



**Renewable Lubricants, Inc.**

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**STABILIZED™**  
by Renewable Lubricants

## **Not All Biobased/Biodegradable Lubricant Technology is the Same!**

There are some companies and government agencies buying biobased anti-wear (AW) hydraulic fluids at the lowest bidding cost based on the idea that all biobased fluids (in the required ISO viscosity) are the same in performance. As the data illustrates, this is not true, there have been dissatisfied customers with performance of biobased fluids. Lower performing biobased AW hydraulic fluids must be changed more frequently and could be more expensive because of oxidation problems. Some of these biobased hydraulic fluid suppliers will not show their oxidative stability because the data is very poor. Without the proper understanding of these fluids, system failure can occur, resulting in customer dissatisfaction.

The following chart shows third party independent oxidation tests performed on RLI's patented, biobased and biodegradable<sup>1</sup> Bio-Fleet™, Bio-HVO, Bio-HVO2, Bio-Ultimax™ 1000, Bio-Ultimax™ 1500 Dielectric, and Bio-Ultimax™ 2000 AW Hydraulic Fluids. In addition, many independent tests have been run using third party laboratories, or the oxidation data (RPVOT) from the competitor's data sheets to show how RLI's patented technology outperforms other biobased AW hydraulic fluid technology with the longest oxidative time. The test data includes comparative results with other mineral based AW hydraulic fluids and very expensive synthetic polyol ester (POE) based AW hydraulic fluids. The oxidation tests are summarized below.

It is assumed that the competitor's biobased fluids meet the USDA biobased content. There is no listed biobased information on the Conoco Synterra POE and Quintolubric POE synthetic esters and mineral oils are not biobased and not Ultimate Biodegradable Pw1. The LZ Biobased/Synthetic POE is a biodegradable hydraulic fluid from Lubrizol. All of RLI's AW hydraulic fluids have been USDA carbon dated, exceed the biobased requirements and are biodegradable. RLI's Bio-HVO and Bio-HVO2 AW Hydraulic Fluids are >97% USDA new carbon (biobased). The improved performance is RLI's patented technology.

### **ASTM D-2272 Rotary Pressure Vessel Oxidation Test (RPVOT)**

The RPVOT is one of the standardized methods of comparing the oxidation life of lubricants in similar formulations. It is used to evaluate the oxidation characteristics of turbine, hydraulic, transformer and gear oils. The test apparatus consists of a pressurized vessel axially rotating at an angle of 30° from horizontal in a bath at 150°C (302°F). Fifty grams of test oil and 5 grams of water are charged to the bomb containing a copper catalyst coil. The bomb is initially pressurized with oxygen to 90 psi at room temperature. The 150°C bath temperature causes this pressure to increase to approximately 200 psi. As oxidation occurs, the pressure drops, and the usual failure point is taken as a 25 psi drop from the maximum pressure attained at 150°C. The results are reported as the number of minutes to a 25 psi loss. **The longer the time in minutes, the greater the stability of the fluid. The US Steel requirement for anti-wear hydraulic fluid is >120 minutes.**

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

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# Rotary Pressure Vessel Oxidation Test (RPVOT) @ 150°C ASTM D 2272: A Comparative Study of Biobased, POE, and Petroleum Hydraulic Fluids over Time

