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Product Stewardship Summary Specialty Organosulfur Products

The product stewardship summary is intended to give general information about the chemical or categories of chemicals addressed. It is not intended to provide an in-depth discussion of all health and safety information. Additional information is available through the applicable Safety Data Sheet (SDS) which should be consulted before use of any chemical. This product stewardship summary does not supplant or replace required regulatory and/or legal communication documents.

Chemical Identity:

The products in the Specialty Organosulfur group are organic compounds with varied sulfur-containing functional groups. They are mostly colorless liquids, except for Sulfolene, which is a crystalline solid. These products tend to have a strong, objectionable, and pungent odor and are typically transported in well-sealed drums and isocontainers. The one exception is Sulfolene, which is a solid and is packaged in plastic lined paper sacks. The ten (10) products included in the Specialty Organosulfur group are listed below.

- BME (2-mercaptoethanol)
- DiHEDS (di-(2-ethylhexyl)disulfide)
- Ethylthioethanol (ETE)
- 2-Hydroxyethyl-*n*-Octyl Sulfide (R-874)
- MMP (methyl 3-mercaptoproprionate)
- Sulfolane Electronic Grade
- Sulfolane-A Anhydrous
- Sulfolane-A Low Color
- Sulfolane-W
- Sulfolene

Category Justification

The Specialty Organosulfur products are sulfur-containing organic compounds. In general, they exhibit some similar physical and chemical characteristics. These products generally tend to have low to moderate volatility, flammability, and combustible characteristics, and are typically not reactive products. They are generally incompatible with oxygen and strong oxidizing agents such as chlorates, nitrates, and peroxides. Products within this group exhibit some similar health and environmental hazards; however, the severity of toxic effects tends to be widely varied.

Product Uses:

The Specialty Organosulfur products are primarily used as solvents or chemical intermediates in wide ranging markets such as use as a chemical intermediate, pharmaceuticals, agriculture, and lubricants. Products in this group are commercially available to industrial customers only, which typically include chemical manufacturing, cleaning, extraction facilities, and agricultural/pharmaceutical product manufacturers.

Physical/Chemical Properties:

The Specialty Organosulfur products are not self-igniting. However, to varying degrees, the Specialty Organosulfur products have the potential to cause fires if they are exposed to an ignition source. The formation of hazardous combustible or decomposition byproducts such as hydrogen sulfide, and sulfur and carbon oxides are possible for these products. Bonding and grounding are recommended to prevent electrostatic hazards. Containers can explode under pressurized conditions. However, it should be noted that these products are typically stable under normal ambient and



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anticipated storage and handling conditions of temperature and pressure. Sulfolene may also form combustible dust concentrations and care should be taken to avoid dust generation.

Health Information:

The Specialty Organosulfur products may be expected to have low to severe acute toxicity. Acute effects on the eye may include mild to severe irritation, corrosive and permanent (irreversible) damage (such as blindness). Dermal contact with some of these products may cause irritation, defatting of the skin, and skin sensitization. Prolonged exposure to high vapor concentrations of some of these products may cause respiratory irritation, central nervous system (CNS) effects, coma, and death. R-874, if ingested, may be aspirated into the lungs, which can result in severe pulmonary injury or can be fatal. The heart and liver are target organs in rats following repeated oral exposure to BME whereas Sulfolane has been shown to cause mild leukopenia based on animal studies. Sulfolane is also a reproductive and developmental toxicant. For the other Specialty Organosulfur products except for BME, animal studies showed low to no potential for reproductive or developmental toxicity. Data are limited to characterize their potential to cause cancer in humans; however, genetic toxicity data were overall negative for the products tested.

Environmental Information:

The environmental hazard potential for the products in the Specialty Organosulfur group is expected to be varied (i.e., range from low to high toxicity). Some of these products are highly toxic to aquatic organisms; hence, care should be taken to avoid releases of these products to sewage, drainage systems, and water bodies. Overall, the available data suggest the bioaccumulation potential of these products is expected to be low. In general, these products are not expected to readily biodegrade except for R-874.

Exposure Potential:

The most likely routes of exposure to the Specialty Organosulfur products are skin and eye contact, and inhalation exposures. The best way to prevent exposure is to work in well-ventilated areas, wear appropriate personal protective equipment (PPE), and follow good personal hygiene practices.

Workplace use:

Potentially exposed populations include: (1) workers who manufacture these products; (2) quality assurance workers who sample and analyze the products to ensure that they meet specifications; (3) workers involved in distribution and storage of these products; and (4) commercial consumers, in occupational settings, that use these products in intended applications. The most likely routes of exposure to these products in an occupational setting are skin and eye contact, and inhalation exposures. The probability of exposure to workers is expected to be low because these products are manufactured in enclosed, controlled environments, and are transported in tightly sealed containers. These products are sold to industrial customers who are familiar with their intended applications, safe handling, storage, and disposal requirements. Manufacturing, quality assurance and transportation workers should adhere to safe handling practices and wear appropriate personal protective equipment (PPE), and have access to exposure prevention measures (e.g., engineering controls). Customers should also use appropriate PPE during handling and have risk mitigation measures in place to address potential physical hazards or accidental releases.

Consumer use:

Potential exposure or health impacts to the general public is not anticipated. These products are sold by Chevron Phillips Chemical to industry users knowledgeable in the safe handling and use of these products. In the event of a fire, inhalation of hazardous combustion byproducts could be a potential concern for nearby residents.

Potential Environmental Release:



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There may be some potential for significant exposure to the environment from accidental releases during transportation of drums, truck trailers, or container ships; however, the frequency of distribution incidents involving accidental release of these products has been low, and reported volumes spilled have been minimal. Small quantities are shipped for laboratory quality and performance testing. Those performing the tests understand the hazards and adhere to the safe handling practices as explained above. Chevron Phillips Chemical is committed to operating in an environmentally responsible manner and participates in the American Chemistry Council's Responsible Care® program.

Risk Management

Chevron Phillips Chemical is committed to Product Stewardship and doing business responsibly. We endeavor to provide sufficient information for the safe use and handling of all our products. We make product information available to all of our customers, distributors, carriers, and users of these products which contain detail about the properties of each product. To that end, a Safety Data Sheet and a certificate of analysis accompanies each shipment from our manufacturing plant or warehouse.

Before using these products, the user is cautioned to make its own determination and assessment of the safety and suitability of the product for the specific use in question. It is the ultimate responsibility of the user to ensure suitability for use and determine if this information is applicable to the user's specific application. Chevron Phillips Chemical does not make, and expressly disclaims, all warranties, including warranties of merchantability or fitness for a particular purpose, regardless of whether oral or written, express or implied, or allegedly arising from any usage of any trade or from any course of dealing in connection with the use of the information contained herein or any product itself. The user expressly assumes all risk and liability, whether based in contract, tort or otherwise, in connection with the use of the information contained herein or any product itself.

Regulatory Information:

Regulations exist that govern the manufacture, sale, transportation, use, and disposal of these products. These regulations may vary by city, state, country or geographic region. Additional relevant information may be found by consulting the applicable SDS.

Sources of Additional Information:

Safety Data Sheets (SDS) at <https://www.cpchem.com> or available upon request at SDS@CPChem.com

European Chemical Agency (ECHA) Dissemination portal with information on chemical substances registered under REACH

- <https://echa.europa.eu/information-on-chemicals>

Organization for Economic Cooperation and Development (OECD): eChemPortal web-based search tool

- <https://www.echemportal.org/echemportal/>

U.S. EPA ChemView

- <https://chemview.epa.gov/chemview>

Conclusion:

The Specialty Organosulfur products are classified as hazardous chemicals. Efforts should be taken to minimize exposure to these products by adhering to safe-handling procedures, designated applications and uses, appropriate personal-protective equipment practices, and appropriate labeling, storage, and transportation procedures and requirements.



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The relevant SDS and applicable regulatory guidelines and requirements, including but not limited to Occupational Health and Safety Administration (OSHA) guidelines, should be consulted prior to the use or handling of these products.

Contact Information:

<https://www.cpchem.com/>