Friction Modifiers

Introduction

At Chevron Oronite, we foster a culture grounded in operational excellence and are conscientiously 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 which are used as additives in lubricating oils for internal combustion engines and transmissions. They are a key component of modern engine oils, and while they represent only a small fraction of the total engine oil, they play a vital role by reducing friction in key metal-metal contact points in engines and transmissions. In addition to boosting fuel economy by reducing friction, they can also prevent metal scoring, reduce engine wear and noise, and help to prevent micropitting of metal surfaces when used in industrial gear lubricants.

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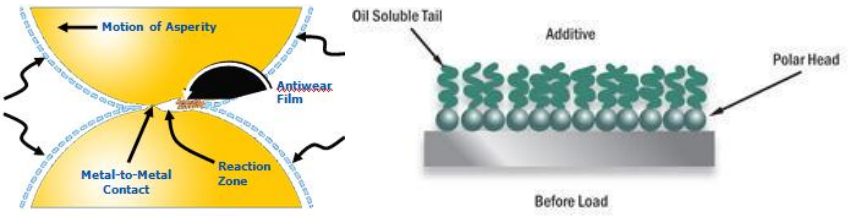

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Figure 1. How Friction Modifiers Behave in an Engine

Description and Properties

Friction modifiers typically have a water-soluble end (head) and an oil-soluble end (tail).When used as a lubricant additive, the water-soluble end of the molecule finds a metal surface and attaches itself. This provides a sacrificial liquid coating on the metal which serves to minimize friction as a result of metal to metal contact; a sacrificial coating indicates that the friction modifier 'sacrifices' itself to the friction, thereby reducing the effect of the friction on the metal surface. Usually manufactured as yellow liquids, friction modifiers are not soluble in water and will float in an aquatic environment.

Health Information

Studies conducted on friction modifiers demonstrate that acute exposure to these substances are relatively low in toxicity by the dermal, oral, and inhalation routes of exposure. Test data highlight that friction modifiers do not cause eye irritation or cause sensitization of the skin.

Prolonged dermal exposure to friction modifiers may cause dermal irritation but these materials are not expected to cause any adverse prolonged effects. Friction modifiers may cause respiratory irritation after prolonged and repeated inhalation.

Test data demonstrate that friction modifiers have low potential to be toxic to the genetic material in cells and do not present a significant risk of causing cancer in humans.

Environmental Information

Studies conducted on aquatic organisms indicate that friction modifiers have a low order of aquatic toxicity. Friction modifiers are expected to persist in the environment due to limited biodegradability.

The Material Safety Data Sheets (MSDS) provided with these products contain suggested spill response and clean-up procedures. As appropriate (or required), report spills to local authorities. In the USA, the National Response Center can be reached at 1-800-424-8802 and CHEMTREC® at 1-800-424-9300.

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 Material Safety Data Sheet (MSDS) or contact us.

Exposure Potential

The low volatility and low water solubility of friction modifiers limits the potential for exposure, and therefore risk, to people in the workplace and consumers. Indirect exposure to these chemicals via the environment is likely to be negligible. Also, exposure to these substances outside of the workplace is likely to be low because they comprise only a fraction of the final lubricant oil products.

Manufacturing of friction modifiers generally occurs in dedicated closed systems with proper engineering controls, thereby minimizing the potential for exposure. Solid waste is either incinerated or recycled and therefore there is no significant potential for release to the environment. Waste water is treated before release to a sewer or other appropriate system. Workers in manufacturing plants, including those in sample analysis, blending, maintenance, and cleaning are well trained in their particular operations and wear appropriate personal protection equipment, e.g. safety glasses and chemical resistant gloves.

Professional mechanics, service station attendants, and other skilled workers that are frequently involved with oil changes use personal protective equipment and hygiene practices that reduce the potential for exposure to lubricant oils. Consumers have potential for exposure to small amounts of these substances due to the possibility of skin contact

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with fresh lubricant oils that can occur during crankcase oil changes or periodic oil "top off". There may also be infrequent, trivial inhalation exposure to aerosols/vapor if "top-off" is conducted before the engine has cooled. However, "do-it-yourself" consumer exposure is likely to be relatively infrequent. In summary, there is minimal potential for exposure to friction modifiers to the consumer commercial settings.

Responsible Care® Contact Information

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This summary is based on information as of January 2013.