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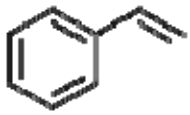
Product Stewardship Summary
Styrene

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

Chemical Identity:
Styrene is a clear, colorless liquid that is a component of materials used to make thousands of everyday products for home, school, work and play. Styrene is one of the most important monomers produced by the chemical industry today.

Chemical Formula: $C_6H_5CH=CH_2$
CAS Number: 100-42-5
Chemical Structure:



Synonyms：ethenylbenzene, styrol, styrolene, cinnamene, phenylethylene, vinylbenzene, cinnamol, phenylethylene, inhibited styrene

Product Uses:
Styrene is a chemical building block that is the backbone of many familiar products, such as food containers, rubber tires, building insulation, carpet backing and reinforced fiberglass composites such as boat hulls, surfboards, residential kitchen countertops, bathtubs and shower enclosures.

Physical/Chemical Properties:
Styrene requires special handling procedures due to its flammability and potential to polymerize spontaneously under specific conditions. To minimize risks, special handling and storage procedures are required.

Health Information:
Styrene is a skin irritant and a potential aspiration hazard. It can cause mild and reversible nervous system effects if workplace exposures are not controlled. Reversible acute central nervous system depression, effects to hearing (ototoxicity) and changes in color perception have been reported at high exposure levels (time-weighted average above 50 ppm). Effects on nasal olfactory tissue in animals exposed repeatedly to 20 ppm or above are the subject of further research in order to understand their relevance to humans. The styrene concentrations that cause neurobehavioral and neurosensory effects are more than 1,000 times higher than the levels usually found in the environment. Repeated styrene exposure caused lung tumors and other lung effects in mice but not in rats; liver toxicity was also seen primarily in mice. Extensive epidemiology studies have not found that styrene causes cancer in humans.

Environmental Information:
Styrene may be toxic to fish and aquatic invertebrates and may range from being toxic to highly toxic in algae. Styrene is not expected to concentrate in biological tissues and is readily volatilized from water and soil and then broken down in air. Styrene that is not volatilized is expected to be biodegraded or adsorbed to soil particles. In soil, persistence is low to medium, depending on soil characteristics. Actual exposure in the environment is routinely significantly lower than levels shown to cause effects. An inadvertent release to water may cause harm to the immediate aquatic environment.

Exposure Potential:
Exposure to styrene in occupational and non-occupational settings is expected to be very limited. Styrene is handled in closed systems and protective equipment is used. Worker exposure is kept to a minimum.

- *Workplace use*: This refers to potential exposure to styrene to persons in a manufacturing facility or through various industrial applications. Manufacturing and transport involving styrene are usually conducted in closed systems and proper personal protective equipment is used during sampling, so human exposure is expected to be very limited.

- *Consumer use*: Consumer uses are considered safe because consumer products contain only trace amounts of styrene. Styrene may be intentionally present in products such as resins for repair purpose for small ships or vessels. Carefully read and follow the instructions given on product labels for proper use.

- *Potential environmental release*: Styrene is stored and transported in closed systems. Exposure to the environment is expected to be very low. Chevron Phillips Chemical is committed to operating in an environmentally responsible manner and has adopted the American Chemistry Council's Responsible Care® initiative.

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. To that end, a SDS and certificate of analysis are provided to customers. In addition, we have completed a product risk assessment to evaluate the potential risks associated with the distribution and use of styrene. We also have available for our business partners an in-depth guide to the safe handling & storage of styrene. Before using this product, the user is advised and cautioned to make his/her 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 manufacturing, sale, transportation, use and/or disposal of styrene. These regulations may vary by city, state, country or geographic region. Additional helpful information may be found by consulting the relevant product SDS and local and federal regulations.

Sources of Additional Information:

- A resource for consumers, employees and communities: http://youknowstyrene.org
- Styrene Information & Research Center (SIRC) website: http://www.styrene.org
- Organization for Economic Cooperation and Development (OECD) – eChemPortal web-based search tool (use applicable CAS No): https://www.echemportal.org/echemportal/ European Aromatics Producers Association – Aromatics: Improving the Quality of Your Life https://www.aromaticsonline.eu/applications
- EU Risk Assessment Report on styrene (2002):
- https://echa.europa.eu/documents/10162/a05e9fc2-eaf7-448e-b9b2-d224d28173c0 U.S. Environmental Protection Agency (USEPA) – Integrated Risk Information System (IRIS): https://cfpub.epa.gov/ncea/iris2/chemicallanding.cfm?substance_nmbr=104
- European Chemicals Agency (ECHA) – Information on Registered Substances: https://echa.europa.eu/information-on-chemicals/registered-substances http://apps.echa.europa.eu/registered/registered-sub.aspx
- Our Aromatics product website: https://www.cpchem.com/what-we-do/solutions/aromatics/products

Conclusion:
Styrene is an important chemical building block used in many of our everyday products. Styrene is flammable and may polymerize spontaneously under specific conditions. Appropriate personal protective equipment practices and labeling, storage and transportation procedures shall be followed. Further, the relevant product SDS and

applicable regulatory guidelines and requirements, including, but not limited to, OSHA guidelines, must be consulted prior to the use or handling of styrene.

Contact Information:
http://www.cpchem.com/

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