

XL-9360

ECOSYNTHETIC® LUBRICATING OIL

Thermal-Lube's growing line of **XL-9000** series of **EcoSynthetic®**, **BioSynthetic®**, and **BioNatural®** lubricants are products fully formulated to exacting specifications with carefully selected components that are each categorized as "environmentally compatible", and conducive to definite applications.

*".....The term 'biobased product' as defined by **Farm Security and Rural Investment Act (FSRIA)**, means a product determined by the U.S. Secretary of Agriculture to be a commercial or industrial product (other than food or feed), that is composed in whole or in significant part, of biological products or renewable domestic agricultural materials (including plant, animal, and marine materials) or forestry materials. In short, biobased industrial products are produced from renewable plant and animal sources, and are generally presumed to be more environmentally benign than their petroleum based counterparts. They are usually biodegradable and can be returned to the earth at the end of their useful life or recycled and used again....."*

The ecological impact analysis of the entire life cycle of each individual component has been addressed and applied to the overall effect that each formulated lubricant from this series will have on the environment.

The overall toxicological potential of the **XL-9000** series of lubricants is evaluated by addressing the **intrinsic toxicity** of the material itself and understanding the magnitude of **exposure to the ecosystem**. Only when these two parameters are evaluated together with the **final degradation analysis, can the total ecological impact of the lubricant be ranked**.

For example: A toxic lubricant may not pose a threat to the environment if the exposure is minimized or eliminated. On the other hand, a lubricant that is relatively non-toxic may be an environmental concern if large amounts are exposed to a population.

Toxicity is related to exposure (or dose). This is generally determined by the amount of a material in air or water to kill 50% of an organism population within a pre-designated time period [LC₅₀ (Lethal Concentration)]. With direct oral and/or dermal doses to a particular species, this value is referred to as the LD₅₀ (Lethal Dose to kill 50% of the species). LC₅₀ values greater than 100ppm, LD₅₀ oral values greater than 2000mg/Kg body weight, and LD₅₀ dermal values greater than 5000mg/Kg body weight are generally considered non-toxic.

Ecotoxicity is correlated to the bioaccumulation potential (concentration of chemicals from water or food into living organisms). This is determined by the degree of uptake, distribution, metabolism, and elimination of a substance within a living organism.

For example: A material that is taken up and widely distributed, but metabolised and eliminated, will not bioaccumulate. Similarly, a material that is not taken up cannot bioaccumulate. However, bioaccumulation will occur when some highly lipid-soluble materials will be taken up and stored in fats (lipids).

Final **biodegradation** of a lubricant is the last criterion to be assessed. Degradation may override many harmful characteristics such as toxicity and bioaccumulation.

For example: A lubricant that degrades may not be an ecological threat even though the material is toxic and/or bioaccumulates. Final degradation may occur by hydrolysis, photolysis, and biodegradation.

Determining biodegradation tendencies of a lubricant is difficult because of its hydrophobic nature. The test method being developed and used as of this writing is the CEC L-33-T-82 test. This measures the oxygen consumption or carbon dioxide production in a closed aqueous (inoculum) system for 28 days.

Materials analyzed by this test method can be categorized as readily, inherently, or relatively biodegradable as compared to mineral oils. Readily biodegradable lubricants will degrade a minimum of 60% in 28 days. Inherently and relatively biodegradable lubricants will degrade over 15% in 28 days. What this actually means is that inherently and readily biodegradable lubricant products will degrade, but over a longer period of time.

In many industrial applications where lubricants are subjected to harsh or outdoor conditions, and long lubricant life is expected, inherently biodegradable lubricants would be the desirable choice. Thermal-Lube's **XL-9000 EcoSynthetic**[®] series of synthetic lubricant products are all non-toxic, non-bioaccumulator, and inherently biodegradable. In applications where lubricant leakage, environmental contamination, and toxicity pose ecological problems, readily biodegradable lubricants would be the desirable choice. Thermal-Lube's **XL-9000 BioSynthetic**[®] and **BioNatural**[®] series of lubricant products are all non-toxic, non-bioaccumulator, and readily biodegradable.

For continuous real-time FTIR analytical monitoring and automatic additive dosing of lubrication systems, please inquire about Thermal-Lube's COAT[®] system.

TYPICAL SPECIFICATIONS			
Product Code: XL-9360	/032	/046	/068
ISO Grade	32	46	68
Viscosity (cSt @ 40°C) (ASTM D-445)	31.0	44.7	71.1
Viscosity (cSt @ 100°C) (ASTM D-445)	6.1	7.8	11.4
Viscosity Index	148	145	154
Pour Point (°C) (ASTM D-97)	-47	-40	-40