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Product Stewardship Summary Ethylene

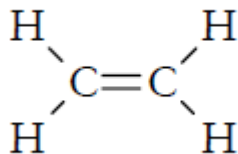
The product stewardship summary is intended to give general information about the chemical or categories of chemicals addressed. It is not intended to provide an in-depth discussion of all health and safety information. Additional information on this chemical is available through the applicable Safety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

Chemical Identity:

Ethylene is a major building block for the chemical industry. It is one of the highest volume chemicals produced globally. Ethylene is produced commercially primarily by two processes. The main process is steam cracking (steam pyrolysis) of paraffinic hydrocarbon feedstocks (ethane, propane, butane, naphtha and gas oil). It is also produced through petroleum refining (separation from refinery gas streams). Ethylene is also produced naturally by emission from vegetation of all types where it functions as a plant hormone.

Chemical Formula: C₂H₄ CAS Number: 74-85-1 Synonyms: Ethene, Ethylene HP (Unodorized), Acetene

Chemical Structure:



Product Uses:

Ethylene is a major chemical intermediate and is primarily used as a polymerized monomer to form polyethylene, the most common plastic in the world. Ethylene is also used to make alpha olefins, styrene, ethyl benzene (used to manufacture styrene monomer), ethylene oxide, ethylene glycols (antifreeze), ethyl alcohol, ethylene dichloride, acetaldehyde, and various other chemicals.

Ethylene is universally used as a building-block chemical. As one of the largest-volume commodity chemicals produced worldwide, it is used to produce plastics, fibers and other organic chemicals in packaging, transportation, construction and other industries.

Physical/Chemical Properties:

Ethylene is a volatile, colorless, non-corrosive, flammable gas with a faint sweet odor at room temperature and pressure. It is a liquid at low temperatures or under high pressure. Ethylene is explosive when exposed to heat, flame or spark.

Health Information:

Ethylene is not acutely toxic. Prolonged or repeated inhalation exposure at low concentrations is not expected to cause adverse health effects. Exposure to high concentrations may cause central nervous system effects and asphyxia (reducing available oxygen for breathing). It is not expected to be an acute skin or eye irritant in the gaseous form, but may produce burns (frostbite) when released from the compressed liquid form. There is no evidence that long-term exposure causes any adverse genetic, developmental, reproductive or carcinogenic effects in humans or animals.

Environmental Information:

Ethylene is not expected to be harmful to aquatic organisms or to bioaccumulate. If introduced into the environment, ethylene will quickly partition to the air where rapid degradation is expected to occur. Any ethylene remaining in water or soil will degrade quickly.

Ethylene is also a natural plant hormone produced continuously by plants. It regulates plant growth and development.

Exposure Potential:

- Workplace use: This refers to potential exposure to ethylene to persons in a manufacturing facility or through various industrial applications. Occupational exposure to ethylene is primarily through inhalation and it is expected to be low. Manufacturing, storage and transport involving ethylene are conducted in closed systems, so human exposure is expected to be very limited. Occupational exposure may occur from failure to follow correct procedures during sampling, when filling cylinders, during cutting gas applications, or due to unexpected leakages resulting from equipment failure.
- Consumer use: There is no direct consumer use of ethylene. Non-occupational exposure to ethylene is expected to be limited to exposure following inadvertent release of the product.
- Potential environmental release: In the case of an accidental release, ethylene is expected to dissipate quickly into the atmosphere. Thus, except for the

flammability/explosivity potential hazards, the impact on human health of an accidental release of ethylene is expected to be minimal. 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. We make product information available to all of our customers, distributors, carriers and users of these products which contains detail about the properties of each product. To that end, a Safety Data Sheet is provided to each customer and ethylene quality is monitored on a consistent basis using on-line analyzers at stations along the ethylene pipeline network. In addition, we have completed a Hazard and Exposure Risk Characterization (HERC) to evaluate the potential risks associated with the distribution and use of ethylene.

Before using this product, the user is advised and 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/or disposal of ethylene. These regulations may vary by city, state, country or geographic region. Additional helpful information may be found by consulting the relevant product Safety Data Sheet and local and federal regulatory rules.

Sources of Additional Information:

- Organization for Economic Cooperation and Development (OECD) - eChemPortal web-based search tool (use applicable CAS No): <http://www.echemportal.org/>
- European Chemicals Agency (ECHA) – Information on Registered Substances: <http://apps.echa.europa.eu/registered/registered-sub.aspx>
- Chevron Phillips Chemical's olefins product website: <https://www.cpchem.com/what-we-do/solutions/olefins/products>

Conclusion:

Ethylene is a major chemical intermediate and used primarily to make other industrial

chemicals or polymers. Ethylene is not acutely toxic. Exposure to high concentrations, which is not expected, may cause central nervous system effects and asphyxia. Exposure to compressed liquid form of ethylene may cause frostbite. Ethylene is extremely flammable. Appropriate personal protective equipment practices and labeling, storage, and transportation procedures shall be followed. Further, the relevant product Safety Data Sheets and applicable regulatory guidelines and requirements, including, but not limited to, Occupational Safety and Health Administration (OSHA) guidelines, should be consulted prior to the use or handling of ethylene product.

Contact Information:

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

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