

## PRODUCT STEWARDSHIP SUMMARY

**ENGINE OILS COMPONENTRY – ZINC DIALKYL DITHIOPHOSPHATE (ZDDP)****Introduction**

Afton's additives are designed to protect various engine types. This is necessary to meet the needs required of our customers. Afton employs expert understanding of our chemistries, technologies and the lubricant additives market. Our 125+ year experience has brought us to our ultimate goal which is customer intimacy using our passion for solutions. Afton is able to provide a wide array of products and technologies to meet the needs of our customers.

**Uses and Advantages**

ZDDPs are used by companies within the lubricant industry that manufacture lubricants and greases including engine oils. Afton's products containing ZDDP cover many uses including heavy duty diesel engines, medium speed diesel engines, passenger car motor oils and many other technologies. The advantages provided by ZDDP in our products include:

- Oxidation control
- Corrosion control
- Increased engine oil life
- Sludge reduction
- Prevention of deposit and contaminant build-up
- Rust prevention
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**Health Effects**

ZDDPs have undergone significant testing both by Afton as well as through the United States Environmental Protection Agency's High Production Volume Program (US EPA HPV) to determine health and environmental effects. The primary health hazards of ZDDPs include skin and eye irritation and/or corrosion. However, based on test data obtained by Afton, specific concentration limits are used to determine the final product classification under the Globally Harmonized System of Classification and Labeling (GHS). ZDDPs are of low concern for acute oral, dermal, or inhalation toxicity. ZDDPs may cause some effects after repeated oral dosing at high levels, primarily due to the irritating nature of the group of substances. Based on available data, ZDDPs are not expected to cause reproductive, developmental, mutagenic or carcinogenic effects.

**Environmental Effects**

A large number of studies have been conducted on ZDDP additives in aquatic vertebrate and invertebrate species. Based on environmental fate and Eco toxicological data for daphnids, fish and algae, ZDDPs are considered harmful or toxic to aquatic life with long lasting effects, and are not readily biodegradable.

## Exposure

Typically, worker exposure is managed with the following:

### Industrial use:

- Exhaust ventilation or other engineering controls to keep the airborne concentrations of mists below their respective threshold limit value
- Safety glasses with side shields
- Appropriate respiratory protection
- Chemical resistant gloves (Nitrile gloves of minimum thickness 0.4 mm)
- Disposable outer garments when there is a risk of contact with the material
- Training is provided to workers to ensure they are adequately informed of the need to minimize exposure and how to prevent exposure based on treat rate usage.

### Consumer or Commercial Use Exposure:

Engine Oil Fluids can cause adverse health effects through skin contact with fluid or mist and through inhalation. Health problems including irritation of the skin, eyes or respiratory tract can be associated with excessive exposure.

Safety Data Sheets (SDS), treat rate and use information as well as training are provided to workers to ensure they are adequately informed of the need to minimize exposure and how to prevent exposure. Methods of avoiding direct contact with engine oil fluids include wearing chemical resistant gloves, safety goggles and protective outer garments. Appropriate respiratory protection may also be required. Consumers are typically exposed to engine oils when changing and checking oil levels.

## Risk Management

The primary hazards of Engine Oil additives relate to ZDDP. Depending on the product, there may be physical, health, or environmental hazards. The supply chain manages these risks to ensure proper protection for our employees, customers, consumers and the environment. The SDS provides instruction on safe handling practices of Afton products. Engineering controls, work practices, personal precautions and protective equipment (PPE) are required during manufacturing and use.

## Conclusion

The life of your engine depends in no small part on the quality of the oil you put in it; oil is its lifeblood. Your engine oil performs many functions. It stops metal surfaces in your engine from grinding together and tearing themselves apart from friction, and it transfers heat away from the combustion cycle. Engine oil must also be able to hold in suspension all the negative by-products of combustion such as silica and acids. Engine oil minimizes the exposure to oxygen and thus oxidation at higher temperatures. This all can happen under the tremendous heat and pressure in today's engines. Afton is committed to providing its customers with the information they need to responsibly manage any health and environmental risks associated with the intended use of Afton products.

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## For additional information, contact us at:

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