



## Product Stewardship Summary C<sub>2</sub>-C<sub>4</sub> ORGANOSULFUR SPECIALTY PRODUCTS

The product stewardship summary is intended to give general information about the chemical or categories of chemicals addressed in this document. It is not intended to provide an in-depth discussion of all health and safety information Related to the chemicals or the products included in this summary. Additional information is available through the applicable Material Safety Data Sheet (MSDS) 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 C<sub>2</sub>-C<sub>4</sub> Organosulfur Specialty Group are low molecular weight compounds with a carbon number of C<sub>2</sub> through C<sub>4</sub>. They are colorless liquids with a strong repulsive or pungent odor. This Product Line is comprised of pure substances or mixtures containing two or more of the pure substances from the following three classes of low molecular weight organosulfur compounds: 1) Mercaptans, which include: Ethyl Mercaptan, n-Propyl Mercaptan, Isopropyl Mercaptan, n-Butyl Mercaptan, Tertiary Butyl Mercaptan , and sec-Butyl Mercaptan; 2) Sulfides, which include: Dimethyl Sulfide; and Methyl Ethyl Sulfide; and 3) Tetrahydrothiophene. The 22 products included in the C<sub>2</sub>-C<sub>4</sub> Organosulfur Specialty Group are listed below.

- Ethyl Mercaptan
- Isopropyl Mercaptan
- n-Butyl Mercaptan
- n-Propyl Mercaptan
- sec-Butyl Mercaptan
- t-Butyl Mercaptan
- Scentinel® A
- Scentinel® T
- Scentinel® TB
- Scentinel® TB5
- Scentinel® C
- Scentinel® E
- Scentinel® F-20
- Scentinel® F-25
- Scentinel® F-35
- Scentinel® N
- Scentinel® O-10
- Scentinel® S-20
- Scentinel® S-35
- Scentinel® S-40
- Scentinel® S-50
- Scentinel® T-50

### Category Justification:

Overall, these products have similar physical and chemical characteristics. They are low molecular weight with moderate to high volatility, vapor pressure, and flammability characteristics, but are not reactive products. In general, the products within this group exhibit similar health and environmental hazards, with varying severity of effects.

### Product Uses:

The C<sub>2</sub>-C<sub>4</sub> Organosulfur products are typically used as agricultural, chemical, and pharmaceutical intermediates, chain transfer agents, and petroleum gas odorants. Products in this group are commercially available to industrial customers only, which typically include Agricultural and Chemical Manufacturers, Pharmaceutical, and Utility Companies.

**Physical/Chemical Properties:**

The C<sub>2</sub>-C<sub>4</sub> Organosulfur Specialty Products are highly flammable liquids and have a high potential to cause fires if they are exposed to an ignitable source. The formation of hazardous combustible or decomposition byproducts, such as, sulfur and carbon oxides is possible. However, these products are typically stable under normal storage and handling conditions (ambient temperature and pressure). These products should be kept in a tightly sealed container, and stored in a cool and well ventilated place, away from ignitable sources such as heat, sparks, open flames, or hot surfaces.

**Health Information:**

Overall, the C<sub>2</sub>-C<sub>4</sub> Organosulfur products may cause low acute toxicity effects in humans, primarily affecting the skin and eyes. Dermal contact with some of these products may cause skin sensitization (an allergic skin reaction), and varying degrees of irritation, ranging from slightly irritating to severe irritating. Acute effects on the eye may include mild to severe irritation. Prolonged exposure to high vapor concentrations may cause respiratory irritation, central nervous system (CNS) effects, including dizziness, headache, nausea, and loss of coordination. Due to their low odor thresholds, prolonged inhalation exposure is not expected to occur frequently; however, continuous exposures to some of these compounds may increase olfactory thresholds (i.e., decrease sense of smell). If ingested, some of these products may cause an aspiration hazard, which can result in severe pulmonary damage (e.g., pneumonitis or inflammation) or may be fatal. These products exhibit a low potential for chronic toxicity effects in humans; however, the kidney, liver, thymus, and spleen have been noted as potential target organs in repeated high dose inhalation animal toxicity studies. Data are currently unavailable to characterize the potential of these products to cause cancer in humans. However, genetic toxicity data were negative for these products, suggesting that they have a low potential to cause cancer. Additionally, available data show no evidence for these products potential to cause reproductive, teratogenic or developmental toxicity effects.

**Environmental Information:**

The environmental hazard potential for the C<sub>2</sub>-C<sub>4</sub> Organosulfur Specialty Products is high. These products may cause acute and chronic toxicity to aquatic life, with effects ranging from harmful to highly toxic. Some of these products may persist in the environment (i.e., they are not expected to be readily biodegradable). However, their low octanol-water partition coefficients (log K<sub>ow</sub>) indicate that they have a low potential to accumulate in aquatic life. Due to the potential of these products to cause significant harm to aquatic environments, care should be taken to avoid releases of these products to sewage, drainage systems, and water bodies. Spillage shall be quickly collected in the event of an accidental release.

**Exposure Potential:**

The most likely routes of exposure to the C<sub>2</sub>-C<sub>4</sub> Organosulfur Specialty Products are skin and eye contact, and inhalation exposures.

*Workplace Use:* The populations that have potential for exposure to these products 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 probability of exposure to workers is expected to be low because these products are manufactured in enclosed controlled environments and are transported in well sealed containers. Due to their low odor thresholds leaks can be detected quickly and prolonged exposures can be avoided. Further, these products are sold to industrial customers that are familiar with their intended applications, safe handling, storage, and disposal requirements. Manufacturing, quality assurance, and transportation workers will likely adhere to safe handling

practices and wear appropriate personal protective equipment (PPE). Additionally, they have access to exposure prevention measures (e.g., engineering controls). Customers are also likely to use appropriate PPE during handling, and to have risk mitigation measures in place to address potential physical hazards or accidental releases.

Consumer Use: Potential exposure or impact to the general public is not anticipated for these products as they are not sold to the general population. The potential for odor complaints from the public is possible if a large scale spill or significant release occurred near a residential setting.

Potential Environmental Release: The potential for significant accidental releases of these products to the environment is possible during transportation of large quantities over long distances via truck trailers, rail cars, or container ship. However, available data show that the frequency of distribution incidents involving significant releases of these products has been minimal. Chevron Phillips Chemical Company LP is committed to operating in an environmentally responsible manner and has adopted the American Chemical Council's Responsible Care<sup>®</sup> initiative.

### **Risk Management:**

Chevron Phillips Chemical Company LP 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 begin by ensuring that all of our customers, distributors, carriers, and users of these products are well informed about the properties of each product. To that end, a Material Safety Data Sheet and a certificate of analysis accompany each shipment from our manufacturing plant. In addition, Hazard and Exposure Risk Characterizations (HERCs) have been completed for the C<sub>2</sub>-C<sub>4</sub> Organosulfur products to evaluate the potential risks associated with their distribution and use. Also, Material Safety Data Sheets and HERC documents are updated as new hazard data is developed. Material Safety Data Sheets are available on-line at [www.cpchem.com](http://www.cpchem.com).

### **Regulatory Information:**

Regulations exist that govern the manufacture, sale, transportation, use, and disposal of these C<sub>2</sub>-C<sub>4</sub> Organosulfur products. These regulations may vary by city, state, country or geographic region and should be consulted before use by customers. Additional relevant information may be found by consulting the applicable product Material Safety Data Sheets.

### **Sources of Additional Information:**

Organization for Economic Co-Operation and Development (OCED) SIDS. 2010. SIDS Initial Assessment Report for SIAM 31. C<sub>2</sub>-C<sub>4</sub> Aliphatic Thiols. April 20-23.  
ChevronPhillips Chemical Company LP (CPChem), 2010. Chemical Safety Report: 2-Methylpropane-2-thiol. Internal Document. September 29.  
CPChem, 2010. Chemical Safety Report: Dimethyl Sulfide. Internal Document. September 14.  
CPChem, 2010. Chemical Safety Report: Ethanethiol. Internal Document. September 28.  
CPChem, 2010. Chemical Safety Report: Isopropyl Mercaptan. Internal Document. September 30.  
CPChem, 2010. Chemical Safety Report: Tetrahydrothiophene. Internal Document. September 21.

**Conclusion:**

The C<sub>2</sub>-C<sub>4</sub> Organosulfur Specialty Products are classified as hazardous chemicals. Effort should be taken to minimize eye, dermal and inhalation exposures to these products by adhering to safe handling procedures, which include using these products for designated applications and uses only, using appropriate personal protective equipment, and following all labeling, storage, and transportation procedures and requirements. The relevant product Material Safety Data Sheets 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:**

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

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