

PRODUCT STEWARDSHIP SUMMARY

DRIVELINE - DISPERSANTS

Introduction

Afton manufactures a range of Succinimide type dispersants for use in formulating lubricants used in many applications. Typically, these dispersants are optimized for the performance attributes demanded by the specific application. In the finished oil these dispersants contribute to performance areas including cleanliness, filtration, oxidation and many other important attributes. They are soluble in a range of base oils which leads to their wide adoption in the lubricant industry. Over the years succinimide dispersants have become a basic core building block for performance additives. Many mechanical devices operate efficiently due to the dispersants' role in lubrication.

Uses and Advantages

Afton Chemical Corporation's portfolio of ashless polybutenyl succinimide dispersants are available as capped, in which the polar polyamine hydrophilic head group is boronated and/or phosphorylated to make it more attractive to the polar sludge particles, or uncapped. The polar head group attaches itself to the sludge particles, while the long non-polar polybutenyl hydrophobic tail allows for solubility in the base oil to keep the sludge in suspension to inhibit carbon and varnish from forming on the metal parts at low to moderate temperatures. The polar head group is attracted to and adsorbed onto the polar metal surfaces to also increase the coefficient of friction, especially in automatic transmission applications, while also promoting clean-gear chemistry. Capped dispersants are also known to improve antiwear performance while adsorbed onto the metal surface by hindering metal-to-metal contact. These dispersants are ashless to avoid introduction of metals into the application that could cause sludge formation. Many dispersants also serve as detergents for gasoline.

Afton Chemical's portfolio of ashless dispersants consistently delivers superior performance in the following ways:

- Promotes clean gear – prevents agglomeration of soot and oxidative/thermal degradation by-products (sludge) of base oil and fuel and suspends the soot and sludge in solution to inhibit formation of carbon and varnish on metal parts, thus prolonging equipment life
- Friction control – raises the coefficient of friction by polar attraction of the head group to the metal surface creating a monolayer that is harder to shear-off than a typical multi-layer friction modifier, thus increasing the coefficient of friction of the fluid
- Minimizes seal degradation – prevents deposits on shafts that could cause wear on seals and thus prevents leakage
- Ashless – does not contain any metallic ash-forming additives that could contribute to wear
- Antiwear – boronated and phosphorylated dispersants protect metal parts from wear

Health Effects

Based on both internal data as well as data generated under the United States Environmental Protection High Production Volume (US EPA HPV) program for the category Succinimide Dispersants, Afton's dispersants are not classified under the Global Harmonization System (GHS). The dispersants are of low acute oral and dermal toxicity, and they are not expected to cause skin and eye irritation or skin sensitization under normal use. Based on a low vapor pressure, they are not expected to present a risk by inhalation. Based on analogs that have been tested, the category of succinimide dispersants is not expected to cause chronic, reproductive, developmental, or neuro toxicity. Based on the available data, the category is not expected to be carcinogenic.

Environmental Effects

Succinimide dispersants have been assessed as a category by the U.S. EPA under the HPV (High Production Volume) Challenge Program. Category members are expected to be quite stable in the environment, due to the lack of biotic or abiotic degradation potential. Their low water solubility and low vapor pressure suggest that succinimide dispersants are likely to partition into the organic fractions in soil or sediment, rather than to water or air. Mobility in soil is expected to be low as is volatilization. Based on the available data, Succinimide dispersants are unlikely to bioaccumulate in the environment and exhibit low toxicity to aquatic organisms at the limits of solubility.

Exposure

The extent of exposure can depend on the type of system (open or enclosed), adequacy of engineering controls, adequacy of fluid management measures and other workplace practices. Methods of avoiding direct contact with dispersants include wearing chemical resistant gloves, boots, safety eyewear, and appropriate respiratory protection as necessary. Adequate exhaust ventilation or other engineering controls should be provided to keep airborne concentrations of fumes, mists and vapors below their respective threshold limit value. Information in the Safety Data Sheet (SDS) should be followed in the event of a spill of a product containing category members.

Risk Management

Dispersants are formulated to meet a wide range of 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 provision of safety data sheets. Appropriate engineering controls, work practices and personal protective equipment are needed to control exposures during manufacture and use.

Conclusion

Succinimide dispersant chemistry at Afton includes a large family of products many of which are highly tailored to specific applications or customer needs. Afton's additives deliver superior performance across driveline applications by reducing end user costs, enhancing reliability and increasing durability of their additives. 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.

For additional information, contact us at:

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