1. Identification

Product Identifiner	:	Propane
Other means of identification	:	Propane, n-Propane, Bottled gas, Propane liquefied, C3H8, UN 1075
Product use	:	Synthetic, Analytical chemistry
Supplier	:	Leland Limited, Inc. 2614 South Clinton Ave. South Plainfield, NJ 07080 1-908-668-1008 (9-5 EST)
Emergency calls (CHEMTREC)	:	1-800-424-9300 (Domestic) 1-703-527-3887 (International)

2. Hazards Identification

OSHA/HCS status	:	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910. 1200).
Classification of the substance or mixture	:	Flammable gases – Category 1 Gases under pressure – Liquefied gas

GHS label elements

Hazard pictograms :

Signal word	:	Danger
Hazards statements	:	Extremely flammable gas Contains gas under pressure; may explode if heated. May cause frostbite. May displace oxygen and cause rapid suffocation.

Precautionary statements

General	:	Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Always keep container in upright position. Approach suspected leak area with caution.
Prevention	:	Never put cylinders into unventilated areas of passenger vehicles. Keep away from heat, sparks, open flames and hot surfaces. – No smoking. Use and store only outdoors or in a well ventilated place.
Response	:	Leaking gas fire: Do not extinguish, unless leak can be stopped safety. Eliminate all ignition sources if safe to do so.
Storage	:	Protect from sunlight. Protect from sunlight when ambient temperature exceeds 40C/104F. Store in a well-ventilated place.
Disposal	:	Not applicable
Hazards not otherwise	:	In addition to any other important health or physical hazards, this product

classified may displace oxygen and cause rapid suffocation.

3. Composition, Information on Ingredients

Substance/Mixture	:	Substance
Chemical Name	:	Propane
Synonyms	:	Propane, n-Propane, Bottled gas, Propane liquefied, C3H8, UN 1075
CAS Number	:	74-98-6
Content (vo%)	:	99.5 % or more

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

4. First Aid Measures

Description of necessary first aid measures

Inhalation	:	Remove exposed person to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular, or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
Skin Contact	:	Wash contaminated skin with soap and water. Remove contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Eye Contact	:	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.
Ingestion	:	Since this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Inhalation	:	No known significant effects or critical hazards.
Skin Contact	:	No known significant effects or critical hazards.
Eye Contact	:	No known significant effects or critical hazards.
Frostbite	:	Try to warm up the frozen tissues and seek medical attention.
Ingestion	:	Since this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Inhalation	:	No specific data.
Skin Contact	:	No specific data.
Eye Contact	:	No specific data.
Ingestion	:	No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician	:	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments	:	No specific treatment.
Protection of first-aiders	:	No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

5. Fire Fighting Measures

Extinguishing media

Suitable extinguishing media	:	Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media	:	None known.
Specific hazards arising from the chemical	:	Contains gas under pressure. Extremely flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.
Hazardous thermal decomposition products	:	Decomposition products may include the following materials: carbon dioxide, carbon monoxide
Special protective actions for fire-fighters	:	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance. Eliminate all ignition sources if safe to do so.
Special protective equipment for fire-fighters		Fire-fighters should wear appropriate equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	:	Accidental releases pose a serious fire or explosion hazard. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
For emergency responders	:	If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in “For non-emergency personnel”.

Environmental precautions	:	Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill	:	Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.
Large spill	:	Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

7. Handling and Storage

Precautions for safe handling

Protective measures	:	Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Store and use away from heat, sparks, open flame, or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.
Advice on general occupational hygiene	:	Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.
Conditions for safe storage, including any incompatibilities	:	Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Eliminate all ignition sources. Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 40C (104F).

8. Exposure Controls and Personal Protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Propane	ACGIH TLV (United States, 3/2012) TWA: 1000 ppm 8 hours NIOSH REL (United States, 1/2012)

	TWA: 1800 mg/m^3 10 hours TWA: 1000 ppm 10 hours OSHA PEL (United States, 6/2010) TWA: 1800 mg/m^3 10 hours TWA: 1000 ppm 8 hours OSHA PEL 1989 (United States, 3/1989) TWA: 1800 mg/m^3 8 hours TWA: 1000 ppm 8 hours

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure control : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking, using the lavatory and at the end of your shift. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/Face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition

		from static electricity, wear anti static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves
Other skin protection	:	Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Respiratory protection	:	Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

9. Physical and Chemical Properties

Appearance

Physical state	:	Gas [Liquefied compressed gas]
Color	:	Colorless.
Molecular weight	:	44.11 g/mol
Molecular formula	:	C3-H8
Boiling/condensation point		-161.48C (-258.7F)
Melting/freezing point	:	-187.6C (-305.7F)
Critical temperature	:	95.55C (205.8F)
Odor	:	Odorless. But may have skunk odor added.
Odor threshold	:	Not available.
pH	:	Not available.
Flash point	:	Closed cup: -104C (-155.2F) Open cup: -104C (-155.2F)
Burning time	:	Not applicable.
Burning rate	:	Not applicable.
Evaporation rate	:	Not available.
Flammability (solid, gas)	:	Extremely flammable in the presence of the following materials or conditions: reducing materials, combustible materials and organic materials.
Lower and upper explosive (flammable) limits	:	Not available.
Vapor pressure	:	Not available
Vapor density	:	1.1 (Air = 1)
Specific Volume	:	12.0482 ft^3/lb
Gas Density	:	0.083 lb/ft^3
Relative density	:	Not applicable.
Solubility	:	Not available.
Solubility in Water	:	0.0244 g/L
Partition coefficient: n-octanol/water	:	1.09
Auto-ignition temperature	:	287C (548.6F)
Decomposition temperature	:	Not available.

SADT	:	Not available.
Viscosity	:	Not applicable.

10. Stability and Reactivity

Reactivity	:	No specific test data related to reactivity is available for this product or its ingredients.
Chemical stability	:	The product is stable.
Possibility of hazardous reactions	:	Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	:	Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
Incompatibility with various substances		Extremely reactive or incompatible with the following materials: oxidizing materials.
Hazardous decomposition products	:	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization	:	Under normal conditions of storage and use, hazardous polymerization will not occur.

11. Toxicological Information

Information on toxicological effects

Acute toxicity	:	Not available.
Irritation / Corrosion	:	Not available.
Sensitization	:	Not available.
Mutagenicity	:	Not available.
Carcinogenicity	:	Not available.
Reproductive toxicity	:	Not available.
Teratogenicity	:	Not available.
Specific target organ toxicity (single exposure)	:	Not available.
Specific target organ toxicity (repeated exposure)	:	Not available.
Aspiration hazard	:	Not available.
Information on the likely routes of exposure	:	Not available.

Potential acute health effects

Eye contact	:	No known significant effects or critical hazards.
Inhalation	:	No known significant effects or critical hazards.
Skin contact	:	No known significant effects or critical hazards.
Ingestion	:	Since this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact	:	No specific data.
Inhalation	:	No specific data.
Skin contact	:	No specific data.

ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure
Short term exposure
Potential immediate effects : Not available.
Potential delayed effects : Not available.

Long term exposure
Potential immediate effects : Not available.
Potential delayed effects : Not available.

Potential chronic health effects – Not available.
General : No known significant effects or critical hazards.
Carcinogenicity : No known significant effects or critical hazards.
Mutagenicity : No known significant effects or critical hazards.
Teratogenicity : No known significant effects or critical hazards.
Developmental effects No known significant effects or critical hazards.
Fertility effects No known significant effects or critical hazards.

Numerical measures of toxicity
Acute toxicity estimates : Not available.

12. Ecological Information

Toxicity : Not available.
Persistence and degradability : Not available.

Bioaccumulative potential

Product/Ingredient name	Log P_{ow}	BCF	Potential
Propane	1.09	-	low

Mobility is soil
Soil/Water partition coefficient (K_{OC}) : Not available.
Other adverse effects : No known significant effects or critical hazards.

13. Disposal Considerations

Disposal methods : If gas remains in cylinders, release gas with proper equipment and dispose of cylinders as incombustible waste.
For empty cylinders, check for a puncture hole and dispose of as incombustible waste.
Do not dispose of cylinders without first checking that all gas has been released.

14. Transport Information

DOT / IMDG Shipping Name : Propane
UN Number : UN 1978

Hazard Class	:	2.1
Placard (When required)	:	Flammable gas

Special Shipping Information	:	See CFR 49, 172.101, 173.306 for exceptions of labeling.

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	:	TSCA 8(a) CDR Exempt/Partial exemption: Not determined United States inventory (TSCA 8b): this material is listed or exempted. Clean Air Act (CAA) 112 regulated flammable substances: propane		
Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)	:	Not listed		
Clean Air Act Section 602 Class I Substances	:	Not listed		
Clean Air Act Section 602 Class II Substances		Not listed		
DEA List I Chemicals (Precursor Chemicals)		Not listed		
DEA List II Chemicals (Essential Chemicals)		Not listed		
SARA 311/312	:	%	:	100
Hazardous Categories		Fire hazard	:	Yes
		Sudden release of pressure	:	Yes
		Reactive	:	No
		Immediate (acute) health hazard	:	No
		Delayed (chronic) health hazard	:	No
State Regulations	:	Massachusetts	:	This material is listed.
		New York	:	This material is not listed.
		New Jersey	:	This material is listed.
		Pennsylvania	:	This material is listed.
		California	:	This material is not listed.
International Regulations	:	Canada inventory		This material is listed or exempted.
		Australia inventory (AICS)		This material is listed or exempted.
		China inventory (IECSC)		This material is listed or exempted.
		Japan inventory		This material is listed or exempted.
		Korea inventory		This material is listed or exempted.
		Malaysia inventory (EHS Register)		Not determined.

New Zealand inventory of Chemicals (NZIoC)	This material is listed or exempted.
Philippines inventory (PICCS)	This material is listed or exempted.
Taiwan inventory (CSNN)	Not determined.

16. Other Information

Hazard Rating Systems :

NFPA Ratings	**HMIS Ratings**
Health = 2	Health = 1
Flammability = 4	Flammability = 4
Reactivity = 0	Physical hazards = 2

Key to abbreviations

ACGIH	:	American Conference of Governmental Industrial Hygienists
BCF	:	Bioconcentration Factor
CAS	:	Chemical Abstract Services
CERCLA	:	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	:	United States Code of Federal Regulations
DOT	:	Department of Transportation
GHS	:	Globally Harmonized System of Classification and Labeling of Chemicals
IATA	:	International Air Transport Association
IMDG	:	International Maritime Dangerous Goods
Log P_{ow}	:	Logarithm of the octanol/water partition coefficient
NIOSH	:	National Institute for Occupational Safety and Health
OSHA	:	Occupational Safety and Health Administration
STEL	:	Short-term Exposure Limit
SARA	:	Superfund Amendments and Reauthorization Act
TLV	:	Threshold Limit Value
TSCA	:	Toxic Substances Control Act
TWA	:	Time Weighted Average

Notice to reader:

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee they are the only hazards that exist.