



Methylene Chloride

Chemical Name:

Methylene dichloride – Methylene bichloride - Dichloromethane -Methylene chloride

Chemical Formula: CH₂CL₂

Hazard Symbols:



Physical and Chemical Properties:

Physical State: Liquid

Color: colorless

Odor: ethereal odor - chloroform-like

pH: Not available

Vapor Pressure: 350 mm Hg @ 20 deg C

Viscosity: Not available

Boiling Point: 40 deg C (104.00 °F)

Freezing/Melting Point: -97 deg C (-142.60°F)

Autoignition Temperature: 556 deg C (1,032.80 °F)

Flash Point: Not available

Explosion Limits: Lower: 13 vol %

Explosion Limits: Upper: 23 vol %

Decomposition Temperature: Not available

Solubility in water: Slightly soluble

Specific Gravity/Density: 1.323 g/mol

Molecular Weight: 84.93

Limit:

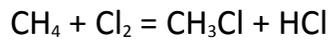
OSHA: 25 ppm; 25 ppm STEL

NIOSH: lowest feasible; carcinogen

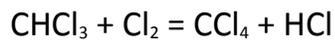
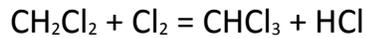
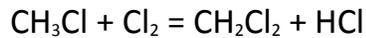
ACGIH: 50 ppm; suspect carcinogen

Production Process:

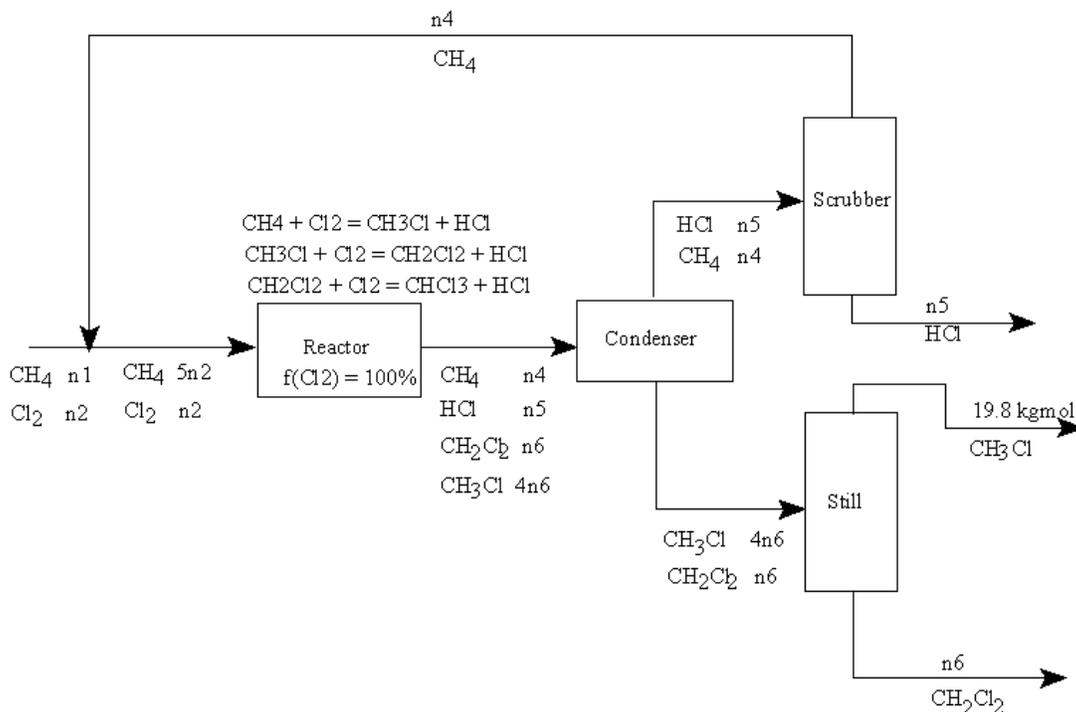
Methane reacts with chlorine to produce methyl chloride and hydrogen chloride,



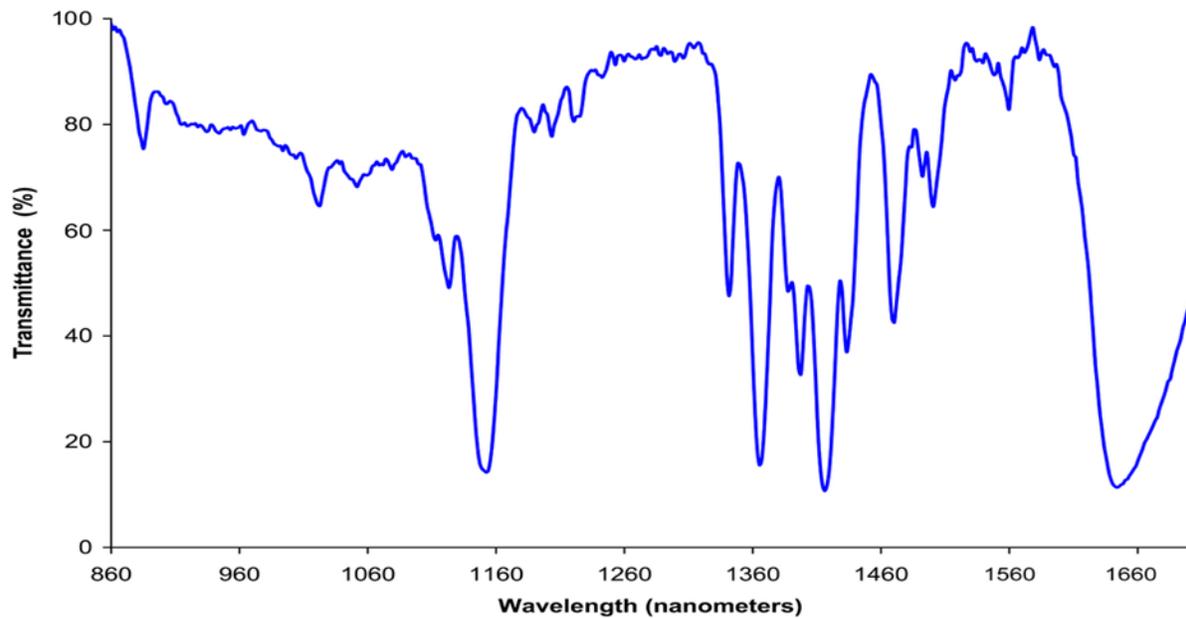
Once formed, the CH_3Cl may undergo further chlorination to form methylene chloride, chloroform, and carbon tetrachloride, via



In a methyl chloride production process, methane and chlorine are fed to a reactor in a mole ratio of 5:1. (The ratio is kept high to minimize polysubstitution). A single-pass conversion of 100% may be assumed. The mole ratio of CH_3Cl to CH_2Cl_2 in the product is 4:1, and negligible amounts of CHCl_3 and CCl_4 are produced. The product gases are cooled, condensing the CH_3Cl and CH_2Cl_2 , which are then separated in a distillation column. The gas leaving the condenser goes to a scrubber in which the HCl is absorbed. The gas leaving the scrubber, which may be considered pure methane, is recycled back to the reactor.



Infrared Spectrum:



Methylene Chloride end use applications:

Methylene chloride is a solvent found in paint and varnish strippers that are used to remove paint or varnish coatings from a variety of surfaces. It is also used in bathtub refinishing. Methylene chloride is most prominently used industrially in the production of paint strippers, pharmaceuticals and process solvents.

Methylene chloride also is used in the following industrial settings:

Food and Beverage Manufacturing

Methylene chloride is used as an extraction solvent in the food and beverage manufacturing industry. For example, methylene chloride can be used to remove caffeine from unroasted coffee beans and tea leaves, to make decaffeinated coffee and tea. Methylene chloride also is used in processing spices, creating hops extract for beer and other flavorings for the food and beverage industries.

Transportation Industry

Methylene chloride can be used to degrease metal surfaces and parts, such as airplane components and railroad tracks and equipment. Lubricating and degreasing products used in automotive products, for example in gasket removal and for prepping metal parts for a new gasket, could contain methylene chloride. Automotive specialists use a vapor methylene chloride degreasing process to remove oils and grease from car transistor parts, diesel motors and aircraft components and spacecraft assemblies. Modern vapor degreasing techniques that rely on methylene chloride enable metal parts in transportation systems to be cleaned quickly and safely.

Medical Applications

In laboratories, methylene chloride is used to extract chemicals from plants or foods for medicine such as steroids, antibiotics and vitamins. Medical equipment can be quickly and efficiently cleaned with methylene chloride cleaners without causing corrosion problems or damage to heat-sensitive parts.

Other Industrial Uses

Methylene chloride is used in the production of photographic films, synthetic fibers, adhesives, inks and printed circuit boards.

Hazards Identification: (Potential Health Effects):

Eye: Contact with eyes may cause severe irritation, and possible eye burns.

Skin: May be absorbed through the skin. Causes irritation with burning pain, itching, and redness. Prolonged exposure may result in skin burns.

Ingestion: Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May cause kidney damage. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. May cause carboxyhemoglobinemia.

Inhalation: Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. Causes respiratory tract irritation. May cause narcotic effects in high concentration. Vapors may cause dizziness or suffocation. May cause blood changes. Overexposure may cause an increase in carboxyhemoglobin levels in the

blood. Can produce delayed pulmonary edema.

Chronic: Possible cancer hazard based on tests with laboratory animals. Prolonged or repeated skin contact may cause dermatitis. May cause reproductive and fetal effects. Laboratory experiments have resulted in mutagenic effects. Chronic exposure may cause lung, liver, and pancreatic tumors. May cause conjunctivitis and/or corneal burns.

First Aid Measures:

Eyes: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

Skin: In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.

Ingestion: If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: Treat symptomatically and supportively.

Fire Fighting Measures:

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Use water spray to keep fire-exposed containers cool. No flash point in conventional closed tester, but forms flammable vapor-air mixtures in larger volumes and may be an explosion hazard in a confined space.

Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or appropriate foam.

Accidental Release Measures:

Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Provide ventilation.

Handling and Storage:

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Keep away from heat, sparks and flame. Use only with adequate ventilation. Avoid breathing vapor or mist.

Storage: Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Store below 40°C. Keep away from active metals.

Exposure Controls, Personal Protection:

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Personal Protective Equipment:

Eyes: Wear chemical splash goggles.

Skin: Viton gloves are recommended.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Stability and Reactivity:

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions. May form explosive mixtures in atmospheres having high oxygen content.

Conditions to Avoid: oxygen content.

Conditions to Avoid: Excess heat, attacks some plastics, rubber, and coatings, confined spaces, when no water is present, dichloromethane is not corrosive to metals. At high temperatures and in the presence of water (causing slow decomposition forming HCl), corrosion of iron, some stainless steels, copper and aluminum can occur.

Incompatibilities with Other Materials: Strong oxidizing agents, strong bases, chemically active metals.

Hazardous Decomposition Products: Hydrogen chloride, phosgene, carbon monoxide, carbon dioxide.

Hazardous Polymerization: Will not occur.

Disposal Considerations: Products considered hazardous for supply are classified as Special Waste and the disposal of such chemicals is covered by regulations which may vary according to location. Contact a specialist disposal company or the local authority or advice. Empty containers must be decontaminated before returning for recycling.