



Hydro Safe®

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Hydro Safe® Fire Resistant Hydraulic Fluids **(ISO VG 32, VG 46, & VG 68 FR Fluids)**

STABILIZED™
by Renewable Lubricants

"Biobased Lubricants that Perform Like Synthetics"

Hydro Safe® Fire Resistant Hydraulic Fluids are ultimately biodegradable¹ vegetable based formulas that meet and exceed Vickers M-2950-S, Vickers 1-286-5, U.S. Steel 126, U.S. Steel 127, and U.S. Steel 136. They have been USDA Biobased tested to show new carbon (vegetable oil) at >96% for ISO 46 & 68, and >93% for ISO 32. They are **Specially formulated to offer the lowest toxicity in aquatic conditions** to meet and exceed the requirements of International Ecolabels and US Environmental Protection Agency (EPA) Vessel General Permit (VGP) guidelines for EALs. In addition, these products are an excellent choice for inner plant applications (i.e. Building Elevators and Steel Mill Equipment) as fire resistant (FR) hydraulic fluids and they provide exceptional oxidation stability (RPVOT avg. 235 minutes) exceeding US Steel minimum requirement of 120 minutes. **Although they have a pour point of average -30°C, care must be taken if used in hydraulic systems setting static below -10°C for extended periods.**

Hydro Safe® Fire Resistant Hydraulic Fluids are formulated to perform in stationary and mobile hydraulic systems that require Anti-Wear, Anti-Rust and Anti-Oxidation properties. These patented super high VI fluids have a long history of successfully being used in hydraulic systems designed with vane, piston, and gear-type pumps, that require DIN 51524 Part 2 and 3, Parker-Denison HF-O, HF-1, HF-2, Eaton-Vickers, Rexroth, and Sauer-Sundstrand. They have shown to have exceptional anti-wear performance in ASTM D-4172 Four Ball Wear Tests. Their anti-wear performance **exceeds the requirements** for US Steel 126, 136 and 127, DIN 51524 Part 2 and 3 load stage 10 in the FZG (DIN 51354). They also meet and exceed the requirements for ashless GL-1, GL-2, GL-3 and AGMA Non-EP gear oils in reduction units and gear sets where they meet the viscosity ranges. They are highly inhibited against moisture and rusting in both fresh and sea water and pass A and B Sequences of the ASTM D-665 Turbine Oil Rust Test. Incorporating the super high viscosity index of the Stabilized* High Oleic Base Stocks (HOBS) into the formulas, gives multi-grade synthetic base oils performance by boosting the viscosity index to synthetic levels (Energy Conserving Formulas). An environmentally friendly, zinc-free additive system has also been developed that meets or exceeds high pressure pump requirements.

Fire Resistant Performance: The super high viscosity index of the HOBS naturally improves the thermal shear stability of the formulas and their load capacity. The HOBS's extremely low volatility (NOACK <1) and excellent oxidation stability improves the flash and fire safety features in these formulas. In ASTM D-92, Flash Points range from 525°F (274°C) to 570°F (299°C) and Fire Points range from 610°F (321°C) to 649°F (343°C). Based on test results and proven optimized patented formulations, Hydro Safe® FR hydraulic fluids ISO VG-32 (FR), ISO VG-46 (FR), ISO VG-68 (FR), which are vegetable oils derived fire-resistant hydraulic fluids, meet the Factory Mutual as a less hazardous fluid "Specification Tested" ISO/CD 15029-3 rating (**HFDU**), and ISO/TS 15029-2 Spray Ignition-Ignitability (**Class H**). Previous studies have supported the expected temperature ranges of Autoignition (ASTM D-2155) @ 752 - 815°F (400 - 435°C) and Manifold Ignition (ISO 20823) @ 824 - 896°F (440 - 480°C).

Hydro Safe® Fire Resistant Hydraulic 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 >1000 ppm) criteria adopted by the US Fish and Wildlife Service and the US EPA. Hydro Safe® Fire Resistant Hydraulic Fluids are **ENVIRONMENTALLY ACCEPTED LUBRICANTS (EALs)** that are formulated from renewable agricultural biobased resources. We believe Earth's environmental future rests in the use of renewable materials.

¹Ultimate Biodegradation (Pw1) within 28 days in ASTM D-5864 Aerobic Aquatic Biodegradation of Lubricants

STABILIZED by Renewable Lubricants* is RLI's trademark on their proprietary and patented anti-oxidant, anti-wear, and cold flow technology. High Oleic Base Stock (HOBS) are agricultural vegetable oils. This Stabilized technology allows the HOBS to perform as a high performance formula in high and low temperature applications, reducing oil thickening and deposits. Patented Product: US Patent 6,383,992, US Patent 6,534,454 with additional Pending and Foreign Patents.

Hydro Safe® is a registered trademark of Renewable Lubricants, Inc.

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

Hydro Safe® Fire Resistant Hydraulic Fluids

TYPICAL SPECIFICATIONS TEST	Page 2	METHOD	<u>Hydro Safe® Fire Resistant Hydraulic Fluid ISO VG 32</u>	<u>Hydro Safe® Fire Resistant Hydraulic Fluid ISO VG 46</u>	<u>Hydro Safe® Fire Resistant Hydraulic Fluid ISO VG 68</u>
Specific Gravity @ 15.6°C Viscosity @ 40°C Viscosity @ 100°C Viscosity @ 0°C Viscosity @ -15°C, Brookfield Viscosity @ -20°C, Brookfield Viscosity Index		ASTM D-287 ASTM D-445 (cSt) ASTM D-445 (cSt) ASTM D-445 (cSt) ASTM D-2983 ASTM D-2983 ASTM D-2270	0.92 34.2 7.6 204 750 cP 1,270 cP 201	0.92 44.0 9.6 260 980 cP 1,500 cP 212	0.92 64.0 13.4 382 1,050 cP 1,800 cP 218
Pour Point Flash Point (COC) Fire Point (COC) NOACK Volatility 1 hr @ 250°C Foam Sequence I, II, III (10 min) Rust Prevention Distilled Water Syn. Sea Water		ASTM D-97 ASTM D-92 ASTM D-92 DIN51581 ASTM D-892 ASTM D-665	-36°C 274°C 321°C 1% 0 Foam Pass/Clean Pass/Clean	-32°C 290°C 340°C <1% 0 Foam Pass/Clean Pass/Clean	-32°C 299°C 343°C <1% 0 Foam Pass/Clean Pass/Clean
Accelerated Storage Stability Copper Corrosion Strip 3hr @ 100°C			Pass 1A	Pass 1A	Pass 1A
RPVOT, (min) Dielectric Strength, KV (Avg) Acid Number Elastomer Testing BUNA-N Rubber Volume Change, % Shore A Hardness Change Demulsibility, ML Oil/Water/Emulsion 4-Ball Wear, 1h, 167°F, 1200 RPM, 40 kg FZG Test A/8,3/90		ASTM D-2272 ASTM D-877 ASTM D-974 D-471 D-2240 ASTM D-1401 ASTM D-4172 DIN 51354 Part 2	180-200 47 0.4 8.0 -6 40/ 40/ 0 .30-.40 12	200-250 47 0.4 2.0 0.0 40/ 40/ 0 .30-.40 12	200-250 46 0.4 2.0 0.0 40/ 40/ 0 .30-.40 12
<u>Environmentally Acceptable Lubricants (EALs)</u> <u>Readily / Ultimate Biodegradability</u> <u>Ecotoxicity</u> Fathead minnow, 96h LC50, ppm Daphnis magna, 48 h, EC50, ppm Sludge respiration inhibition, EC50, ppm <u>Meets EPA requirements 560/6-82-002, 560/6-82-003</u> <u>Environmentally Friendly</u> <u>USDA Biobased Tested</u> <u>Environmental Management System</u>		EPA VGP Requirement CEC-L33-T-82 OECD 301B Mod. Sturm ASTM D-5864 ISO 15380 New Carbon ISO 14001	yes >80% >60% >60% >10,000 ppm >10,000 WAF >10,000 ppm yes yes yes yes	yes >80% >60% >60% >10,000 ppm >10,000 WAF >10,000 ppm yes yes yes yes	yes >80% >60% >60% >10,000 ppm >10,000 WAF >10,000 ppm yes yes yes yes
Hydro Safe® Product		Item #	71590	71600	71610