Why Environmental Protection Matters for Industrial Fluids

Across industries, equipment end users increasingly rank environmental friendliness as an important purchase factor. For any formulator, adding EALs to your portfolio can help you contribute to your more eco-conscious reputation and deliver more environmentally friendly solutions to your customers.

***Paul Robinson**, Industrial Commercial Manager at Lubrizol*

How environmentally friendly are your industrial fluids?

It's a question many lubricant manufacturers are — or should be — taking more seriously in today's market. And it's part of why environmentally acceptable lubricants (EALs) are gaining significant traction throughout the industrial fluids market.

The term EALs is used to describe lubricants that have been demonstrated to meet regulatory standards for biodegradability, non-bioaccumulative potential and minimal toxicity to aquatic life compared to conventional lubricants. As widespread regulatory measures have spurred the industry to make their product lines more environmentally friendly, demand for EALs is increasing, with the market projected to grow to a ~5% CAGR by 2024, according to research from Kline & Company.

For formulators, there's an increasing incentive to make EALs a part of your portfolio. Doing so successfully will require the right approach, using the right chemistry to maximise performance while maintaining environmental protection.

Why EALs?

Every year, considerable volumes of industrial fluids make their way into the environment via machine leakage, accidental spills, and improper disposal. As the global society grows increasingly environmentally conscious, mitigating the escape of hydraulic fluids, greases, metalworking fluids, industrial gear oils, and other fluids into the environment has become even more important. Biodegradability — a lubricant's ability to be decomposed by microorganisms over time into simpler byproducts, ultimately carbon dioxide and water—has become a sought-after trait.

Regulatory requirements have played a major role in driving new demand for fluids with improved environmental properties. Europe's EcoLabel, which certifies products with a guaranteed, independently verified low environmental impact, and Germany's Blue Angel label, which the country awards to a wide variety of environmentally friendly products, have both increased their stringency in recent years. Meanwhile, the United States recently developed the Vessel Incidental Discharge Act (VIDA), which establishes a framework for the regulation of discharges incidental to the normal operation of a vessel under a new Clean Water Act.

But legislative incentives aren't the only driver of greater environmental awareness. Equipment end users increasingly demand to know what goes into products they buy, and whether those components are safe for the environment. Social responsibility to protect the land and sea, and a clean future for our planet is a major, growing concern among buyers at all levels. It is a mindset shift that is opening up new opportunities everywhere.

Maintaining Necessary Performance Levels

In order to seize the market potential for EALs, formulators need to maintain the right performance characteristics that end users expect from conventional lubricants.

This is no easy task, however. Certain formulation approaches must be taken in developing an EAL, many of them fundamentally different than when developing a conventional fluid. For example, wear protection represents one of the most critical characteristics of any industrial fluid. And one of the most reliable classes of anti-wear additives is zinc dialkyl dithiophosphates (ZDDPs). However, ZDDPs do not naturally biodegrade as necessitated by EAL classifications, so they cannot be used in an EAL formulation. Therefore alternative anti-wear chemistries must be used.

The same is true for other performance requirements. An industrial gear oil, for example, must typically incorporate extreme pressure additives. Sulphurised olefins are commonly deployed for extreme pressure applications but are likewise not biodegradable in accordance with EAL standards. The same is true of many critical additives that are found in conventional industrial fluids. Many conventional chemistries frequently deployed as emulsifiers, antifoam agents, corrosion inhibitors, friction and viscosity modifiers cannot be used in the composition of an EAL, and again alternative types must be used.

And because of biodegradability and toxicity concerns, EAL standards further restrict the use of traditional mineral oils. This functionally eliminates Group I, II and III base oils from EAL formulations. Synthetic base oil formulations from Groups IV (polyalphaolefins) and V (for example, esters) are therefore required.

Despite these formulation challenges, it can be worth the investment to capture new EAL markets as environmental protection initiatives continue to grow. To succeed, working collaboratively with the right partner can be beneficial to help you develop environmentally certified and performance-validated fluids. A true partner should be able to offer reliable chemistry expertise and EAL-compatible solutions, enabling your business to expand EAL offerings quickly to gain greater share of new markets. Lubrizol are committed to this approach, with a comprehensive portfolio of EAL solutions for industrial fluids.

Additional research from Kline & Company anticipates that marine, agriculture, construction, mining, and offshore power generation will see significant growth potential for EALs in the coming years. The world is increasingly concerned with environmental impact. Legislative measures will only grow more stringent. Demand for EALs will only grow — and your business needs to be ready.

About Paul Robinson

***Paul Robinson**, Ph.D., has spent the last 15 years working at Lubrizol in roles across R&D, Engine Oils, Performance Polymers and most recently in the Industrial Oils group. In his current role as Industrial Commercial Manager, Paul is responsible for Lubrizol's industrial gear oil product line globally. He has a keen interest in the ongoing development of synthetic lubricant technology, particularly PAO and ester-based fluids. Paul has a Ph.D. in Organic Chemistry from Loughborough University, UK.*

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