PRODUCT STEWARDSHIP SUMMARY

FUELS - 2-Ethylhexyl Nitrate (2-EHN)

Introduction

Afton Chemical has supplied 2-Ethylhexyl Nitrate (2-EHN) cetane improver for over 50 years. 2-EHN is a clear white to yellow liquid at room temperature and is used mainly to increase the cetane number for Diesel Fuel applications to improve combustion speed.

Uses and Advantages

2-EHN has been used for decades to enhance the quality of diesel and biodiesel fuels by raising the cetane number. This additive may be used to improve ignition quality for reduced noise, reduce emissions, provide better cold starting, and improve fuel economy. Cetane Improver is recognized as a US EPA “Verified Retrofit Technology” for NOx Reduction. In addition to reducing NOx, the use of Cetane Improver causes a reduction in other diesel pollutants such as carbon monoxide, hydrocarbons, and particulate matter.

Health Effects

2-EHN has undergone significant testing through the United States Environmental Protection High Production Volume (HPV) program, and as part of the European Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH) program to determine the health and environmental effects. 2-EHN has low acute oral, dermal, and inhalation toxicity when tested in animals. However, ingestion, dermal absorption, or inhalation of 2-EHN can result in the enlargement of the blood vessels causing reduced blood pressure, known as vasodilation. Therefore, 2-EHN is classified as harmful if swallowed, in contact with the skin, or inhaled. 2-EHN is not considered a skin or eye irritant, nor is it considered a skin sensitizer. Exposure to 2-EHN at high doses or over extended time periods may cause developmental effects. Based on the available data, 2-EHN is not expected to cause mutagenic or carcinogenic effects.

Environmental Effects

2-EHN has been studied in vertebrates and invertebrate species, where some toxicity was seen. The substance is classified as very toxic to aquatic life, with long-lasting effects. 2-EHN is not readily biodegradable. However, it is not bioaccumulative and therefore is not considered PBT (Persistent, Bioaccumulative, and Toxic) or vPvB (very Persistent very Bioaccumulative). If released into the environment, 2-EHN is expected to partition to soil or suspended sediment in water. It may also be subject to hydrolysis and is likely to volatilize from water and soil surfaces.

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 the significance of inhalation exposure.

Consumers are most commonly exposed to this substance when they purchase treated diesel fuel. As such, consumers are only potentially exposed to very low (ppm) levels through skin contact with the treated diesel fuel. Many diesel fuel additives, such as 2-EHN, are targeted for the commercial sector, including heavy-duty diesel trucks, agriculture tractors, and mining equipment. The workers in this sector can be exposed both to the additive as well as to the treated diesel fuel.

Risk Management

2-EHN is combustible in both liquid and vapor forms. It undergoes a self-accelerating decomposition reaction if heated above 100ºC (212ºF). For this reason, Cetane improver requires special care in handling. Afton provides a safe handling manual and technical assistance to customers of 2-EHN to ensure its safe handling.

The health and environmental risks of this substance can vary depending on the conditions of use. Information on the safe handling of 2-EHN is provided to users through the safety data sheets in addition to the safe handling manual. Appropriate engineering, administrative controls (work practices), and personal protective equipment are recommended to control exposures during manufacture and use, as well as to manage the risk associated with the flammability of these products.

Conclusion

In conclusion, the use of 2-EHN allows upgrading diesel to support marketing claims and optimization of refinery economics. The company strives to provide the technical expertise for obtaining the greatest value from the use of 2-EHN. 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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