



Biolubricants

April 2011

For government purchasers

Publication No. 13-07-011

Responsible Purchasing Attributes

- Toxic chemical reduction
- Improved water quality
- Climate change reduction

Benefits of Purchasing

- Reduces public exposure to toxins in the environment
- Contributes to improved water quality for human and aquatic life
- Reduces greenhouse gas emissions
- Increases economic security

How to Buy

Biolubricants are not state contract.

Biolubricants, also known as bio-based lubricants or bio-lubes, are made from a variety of vegetable oils, such as rapeseed, canola, sunflower, soybean, palm, and coconut oils. The best application for biolubricants is in machinery that loses oil directly into the environment during use, total loss lubricants (TLLs), and in machinery used in any sensitive areas, such as in or near water. Applications for TLLs include two-stroke engines, chainsaw bars and chains, railroad flanges, cables, dust suppressants, and marine lubricants.

Compared to petroleum-based lubricants, use of biolubricants:

- Produces a cleaner, less toxic work environment and fewer skin problems for those working with engines and hydraulic systems.
- Offers better safety due to higher flashpoints, constant viscosity, and less oil mist and vapor emissions.
- Produces fewer emissions due to higher boiling temperature ranges of esters.
- Are highly biodegradable.
- Costs less over the product's life-cycle due to less maintenance, storage and disposal requirements.

The use of biolubricants can reduce pollution in stormwater from leaks in engines, hydraulic systems, and brake lines. Many European countries now require biolubricants in selected environmentally sensitive areas.

Success Story: City of Seattle

The [City of Seattle](#) is promoting the use of biolubricants for bar oil and hydraulics in heavy equipment used in watershed maintenance.

Standards

Numerous biolubricants are available on the market that meet or exceed the [American Society for Testing and Materials International \(ASTM\)](#) standards for comparable mineral lubricants made from petroleum. The National Marine Manufacturers Association (NMMA) also provides certifications for biolubricants, including [TC-W3](#), for two-stroke engine oil performance.



Canola plant used in making canola oil

Bio-based content is determined by testing to ASTM method D6866. Using radiocarbon dating, it is possible to compare the total amount of decaying carbon isotope in a product to how much would be found in recently grown materials. The ratio provides the percentage of the product's bio-based content.



Black Soybeans

The city has been using biolubricants for several years now and performance has been at least as good as or superior to petroleum-based lubricants.

Environmentally Preferable Purchasing

The Department of Ecology offers tools and resources to make environmentally preferable purchasing easier.

Find out about environmentally preferable products, standards and certifications, law and directives, and more at our website:

<http://www.ecy.wa.gov/programs/swfa/epp/>

Contact:

Tina Simcich
tina.simcich@ecy.wa.gov

Resources

[American Society for Testing and Materials International](#)

[United Soybean Board Biobased Lubricants](#)

[USDA Bio-Preferred Catalog](#)

[Comparative Life Cycle Assessment of Biolubricants and Mineral Based Lubricants](#)

[King County's Environmental Purchasing Bulletin #59: Vegetable Oil-Based Hydraulic Fluids](#)

[National Marine Manufacturers Association: TC-W3 Two-Stroke Oil Certification Program](#)

Performance

Since biolubricants outperform petroleum lubricants, less is required per application. Cost benefits include reductions in environmental and safety penalties in the case of spills, and less parts wear, maintenance costs, and disposal fees.

Biolubricants:

- Evaporate slower than petroleum lubricants.
- Adhere better to metal surfaces.

They have several disadvantages in the use phase of the product life cycle, including:

- Some bad odors if contaminants are present.
- High viscosity at low temperatures.
- Poor oxidative stability at high temperatures, although additives designed specifically for plant-based lubricants eliminate stability issues related to extreme high and low temperatures.

For more information on biolubricants application and performance, see the United States Department of Agriculture (USDA) [Bio-Preferred Catalog](#), which includes more than 200 product categories.

End of Life

One study estimates that more than 50 percent of all lubricants used end up being released in the environment. Although most biolubricants contain a small percentage of additives that are not biodegradable, the quantity of toxins present is significantly less than petroleum lubricants. Thus, used, accidentally spilled, or leaked biolubricants will not contaminate streams nor kill vegetation and wildlife.



Biolubricant on gearing

Laws and Directives

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| <p>Executive Order 02-03 Sustainable Practices by State Agencies</p> | <p>Requires sustainable practices by state agencies. This includes practices that do not sacrifice the needs of future generations and reduce threats to resources such as clean water.</p> |
| <p>Executive Order 04-01 Persistent Toxic Chemicals</p> | <p>Directs state agencies to adopt measures to reduce the use of equipment, supplies, and other products that contain persistent, toxic chemicals.</p> |

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