

PRODUCT STEWARDSHIP SUMMARY

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

Afton aims to deliver technologies that allow our customers to achieve a competitive, cost-effective finished fluid formulation that is compatible with industry and OEM specifications. Our products offer a wide range of base oil coverage, competitive viscosity modifiers, pour point depressants, and customizable performance differentiation. Our engine oils help to reduce emissions, improve vehicle performance and fuel economy, and extend engine life. ZDDPs are a core technology used in modern engine oils.

Uses and Advantages

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

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

Health Effects

ZDDPs have undergone significant testing by Afton, through the United States Environmental Protection Agency's High Production Volume Program (US EPA HPV), and as part of the European Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH) program to determine health and environmental effects. The primary health hazards of ZDDPs include skin and eye irritation or corrosion. ZDDPs are a low concern for acute oral, dermal, or inhalation toxicity. Developmental and sub-chronic toxicity testing has recently been completed. Based on available data, Afton's ZDDPs are not expected to cause reproductive, developmental, or carcinogenic effects. ZDDPs are also not expected to cause organ effects following long term exposure.

Environmental Effects

ZDDPs are generally considered toxic to aquatic life with long-lasting effects. ZDDPs may be persistent in the environment. However, ZDDPs are not considered PBT (Persistent, Bioaccumulative, and Toxic) or vPvB (very Persistent very Bioaccumulative).

Exposure

For industrial workers, the most common route of exposure is via skin contact during manufacturing and processing. The extent of exposure can depend on the type of manufacturing system (open or enclosed), adequacy of engineering controls, material handling practices, and use of personal protective equipment. Handling at elevated temperatures or generating vapors or mists can increase inhalation exposure which is otherwise not considered a significant route of exposure.

For professional and consumer use, the primary route of exposure is via skin contact with engine oils, which can occur during fluid changes or when adding oil to vehicles. Inhalation is not generally a concern for professional or consumer use. Exposure to ZDDPs is less in the finished engine oil due to their reduced concentration. Many engine oils are either not classified as hazardous according to the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) or have relatively low hazard classifications compared to the additive package.

Risk Management

Engine Oil Additives containing ZDDP are formulated to meet various performance requirements. The health and environmental risks of these products can vary depending on the product as well as the conditions encountered during their use. Information on the safe handling of these products is provided to users through the safety data sheets. Appropriate engineering, administrative controls (work practices), and personal protective equipment are recommended to control exposures during manufacture and use.

Conclusion

The life of your engine depends on many factors, including the quality of the oil you put in it. 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 oils must also be able to hold all the negative by-products of combustion in suspension. Engine oil minimizes exposure to oxygen and, thus, oxidation at higher temperatures, which can all 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 safety, health, and environmental risks associated with the intended use of Afton products.

For additional information, contact us at:

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