

## **Biodraulic**

Heavy Duty EAL Hydraulic Fluid

No. 309

ISO: 32, 46, 68

### **DESCRIPTION:**

**Biodraulic** EAL (Environmentally Acceptable Lubricant) hydraulic fluid is a premium quality, highly oxidation stable, anti-wear lubricant. This biosynthetic based product has been formulated to meet and exceed the requirements set forth by most hydraulic pump manufacturers, and is stable enough to be used in both high temperature and high pressure hydraulic systems. Even with these elevated performance characteristics, **Biodraulic** satisfies the criteria for ultimate biodegradability (PW1) and non-toxicity. **Biodraulic** has a unique rust and oxidation inhibiting system that assures the highest level of rust and oxidation protection available. It is a clear choice for use in applications on or near water. **Biodraulic** can be used in most applications that require an R&O or AW hydraulic fluid, and will provide environmental safety without sacrificing performance.

*Biodraulic meets the definition of a bio-based lubricant as outlined in section 9001 of the Farm Security and Rural Investment Act (FSRIA) of 2002 and qualifies for preferred procurement by U. S. Federal Agencies as set forth in FSRIA Section 9002. Biodraulic complies with the “biodegradable”, “minimally-toxic” and “not bioaccumulative” standards as defined in Appendix A of the 2013 Vessel General Permit issued by the United States Environmental Protection Agency.*

### **PERFORMANCE CHARACTERISTICS:**

- **Ultimate biodegradability**  
**Biodraulic** is a ASTM D5864 PW1 rated hydraulic fluid. It exhibits the highest level of biodegradability in the industry. (*Ultimate >60% degraded at 28 days.*)
- **Non Toxic**  
Passes and exceeds the acute toxicity (LC-50) criteria adopted by the United States EPA and the United States Fish and Wildlife Service.
- **Non Sheen**  
**Biodraulic** does not produce an iridescent appearance (sheen) on the surface of the water when tested in accordance with the U.S. Coast Guard Static Sheen Test (*40 CFR 435 Appendix A*)
- **Oxidation resistant**  
Oxidation inhibitors and premium quality base oils combine to form a product with outstanding resistance to oxidation and provide the maximum protection against varnish formation at both high and low temperatures. This feature will allow for drain intervals commensurate with conventional oils.
- **Provides excellent anti-wear protection**  
Special anti-wear, extreme pressure and friction reducing additives provide the highest level of protection against wear and scuffing in all types of vane, piston, and gear pumps used in both low and high pressure hydraulic systems.
- **Superior rust protection**  
Inhibitors protect both steel and yellow metal surfaces against rust and corrosion. Vastly outperforms other Bio-based fluids.
- **Demulsibility**  
Designed to separate rapidly from water
- **High foam resistance**  
Foam inhibitors provide a high level of foam resistance to prevent pump starvation and damage.
- **High viscosity index**  
To insure viscosity stability.
- **Superior filterability**  
New technology allows for better filterability and no freeze capability previously unseen in bio based fluids.

**TYPICAL APPLICATIONS:**

Recommended for use as a premium EAL anti-wear hydraulic fluid in all types of vane, gear, and piston pumps and to protect against environmental issues in many industries:

- |                     |                      |                               |
|---------------------|----------------------|-------------------------------|
| Cities and Counties | Barges and Shipping  | State and Federal Agencies    |
| Bridge Hydraulics   | Irrigation Districts | Water and Foundation Drilling |
| Waste Management    | Street Sweeping      | Construction Equipment        |

**SUMMARY:**

Hydraulic systems are constantly subjected to adverse conditions such as water, heat, high pressures, and long operating intervals. Each of these factors affects the ability of the hydraulic system to provide maximum output when needed. Bearing, pump, valve, gear, motor and cylinder wear are very common. Gum and varnish buildup lead to poor system performance. Oil deterioration and rapid oxidation of conventional bio based fluids results not only in excessive wear, but frequent overhauls, rancid smells and poor filterability. Deterioration of seals and O-rings lead to increased oil consumption.

**Biodraulic EAL hydraulic fluid is formulated to greatly reduce these problems and provide maximum environmental safety. Spill and leakage issues are a thing of the past.**

**SERVICE APPLICATIONS:**

**Biodraulic** hydraulic fluid meets and exceeds the following service requirements for hydraulic pumps:

- |   |                          |
|---|--------------------------|
| Vickers 1-286-S, M-2950-S                 | Denison HF-1, HF-2, HF-0 |
| General Motors LH-04-1, LH-06-01, LH-15-1 | Jeffrey No. 87           |
| Cincinnati Milacron P-68, P-69, P-70      | Lee Norse 100-1          |
| Ford M-6C32                               | U.S. Steel 127,136       |
| B.F. Goodrich 0152                        | Commercial Shearing      |

**TYPICAL SPECIFICATIONS:**

ISO Grade	Test Method	32	46	68
Viscosity @ 40° C, cSt:		31.3	43.5	64.6
Viscosity @ 100° C, cSt:		6.8	9.8	12.7
Viscosity Index:		188	220	201
Flash Point, COC, °F		460	470	485
Pour Point, °F:		-40	-39	-39
Oxidation Stability, TOST, hr <sup>1</sup>	ASTM D-943	7000+	7000+	7000+
Four Ball Wear Test, (mm)	ASTM D 4172	Scar 0.37	Scar 0.35	Scar 0.35
Corrosion test, Steel,	ASTM D665	Pass	Pass	Pass
Foam Test, foam after 10 min.	ASTM D-892	Nil	Nil	Nil
Rust Test	ASTM D-665 A/B			
Distilled Water		Pass-clean	Pass-clean	Pass-clean
Synthetic Sea Water		Pass-clean	Pass-clean	Pass-clean
Demulsibility Test	ASTM D-1401	Pass	Pass	Pass
FZG Gear Test	DIN 51354	12	12	12
Emulsion Tendency, (10 min)	ASTM D-1401	40/40/0	40/40/0	40/40/0
LC-50 criteria	Adopted by the United States EPA and the United States FWS	Pass	Pass	Pass
Coast Guard Static Sheen Test	(40 CFR 435 Appendix A)	Pass	Pass	Pass
Biodegradation	ASTM D5864	Ultimate	Ultimate	Ultimate
Classification		PW1	PW1	PW1
VGP/EAL		Yes	Yes	Yes

**PERFORMANCE PRODUCTS GUARANTEED**