

Product stewardship summary: Zinc Dialkydithiophosphates



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.

Zinc Dialkyldithiophosphates (ZDTP) are used as additives in lubricating oils for internal combustion engines and transmissions. ZDTP are a key component of modern engine oils, providing wear protection. Additionally, ZDTP provide oxidation protection. The combined results of these properties are extended engine and transmission life.

ZDTP prevent engine wear by interacting with metal oxides on the metal surface, creating a protective metal sulfide film. This soft film acts as a protective layer to engine parts and helps prevent wear of the harder metal surface. This process is described in Figure 1 below.

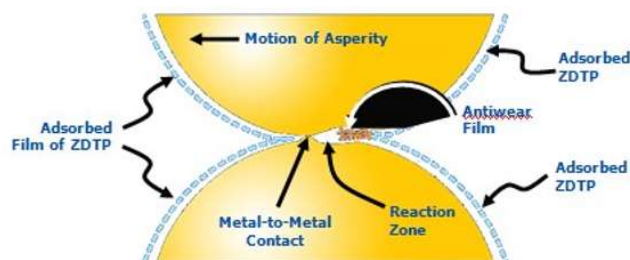


Figure 1. Creation of the protective wear film.

Description and Properties

ZDTP appear as gold-colored liquids with a viscosity like heavy syrup. They are readily soluble in oil and lighter weight hydrocarbons such as gasoline. ZDTP have very low vapor pressure and little noticeable odor at ambient temperatures. Upon heating, a sulfurous odor can be detected, like that of burning rubber. Since ZDTP manufacturing generally occurs in dedicated closed systems with proper engineering controls, and ZDTP are present in small amounts in lubricating oils, this odor is not noticeable during normal operation.

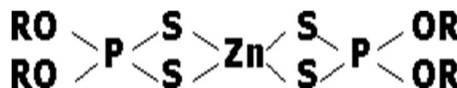


Figure 2: Generic structure of ZDTP.

Health Information

Studies of ZDTP by the dermal and oral routes of exposure indicate that these substances are low in acute toxicity by both routes of exposure. Clinical signs of toxicity were relatively minor, and in many cases the effects disappeared after exposure was stopped.

Studies indicate that ZDTP are strong skin, eye and mucosal irritants, and have demonstrated that ZDTP can cause irreversible eye damage. Repeated exposures to high doses of ZDTP via oral or dermal routes of exposure results in toxic effects that are related to the strong irritancy of the ZDTP.

Repeated dermal exposure can cause dermatitis and body weight loss. Repeated oral exposures can cause gastrointestinal irritation, inflammation, body weight loss and diarrhea.

Studies demonstrate that these substances have low potential to be toxic to genetic material in cells and do not present a significant risk for mutagenicity or carcinogenicity in humans. Studies, as well as human epidemiological evaluations, provide no evidence of direct effects of repeated doses of ZDTP on reproductive systems or indices; however, impurities that remain from the manufacture of some ZDTP may impose other hazards, including reproductive hazard classification.

Environmental Information

Based on test data, ZDTP are not readily biodegradable and may cause long-term adverse effects in the aquatic environment. ZDTP are not acutely toxic to aquatic organisms. These substances are not expected to inhibit wastewater treatment plant microorganisms at typical discharge rates.

In the event of a spill of a product containing ZDTP, 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 ZDTP or products containing them. These requirements may vary by jurisdiction. For more information, consult the relevant Safety Data Sheet.

Exposure Potential

Manufacturing of ZDTP 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 who conduct 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 ZDTP to the consumer.

Responsible Care Contact Information

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