BOC GASES

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: METHYL CHLORIDE

1. Product and Company Identification

BOC Gases,
Division of,
The BOC Group, Inc.
575 Mountain Avenue
Murray Hill, NJ 07974

TELEPHONE NUMBER: (908) 464-8100
24-HOUR EMERGENCY TELEPHONE NUMBER:
CHEMTREC (800) 424-9300

BOC Gases
Division of
BOC Canada Limited
5975 Falbourne Street, Unit 2
Mississauga, Ontario L5R 3W6

TELEPHONE NUMBER: (905) 501-1700
24-HOUR EMERGENCY TELEPHONE NUMBER:
(905) 501-0802
EMERGENCY RESPONSE PLAN NO: 2-0101

PRODUCT NAME: METHYL CHLORIDE
CHEMICAL NAME: Chloromethane
COMMON NAMES/SYNONYMS: Chloromethane
TDG (Canada) CLASSIFICATION: 2.1
WHMIS CLASSIFICATION: A, D2A, D2B, B1

PREPARED BY: Loss Control (908)464-8100/(905)501-1700
PREPARATION DATE: 6/1/95
REVIEW DATES: 06/18/04

2. Composition, Information on Ingredients

EXPOSURE LIMITS[1]:

INGREDIENT	% VOLUME	PEL-OSHA[2]	TLV-ACGIH[3]	LD_{50} or LC_{50} Route/Species
Chloromethane FORMULA: CH_3Cl CAS: 74-87-3 RTECS #: PA6300000	> 99.5	100 ppm TWA 200 ppm Ceiling 300 ppm (5-min max. peak)	50 ppm TWA 100 ppm STEL Skin	LC_{50}: 8300 ppm (ISO, CGA P-20) (1 H)

[1] Refer to individual state or provincial regulations, as applicable, for limits which may be more stringent than those listed here.
[2] As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)
[3] As stated in the ACGIH 2004 Threshold Limit Values for Chemical Substances and Physical Agents.

OSHA Regulatory Status: This material is classified as hazardous under OSHA regulations.

3. Hazards Identification

EMERGENCY OVERVIEW

Flammable water white liquid or colorless gas with slightly sweet odor. Dangerous fire and explosion hazard. Avoid heat, sparks, and flames. Inhalation of high concentrations of this compound may cause dizziness and interfere with normal heart rhythm. Exposure to this material may result in toxicity to the liver and kidneys. Contact with liquid may cause frostbite or freezing burns. Decomposes into phosgene and other toxic gases under fire conditions. May adversely affect the developing fetus and reproductive system based on data in experimental animals. Contents under pressure. Use and store below 125 °F.

ROUTE OF ENTRY:

Skin Contact	Skin Absorption	Eye Contact	Inhalation	Ingestion
Yes	Yes	Yes	Yes	No

HEALTH EFFECTS:

Exposure Limits	Irritant	Sensitization
Yes	No	No
Teratogen	Reproductive Hazard	Mutagen
Yes	Yes	Yes
Synergistic Effects None Reported		

Carcinogenicity: -- NTP: No IARC: No OSHA: No

EYE EFFECTS: May cause minor irritation. Contact with liquid or rapidly expanding gas near the point of release may cause frostbite.

SKIN EFFECTS: Methyl chloride may be absorbed through the skin in toxic amounts. Contact with liquid or rapidly expanding gas near the point of release may cause frostbite with redness, skin color change to gray or white, and blistering.

INGESTION EFFECTS: Ingestion unlikely.

INHALATION EFFECTS: Moderate exposure may be characterized by eye symptoms, headache, dizziness, or drowsiness. Serious or repeated exposure may result in severe effects on the central nervous system (CNS) causing ataxia, weakness, dizziness, blurred vision, tremors, staggering, difficulty in speech and mental confusion. High concentrations can induce immediate CNS depression, vomiting, nausea, abdominal pain, diarrhea, kidney and liver damage, and death.

Repeated inhalation of concentrations greater than or equal to 500 ppm has adversely affected offspring and the reproductive system in experimental animals.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: May aggravate pre-existing eye, CNS, liver, or kidney disease.

POTENTIAL ENVIRONMENTAL EFFECTS: The toxicity threshold (Cell Multiplication Inhibition Test) in the *Microcystis aeruginosa* (algae) was 550 mg/L. The LC50 in the *Lepomis macrochirus* was 550 ppm/96 H (static bioassay in fresh water @ 23 degrees C).

4. First Aid Measures

EYES: Flush eyes immediately with lukewarm water for at least 15 minutes. A physician should see the patient promptly.

SKIN: Remove contaminated clothing and flush affected areas with lukewarm water. DO NOT USE HOT WATER! If irritation persists or frostbite is suspected, seek medical attention.

INGESTION: Not expected.

INHALATION: PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS AND BE COGNIZANT OF EXTREME FIRE AND EXPLOSION HAZARDS. Conscious persons should be assisted to an uncontaminated area and inhale fresh air. If breathing is difficult, administer oxygen. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area and given artificial resuscitation and supplemental oxygen. Medical assistance should be sought immediately. The physician should be instructed not to use adrenaline as a stimulant in cases of methyl chloride poisoning. Further treatment should be symptomatic and supportive.

5. Fire Fighting Measures

Conditions of Flammability: Flammable		
Flash point: 32 ^{o}F (0 ^{o}C)	Method: Open cup	Autoignition Temperature: 1170 ^{o}F (632 ^{o}C)
LEL(%): 8.1	UEL(%): 17.2	
Hazardous combustion products: Phosgene, Carbon Monoxide, Chloride		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: None		

FIRE AND EXPLOSION HAZARDS: Flammable gas. Vapors are heavier than air and may travel to an ignition source and flash back. Reacts with moisture in air or with water to form hydrochloric acid. If flame is extinguished and flow of gas continues, increase ventilation to prevent explosive mixture formation in low areas or pockets. Cylinder may vent rapidly or rupture violently from pressure when involved in a fire situation.

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical, or water spray.

FIRE FIGHTING INSTRUCTIONS: If possible, stop the flow of gas. Inerting the atmosphere to reduce oxygen levels may extinguish flame, allowing capping of leaking container. Do not attempt this unless specifically trained. Reduce the rate of flow and inject an inert gas, if possible, before completely stopping the flow to prevent flashback. Do not extinguish the fire until the supply is shut off as otherwise an explosive re-ignition may occur. If the fire is extinguished and the flow of gas continues, use increased ventilation to prevent build-up of explosive atmosphere. Use non-sparking tools to close container valves.

Use water spray to cool surrounding containers. Be cautious of a Boiling Liquid Evaporating Vapor Explosion, BLEVE, if flame is impinging on surrounding containers. Direct 500 GPM water stream onto containers above liquid level with remote monitors. Limit the number of personnel in proximity of fire and evacuate surrounding areas in all directions.

Firefighters should wear respiratory protection (SCBA) and full turnout or Bunker gear with additional protective clothing as necessary to avoid exposure to decomposition products. Continue to cool fire-exposed cylinders until well after flames are extinguished.

6. Accidental Release Measures

Immediately extinguish all ignition sources and evacuate all personnel from affected area. No smoking, flames, sparks, or flares in hazard area. Use appropriate protective equipment (See Section 8). Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. Ventilate enclosed areas. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or container valve, contact the appropriate emergency telephone number listed in Section 1 or call your closest BOC location.

7. Handling and Storage

Electrical Classification: Group C 9See NFPA No. 70).
Eliminate sources of ignition.

Most metals corrode with wet methyl chloride. Anhydrous methyl chloride (water content less than a dew point of - 40°F (-40°C) can be handled in carbon or stainless steel, copper and bronze. Gasketing materials should be of Teflon ® or Kel-F ®.

Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. Do not insert any object (i.e.: screwdriver) into valve cap openings as this can damage the valve causing leakage.

Protect containers from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas, emergency exits, and oxidizers. Do not allow the temperature where containers are stored to exceed 125°F (52°C). Containers should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty containers should be segregated. Use a "first in-first out" inventory system to prevent full containers being stored for excessive periods of time. Post "NO SMOKING OR OPEN FLAMES" signs in the storage or use area. There should be no sources of ignition in the storage or use area.

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid form in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.

For additional storage recommendations, consult Compressed Gas Association's Pamphlet P-1.

8. Exposure Controls, Personal Protection

ENGINEERING CONTROLS: Use enclosures and local exhaust ventilation as necessary to limit exposure below the acceptable exposure limits. Exhaust gas should be vented to a gas treatment system. If product is handled routinely where the potential for leaks exists, all electrical equipment must be rated for use in potentially flammable atmospheres. Consult the National Electrical Code for details.

EYE/FACE PROTECTION: Safety goggles or glasses with full faceshield

SKIN PROTECTION: Appropriate protective and chemical-resistant gloves, clothing and splash protection, or fully encapsulating vapor protective clothing to prevent exposure. For materials of construction, consult protective clothing manufacture's specific data. (Viton™ and Saranex™ are generally effective for exposures greater than 8 hours but will not provide protection from frostbite.)

RESPIRATORY PROTECTION: For emergency release and conditions with exposures above the applicable exposure limits use a positive pressure NIOSH approved air-supplying respirator system (SCBA or airline/escape bottle) using a minimum Grade D air.

OTHER/GENERAL PROTECTION: Safety shoes, safety shower, eyewash "fountain", faceshield.

9. Physical and Chemical Properties

PARAMETER	VALUE	UNITS
Physical state (gas, liquid, solid)	: Gas	
Vapor pressure at STP	: 73.4	psia
Vapor density at STP (Air = 1)	: 1.45	
Evaporation point	: Not Available	
Boiling point	: -10.8	^{o}F
	: -23.8	^{o}C
Freezing point	: -143.7	^{o}F
	: -97.6	^{o}C
pH	: Not Available	
Specific gravity	: 0.9159 @ 20 °C	
Oil/water partition coefficient	: Not Available	
Solubility (H_20)	: Very slightly	
Odor threshold	: 10 ppm	
Odor and appearance	: Colorless gas with a slightly sweet odor; liquid is water white.	

10. Stability and Reactivity

STABILITY: Stable at temperatures below 750^{o}F (399^{o}C). Hydrolyzes slowly below 212^{o}F (100^{o}C).

INCOMPATIBLE MATERIALS: Reacts with zinc, its alloys and galvanized iron. Explodes on contact with magnesium. Reacts with aluminum & its alloys to form methylated aluminum compounds which are flammable in air. Reacts explosively with sodium & alkali metals.

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen chloride, carbon monoxide, phosgene, chloride and chlorine.

HAZARDOUS POLYMERIZATION: Will not occur.

11. Toxicological Information

INHALATION: In the body, methyl chloride is hydrolyzed to hydrochloric acid and methyl alcohol, which may cause degenerative changes to the lungs, brain, kidney and liver. Methyl chloride is readily absorbed into the body, but is very slowly given up, resulting in the possibility of latent toxicological effects. In fatal cases, autopsy has shown congestion of the lungs, liver and kidneys.

SKIN AND EYE: May cause minor eye and skin irritation.

OTHER: Repeated exposure to methyl chloride can have neurological effects. Symptoms may include fatigue, mental confusion, headache, blurred vision, incoordination, and personality change.

Repeated animal inhalation exposures of > 500 ppm have been reported to adversely affect the liver and kidneys, cause testicular degenration and development alterations (cardiac malformation).

Reproductive toxicity was observed in male rats following an inhalation exposure (of unknown duration) of 2000 ppm for 6 hours. Developmental defects were observed following inhalation exposure of pregnant female rats to 1500 ppm for 6 hours.

12. Ecological Information

Does not contain Class I or Class II ozone depleting substances. See Section 3 for ecotoxicity information. A calculated BCF of 3 indicates a low potential for bioconcentration in aquatic organisms. Chloromethane is listed under the accident prevention provisions of section 112(r) of the Clean Air Act (CAA) with a threshold quantity (TQ) of 10,000 pounds. It is listed as a CERCLA hazardous substance with a reportable quantity (RQ) of 100 pounds.

13. Disposal Considerations

Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED, WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to BOC Gases or authorized distributor for proper disposal.

14. Transport Information

PARAMETER	United States DOT	Canada TDG
PROPER SHIPPING NAME:	Methyl Chloride or Refrigerant Gas R40	Methyl Chloride or Refrigerant Gas R40
HAZARD CLASS:	2.1	2.1
IDENTIFICATION NUMBER:	UN 1063	UN 1063
SHIPPING LABEL:	FLAMMABLE GAS	FLAMMABLE GAS

Additional Marking Requirement: If net weight of product $\geq$ 100 pounds, the container must be also marked with the letters "RQ".

Additional Shipping Paper Description Requirement: If net weight of product $\geq$ 100 pounds, the shipping papers must be also marked with the letters "RQ".

15. Regulatory Information

SARA TITLE III NOTIFICATIONS AND INFORMATION
SARA TITLE III - HAZARD CLASSES:
Acute Health Hazard
Chronic Health Hazard
Fire Hazard
Sudden Release of Pressure Hazard

SARA TITLE III - SECTION 313 SUPPLIER NOTIFICATION:
This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

CAS NUMBER	INGREDIENT NAME	PERCENT BY VOLUME
74-87-3	CHLOROMETHANE	> 99.5

This information must be included on all MSDSs that are copied and distributed for this material.

U.S. TSCA/Canadian DSL: All ingredients are listed on the U.S. Toxic Substances Control Act (TSCA) inventory or exempt from listing and on the Canadian Domestic Substance List (DSL).

California Proposition 65: This product contains an ingredient known to the State of California to cause birth defects or other reproductive harm.

Canadian Controlled Products Regulations (CPR): This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

16. Other Information

NFPA HAZARD CODES		HMIS HAZARD CODES		RATINGS SYSTEM
Health:	2	Health:	2*	0 = No Hazard
Flammability:	4	Flammability:	4	1 = Slight Hazard
Instability:	1	Physical Hazard:	2	2 = Moderate Hazard
				3 = Serious Hazard
		* Chronic Health Hazard		4 = Severe Hazard

Note: Ratings were assigned in accordance with Compressed Gas Association (CGA) guidelines as published in CGA Pamphlet P-19-2004, *CGA Recommended Hazard Ratings for Compressed Gases, 2nd Edition.*

ACGIH	American Conference of Governmental Industrial Hygienists
DOT	Department of Transportation
IARC	International Agency for Research on Cancer
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
SARA	Superfund Amendments and Reauthorization Act
STEL	Short Term Exposure Limit
TDG	Transportation of Dangerous Goods
TLV	Threshold Limit Value
WHMIS	Workplace Hazardous Materials Information System

Compressed gas cylinders shall not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder which has not been filled by the owner or with his/her (written) consent is a violation of transportation regulations.

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