Product stewardship summary: friction modifiers

Introduction

At Chevron Oronite, we foster a culture grounded in operational excellence and are committed to protecting people and the environment. This product summary is one example of that commitment.

For engines to perform their everyday functions as well as expected, all their moving parts must be powered and protected with fuels and lubricants enhanced by some of the most technologically advanced additives. The products we produce help fuels and lubricants push the boundaries of speed, strength, cleanliness, and durability.

Friction modifiers are oil soluble chemicals that are used as additives in lubricating oils for internal combustion engines and transmissions and are a key component of modern engine oils. While they represent only a small fraction of the total engine oil, friction modifiers play a key role by reducing friction in critical metal to metal contact points in engines and transmissions. Benefits include boosting fuel economy by reducing friction, preventing metal scoring, and reducing engine wear and noise or micro pitting of metal surfaces when used in industrial gear lubricants.

Description and Properties

Friction modifiers typically have a polar end (head) and an oil-soluble end (tail). When used as a lubricant additive, the polar end of the molecule attaches itself to the engine metal surface. This provides a sacrificial film on the metal which serves to minimize friction because of direct metal to metal contact. Generally, they are as yellow liquids, insoluble in water.

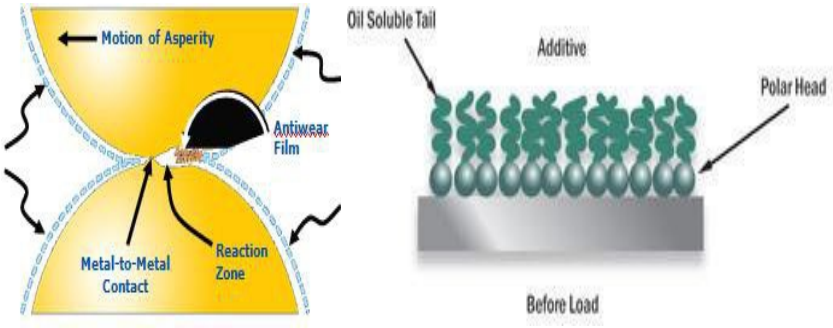

Figure 1. Mechanism of action of friction modifiers

This summary is based on information as of March 2024

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Health Information

Studies conducted on friction modifiers demonstrate that some substances may cause skin irritation or allergic skin reactions. Dermal exposure to some chemicals may cause permanent damage, including burns and scarring. Some friction modifiers have potential to induce eye irritation or cause permanent eye damage. Some friction modifiers may be irritating and cause damage to mouth, throat and stomach when ingested.
Some low viscosity friction modifiers are aspiration hazards. Certain friction modifiers can contain a trace amount of a chemical that may be carcinogenic to humans, however this hazard is not expected to be of major health concern at concentrations found in consumer products.

Environmental Information

Studies show that some friction modifiers are expected to be toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment. Several friction modifiers are expected to be readily biodegradable; however, some materials may persist in the environment due to limited biodegradability.

In the event of a spill of a product containing friction modifiers, stop the source of the release if it can be done safely. Refer to Safety Data Sheet for spill response and clean-up procedures. Report spills to local authorities. For USA, call National Response Center at 1-800-424-8802.

Regulatory Information

Requirements may exist that govern the manufacture, importation, sale, transportation, use and/or disposal of friction modifiers or products containing them. These requirements may vary by jurisdiction. For more information, consult the relevant Safety Data Sheet.

Exposure Potential

Manufacturing of friction modifiers generally occurs in dedicated closed systems with proper engineering controls, thereby minimizing exposure. Solid waste is either incinerated or recycled. Therefore, there is no significant release to the environment. Wastewater is treated before it is released. Workers in manufacturing plants, including those completing sample analysis, blending, maintenance and cleaning are well trained in their operations and wear appropriate personal protection equipment. Professional mechanics, service station attendants, and other skilled workers wear personal protective equipment and use hygiene practices that reduce exposure to the oil. Consumer exposure may occur while working around engines, but this is likely to be infrequent. In summary, there is minimal potential for exposure to friction modifiers to the consumer.

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