

Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: Propane	Trade Name: Liquefied Petroleum Gas
Product Use: Many.	
Chemical Name: Propane	Synonym: Dimethylmethane, propyl hydride, propylhydride
Chemical Formula: C ₃ H ₈	Chemical Family: Alkane
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. Hazards Identification

Emergency Overview

DANGER! Flammable liquid and gas under pressure. Can form explosive mixtures with air. May cause frostbite. Can cause rapid suffocation. May cause dizziness and drowsiness. Self-contained breathing apparatus may be required by rescue workers. Odour: Faintly disagreeable.

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

THRESHOLD LIMIT VALUE: TLV-TWA Data from 2007 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: Asphyxiant. Effects are due to lack of oxygen. Moderate concentrations may cause headaches, drowsiness, dizziness, excitation, excess salivation, vomiting, and unconsciousness. Lack of oxygen can kill.

SKIN CONTACT: No harm expected from vapour. Liquid may cause frostbite.

SKIN ABSORPTION: No evidence of adverse effects from available information.

SWALLOWING: This product is a gas at normal temperature and pressure. Frostbite of the lips and mouth may result from contact with liquid.

EYE CONTACT: No harm expected from vapour. Liquid may cause frostbite.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE:

No evidence of adverse effects from available information.

WORKING WITH WELDING AND CUTTING MAY CREATE ADDITIONAL HEALTH HAZARDS. FUMES AND GASES can be dangerous to your health and may cause serious lung disease.* Keep your head out of the fumes. Do not breathe fumes and gases caused by the process. Use enough ventilation, local exhaust, or both to keep fumes and gases from your breathing zone and the general area. The type and amount of fumes and gases depend on the equipment and supplies used. Possibly dangerous materials may be found in fluxes, coatings, gases, metals etc. Get a Material Safety Data Sheet (MSDS) for every material used. Air samples can be used to find out what respiratory protection is needed. Short term overexposure to fumes may result in discomfort such as dizziness, nausea, or dryness or irritation of nose, throat, or eyes.

OTHER EFFECTS OF OVEREXPOSURE:

Contact with liquid may cause frostbite. At very high concentrations may produce cardiac arrhythmia or arrest due to sensitization of the heart to adrenalin and nor-adrenalin. Exposure to fluorocarbon thermal decomposition products may produce flu-like symptoms including chills, fever, weakness, muscular aches, headache, chest discomfort, sore throat, and dry cough. Complete recovery usually occurs within 24 hours after exposure.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:

A knowledge of the available toxicology information and of the physical and chemical properties of the material suggests that overexposure is unlikely to aggravate existing medical conditions.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION:

In a study conducted in 1948, dogs breathed varying mixtures of hydrocarbons and oxygen for 10 minutes. Of a group of dogs exposed to propane, all (3 of 3) showed myocardial sensitivity to injected epinephrine hydrochloride as determined by electrocardiogram (EKG) readings. No direct evidence is known of propane-induced cardiac sensitization in humans.

CARCINOGENICITY:

Not listed as carcinogen by OSHA, NTP or IARC.

3. Composition and Information on Ingredients

COMPONENTS	CAS NUMBER	CONCENTRATION % by Mole
Propane	74-98-6	100

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.

SKIN CONTACT:

For exposure to liquid, immediately warm frostbite area with warm water not to exceed 41 C. In case of massive exposure, remove contaminated clothing while showering with warm water. Call a physician.

SWALLOWING:

This product is a gas at normal temperature and pressure. Frostbite of the lips and mouth may result from contact with liquid.

EYE CONTACT:

For contact with the liquid, immediately flush eyes thoroughly 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:

There is no specific antidote. Treatment of over-exposure should be directed at the control of symptoms and the clinical condition. This material may be a cardiac sensitizer, avoid use of epinephrine.

5. Fire Fighting Measures

FLAMMABLE : Yes. **IF YES, UNDER WHAT CONDITIONS?** Forms explosive mixtures with air and oxidizing agents.

EXTINGUISHING MEDIA:

CO₂, dry chemical, water spray or fog.

PRODUCTS OF COMBUSTION:

These products are carbon oxides (CO, CO₂).

PROTECTION OF FIREFIGHTERS:

DANGER! Evacuate all personnel from danger area. Immediately cool cylinders with water spray from maximum distance taking care not to extinguish flames. Remove ignition source if without risk. If flames are accidentally extinguished. Explosive re-ignition may occur; therefore, appropriate measures should be taken; e.g., total evacuation. Reapproach with extreme caution. Use self-contained breathing apparatus. Stop flow of gas if without risk while continuing cooling water spray. Remove all containers from area if without risk. Allow fire to burn out.

SPECIFIC PHYSICAL AND CHEMICAL HAZARDS:

Flammable 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. Vapours form from this product and may travel or be moved by air currents and 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. Most containers are provided with a pressure relief device designed to vent contents when they are exposed to elevated temperature.

SENSITIVITY TO IMPACT:

Avoid impact against container.

SENSITIVITY TO STATIC DISCHARGE:

Possible, ground container.

PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIREFIGHTERS:

Firefighters should wear self-contained breathing apparatus and full fire-fighting turnout gear.

FLAMMABLE LIMITS IN AIR, % by volume:

LOWER: 2.1 **UPPER:** 9.5

FLASH POINT: CLOSED CUP: -104°C (-155.2°F).
(Tag.)

AUTOIGNITION TEMPERATURE: 450°C (842°F)

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

Personal Precautions:

DANGER! Immediately evacuate all personnel from danger area. Forms explosive mixtures with air. Use self-contained breathing apparatus and protective clothing where needed. Remove all sources of ignition if without risk. Reduce vapours with fog or fine water spray. Shut off leak if without risk. Ventilate area of leak or move leaking container to well ventilated area. Flammable vapours may spread from spill. Before entering area, especially confined areas, check atmosphere with appropriate device.

Environmental Precautions:

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 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 storage 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.

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.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE:

Flammable high-pressure gas. Use only in a closed system. 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. **Gas can cause rapid suffocation due to oxygen deficiency.** Store and use with adequate ventilation. 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.**

RECOMMENDED PUBLICATIONS:

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

See also Praxair publication P-14-153, *Guidelines for Handling Gas Cylinders and Containers*. Obtain from your local supplier.

8. Exposure Controls/Personal Protection

INGREDIENTS	CAS NUMBER	LD ₅₀ (Species & Routes)	LC ₅₀ (Rat, 4 hrs.)	Exposure Limits
Propane	74-98-6	Not applicable.	Not available.	1000 ppm

THRESHOLD LIMIT VALUE: TLV-TWA Data from 2007 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.

IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH):**VENTILATION/ENGINEERING CONTROLS:**

LOCAL EXHAUST: An explosion-proof local exhaust system is acceptable. See SPECIAL.

MECHANICAL (General): Inadequate.
See SPECIAL.

SPECIAL: Use only in a closed system.

OTHER: See SPECIAL.

PERSONAL PROTECTION:

RESPIRATORY PROTECTION: Use respirable fume respirator or air supplied respirator when working in confined space or where local exhaust or ventilation does not keep exposure below TLV. Select in accordance with the provincial regulations or guidelines. Selection should also be based on the current CSA standards Z94.4, "Selection, care and use of respirators". Respirators should be approved by NIOSH and MSHA.

SKIN PROTECTION: Wear work gloves when handling cylinders to prevent exposure to liquid. Wear welding gloves for welding.

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
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PHYSICAL STATE: Gas. (Compressed Gas.)	FREEZING POINT: -187.68°C (-305.8°F)	pH: Not applicable.
BOILING POINT: -42.03°C (-43.7°F)	VAPOUR PRESSURE: 852.5 kPa (@ 20°C)	MOLECULAR WEIGHT: 44.097 g/mole
SPECIFIC GRAVITY: LIQUID (Water = 1): 0.59 @ 45 C	SOLUBILITY IN WATER: Negligible.	
SPECIFIC GRAVITY: VAPOUR (air = 1): 1.55	EVAPORATION RATE (Butyl Acetate=1): >1 compared to (Butyl Acetate = 1)	COEFFICIENT OF WATER/OIL DISTRIBUTION: Not applicable.
VAPOUR DENSITY: 1.55	% VOLATILES BY VOLUME: 100% (v/v).	ODOUR THRESHOLD: Not available.

APPEARANCE & ODOUR: Colourless.

Odour: Faintly disagreeable

10. Stability and Reactivity

STABILITY:	The product is stable.
CONDITIONS OF CHEMICAL INSTABILITY:	Not available.
INCOMPATIBILITY (materials to avoid):	Oxidizing agents. Chlorine dioxide.
HAZARDOUS DECOMPOSITION PRODUCTS:	Thermal decomposition or burning may produce carbon monoxide/carbon dioxide.
HAZARDOUS POLYMERIZATION:	Will not occur.
CONDITIONS TO AVOID:	None.
CONDITIONS OF REACTIVITY:	None.

11. Toxicological Information

ACUTE DOSE EFFECTS: Possible cardiac sensitization to epinephrine; see section 2. The welding process may generate hazardous fumes and gases. (See section 2, 10, 15 and 16)

STUDY RESULTS:

None known.

12. Ecological Information

No adverse ecological effects expected. This product does not contain any Class I or Class II ozone-depleting chemicals. The components of this mixture are not listed as marine pollutants 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: Propane, or Liquefied Petroleum Gases

HAZARD CLASS:	CLASS 2.1: Flammable gas.	IDENTIFICATION #:	UN1978, or UN 1075	PRODUCT RQ:	Any accidental release in a quantity that could pose a danger to public safety or any sustained release of 10 minutes or more.
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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 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. 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.

WHMIS (Canada): CLASS A: Compressed gas.
CLASS B-1: Flammable gas.

This product is on the DSL list.

International Regulations:

EINECS: Not available.

DSCL (EEC): This product is not classified according to the EU regulations.

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 1

FLAMMABILITY 4

PHYSICAL HAZARD 2

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED: CGA-510 (gas withdrawal)
CGA-555 (liquid withdrawal)

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
- P-14 Accident Prevention in Oxygen-Rich, Oxygen-Deficient Atmosphere
- SB-2 Oxygen-Deficient Atmospheres
- 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

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.

PREPARATION INFORMATION:

DATE: 10/15/2007
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 information, (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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