

Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: Methyl chloride (MSDS No. P-4622-F)		Trade Name: Methyl Chloride
Chemical Name: Methyl chloride		Synonyms: Arctic, chloromethane, halocarbon 40, monochloromethane, refrigerant gas R40
Formula: CH ₃ Cl		Chemical Family: Halogenated alkane
Telephone:	Emergencies: 1-800-645-4633* CHEMTREC: 1-800-424-9300* Routine: 1-800-PRAXAIR	Company Name: Praxair, Inc. 39 Old Ridgebury Road Danbury, CT 06810-5113

* Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier, Praxair sales representative, or call 1-800-PRAXAIR (1-800-772-9247).

2. Composition/Information on Ingredients

See section 16 for important information about mixtures.

INGREDIENT	CAS NUMBER	CONCENTRATION	OSHA PEL	ACGIH TLV-TWA (2004)
Methyl chloride	74-87-3	>99%*	100 ppm, 200 ppm (ceiling)** 300 ppm (5 min every 3 hr)	50 ppm (skin)*** 100 ppm, 15 min STEL

* The symbol > means "greater than." **Ceiling values are not time-weighted average.

***The "skin" designation means that absorption through the skin and eyes may contribute significantly to overall exposure.

3. Hazards Identification

EMERGENCY OVERVIEW

DANGER! Flammable liquid and gas under pressure.

Can form explosive mixtures with air.

Harmful if inhaled or absorbed through the skin.

May cause lung, kidney, liver, and central nervous system damage.

May irritate the eyes, skin, and mucous membranes.

May cause frostbite.

Self-contained breathing apparatus and protective clothing must be worn by rescue workers.

Odor: Faintly sweet

THRESHOLD LIMIT VALUE: TLV-TWA, 50 ppm, skin; 100 ppm STEL (ACGIH, 2004). TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations.

EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

INHALATION—Effects may mimic alcohol intoxication. Causes headache, dizziness, drowsiness, tremors, blurred vision, weakness, incoordination, mental confusion, slurred speech, fever, abdominal pain, nausea, vomiting, diarrhea, and loss of feeling in arms and legs. Onset of symptoms may be delayed hours or days. May cause lung, liver, kidney, and central nervous system damage, with paralysis, convulsions, coma, brain damage, and psychological disturbances.

SKIN CONTACT—Liquid may cause local anesthesia (loss of sensation) and frostbite with reddening and blister formation. With prolonged or widespread contact, the skin may absorb potentially harmful amounts of material.

SWALLOWING—An unlikely route of exposure; this product is a gas at normal temperature and pressure. Frostbite of the lips and mouth may result from contact with the liquid.

EYE CONTACT—Liquid may cause freezing of the eye.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE: Repeated inhalation causes injury and symptoms similar to those following acute exposure but slower in onset and with delayed recovery. Damage may be cumulative.

OTHER EFFECTS OF OVEREXPOSURE: None known.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: The toxicology and the physical and chemical properties of methyl chloride suggest that overexposure is unlikely to aggravate existing medical conditions.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION: Methyl chloride has been shown to cause cancer in laboratory animals when rats were repeatedly exposed through stomach intubation. Bacterial tests with the product have produced mutations. There is insufficient evidence to evaluate the carcinogenicity of methyl chloride in humans.

CARCINOGENICITY: The IARC lists methyl chloride as Group 3: Unclassifiable as to carcinogenicity to humans. Methyl chloride is not listed by NTP or OSHA.

4. First Aid Measures

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Keep patient warm. Call a physician.

SKIN CONTACT: For liquid exposure, immediately warm frostbite area with warm water not to exceed 105°F (52.1°C). In case of massive exposure, remove clothing while showering with warm water. Call a physician.

SWALLOWING: An unlikely route of exposure. This product is a gas at normal temperature and pressure.

EYE CONTACT: Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. See a physician, preferably an ophthalmologist, immediately.

NOTES TO PHYSICIAN: *The onset of neurologic and behavioral effects of acute and long-term methyl chloride poisoning is generally insidious. There is no specific antidote; direct treatment to control of*

symptoms and the clinical condition of the patient. Use of sympathomimetics is contraindicated because of the risk of myocardial sensitization.

5. Fire Fighting Measures

FLASH POINT (test method):	Flammable gas.	
AUTOIGNITION TEMPERATURE:	1170°F (632.2°C)	
FLAMMABLE LIMITS IN AIR, % by volume:	LOWER: 8.1%	UPPER: 17.4%
EXTINGUISHING MEDIA: CO ₂ , dry chemical, water spray, or fog		

SPECIAL FIRE FIGHTING PROCEDURES: DANGER! Flammable liquid and gas under pressure. Evacuate all personnel from danger area. Do not approach area without self-contained breathing apparatus and protective clothing. Immediately cool cylinders with water spray from maximum distance, taking care not to extinguish flames. Remove ignition sources if without risk. If flames are accidentally extinguished, explosive reignition may occur. Reverse flow into cylinders may cause rupture. (See section 16.) Stop flow of gas if without risk while continuing cooling water spray. Remove all containers from area of fire if without risk. Allow fire to burn out. On-site fire brigades must comply with OSHA 29 CFR 1910.156.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Heat of fire can build pressure in cylinder and cause it to rupture. No part of cylinder should be subjected to a temperature higher than 125°F (52°C). Methyl chloride cylinders are equipped with a pressure relief device. (Exceptions may exist where authorized by DOT.) If leaking or spilled methyl chloride catches fire, do not extinguish flames. Flammable vapors may spread from leak and could explode if reignited by sparks or flames. Explosive atmospheres may linger. Reignition may occur at locations distant from product handling point. To protect persons from cylinder fragments and toxic fumes should a rupture occur, evacuate the area if the fire cannot be brought under immediate control. Corrosive vapors may spread from spill. Vapors are irritating and may burn skin and eyes on contact. Before entering area, especially confined areas, check with an appropriate device.

HAZARDOUS COMBUSTION PRODUCTS: CO, CO₂, Cl₂, HCl, highly toxic fumes of chlorides, and possible low concentrations of phosgene. (See section 10.)

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: DANGER! Flammable liquid and gas under pressure. May form explosive mixtures with air. Immediately evacuate all personnel from danger area. Do not approach area without self-contained breathing apparatus and protective clothing. Reduce vapors with fog or fine water spray. Reverse flow into cylinder may cause rupture (See section 16). Shut off flow if without risk. Ventilate area or move cylinder to a well-ventilated area. Prevent runoff from contaminating surrounding environment. Flammable vapors may spread from spill. Before entering area, especially a confined area, check atmosphere with an appropriate device.

WASTE DISPOSAL METHOD: Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, state, and local regulations. If necessary, call your local supplier for assistance.

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN STORAGE: Store and use with adequate ventilation. Separate methyl chloride cylinders from oxygen and other oxidizers by at least 20 ft (6.1 m) or use a barricade of noncombustible material. This barricade should be at least 5 ft (1.53 m) high and have a fire resistance rating of at least ½ hour. Firmly secure cylinders upright to keep them from falling or being knocked over. Screw valve protection cap firmly in place by hand. Store only where temperature will not exceed 125°F (52°C). Store full and empty cylinders separately. Use a first-in, first-out inventory system to prevent storing full cylinders for long periods. Post “No Smoking or Open Flames” signs in storage and use areas. There must be no sources of ignition. All electrical equipment in storage areas must be explosion-proof. Storage areas must meet national electric codes for Class 1 hazardous areas.

PRECAUTIONS TO BE TAKEN IN HANDLING: Protect cylinders from damage. Use a suitable hand truck to move cylinders; do not drag, roll, slide, or drop. Electrical equipment must be non-sparking or explosion-proof. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Open valve slowly. If valve is hard to open, discontinue use and contact your supplier. For other precautions in using methyl chloride, see section 16.

For further information on storage, handling, and use of this product, see NFPA 55, *Standard for the Storage, Use, and Handling of Compressed and Liquefied Gases in Portable Cylinders*, published by the National Fire Protection Association.

8. Exposure Controls/Personal Protection

VENTILATION/ENGINEERING CONTROLS:

LOCAL EXHAUST EXHAUST—Use explosion-proof local exhaust ventilation with sufficient air flow to keep the methyl chloride concentration below the TLV in the worker’s breathing zone.

MECHANICAL (general)—Inadequate; see SPECIAL.

SPECIAL—Use only in a closed system. A canopy type of forced-air fume hood equipped with an explosion-proof device may be more desirable for certain applications.

OTHER—See SPECIAL.

RESPIRATORY PROTECTION: Use an air supplied respirator or a full-face, positive-pressure, self-contained breathing apparatus. Respiratory protection must conform to OSHA 29 CFR 1910.134. Select per OSHA 29 CFR 1910.134 and ANSI Z88.2.

PROTECTIVE GLOVES: Use work gloves for cylinder handling; neoprene gloves when changing out cylinders or wherever contact with product is possible.

EYE PROTECTION: Wear safety glasses when handling cylinders; vapor-proof goggles and a face shield during cylinder changeout or wherever contact with product is possible. Select per OSHA 29 CFR 1910.133.

OTHER PROTECTIVE EQUIPMENT: Metatarsal shoes for cylinder handling and protective clothing where needed. Select per OSHA 29 CFR 1910.132 and 1910.133. Regardless of protective equipment, never touch live electrical parts.

9. Physical and Chemical Properties

MOLECULAR WEIGHT:	50.488
SPECIFIC GRAVITY (H ₂ O = 1) at 68°F (20°C):	0.92
SPECIFIC GRAVITY (Air = 1) at 70°F (21.1°C) and 1 atm:	1.743
VAPOR PRESSURE at 68°F (20°C):	73.4 psi (506.1 kPa)
SOLUBILITY IN WATER vol/vol at 68°F (20°C) at 1 atm:	2.2
PERCENT VOLATILES BY VOLUME:	100
EVAPORATION RATE (Butyl Acetate = 1):	High
BOILING POINT at 1 atm:	-11.6°F (-24.22°C)
MELTING POINT at 1 atm:	-143.86°F (-97.7°C)

APPEARANCE, ODOR, AND STATE: Colorless gas at normal temperature and pressure; faintly sweet odor.

10. Stability and Reactivity

STABILITY: Unstable Stable

INCOMPATIBILITY (materials to avoid): Oxidizing agents; aluminum, magnesium, zinc, and their alloys; potassium, sodium, aluminum trichloride, ethylene, moisture, rubber. Reaction with aluminum may form pyrophoric trimethyl aluminum or aluminum alkyls.

HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition or burning may produce CO, CO₂, Cl₂, HCl, and highly toxic fumes of chlorides. Low concentrations of phosgene may also be produced.

HAZARDOUS POLYMERIZATION: May Occur Will Not Occur

CONDITIONS TO AVOID: Temperatures exceeding 752°F (400°C).

11. Toxicological Information

LC₅₀ = 8300 ppm, 1hr, rat. See section 3.

12. Ecological Information

Methyl chloride does not contain any Class I or Class II ozone-depleting chemicals. Methyl chloride is not listed as a marine pollutant by DOT.

13. Disposal Considerations

WASTE DISPOSAL METHOD: Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier.

14. Transport Information

DOT/IMO SHIPPING NAME: Methyl chloride

HAZARD CLASS: 2.1	IDENTIFICATION NUMBER: UN 1063	PRODUCT RQ: 100 lb (45.4 kg)
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SHIPPING LABEL(s): FLAMMABLE GAS

PLACARD (when required): FLAMMABLE GAS

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, nonventilated compartment of a vehicle can present serious safety hazards.

Shipment of compressed gas cylinders that have been filled without the owner's consent is a violation of federal law [49 CFR 173.301(b)].

15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, state, and local regulations.

U.S. FEDERAL REGULATIONS:

EPA (ENVIRONMENTAL PROTECTION AGENCY)

CERCLA: COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (40 CFR Parts 117 and 302):

Reportable Quantity (RQ): 100 lb (45.4 kg)

SARA: SUPERFUND AMENDMENT AND REAUTHORIZATION ACT:

SECTIONS 302/304: Require emergency planning based on Threshold Planning Quantity (TPQ) and release reporting based on Reportable Quantities (RQ) of Extremely Hazardous Substances (EHS) (40 CFR Part 355):

TPQ: None

EHS RQ: None

SECTIONS 311/312: Require submission of MSDSs and reporting of chemical inventories with identification of EPA hazard categories. The hazard categories for this product are as follows:

IMMEDIATE: Yes

PRESSURE: Yes

DELAYED: Yes

REACTIVITY: No

FIRE: Yes

SECTION 313: Requires submission of annual reports of release of toxic chemicals that appear in 40 CFR Part 372.

Methyl chloride is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) and 40CFR Part 372.

40 CFR 68: RISK MANAGEMENT PROGRAM FOR CHEMICAL ACCIDENTAL RELEASE PREVENTION: Requires development and implementation of risk management programs at facilities that manufacture, use, store, or otherwise handle regulated substances in quantities that exceed specified thresholds.

Methyl chloride is listed as a regulated substance in quantities of 10,000 lb (4536 kg) or greater.

TSCA: TOXIC SUBSTANCES CONTROL ACT: Methyl chloride is listed on the TSCA inventory.

OSHA: OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION:

29 CFR 1910.119: PROCESS SAFETY MANAGEMENT OF HIGHLY HAZARDOUS CHEMICALS: Requires facilities to develop a process safety management program based on Threshold Quantities (TQ) of highly hazardous chemicals.

Methyl chloride is listed in Appendix A as a highly hazardous chemical in quantities of 15,000 lb (6804 kg) or greater.

STATE REGULATIONS:

CALIFORNIA: Methyl chloride is listed by California under the SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 (Proposition 65).

WARNING: Methyl chloride is a chemical known to the State of California to cause birth defects or other reproductive harm.

(*California Health and Safety Code §25249.5 et seq.*)

PENNSYLVANIA: This product is subject to the PENNSYLVANIA WORKER AND COMMUNITY RIGHT-TO-KNOW ACT (35 P.S. Sections 7301-7320).

16. Other Information

Be sure to read and understand all labels and instructions supplied with all containers of this product.

Flammable liquid and gas under pressure. Do not breathe gas. Do not get vapors or liquid in eyes, on skin, or on clothing. (See section 3.) Have safety showers and eyewash fountains immediately available. Use piping and equipment adequately designed to withstand pressures to be encountered. **May form explosive mixtures with air.** Keep away from heat, sparks, or open flame. Ground all equipment. Use only spark-proof tools and explosion-proof equipment. **Prevent reverse flow.** Reverse flow into cylinder may cause rupture. Use a check valve or other protective device in any line or piping from the cylinder. **Store and use with adequate ventilation at all times.** Use only in a closed system constructed of corrosion-resistant materials. Close valve after each use; keep closed even when empty. **Never work on a pressurized system.** If there is a leak, close the cylinder valve. Blow the system down in an environmentally safe manner in compliance with all federal, state, and local laws; then repair the leak. **Never place a compressed gas cylinder where it may become part of an electrical circuit.**

NOTE: Prior to using any plastics, confirm their compatibility with methyl chloride.

MIXTURES: When you mix two or more gases or liquefied gases, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Remember, gases and liquids have properties that can cause serious injury or death.

HAZARD RATING SYSTEMS:**NFPA RATINGS:**

HEALTH = 2
FLAMMABILITY = 4
INSTABILITY = 1
SPECIAL = None

HMIS RATINGS:

HEALTH = 2*
FLAMMABILITY = 4
PHYSICAL HAZARD = 2

**An asterisk used in conjunction with HMIS health hazard ratings designates a carcinogenic or reproductive hazard.*

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED: CGA-510, 660 (limited standard)

PIN-INDEXED YOKE: Not applicable

ULTRA-HIGH-INTEGRITY CONNECTION: No current assignment

Use the proper CGA connections. **DO NOT USE ADAPTERS.** Additional limited-standard connections may apply. See CGA pamphlet V-1 listed below.

Ask your supplier about free Praxair safety literature as referred to in this MSDS and on the label for this product. Further information about this product can be found in the following pamphlets published by the Compressed Gas Association, Inc. (CGA), 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2923, Telephone (703) 788-2700, <http://www.cganet.com/Publication.asp>.

P-1 *Safe Handling of Compressed Gases in Containers*
V-1 *Compressed Gas Cylinder Valve Inlet and Outlet Connections*
— *Handbook of Compressed Gases, Fourth Edition*

Praxair asks users of this product to study this MSDS and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this MSDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.

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