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Not All Bio-based/Biodegradable Lubricant Technology is the Same!

Additional independent tests have been run using Chevron Phillips Chemical's laboratories to show how RLI's patented technology outperforms other bio-based technology. (SEE Chevron/Phillips Email attached)

There have been some government agencies that were buying bio-based hydraulic fluids at the lowest bidding cost based on the idea that all bio-based fluids in the required ISO viscosity were the same. As the data shows, this is not true and explains why there have been dissatisfied customers with performance and that these lower performing bio-based hydraulic fluids must be changed more frequently because of oxidation problems. The test data also shows that there is a considerable difference in low temperature performance. Without the proper understanding of these fluids, system failure could occur.

RLI's patented technology considerably out-performs the other fluids in these oxidation and low temperature fluidity tests. In comparing the Rotary Bomb Oxidation Tests (RBOT), keep in mind that **RLI's Bio-Trans-Hydraulic UTF (avg. 105.3 RBOT)** and the poorer results of Terresolve Environlogic 700 UTF (avg. 35.2 minutes RBOT) are both Universal Tractor Fluids (UTF) containing a zinc additive for John Deere J20-C API GL-4, Low-Speed/High Torque requirement. In the RBOT, the zinc additive act as an additional catalyst with the copper in this oxidation test, lowering the results. These two UTFs should be compared in the oxidation tests together, while the very poor oxidation of the Fuchs Plantohyd 68 (avg. 17.6 minutes RBOT) should be compared to the zinc-free **RLI Bio-Ultimax Hydraulic Product Line with excellent oxidation stability (avg. 250-600 minutes RBOT).** These independent tests show **RLI's Ultimax Hydraulic Fluid Technology** to be **15 to 35 times more stable** than the Fuchs Plantohyd Fluid and the **RLI Bio-Trans-Hydraulic UTF** to be **three times more stable** than the Terresolve Environlogic 700 UTF. This allows RLI's bio-hydraulic fluids to perform according to OEM oil change specifications.

In the cold temperature tests the Terresolve Environlogic 700 UTF scored the poorest Gelation Index of 24.9 @ -21.2C compared to **RLI's Bio-Trans-Hydraulic UTF with an improved performance Gelation Index of 20.6 @ -33.9C.** The Fuchs Plantohyd 68 did fairly well with a Gelation Index of 26.2 @ -34.4C, but did not perform as well as RLI's Bio-Trans-Hydraulic UTF Gelation Index of 20.6 in this test. The lower the Gelation Index number related to the temperature is preferred**. The Scanning Brookfield Test also shows the improved fluidity (lower viscosities) at lower temperatures with RLI's Bio-Trans-Hydraulic UTF as shown below.**

Scanning Brookfield @	**-20^0 C**	**-25^0 C**	**-30^0 C**
RLI UTF	**1200 cP**	**2500 cP**	**4000 cP**
Terresolve UTF	1200 cP	7500 cP	15000 cP
Fuchs Hyd 68	2000 cP	5000 cP	8500 cP

Additional testing was conducted in RLI's laboratory in the Cold Static Tests. This test shows how many hours or days a base oil or formula can stay fluid. 15 mL is placed in a freezer @ -25^0 C and checked for fluidity every day for 21 day. This test is a simple test that can also be performed at home even if the home freezer does not go to -25^0 C. Different formulas can be tested side by side for evaluation and compared.

Fluids tested included a biodegradable product sold in Florida called SWPC that a company asked RLI to evaluate, Terresolve Environlogic 700 UTF, Fuchs Plantohyd 68 Fluid, RLI's Bio-Trans-Hydraulic UTF, and RLI's Bio-Ultimax 1000 Hydraulic Fluids ISO 32, 46, and 68.

Test Sample	**Pass/Fail**	**Evaluation**
SWPC	Failed	Semisolid 8 days – solid 9 days
Plantohyd 68	Failed	Semisolid 8 days – solid 14 days
Environlogic 700 UTF	Failed	Semisolid 15 days – solid 16 days
RLI Bio-Syn TransHydraulic UTF	**Passed**	**Fluid 21 days**
RLI Bio-Ultimax 1000 ISO 32	**Passed**	**Fluid 21 days**
RLI Bio-Ultimax 1000 ISO 46	**Passed**	**Fluid 21 days**
RLI Bio-Ultimax 1000 ISO 68	**Passed**	**Fluid 21 days**

Contact RLI for additional independent test data and lower cost products.

Respectfully submitted,

William W. Garmier, Vice-President
Renewable Lubricants, Inc.