

Common Misperceptions About Environmentally Acceptable Lubricants (EALs)

MYTH #1: All EALs are the same

TRUTH: There Are 4 Classification of EALs Recognized By US EPA and International Standards Organization (ISO) per Standard 6743/4:

- Hydraulic Environmental Triglycerides (HETG)
- Hydraulic Environmental Polyalkylene Glycols (HEPG)
- Hydraulic Environmental Synthetic Esters (HEES)
- Hydraulic Environmental Polyalphaolefins and related hydrocarbon products (HEPR)

Note: Particular application factors affect EAL selection.

HETG

- They have good frictional characteristics and viscosity index, but they have a shorter oil life expectancy than time between dry docks
- Their oxidative stability under high temperature applications is more susceptible to oxidation
- Their hydrolytic stability is more prone to hydrolysis in the presence of water (typically > 1%)
- Care must be taken in application selection

HEPG

- They are fire resistant
- They are not compatible with conventional seals or filters
- They are not compatible with petroleum, vegetable or ester based oils
- And they absorb water (creates rust and acid)

HEES

- They are hydrolytically unstable, they “unzip” with water and can form acid
- They can cause seal deterioration

HEPR

- Durable
- Low cost
- Have longer fluid life
- Separate from water
- Have good seal compatibility
- Broad Temperature Range

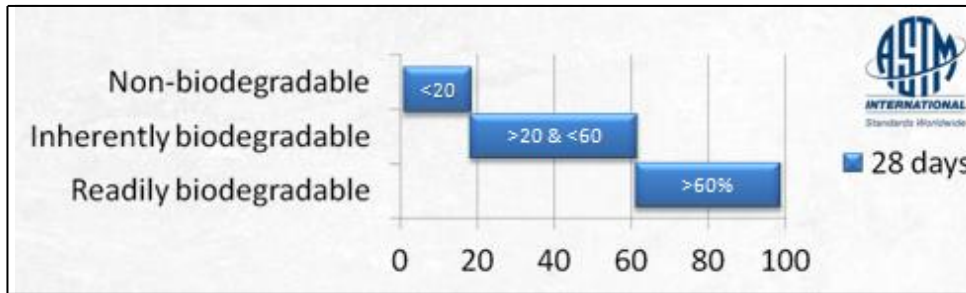
Many RSC EnviroLogic® EAL offerings are HEPR type.



MYTH #2: HEPR Fluids are not biodegradable

FACT: Biodegradation is a commonly misused industry term.

- Not all solutions are the same.
- Biodegradation as defined by ASTM:



Inherently biodegradable products are not “Environmentally safe”, “Friendly” or VGP compliant.

RSC EnviroLogic® products (including HEPR type) are readily biodegradable.

RSC EnviroLogic Product Grade	USDA BioPreferred*	ASTM D-7373	OECD 301B	Readily Biodegradable**
RSC EnviroLogic HF 15		✓		✓
RSC EnviroLogic HF 22	✓	✓		✓
RSC EnviroLogic HF 32	✓	✓		✓
RSC EnviroLogic HF 46	✓	✓		✓
RSC EnviroLogic HF 68	✓	✓	✓	✓
RSC EnviroLogic HF 100	✓	✓		✓
RSC EnviroLogic HF 15 HP		✓		✓
RSC EnviroLogic HF 22 HP		✓		✓
RSC EnviroLogic HF 32 HP		✓		✓
RSC EnviroLogic HF 46 HP		✓	✓	✓
RSC EnviroLogic HF 68 HP		✓		✓
RSC EnviroLogic HF 100 HP		✓		✓
RSC EnviroLogic GO 68		✓		✓
RSC EnviroLogic GO 100		✓		✓
RSC EnviroLogic GO 150		✓	✓	✓
RSC EnviroLogic GO 220		✓		✓
RSC FUTERRA HF 32	✓		✓	✓
RSC FUTERRA HF 46	✓		✓	✓
RSC FUTERRA HF 68	✓		✓	✓
RSC FUTERRA HF 100	✓		✓	✓

* Minimum biobased content of 44% for hydraulic fluids (products are certified or qualified)

** ≥60% biodegradation within 28 days



MYTH #3: All EALs are technically infeasible

FACT: Many applications are technically feasible with RSC *EnviroLogic*® products

- Stern tubes (Blohm+Voss / Simplex, Wartsila, JMT, Aegir Marine, Kobelco)
- Thrusters (Rolls-Royce, ABB, Wartsila, Schottle, Berg, Thrustmaster)
- Stabilizers (Blohm + Voss, Rolls-Royce)
- Water-tight doors
- Lifeboat Davits
- Stern Ramps (TTS, MacGregor, Cargotec)
- Deck Equipment (Rolls-Royce, Hatlapa)
- Cargo Deck Fans / Mushrooms
- Hydraulic Cranes

MYTH #4: EALs are not compatible with seals or petroleum lubricants

FACT: RSC *EnviroLogic*® products are compatible with seals and petroleum based fluids

- They are compatible with NBR, HNBR, FKM

100 C 168 Hours				
	NBR	HNBR	FKM	DIN 51524
Volume Change %	11.7	3.0	0.6	0 to 12
Durometer	-7	-4	-1	0 to -7
Tensile Change	-17.6	-14.9	-10.3	N/A
Elongation	-23.2	-0.1	6.8	N/A



A Perspective on Best Practices in Use of Chemical Products in the Marine Industry

Our Extensive Experience across Marine Transportation, Construction and Offshore Oil & Gas Markets Affords a Unique Perspective on Equipment Fleet Operators' Approaches to Chemical Products in regards to:

- Regulatory and EPA 2013 Vessel General Permit (VGP) & pending Small Vessel General Permit (sVGP) Compliance
- Vessel Discharge Management including above water line and equipment to water interfaces
- Approaches to chemical maintenance practices
- Fluid Technology Adoption

Results of our industry survey follow a normal distribution and are summarized in the following table.

	Regulatory and VGP Compliance	Discharge Management	Chemical Maintenance Practices	Fluid Technology Adoption
Top Performers	A culture of sustainability. Years ahead of regulations.	Everything collected. Zero discharge.	Predictive. Real-time fluid monitoring and historic modeling.	Innovative: Engineered, high-performance products; TCO benefits fleetwide
Strong Performers	Proactive risk mitigation. Anticipate future issues to avoid change under duress.	Continuous improvement. Using best available technology.	Periodic. Monitor fluids at set intervals to adjust maintenance procedures.	Early adopters of new product; willing to pay for new tech; regional/selective implementation
The Muddy Middle	Precise compliance. Understand rules to change when required.	Measure and track reduction by type of discharge.	Preventative maintenance on equipment at set intervals.	Industry Followers: Upgrade when quick payback is obvious. Approves for use.
Weak Performers	Look for loopholes. avoids change and deal with penalties when they happen	Report spills in a timely fashion, but no attempt to reduce.	Just in time repair of component systems and fluid replacement.	Status Quo: Previous generation products. No corporate involvement. One-off implementation
Worst Performers	Ignore: will go away or not be enforced. Risk of penalties > cost to change.	No tracking. Handle spills and leaks ad hoc. May not report.	Crisis management: repair components when broken.	Cost Driven. Cheapest solution. No technology initiative.

With high performing RSC *EnviroLogic*® lubricants and SAFECARE® cleaning products, RSC Bio Solutions can help your company reduce operating risks and comply with environmentally acceptable lubricants (EALs) and above water line deck and equipment care.

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