METHYL CHLORIDE
Material Safety Data Sheet

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	METHYL CHLORIDE
Product Code(s)	G-96
UN-Number	UN1063
Recommended Use	Compressed gas.
Synonyms	Chloromethane
Supplier Address*	Linde Gas North America LLC - Linde Merchant Production Inc. - Linde LLC 575 Mountain Ave. Murray Hill, NJ 07974 Phone: 908-464-8100 www.lindeus.com Linde Gas Puerto Rico, Inc. Las Palmas Village Road No. 869, Street No. 7 Catano, Puerto Rico 00962 Phone: 787-641-7445 www.pr.lindegas.com Linde Canada Limited 5860 Chedworth Way Mississauga, Ontario L5R 0A2 Phone: 905-501-1700 www.lindecanada.com * May include subsidiaries or affiliate companies / divisions. For additional product information contact your local customer service.
Chemical Emergency Phone Number	Chemtrec: 1-800-424-9300 for US / 703-527-3887 outside US

2. HAZARDS IDENTIFICATION

DANGER!

Emergency Overview

Flammable gas
Irritating to eyes
Contact with product may cause frostbite
May cause central nervous system depression
May adversely affect liver and kidney
Contents under pressure
Keep at temperatures below 52°C / 125°F

Appearance Colorless | Physical State Compressed gas. | Odor Sweet

OSHA Regulatory Status	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Potential Health Effects

Principle Routes of Exposure	Inhalation. Skin contact. Eye contact.
Acute Toxicity	
Inhalation	May cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination. High concentrations can induce immediate CNS depression, vomiting, nausea, abdominal pain, diarrhea, kidney and liver damage, and death.
Eyes	Irritating to eyes. Contact with rapidly expanding gas near the point of release may cause frostbite.
Skin	None known. Contact with rapidly expanding gas near the point of release may cause frostbite.
Skin Absorption Hazard	May be harmful if absorbed through skin
Ingestion	Not an expected route of exposure.
Chronic Effects	None known
Aggravated Medical Conditions	Central nervous system. Liver disorders. Kidney disorders.
Environmental Hazard	See Section 12 for additional Ecological Information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS-No	Volume %	Chemical Formula
Methyl chloride	74-87-3	>99	C_4H_8

4. FIRST AID MEASURES

Eye Contact	None required for gas. If frostbite is suspected, flush eyes with cool water for 15 minutes and obtain immediate medical attention.
Skin Contact	None required for gas. For dermal contact or suspected frostbite, remove contaminated clothing and flush affected areas with lukewarm water. DO NOT USE HOT WATER. A physican should see the patient promptly if contact with the product has resulted in blistering of the dermal surface or in deep tissue freezing.
Inhalation	PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF INHALATION OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Conscious inhalation victims should be assisted to an uncontaminated area and inhale fresh air. If breathing is difficult, administer oxygen. Unconscious persons should be moved to an uncontaminated area and, as necessary, given artificial resuscitation and supplemental oxygen. Treatment should be symptomatic and supportive.
Ingestion	None under normal use. Get medical attention if symptoms occur.
Notes to Physician	Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flammable Properties	Flammable. Containers may explode when heated.
Suitable Extinguishing Media	Dry chemical or CO_2. Water spray or fog. DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.
Hazardous Combustion Products	Carbon monoxide. Phosgene. Hydrogen chloride.
Explosion Data	
Sensitivity to Mechanical Impact	None
Sensitivity to Static Discharge	Yes.
Specific Hazards Arising from the Chemical	Reacts with moisture in air or with water to form hydrochloric acid. May form explosive mixtures with air. Continue to cool fire exposed cylinders until flames are extinguished. Cylinders may rupture under extreme heat. Damaged cylinders should be handled only by specialists.
Protective Equipment and Precautions for Firefighters	If possible, stop the flow of gas. Do not extinguish the fire until supply is shut off as otherwise an explosive-ignition may occur. If the fire is extinguished and the flow of gas continues, use increased ventilation to prevent build-up of explosive atmosphere. Ventilation fans must be explosion proof. Use non-sparking tools to close container valves. Isolate spill or leak area for at least 100 meters (330 feet) in all directions. Vapors from liquefied gas are initially heavier than air and spread along ground. Vapors may accumulate in confined areas (basement, tanks, hopper / tank cars, etc.). Vapors may travel to source of ignition and flash back. Use water spray to cool surrounding containers. Be cautious of a Boiling Liquid Evaporating Vapor Explosion, BLEVE, if flame is impinging on surrounding containers. As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA / NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions	ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Evacuate personnel to safe areas. Keep people away from and upwind of spill / leak. All equipment used when handling the product must be grounded. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
Environmental Precautions	Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas. Prevent spreading of vapors through sewers, ventilation systems and confined areas.
Methods for Containment	Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. If leak is in container or container valve, contact the appropriate emergency telephone number in Section 1 or call your closest Linde location.
Methods for Cleaning Up	Return cylinder to Linde or an authorized distributor.

7. HANDLING AND STORAGE

Handling

Ground and bond all lines and equipment associated with product system. All equipment should be non-sparking and explosion proof. Remove all sources of ignition. Ensure adequate ventilation.

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®.

Never attempt to lift a cylinder by its valve protection cap. Protect cylinders from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for short distance, use a cart designed to transport cylinders. Use equipment rated for cylinder pressure. Use backflow preventive device in piping.

Use an adjustable strap wrench to remove over-tight or rusted caps. Never insert an object (e.g. wrench, screwdriver, pry bar,etc.) into valve cap openings. Doing so may damage valve, causing leak to occur. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier.

Never put cylinders into trunks of cars or unventilated areas of passenger vehicles. Never attempt to refill a compressed gas cylinder without the owner's written consent. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit.

Storage

Outside or detached storage is preferred. Protect from physical damage. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling. Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Keep at temperatures below 52°C / 125°F. Full and empty cylinders should be segregrated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time. Always store and handle compressed gas cylinders in accordance with Compressed Gas Association, pamphlet CGA-P1, Safe Handling of Compressed Gases in Containers.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Methyl chloride 74-87-3	STEL: 100 ppm TWA: 50 ppm S*	TWA: 100 ppm (vacated) TWA: 50 ppm (vacated) TWA: 105 mg / m^3 (vacated) STEL: 100 ppm (vacated) STEL: 210 mg / m^3 Ceiling: 200 ppm	IDLH: 2000 ppm

Immediately Dangerous to Life or Health.

Other Exposure Guidelines

Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992).

Engineering Measures

Explosion proof ventilation systems. Showers. Eyewash stations. Exhaust gas should be vented to a gas treatment system.

Ventilation

Use ventilation adequate to keep exposures below recommended exposure limits.

Personal Protective Equipment

Eye / Face Protection

Wear protective eyewear (safety glasses). If splashes are likely to occur, wear: Goggles. Face-shield.

Skin and Body 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 manufacturer's specifications.
Respiratory Protection	
General Use	If exposure limits are exceeded or irritation is experienced, NIOSH / MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.
Emergency Use	Use positive pressure airline respirator with escape cylinder or self contained breathing apparatus for oxygen-deficient atmospheres (<19.5%).
Hygiene Measures	Wear suitable gloves and eye / face protection.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Colorless.	Odor	Sweet.
Odor Threshold	10 ppm	Physical State	Compressed gas
Flash Point	32 °F / 0 °C	Flashpoint Method	Open cup
Autoignition Temperature	632 °C / 1170 °F	Decomposition Temperature	No information available.
Boiling Point / Boiling Range	-23.8 °C / -10.8 °F	Freezing Point	-97.6 °C / -143.7 °F
Molecular Weight	50.49	Water Solubility	Very slight
Evaporation Rate	No information available	Vapor Pressure	73.4 psia (STP)
Vapor Density	1.45 (air = 1)	VOC Content (%)	Not applicable.
Flammability Limits in Air			
Upper	17.2%		
Lower	8.1%		

10. STABILITY AND REACTIVITY

Stability	Stable below 399°C / 750°F. Hydrolyzes below 212°F / 100°C.
Incompatible Products	Reacts with zinc, its alloys and galvanized iron. Explodes on contact with magnesium. Reacts with aluminum and its alloys to form methylated aluminum compounds which are flammable in air. Reacts explosively with sodium and alkali metals.
Conditions to Avoid	Heat, flames and sparks.
Hazardous Decomposition Products	Carbon monoxide (CO). Phosgene.
Hazardous Polymerization	Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

LD50 Oral:	No information available.
LD50 Dermal:	No information available.
LC50 Inhalation:	Per CGA P-20: 8300 ppm / 1 hr (Rat)

Inhalation	In the body, methyl chloride is hydrolyzed to hydrochloric acid and methyl alcohol, which may cause degenerative changes in lung, brain, kidney and liver. Methyl chloride is readily absorbed by the body, but is very slowly eliminated, resulting in the possibility of latent toxicological effects. In fatal cases, autopsies have shown congestion of the lungs, liver and kidneys.
Eye Contact	May cause slight irritation.
Skin Contact	May cause irritation.
Repeated Dose Toxicity	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 >500 ppm have been reported to adversely affect the liver and kidneys, causing testicular degeneration and development alternations (cardiac malformations).

Chronic Toxicity

Chronic Toxicity	None known.
Carcinogenicity	Contains no ingredient listed as a carcinogen.

Chemical Name	ACGIH	IARC	NTP	OSHA
Methyl chloride		Group 3		

Irritation	No information available.
Sensitization	No information available.
Reproductive Toxicity	Reproductive toxicity was observed in male rats following an inhalation exposure (of unknown duration) of 2000 ppm for 6 hours.
Developmental Toxicity	Developmental defects were observed following inhalation exposure of pregnant female rats to 1500 ppm for 6 hours.
Synergistic Materials	None known.
Target Organ Effects	Central nervous system (CNS). Kidney. Liver. Lungs. Reproductive system.

12. ECOLOGICAL INFORMATION

Ecotoxicity

A calculated BCF of 3 indicates a low potential for bioconcentration in aquatic organisms.

Ozone depletion potential; ODP; (R-11 = 1): Does not contain ozone depleting chemical (40 CFR Part 82).

Chemical Name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Methyl chloride		LC50 96 h: = 550 mg/L static (Lepomis macrochirus)		

Chemical Name	Log Pow
Methyl chloride	0.91

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods	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 Linde for proper disposal. This material, as supplied, is a hazardous waste according to federal regulations (40 CFR 261).

14. TRANSPORT INFORMATION

DOT

Proper shipping name	Methyl chloride
Hazard Class	2.1
Subsidiary Class	None
UN-Number	UN1063
Description	UN1063,Methyl chloride,2.1
Additional Marking Requirements:	If net weight of product is greater than or equal to .? lbs., the container must also be marked with the letters "RQ".
Emergency Response Guide Number	115

TDG

Proper Shipping Name	Methyl chloride
Hazard Class	2.1
UN-Number	UN1063
Description	UN1063,METHYL CHLORIDE,2.1

MEX

Proper Shipping Name	Methyl chloride
Hazard Class	2.1
UN-Number	UN1063
Description	UN1063, Methyl chloride,2.1

IATA

UN-Number	UN1063
Proper Shipping Name	Methyl chloride
Hazard Class	2.1
ERG Code	10L
Description	UN1063,Methyl chloride,2.1
Maximum Quantity for Passenger	Forbidden
Maximum Quantity for Cargo Only	100 kg
Limited Quantity	No information available.

IMDG / IMO

Proper Shipping Name	Methyl chloride
Hazard Class	2.1
UN-Number	UN1063
EmS No.	F-D, S-U
Description	UN1063, Methyl chloride,2.1, FP 0C

ADR

Proper Shipping Name	Methyl chloride (Refrigerant gas R 40)

Hazard Class	2.1
UN-Number	UN1063
Classification Code	2F
Description	UN1063, Methyl chloride (Refrigerant gas R 40),2.1

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL	Complies
EINECS / ELINCS	Complies

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL / NDSL - Canadian Domestic Substances List / Non-Domestic Substances List
EINECS / ELINCS - European Inventory of Existing Commercial Chemical Substances / EU List of Notified Chemical Substances

U.S. Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

Chemical Name	CAS-No	SARA 313 - Threshold Values %
Methyl chloride	74-87-3	1.0

SARA 311 / 312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	Yes
Sudden Release of Pressure Hazard	Yes
Reactive Hazard	No

Clean Water Act

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42):

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Methyl chloride		X	X	

Risk and Process Safety Management Programs

This material, as supplied, contains one or more regulated substances with specified thresholds under 40 CFR Part 68 or regulated as a highly hazardous chemical pursuant to the 29 CFR Part 1910.110 with specified thresholds:

Chemical Name	U.S. - CAA (Clean Air Act) - Accidental Release Prevention - Toxic Substances	U.S. - CAA (Clean Air Act) - Accidental Release Prevention - Flammable Substances	U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals
Methyl chloride	10000 lbs		15000 lb

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

This product contains the following substances which are listed hazardous air pollutants (HAPS) under Section 112 of the Clean Air Act:

Chemical Name	CAS-No	HAPS data	VOC Chemicals	Class 1 Ozone Depletors	Class 2 Ozone Depletors

Methyl chloride	74-87-3		Group IV		

CERCLA / SARA

This material, as supplied, contains one or more substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355):

Chemical Name	Hazardous Substances RQs	Extremely Hazardous Substances RQs	TPQ
Methyl chloride	100 lb		

U.S. State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals:

Chemical Name	CAS-No	California Prop. 65
Methyl chloride	74-87-3	Developmental Male Reproductive

U.S. State Right-to-Know Regulations

Chemical Name	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Methyl chloride	X	X	X	X	X

International Regulations

Chemical Name	Carcinogen Status	Exposure Limits
Methyl chloride		Mexico: TWA 50 ppm Mexico: TWA 105 mg / m^3 Mexico: STEL 100 ppm Mexico: STEL 205 mg / m^3

Canada

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

WHMIS Hazard Class
A Compressed gases
B1 Flammable gas
D2B Toxic materials

Chemical Name	NPRI
Methyl chloride	X

Legend
NPRI - National Pollutant Release Inventory

Prepared By	Product Stewardship 23 British American Blvd. Latham, NY 12110 1-800-572-6501
Issuing Date	05-Mar-2010
Revision Date	27-Sep-2013
Revision Number	2
Revision Note	Not applicable.

NFPA	Health Hazard 2	Flammability 4	Stability 1	Physical and Chemical Hazards -
HMIS	Health Hazard 2*	Flammability 4	Physical Hazard 2	Personal Protection -

Note: Ratings were assigned in accordance with Compressed Gas Association (CGA) guidelines as published in CGA Pamphlet P-19-2009, CGA Recommended Hazard Ratings for Compressed Gases, 3rd Edition.

End of Safety Data Sheet