

Product Safety Summary

Allyl Chloride and Epichlorohydrin

CAS No: 107-05-1 (Allyl chloride)

CAS No: 106-89-8 (Epichlorohydrin)

This Product Safety Summary is intended to provide a general overview of the chemical substance(s). The information in the summary is basic information and is not intended to provide emergency response information, medical information or treatment information. The summary should not be used to provide in-depth safety and health information. In-depth safety and health information can be found in the Material Safety Data Sheet (MSDS) for the chemical substance(s).

Names

Epichlorohydrin

- 1-chloro-2,3-epoxypropane
- 3-chloro-1,2-epoxypropane
- Chloromethyloxirane
- Chloropropylene oxide
- Glycidyl chloride
- EPI

Allyl Chloride

- 3-chloropropene
- 3-chloropropylene
- 3-chloro-1-propene
- 1-chloro-2-propene
- Chloroallylene

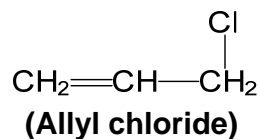
Product Overview

Most allyl chloride is used to manufacture epichlorohydrin, although some is used to manufacture other products such as water treatment chemicals. Epichlorohydrin is used to manufacture products ranging from epoxy resins to flame retardants and water treatment chemicals.

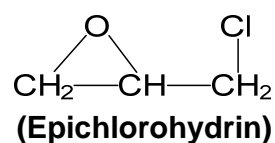
Solvay Chemicals, Inc. does not sell either allyl chloride or epichlorohydrin directly to consumers. Both chemicals are generally used in closed industrial processes; however, workplace exposures can occur. In general, they are consumed in manufacturing processes where they are converted to other compounds. Allyl chloride and Epichlorohydrin can make their way into the environment through unintentional releases (spills) and industrial discharges. Under most environmental conditions, allyl chloride and epichlorohydrin are quickly dissipated and broken down.

Manufacture of Product

Allyl Chloride is typically manufactured by reacting propylene with chlorine.



Epichlorohydrin is typically manufactured by reacting allyl chloride with hypochlorous acid and then a base such as sodium hydroxide. A growing amount of epichlorohydrin, however, is being manufactured by the addition of hydrochloric acid to glycerin.



Product Description

Allyl chloride and epichlorohydrin are clear colorless liquids with pungent, garlic like odors. Allyl chloride is almost completely insoluble in water while epichlorohydrin is moderately soluble in water. Both are flammable (allyl chloride is highly flammable) and can form explosive mixtures in air. Typical properties for allyl chloride and epichlorohydrin are provided in Table 1.

Table 1: Typical physical properties of allyl chloride and epichlorohydrin

	Allyl Chloride	Epichlorohydrin
Boiling Point	113°F (45°C)	239°F (116°C)
Density (68°F)	7.8 lbs/gal	9.8 lbs/gal
Flash Point	-26°F (-32°C)	88°F (31°C)
Auto-ignition Temperature	734°F (390°C)	725°F (385°C)
Vapor Pressure (68°F)	295 mm Hg	13 mm Hg
Vapor Density	2.6 (air = 1.0)	3.2 (air = 1.0)

For additional information concerning allyl chloride and epichlorohydrin properties, please consult the [Material Safety Data Sheet](#).

Product Uses

Most allyl chloride is used to manufacture epichlorohydrin, although some is used to manufacture other compounds. Epichlorohydrin is used to produce epoxy resins, surfactants, flame retardants, water treatment chemicals and a variety of other products. Allyl chloride and epichlorohydrin are only sold to industrial users to make other products. They are not available to consumers.

Exposure Potential

- **Workplace exposure** – Allyl chloride and epichlorohydrin are toxic by ingestion, inhalation or contact with skin and eyes. Exposures can occur at allyl chloride and epichlorohydrin manufacturing facilities or at manufacturing facilities that handle them. Exposure may also occur in the event of a transportation incident. Manufacturing processes or systems where allyl chloride and epichlorohydrin are used are usually “closed” (not exposed to the environment) in order to prevent the evolution of vapor. Persons involved in maintenance, sampling and testing activities, or in the loading and unloading of allyl chloride and epichlorohydrin containers are at greater risk of exposure. Following good industrial hygiene practices will minimize the likelihood of exposure; however, persons involved in higher risk activities should always wear proper personal protective equipment such as impervious gloves and boots, an impervious protective suit, goggles and a hard hat. In instances where the potential for splashes is high, a face shield should also be worn. In instances where the likelihood of exposure to vapor is present, appropriate respiratory protection should be worn.

Please consult the appropriate [Material Safety Data Sheet](#) for more information on allyl chloride and epichlorohydrin exposures and for information concerning exposure limits.

- **Consumer exposure to products containing allyl chloride and epichlorohydrin** – There are no consumer uses for either allyl chloride or epichlorohydrin. Both products are only used in industrial manufacturing facilities as a raw material to make other chemicals. During these reactions, the allyl chloride or epichlorohydrin is converted to other compounds and residuals are either recovered, washed away or decomposed. Consequently, consumer exposure to allyl chloride and epichlorohydrin is highly unlikely.
- **Environmental releases** – Eliminate all potential sources of ignition around any allyl chloride or epichlorohydrin spill. Small spills should be contained and absorbed with earth, sand or a suitable non-combustible absorbent. Larger spills should be diked and isolated from any waterways, sewers, basements, or other confined areas. Persons attempting to clean up spills should wear proper personal protective equipment, including respiratory protection (See guidelines in the [Material Safety Data Sheet](#)). Responders should also use non-sparking tools. Any spilled material and contaminated soils should be recovered and disposed of in compliance with all applicable regulations. Incineration is usually the



preferred method of disposing of allyl chloride or epichlorohydrin. If required, report spills to the appropriate local, state and federal authorities.

- **Fires** - AFFF foam, CO₂, dry chemical, water sprays and water fogs are all acceptable media for extinguishing fires involving allyl chloride or epichlorohydrin. Avoid water streams as these may splash flaming or flammable chemical. Fire fighters should wear self-contained breathing apparatus and protective suits. Containers near a fire should be cooled with water sprays to keep the contents cool and reduce vapor. Vapors are heavier than air and can form explosive mixtures in air. Fumes from combustion or decomposition of allyl chloride or epichlorohydrin may be irritating or toxic. Containers exposed to heat or flame are also at risk of a violent polymerization reaction with attendant risk of explosion and fire.

For additional information concerning allyl chloride and epichlorohydrin emergency response procedures, please consult the [Material Safety Data Sheet](#).

Health Information

Exposures to allyl chloride or epichlorohydrin can produce the following adverse health effects:

- **Contact** – Both allyl chloride and epichlorohydrin may be absorbed through the skin. Skin exposures can cause symptoms ranging from skin irritation to painful burns, blistering and swelling. Eye exposure may result in eye irritation, lachrymation (watery eyes or secretion of tears), redness and eye lesions.
- **Inhalation** - The inhalation of either allyl chloride or epichlorohydrin vapor can cause symptoms ranging from irritation of the respiratory tract to coughing, difficulty breathing, nausea, vomiting and dizziness. Inhalation may also cause feelings of intoxication, restlessness and drowsiness. Higher concentrations, prolonged or repeated exposures may cause pneumonitis (inflammation of the lungs), pulmonary edema (fluid in the lungs), and or systemic intoxication (liver, kidney and/or nervous system damage). Respiratory effects may be delayed.
- **Ingestion** - The ingestion of either allyl chloride or epichlorohydrin may cause severe irritation to the mouth, throat and gastrointestinal system. Other symptoms may include nausea, vomiting, abdominal pain and diarrhea. Risk of convulsions, loss of consciousness, coma and cardiac arrest also exist.
- **Other Effects** - The International Agency for Research on Cancer (IARC) has determined that due to the absence of epidemiological data, no determination could be made on the carcinogenicity of allyl chloride in humans. IARC has also determined there is limited evidence that epichlorohydrin is carcinogenic in humans. Epichlorohydrin may also cause genetic effects and impaired male fertility.

For more information on health effects or for information concerning proper first aid measures, please consult the [Material Safety Data Sheet](#).



Environmental Information

Most allyl chloride and epichlorohydrin are consumed in the manufacturing processes in which they are reacted. Some allyl chloride and epichlorohydrin may make their way into the environment through unintentional releases (spills) and industrial discharges. Under most environmental conditions, allyl chloride and epichlorohydrin are quickly dissipated and broken down. However, both may exert toxic effects before breaking down.

For more ecological and environmental information concerning this product, please consult the [Material Safety Data Sheet](#).

Physical Hazard Information

Allyl chloride is highly flammable and epichlorohydrin is flammable. As such, they are typically stored and handled in closed processes designed to minimize or eliminate potential ignition sources. Please consult chemical compatibility tables before selecting vessels, piping, pumps and other equipment for use in allyl chloride or epichlorohydrin service.

Avoid exposure to water, strong acids and bases, oxidizing agents, alcohols, amines, non-ferrous metals and the salts of those metals. Both allyl chloride and epichlorohydrin may polymerize when exposed to acids, heat or peroxides. Polymerization may be violent, with attendant risk of explosion and fire.

For more information concerning the physical hazards of this product, please consult the [Material Safety Data Sheet](#).

Regulatory Information

Regulations may exist that govern the manufacture, sale, export, import, storage, transportation, use and/or disposal of this chemical. These regulations can vary by city, state, country or geographic region. Information may be found by consulting the relevant [Material Safety Data Sheet](#) specific to your country or region.

Additional Information

- Solvay America, Inc. www.solvaynorthamerica.com
- Solvay Chemicals, Inc. www.solvaychemicals.us
- Solvay Chemicals, Inc. Material Safety Data Sheets
www.solvaychemicals.us/EN/Literature/LiteratureDocuments.aspx
- Contact Solvay Chemicals, Inc. solvaychemicals.us@solvay.com
- NJ Department of Health & Senior Services Hazardous Substance Fact Sheets
<http://web.doh.state.nj.us/rtkhsfs/factsheets.aspx>
- This summary was prepared in January, 2012.

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