Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: Propane (MSDS No. P-4646-G)	**Trade Names:** Liquefied Petroleum Gas
Chemical Name: Propane	**Synonyms:** Dimethylmethane, N-propane, propyl hydride, propylhydride, refrigerant gas R290
Chemical Family: Alkane	**Product Grades:** Industrial, 2.0, 2.5 instrument, 4.0 research

Telephone: **Emergencies:** 1-800-645-4633* **Company Name:** Praxair, Inc.
CHEMTREC: 1-800-424-9300* 39 Old Ridgebury Road
Routine: 1-800-PRAXAIR 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. Hazards Identification

EMERGENCY OVERVIEW

DANGER! Flammable liquid and gas under pressure.
Can form explosive mixtures with air.
May cause frostbite.
May cause dizziness and drowsiness.
Self-contained breathing apparatus may be required by rescue workers.
Under ambient conditions, this is a colorless gas with a faintly disagreeable odor.

OSHA REGULATORY STATUS: This material is considered hazardous by the OSHA Hazard Communications Standard (29 CFR 1910.1200).

POTENTIAL HEALTH EFFECTS:

Effects of a Single (Acute) Overexposure

Inhalation. Asphyxiant. Effects are due to lack of oxygen. Moderate concentrations may cause headache, drowsiness, dizziness, excitation, excess salivation, vomiting, and unconsciousness. Lack of oxygen can kill.

Skin Contact. No harm expected from vapor. Liquid may cause frostbite.

Swallowing. An unlikely route of exposure. This product is a gas at normal temperature and pressure, but frostbite of the lips and mouth may result from contact with the liquid.

Eye Contact. No harm expected from vapor. Liquid may cause frostbite.

Effects of Repeated (Chronic) Overexposure. No harm expected.

Other Effects of Overexposure. At very high concentrations, propane may produce cardiac arrhythmias or arrest due to sensitization of the heart to adrenaline and noradrenalin.

A vertical line in the left margin indicates revised or new material.

Medical Conditions Aggravated by Overexposure. The toxicology and the physical and chemical properties of propane suggest that overexposure is unlikely to aggravate existing medical conditions.

CARCINOGENICITY: Propane is not listed by NTP, OSHA, or IARC.

POTENTIAL ENVIRONMENTAL EFFECTS: None known. For further information, see section 12, Ecological Information.

3. Composition/Information on Ingredients

This section covers materials of manufacture only. See sections 8, 10, 11, and 16 for information on by-products generated during use in welding and cutting. See section 16 for important information about mixtures.

COMPONENT	CAS NUMBER	CONCENTRATION
Propane	74-98-6	>99%*

**The symbol > means "greater than."*

4. First Aid Measures

INHALATION: Immediately remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Call a physician.

SKIN CONTACT: For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). In case of massive exposure, remove contaminated 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: 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: *This material may be a cardiac sensitizer; avoid the use of epinephrine. There is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.*

5. Fire Fighting Measures

FLAMMABLE PROPERTIES: Flammable gas. Forms explosive mixtures with air and oxidizing agents.

SUITABLE EXTINGUISHING MEDIA: CO_2, dry chemicals, water spray, or fog.

PRODUCTS OF COMBUSTION: Carbon dioxide (CO_2), carbon monoxide (CO)

PROTECTION OF FIREFIGHTERS: DANGER! Flammable liquid and gas under pressure. Evacuate all personnel from danger area. Immediately cool cylinders with water spray from maximum distance, taking care not to extinguish flames. Remove ignition sources if without risk. Remove all cylinders from area of fire if without risk, while continuing cooling water spray. Do not extinguish any flames emitted from cylinders. Stop flow of gas if without risk, or allow flames to burn out. Self-contained breathing apparatus may be required by rescue workers. On-site fire brigades must comply with OSHA 29 CFR 1910.156.

Specific Physical and Chemical Hazards. Flammable gas. Forms explosive mixtures with air and oxidizing agents. 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). Propane cylinders are equipped with a pressure relief device. (Exceptions may exist where authorized by DOT.) If venting or leaking propane catches fire, do not extinguish flames. Flammable gas may spread from leak, creating an explosive re-ignition hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with an appropriate device.

Protective Equipment and Precautions for Firefighters. Firefighters should wear self-contained breathing apparatus and full fire-fighting turnout gear.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

DANGER! Flammable liquid and gas under pressure.

Personal Precautions. Forms explosive mixtures with air. (See section 5.) Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Remove all sources of ignition if without risk. Reduce vapors with fog or fine water spray. Shut off flow if without risk. Ventilate area or move cylinder to a well-ventilated area. Flammable vapors may spread from leak. Before entering area, especially confined areas, check atmosphere with an approved 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, state, and local regulations. If necessary, call your local supplier for assistance.

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN HANDLING: ***Flammable liquid and gas under pressure.*** Keep away from heat, sparks, and open flame. Use only spark-proof tools and explosion-proof equipment. Ground all equipment. ***Gas can cause rapid suffocation due to oxygen deficiency.*** Store and use with adequate ventilation. Close cylinder valve after each use; keep closed even when empty. ***Protect cylinders from damage.*** Use a suitable hand truck to move cylinders; do not drag, roll, slide, or drop. ***All piped propane systems and associated equipment must be grounded.*** Electrical equipment must be non-sparking or explosion-proof. Leak check system with soapy water; never use a flame. ***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.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store and use with adequate ventilation. Separate propane cylinders from oxygen, chlorine, 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. 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 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. For other precautions in using propane, see section 16.

RECOMMENDED PUBLICATIONS: For further information on storage, handling, and use, see Praxair publication P-14-153, *Guidelines for Handling Gas Cylinders and Containers*. Obtain from your local supplier.

8. Exposure Controls/Personal Protection

See section 16 for important information on by-products generated during use in welding and cutting.

COMPONENT	OSHA PEL	ACGIH TLV-TWA (2007)
Propane	1000 ppm	1000 ppm

Hazardous fumes may be generated during welding with this product. See section 16 for more information on welding hazards.

TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations.

IDLH = 2100 ppm

ENGINEERING CONTROLS:

Local Exhaust. An explosion-proof local exhaust system is acceptable if it can prevent oxygen deficiency and keep hazardous fumes and gases below all applicable exposure limits in the worker's breathing zone.

Mechanical (General). An explosion-proof system may be acceptable if it can prevent oxygen deficiency and keep hazardous fumes and gases below all applicable exposure limits in the worker's breathing zone.

Special. None

Other. None

PERSONAL PROTECTIVE EQUIPMENT:

Skin Protection. Wear work gloves for cylinder handling and to prevent exposure to liquid. Wear welding gloves for welding. Metatarsal shoes for cylinder handling. For welding, see section 16. Select in accordance with OSHA 29 CFR 1910.132 and 1910.133. Regardless of protective equipment, never touch live electrical parts.

Eye/Face Protection. Wear safety glasses when handling cylinders; for welding, see section 16. Select eye protection in accordance with OSHA 29 CFR 1910.133.

Respiratory Protection. Use air-purifying or air-supplied respirators where local or general exhaust ventilation is inadequate to keep worker exposure below all applicable exposure limits for fumes, gases, and other by-products of welding with propane. See section 16 for details. Air-supplied respirators must be used in confined spaces. Respiratory protection must conform to OSHA rules as specified in 29 CFR 1910.134. Select per OSHA 29 CFR 1910.134 and ANSI Z88.2.

9. Physical and Chemical Properties

APPEARANCE:	Colorless gas
ODOR:	Faintly disagreeable
ODOR THRESHOLD:	Not available.
PHYSICAL STATE:	Gas at normal temperature and pressure
pH:	Not applicable.
FREEZING POINT at 1 atm**:**	-305.84°F (-187.69°C)
BOILING POINT at 1 atm**:**	-43.67°F (-42.04°C)
FLASH POINT (test method)**:**	-156°F (-104°C) TCC
EVAPORATION RATE (Butyl Acetate = 1)**:**	High
FLAMMABILITY:	Flammable
FLAMMABLE LIMITS IN AIR, % by volume**:**	**LOWER:** 2.1% **UPPER:** 9.5%
VAPOR PRESSURE at 70°F (21.1°C)**:**	109.73 psig (756.56 kPa)
VAPOR DENSITY at 70°F (21.1°C) and 1 atm**:**	0.2612 lb/ft^3 (4.183 kg/m^3)
SPECIFIC GRAVITY (H_2O = 1) at 77°F (25°C) and 1 atm**:**	0.5077
SPECIFIC GRAVITY (Air = 1) at 70°F (21.1°C) and 1 atm**:**	1.523
SOLUBILITY IN WATER 68°F (20°C)**:**	0.065
PARTITION COEFFICIENT: n-octanol/water:	Not available.
AUTOIGNITION TEMPERATURE:	842°F (450°C)
DECOMPOSITION TEMPERATURE:	Not available.
PERCENT VOLATILES BY VOLUME:	100
MOLECULAR WEIGHT:	44.096
MOLECULAR FORMULA:	C_3H_8

10. Stability and Reactivity

CHEMICAL STABILITY: ☐ Unstable ☒ Stable

CONDITIONS TO AVOID: None known.

INCOMPATIBLE MATERIALS: Oxidizing agents, chlorine dioxide

HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition and burning may produce CO/CO_2.

POSSIBILITY OF HAZARDOUS REACTIONS: ☒ May Occur ☐ Will Not Occur

Contact with incompatible materials and/or elevated temperatures may result in fire or explosion.

11. Toxicological Information

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

CARDIOVASCULAR EFFECTS: 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.

12. Ecological Information

ECOTOXICITY: No adverse ecological effects expected.

OTHER ADVERSE EFFECTS: Propane does not contain any Class I or Class II ozone-depleting chemicals.

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: Propane or Petroleum gases, liquefied, n.o.s. (propane)

HAZARD CLASS:	2.1	**PACKING GROUP/Zone:**	NA/NA*	**IDENTIFICATION NUMBER:**	UN1978 or UN1075	**PRODUCT RQ:**	None
SHIPPING LABEL(s):		FLAMMABLE GAS					
PLACARD (when required):		FLAMMABLE GAS					

**NA=Not applicable.*

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)].

MARINE POLLUTANTS: Propane is not listed as a marine pollutant by DOT.

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): None

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 (40 CFR 355): 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
DELAYED: No
PRESSURE: Yes
REACTIVITY: No
FIRE: Yes

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

Propane is not subject to reporting under Section 313.

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.

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

TSCA: TOXIC SUBSTANCES CONTROL ACT: Propane 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.

Propane is not listed in Appendix A as a highly hazardous chemical. However, any process that involves a flammable gas on site in one location in quantities of 10,000 lb (4536 kg) or greater is covered under this regulation unless the gas is used as a fuel.

STATE REGULATIONS:

CALIFORNIA: Propane is not listed by California under the SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 (Proposition 65).

PENNSYLVANIA: Propane 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.

SPECIAL PRECAUTIONS: ***Use in welding and cutting.*** Using propane in welding and cutting may create special hazards, including those from fumes, gases, and other by-products of the welding process. Be sure to read and understand the manufacturer's instructions and the precautionary labels on all products. For more information, ask your welding products supplier for a copy of Praxair's free safety booklet, P-2035, *Precautions and Safe Practices for Gas*

Welding, Cutting, and Heating. For a detailed treatment, get ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes*, published by the American Welding Society (AWS), PO Box 351040, Miami, FL 33135, or see OSHA's Web site at http://www.osha-slc.gov/SLTC/weldingcuttingbrazing/. Order AWS documents from Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112-5710, http://global.ihs.com/. ***Arcs and sparks can ignite combustible materials.*** Prevent fires. ***Do not strike an arc on the cylinder.*** The defect caused by an arc burn could lead to cylinder rupture. For more information on fire prevention in welding and cutting, see NFPA 51B, *Standard for Fire Prevention During Welding, Cutting, and Other Hotwork,* published by the National Fire Protection Association.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE: ***Flammable liquid and gas under pressure.*** May form explosive mixtures with air. Use piping and equipment adequately designed to withstand pressures to be encountered. Use a backflow prevention device in any piping. ***Never work on a pressurized system*****.** If there is a leak, blow the system down in an environmentally safe manner in compliance with all federal, state, and local laws; then repair the leak. ***Follow safe practices when returning cylinder to supplier.*** Be sure valve is closed; then install valve outlet cap or plug if provided, leak-tight. ***Never allow a compressed gas cylinder to become part of an electrical circuit.***

NOTE: *Prior to using any plastics, confirm their compatibility with propane.*

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:		**HMIS RATINGS:**	
HEALTH	= 2	HEALTH	= 1
FLAMMABILITY	= 4	FLAMMABILITY	= 4
INSTABILITY	= 0	PHYSICAL HAZARD	= 2
SPECIAL	= None		

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED:	CGA-510 (gas withdrawal) CGA-790(gas grills), CGA-791 (limited standard) CGA-555 (liquid withdrawal)
PIN-INDEXED YOKE:	Not applicable.
ULTRA-HIGH-INTEGRITY CONNECTION:	Not applicable.

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 can be found in the following materials 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.

AV-1	*Safe Handling and Storage of Compressed Gases*
P-1	*Safe Handling of Compressed Gases in Containers*
SB-2	*Oxygen-Deficient Atmospheres*
SB-8	*Use of Oxy-Fuel Gas Welding and Cutting Apparatus*
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.

Praxair MSDSs are furnished on sale or delivery by Praxair or the independent distributors and suppliers who package and sell our products. To obtain current MSDSs for these products, contact your Praxair sales representative or local distributor or supplier, or download from www.praxair.com. If you have questions regarding Praxair MSDSs, would like the form number and date of the latest MSDS, or would like the names of the Praxair suppliers in your area, phone or write the Praxair Call Center (**Phone:** 1-800-PRAXAIR; **Address:** Praxair Call Center, Praxair, Inc., PO Box 44, Tonawanda, NY 14151-0044).

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