Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name:	Methyl Mercaptan	**Trade Name:**	Methyl Mercaptan
Product Use:	Many.		
Chemical Name:	Methanethiol	**Synonym:**	Thiomethane, mercaptomethane, methyl sulphhydrate
Chemical Formula:	CH_3SH	**Chemical Family:**	Mercaptan
Telephone:	**Emergencies:** * 1-800-363-0042	**Supplier /Manufacture:**	Praxair Canada Inc. 1 City Centre Drive Suite 1200 Mississauga, ON L5B 1M2
		Phone:	905-803-1600
		Fax:	905-803-1682

**Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier or Praxair sales representative.*

2. Composition and Information on Ingredients

INGREDIENTS	% (VOL)	CAS NUMBER	LD_{50} (Species & Routes)	LC_{50} (Rat, 4 hrs.)	TLV-TWA (ACGIH)
Methyl mercaptan	100	74-93-1	Not applicable.	675 ppm	0.5 ppm Ceiling: 10 ppm

3. Hazards Identification

Emergency Overview


DANGER! Toxic, flammable liquid and gas under pressure. May be fatal if inhaled. May form explosive mixtures with air. May cause eye, skin, and respiratory tract burns. May cause liver and kidney damage. Symptoms may be delayed. Self-contained breathing apparatus and protective clothing must be worn by rescue workers.

ROUTES OF EXPOSURE: Inhalation. Swallowing. Skin contact. Eye contact.

THRESHOLD LIMIT VALUE: TLV-TWA Data from 2004 Guide to Occupational Exposure Values (ACGIH). 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: Overexposure may cause irritation tot he eyes and mucous membranes, with headache, dizziness, nausea, vomiting, and possible central nervous depression leading to respiratory failure. May also cause pulmonary edema with liver and kidney damage.

SKIN CONTACT:

Exposure may cause irritation, experienced as redness and possible swelling.

No evidence of adverse effects from available information.

SKIN ABSORPTION:

SWALLOWING:
Not a likely route of exposure. This product is a gas at normal temperature and pressure, but may cause irritation of the mouth and throat.

EYE CONTACT:
May cause moderate conjunctivitis, seen as excess redness and swelling of the eye.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE:
Repeated overexposure of liquid to skin may cause dermatitis.

OTHER EFFECTS OF OVEREXPOSURE:
None known.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:
Inhalation may aggravate asthma and inflammatory or fibrotic pulmonary disease. Because of its irritating properties, this material may aggravate an existing dermatitis.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION:
None.

CARCINOGENICITY:
Not listed as carcinogen by OSHA, NTP or IARC.

4. First Aid Measures

INHALATION:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately. Keep patient warm.

SKIN CONTACT:
Immediately flush affected areas with water for at least 15 minutes while removing contaminated clothing and shoes. Discard clothing and shoes. Call a physician.

SWALLOWING:
This product is a gas at normal temperature and pressure.

EYE CONTACT:
For contact with the liquid, immediately flush eyes throughly with warm 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:
Victims of overexposure by inhalation should be observed for up to 72 hours for delayed onset of pulmonary edema. There is no specific antidote. Treatment of over-exposure should be directed at the control of symptoms and the clinical condition.

5. Fire Fighting Measures

FLAMMABLE :	Yes.	**IF YES, UNDER WHAT CONDITIONS?**	Forms explosive mixtures with air and oxidizing agents.
FLASH POINT (test method)	CLOSED CUP: -17.8°C (0°F). (TCC)	**AUTOIGNITION TEMPERATURE**	Not available.
FLAMMABLE LIMITS IN AIR, % by volume:	**LOWER:** 3.9	**UPPER:**	21.8

EXTINGUISHING MEDIA:
Use media appropriate for surrounding fire. CO2, dry chemical, water spray or fog.

SPECIAL FIRE FIGHTING PROCEDURES:

DANGER! Evacuate all personnel from danger area. Do not approach area without self-contained breathing apparatus and protective clothing. Immediately cool containers with water spray form maximum distance, taking care not to extinguish the flames. Reduce corrosive vapours with water spray or fog. 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.

UNUSUAL FIRE AND EXPLOSION HAZARD:

Toxic, flammable, corrosive gas. Forms explosive mixtures with air and oxidizing agents. Container may rupture due to heat of fire. Do not extinguish flames due to possibility of explosive re-ignition. Flammable and toxic vapours form from this product may travel or be moved by air currents an ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharges, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with approved device. No part of a container should be subjected to temperature higher than 52 C (approximately 125 F). Most containers are provided with a pressure relief device designed to vent contents when they are exposed to elevated temperature. The cylinders are not equipped with pressure relief devices to release pressure. Evacuate the area if the fire cannot be brought under immediate control to protect persons from cylinder rupture and toxic fumes.

HAZARDOUS COMBUSTION PRODUCTS:

These products are carbon oxides (CO, CO2), sulfur oxides (SO2, SO3...).

SENSITIVITY TO IMPACT:

Avoid impact against container.

SENSITIVITY TO STATIC DISCHARGE:

Possible - ground all equipment before use.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

DANGER! DANGER: Toxic, flammable, liquefied gas under pressure. May be fatal if inhaled. Gas connot always be detected by odour. Do not breathe gas. Do not get liquid or vapour in eyes, on skin or clothing. Safety showers and eye wash fountains should be 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, and open flame. Ground all equipment. Only use spark-proof tools and explosion-proof equipment. When returning cylinder, install valve outlet plug tightly. Keep away from oxidizing agents. Reverse flow into cylinder may cause rupture. Use a check valve or other protective apparatus in any line or piping from the cylinder to prevent reverse flow.

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, provincial, 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 flammable cylinders from oxygen, chlorine, and other oxidizers by at least 6 m or use a barricade of non-combustible material. This barricade should be at least 1.5 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. 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. Store only where temperature will not exceed 52 C. Store full and empty cylinders separately. Use a first-in, first-out inventory system to prevent storing full cylinders for long periods.

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. 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, see Section 16.

For additional information on stroage and handling, refer to Compressed Gas Association (CGA) pamphlet P-1, *Safe Handling of Compressed Gases in Containers*, available from the CGA. Refer to Section 16 for the address and phone number along with a list of other available publications.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE:

Toxic, flammable, corrosive liquid and gas under pressure. May be fatal if inhaled. Do not breathe gas. Do not get liquid or vapours in eyes, on skin, or clothing. Safety showers and eyewash fountains should be immediately available. Use only in a closed system constructed of corrosion resistant materials. Use piping and equipment adequately designed to withstand pressures to be encountered. Use only spark-proof tools and explosion-proof equipment. Keep away from heat, sparks, and open flame. ***May form explosive mixtures with air.*** Ground all equipment. Store and use with adequate ventilation at all times. Close valve after each use; keep closed even when empty. ***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. ***When returning cylinder to supplier,*** be sure valve is closed, then install valve outlet plug tightly. ***Never work on a pressurized system.*** If there is a leak, close the cylinder valve. Vent the system down in a safe and environmentally sound manner in compliance with all federal, provincial, and local laws; then repair the leak. ***Never place a compressed gas cylinder where it may become part of an electrical circuit.***

8. Exposure Controls/Personal Protection

VENTILATION/ENGINEERING CONTROLS:

LOCAL EXHAUST:	Inadequate. See SPECIAL.
MECHANICAL (general):	Inadequate. See SPECIAL.
SPECIAL:	Use only in a closed system. Explosion-proof, corrosion resistant, forced draft fume hood is preferred.
OTHER:	Not applicable.

PERSONAL PROTECTION:

RESPIRATORY PROTECTION:	For concentrations up to 10 times the applicable exposure limit any NIOSH/MSHA approved supplied air respirator is recommended. Up to 50 times the TLV, a NIOSH/MSHA approved respirator with a full-face piece or self-contained breathing apparatus is recommended. For higher concentration us only self-contained breathing apparatus operated in the pressure demand mode.
SKIN PROTECTION:	Neoprene gloves.
EYE PROTECTION:	Wear safety glasses when handling cylinders. Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.
OTHER PROTECTIVE EQUIPMENT:	Metatarsal shoes for cylinder handling. Protective clothing where needed. Cuffless trousers should be worn outside the shoes. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines.

9. Physical and Chemical Properties

PHYSICAL STATE:	Gas. (Compressed Gas)	**FREEZING POINT:**	-121°C (-185.8°F)	**pH:**	Not applicable.
BOILING POINT	6.8°C (44.2°F)	**VAPOUR PRESSURE**	2047 kPa (@ 20°C)	**MOLECULAR WEIGHT:**	48.107 g/mole
SPECIFIC GRAVITY: LIQUID (Water = 1)	0.8665 @ 20 C	**SOLUBILITY IN WATER,**	Moderate.		
SPECIFIC GRAVITY: VAPOUR (air = 1)	1.66 @ 20 C	**EVAPORATION RATE** (Butyl Acetate=1):	>1 compared to Butyl acetate.	**COEFFICIENT OF WATER/OIL DISTRIBUTION:**	Not applicable.
VAPOUR DENSITY:	Not available.	**% VOLATILES BY VOLUME:**	100% (v/v).	**ODOUR THRESHOLD:**	4.0 x 10-5 mg/m3

APPEARANCE & ODOUR: Colourless. Odour: Disagreeable.

10. Stability and Reactivity

STABILITY:	The product is stable.
CONDITIONS OF CHEMICAL INSTABILITY:	Ferrous sulfide oxidizes with a red glow in the presence of air and ignites methyl mercaptan vapours.
INCOMPATIBILITY (materials to avoid):	Water, acids, oxidizing agents, copper, mercury, lead, zinc, unsaturated organics, aluminum.
HAZARDOUS DECOMPOSITION PRODUCTS:	Thermal decomposition or burning may produce carbon monoxide/carbon dioxide/sulphur dioxide.
HAZARDOUS POLYMERIZATION:	Will not occur.
CONDITIONS OF REACTIVITY:	None known.

11. Toxicological Information

See section 3.

12. Ecological Information

No adverse ecological effects expected. This product does not contain any Class I or Class II ozone-depleting chemicals. This material is listed as a marine pollutant by TDG Regulations.

13. Disposal Considerations

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

14. Transport Information

TDG/IMO SHIPPING NAME: Methyl Mercaptan

HAZARD CLASS:	IDENTIFICATION #:	PRODUCT RQ:
CLASS 2.3: Poisonous gas. CLASS 2.1: Flammable gas.	UN1064	All

SHIPPING LABEL(s): Poison gas, Flammable gas (subsidiary)

PLACARD (when required): Poison gas, Flammable gas (subsidiary)

SPECIAL SHIPPING INFORMATION:

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

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, provincial, and local regulations.

WHMIS (Canada) CLASS A: Compressed gas.
CLASS B-1: Flammable gas.
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).

International Regulations

EINECS Not available.

DSCL (EEC) R23- Toxic by inhalation.

International Lists No products were found.

16. Other Information

MIXTURES:

When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to 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 make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

HAZARD RATING SYSTEM:

HMIS RATINGS:

HEALTH	2
FLAMMABILITY	4
PHYSICAL HAZARD	0

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED: CGA-330

PIN-INDEXED YOKE: Not available.

ULTRA-HIGH-INTEGRITY CONNECTION: Not available.

Use the proper CGA connections. **DO NOT USE ADAPTERS.** Additional limited-standard connections may apply. See CGA pamphlets V-1 and V-7 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, Fax (703) 961-1831, website: www.cganet.com.

AV-1 Safe Handling and Storage of Compressed Gas
P-1 Safe Handling of Compressed Gases in Containers
V-1 Compressed Gas Cylinder Valve Inlet and Outlet Connections
V-7 Standard Method of Determining Cylinder Valve Outlet Connections for Industrial Gas Mixtures
--- Handbook of Compressed Gases, Fourth Edition

PREPARATION INFORMATION:

DATE: **10/15/2004**
DEPARTMENT: **Safety and Environmental Services**
TELEPHONE: **905-803-1600**

The opinions expressed herein are those of qualified experts within Praxair Canada 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 Canada Inc., it is the user's obligation to determine the conditions of safe use of the product.

Praxair Canada Inc. requests the users of this product to study this Material Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety nformation, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

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