

Vinyl Chloride Monomer (VCM)

CAS Number: 75-01-4

Chemical Formula: C₂H₃Cl

Refer to the Material Safety Data Sheet (MSDS) before handling this material.

What is vinyl chloride monomer?

Vinyl chloride monomer, also known as VCM or vinyl chloride, is a colorless, flammable gas with a faint sweet odor. It forms a liquid readily under increased pressure or at reduced temperatures. VCM is used primarily in the production of polyvinyl chloride (PVC) homopolymer and copolymer resins. Georgia Gulf's VCM is produced by cracking of ethylene dichloride at our Lake Charles, LA and Plaquemine, LA facilities.

How is VCM used?

VCM is used primarily as a raw material in industrial operations for the manufacture of polymers, primarily polyvinyl chloride (PVC) and other copolymers. These PVC resins are converted to products for a number of end-use markets. More than half of the total VCM consumption is for construction-related products, with PVC pipe manufacturing being the largest single product. Other products made from PVC resins include:

- Medical – blood and intravenous bags, kidney dialysis and blood transfusion equipment, cardiac catheters, endotracheal tubes, artificial heart valves, and many others
- Automotive – body side moldings, windshield system components, interior upholstery, dashboards, arm rests, floor mats, wire coatings, abrasion coatings, adhesives, and sealants
- Electronics – air conditioners, components, keyboards, phone systems, computers, power tools, electrical cords, refrigerators, fiber optic cable coatings
- Toys – rigid and flexible parts
- Packaging – flexible food wrap, shrink wrap, jar lids and can linings, rigid blister packaging, and bottles

Physical/Chemical Properties

VCM is extremely flammable. At concentrations of about 3.6 percent VCM in air, VCM can be an explosion hazard. Direct contact with open flames or a high energy heat source will result in combustion and corrosive, noxious gases.

VCM will polymerize if exposed to air, elevated temperatures, or other activating substances. Inhibitors are often added to VCM to prevent polymerization during storage. VCM is stable with common metals other than aluminum and aluminum alloys and copper and copper alloys (including brass). When moisture is present, VCM can corrode iron and steel. Avoid VCM contact with moisture, pure oxygen, strong alkalis, alkali metals, open flames and welding arcs, and other high temperature sources which induce thermal decomposition to irritating and corrosive hydrochloric acid.

Properties of Vinyl Chloride Monomer

Boiling Point	7.0°F (-13.9°C)
Freezing Point	-244.8°F (-153.8°C)
Flash Point	-108°F (-77.8°C)
Vapor Pressure, (mm Hg @ 68°F)	2,580
Specific Gravity of liquid, (Water = 1.0)	0.9122
Vapor Density @60°F (air = 1)	2.2

Health and Safety Information

VCM should be used properly so that exposures do not occur. Brief exposure (minutes) to vapor concentrations of VCM may cause serious adverse health effects, even death. Symptoms of excessive exposure may be anesthetic or narcotic effects, dizziness or central nervous system effects.

Because VCM is a vapor at room temperature, the primary route of exposure is by inhalation. VCM is rapidly absorbed following inhalation or oral exposure.

The U.S. Department of Health and Human Services has determined that VCM is a known carcinogen. The International Agency for Research on Cancer has determined that VCM is carcinogenic to people, and the U.S. Environmental Protection Agency has determined that VCM is a human carcinogen.

Exposures to high levels of VCM can also affect the kidneys and lungs, and produce changes in bone, skin, and the vascular system, particularly in the extremities of the body.

VCM did not cause birth defects when tested in rats, mice, or rabbits. Studies in rats show that inhalation produces fetal toxicity only at exposure levels that also produce maternal toxicity.

VCM stored under pressure or at low temperatures can be a liquid. Skin and eye contact with liquid or gaseous VCM can cause frostbite.

People working with this chemical should be properly trained regarding its hazards and its safe use. Before handling, it is important that engineering controls are operating and protective equipment requirements and personal hygiene measures are being followed.

Environmental Information

If released to air, VCM will exist solely as a gas in the ambient atmosphere. It will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 55 hours.

If released to soil, VCM is expected to have high mobility. Volatilization from moist soil surfaces is expected to be an important fate process based on its vapor pressure.

If released into water, VCM is not expected to adsorb to suspended solids and sediment in the water. The biodegradation half-life of vinyl chloride in aerobic and anaerobic waters was reported as 28 and 110 days, respectively. Volatilization from water surfaces is expected to be an important fate process. The estimated volatilization half-lives for a model river and model lake are 1 hour and 3 days, respectively. VCM is practically non-toxic to fish on an acute basis.

Exposure Potential

VCM is used in the production of PVC which is then used to manufacture a number of industrial and consumer products. The most likely ways that exposures could occur are:

- **Workplace Exposure** – Exposure can occur either in a VCM manufacturing facility or in the various industrial or manufacturing facilities that use VCM. Industry uses closed systems in the manufacturing of VCM and in the production of such products as PVC. This reduces environmental releases and lowers worker exposure potential to VCM. In the U.S. there is an Occupational Safety and Health Administration (OSHA) standard, 29 CFR 1910.1017, that contains requirements for personal protective equipment, medical surveillance, and training.

Both OSHA and the American Conference of Governmental Industrial Hygienists (ACGIH) have established occupational airborne exposure limits for VCM. The OSHA Permissible Exposure Limit (PEL) and the ACGIH Threshold Limit Value (TLV) is an 8 hour Time-Weighted Average (TWA) of 1 ppm (part per million).

- **Consumer exposure** – Georgia Gulf does not sell VCM through retail stores.
- **Environmental releases** - In the event of a spill, emphasis should be placed on containing the spill to prevent contamination of soil, surface water, or ground water. If a spill occurs, emergency personnel should wear protective equipment to minimize exposures. The leak should be stopped if it is possible to do so without personal risk. Any ignition sources in the area should be removed immediately. Use only explosion-proof equipment and ground and bond all containers and handling equipment. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Closed spaces must be ventilated before they are entered.

Product Stewardship

Georgia Gulf Corporation is committed to managing Vinyl Chloride so that it can be safely used by its customers. Georgia Gulf's relationships with its customers encourage communication about safety and environmental stewardship.

Georgia Gulf Corporation is staffed and organized to provide advice regarding appropriate corrective actions if an incident should occur.

Conclusion

Although vinyl chloride is a hazardous material that is regulated for public safety, vinyl chloride and its everyday end-use consumer products such as construction materials, medical products, and automotive parts are essential to our health and way of life.

Additional information:

- [Material Safety Data Sheet](#)
- [Agency for Toxic Substances and Disease Registry \(ATSDR\), Toxicological Profile for Vinyl Chloride](#)
- [Hazardous Substances Databank Number 169, Last Revision 20050624](#)
- [OECD SIDS Initial Assessment Report for SIAM 13](#)
- [The Vinyl Institute](#)

Notice

Prior to its use, the user is responsible for determining the suitability of the product or products covered by this Product Stewardship Summary and for complying with all federal, state, and local laws and regulations in connection with its use. Neither Georgia Gulf nor any of its affiliates shall be responsible for any damages of any kind whatsoever resulting from the use of or reliance on this Product Stewardship Summary or product or products to which it refers.

This Product Stewardship Summary is intended only to provide a general summary of the potential hazards associated with the product or products described herein. It is not intended to provide detailed information about potential health effects and safe use and handling information and, although Georgia Gulf believes this information is correct, Georgia Gulf makes no warranties as to its completeness or accuracy. Appropriate literature has been assembled which provides information concerning the health and safety precautions that must be observed when handling the Georgia Gulf product(s) mentioned in this document. Before working with any of these products, users must read and become familiar with the available information on product hazards, proper use, and handling. Information is available in several forms, such as material safety data sheets (MSDS) and product labels. A copy of Georgia Gulf's MSDS for vinyl chloride can be obtained by going to the company's website (www.ggc.com) and clicking "Products."

This information is subject to change without notice.

PRRT Approval:

Legal Approval:

Status: Original

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Contact GGC's RCMS® Team

To contact a member of Georgia Gulf Corporation's Responsible Care® staff, [click here](#).

You can also write us for additional information at:

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