brookfield	ASTM D-2983	**1470 cP**	**1950 cP**	**3100 cP**	**4990 cP**	Note 1
Viscosity Index	ASTM D-2270	**151**	**163**	**165**	**168**	140 (min) (DIN ISO 2909)
Dielectric Strength, KV (Avg)	ASTM D-877	**>40**	**>40**	**>40**	**>40**	35 (min)
Pour Point	ASTM D-97	**-48°C**	**-46°C**	**-43°C**	**-41°C**	-39**°C** to -18**°C** (min) (DIN ISO 3016)
Flash Point	ASTM D-92	**231°C**	**260°C**	**278°C**	**275°C**	175-195°C (min) (DIN EN ISO 2592)
Water Content %	DIN EN ISO 12397	**<.05**	**<.05**	**<.05**	**<.05**	.05% (max)
Foam Sequence I, II, III	ASTM D-892	**< 30/0 Foam**	**< 30/0 Foam**	**< 30/0 Foam**	**< 30/0 Foam**	150/0, 80/0, 150/0 (DIN EN ISO 6247)
Air Release Value (minutes)	ASTM D-3427	**2**	**2**	**3**	**4**	10 (max) (DIN 51381 ISO 9120)
Rust Prevention	ASTM D-665					
Distilled Water		**Pass**	**Pass**	**Pass**	**Pass**	(DIN ISO 7120) Pass
Syn. Sea Water		**Pass**	**Pass**	**Pass**	**Pass**	Pass
Copper Corrosion, 3hr @ 100°C	ASTM D-130	**1B**	**1B**	**1B**	**1B**	DIN 51524 (2 max) (DIN EN ISO 2160)
Oxidation Dry TOST, hrs.	ASTM D-943	**>7000**	**>7000**	**>6000**	**>5000**	Note 2
Oxidation RPVOT, (minutes)	ASTM D-2272	**>1000**	**>1000**	**>900**	**>700**	USS 120 (min)
Baader Test (72 hrs. @ 110°C) KV 40°C % change	DIN 51554-3	**< 2**	**< 2**	**< 3**	**< 3**	20% (max)
Demulsibility, ML Oil/Water/Emulsion	ASTM D-1401	**(<10 minutes) 40/40/0**	**(<10 minutes) 40/40/0**	**(<10 minutes) 40/40/0**	**(<10 minutes) 40/40/0**	40/37/3 (30 minutes) (DIN ISO 6614)
4-Ball Wear, 1h, 167°F, 1200 RPM, 40 kg (mm)	ASTM D-4172	**0.4-0.5**	**0.4-0.5**	**0.4-0.5**	**0.4-0.5**	USS 127 0.5 (max)
FZG Test A/8.3/90 Fail load stage	DIN ISO14635-1	**12**	**12**	**12**	**12**	10 (min)
V104C Vane Pump Low total wear avg. 5 to 15 mg	ASTM D-2882 ISO 20763	**Pass**	**Pass**	**Pass**	**Pass**	Ring loss 120 mg (max) Vane loss 30 mg (max)
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
Bio Preferred	USDA Biobased	yes	yes	yes	yes	meets/exceeds
Environmental Management System	ISO 14001	yes	yes	yes	yes	meets/exceeds
Ecotoxicity LC-50/EC-50 See SDS	EPA 560/6-82002, 003	yes	yes	yes	yes	meets/exceeds
Vessel General Permit	US EPA VGP	yes	yes	yes	yes	meets/exceeds
Ecolabel Performance **	Europe	yes	yes	yes	yes	meets/exceeds
Product Item #		**80850**	**80860**	**80870**	**80880**	--

Note 1 Viscosity Sufficient for Application
Note 2 Not Required

Note ** EU Ecolabel Certification can be purchased for label branding, based on order volumes. (Contact RLI for product order information).