

# Material Safety Data Sheet

## A. Product Information

Synonyms: HD-5, Liquefied Petroleum Gas, LP-Gas, LPG, Propane

Chemical Name: Propane

Chemical Family: Paraffinic Hydrocarbon

Chemical Formula: C<sub>3</sub>H<sub>8</sub>

CAS Reg No: 74-98-6

Product No: 26161

Product and /or Components Entered on EPA's TSCA Inventory: Yes

This product has been commercially introduced into US commerce, and is listed in the Toxic Substances Control Act (TSCA) Inventory of Chemicals in Commerce; hence, it is subject to all applicable provisions and restrictions under TSCA 40 CFR, section 721 and 723,250.

## B. Hazardous Components

Ingredients	CAS Number	% By Wt	OSHA PEL	ACGIH TLV
Propane	74-98-6	>90	1000ppm	Simple Asphyxiate
Propylene	15-07-1	<05	NE	Simple Asphyxiate
Butanes	Various	<2.5	800 ppm*	800 ppm*

\*for n-Butane

NE-Not Established

NA-Not Applicable

## C. Personal Protection Information

Ventilation:	Use adequate ventilation to control exposure below recommended levels.
Respiratory Protection:	Not generally required. When entry into or exit from concentrations of unknown exposure, use NIOSH/MSHA approved self-contained breathing apparatus (SCBA).
Eye Protection:	Use safety glasses with side shields.
Skin Protection:	No special garments required. Avoid unnecessary skin contamination with material.
Odor Fading:	See WARNING information in Section B.

**NOTE:** Personal protection information shown in Section C is based upon general information as to normal uses and conditions. Where special or unusual uses or conditions exist, it is suggested that the expert assistance of an industrial hygienist or other qualified professional be sought.

#### **D. Handling and Storage Precautions**

Do not get in eyes, on skin or on clothing. Avoid breathing vapors. Ear protective equipment and/or garments described in Section C if exposure conditions warrant. Wash thoroughly after handling. Launder contaminated clothing before reuse.

Store in cool, well ventilated area away from ignition sources. Provide means for controlling leaks. Bond and ground during transfer. Keep containers closed.

#### **E. Reactivity Data**

Stability	Stable
Conditions to Avoid	Not established
Incompatibility Materials to Avoid	Oxygen and strong oxidizing agents
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid:	Not Established

Hazardous Decomposition

Carbon oxides formed when burned.

### F. Health Hazard Data

Recommended Exposure Limits:  
See Section B

Acute Effects of Overexposure:

Eye: Very high gas concentrations may cause mild irritation effects. Liquefied gas may cause freeze burns upon direct contact.

Skin: Very high gas concentrations may cause mild irritation to mucous membranes. Liquefied gas may cause freeze burns upon direct contact.

Inhalation: Simple asphyxiate. Extreme over exposure may produce dizziness, headache, disorientation, excitation, fatigue, inability to concentrate, vomiting coughing, anesthesia, unconsciousness and death.

Ingestion: Not a likely exposure route. Liquefied gas may cause freeze burns to the mucous membranes and possible central nervous system depression.

Subchronic and Chronic Effects of Overexposure:

Exposure to 1000 ppm for 8 hours a day, 5 days a week, for approximately 2 weeks produced no abnormal reactions, including cardiac, pulmonary, and neurologic functions in humans.

#### Other Health Effects:

Propane was not mutagenic in the AMES assay.

Health Hazard Categories:

	Animal	Human		Animal	Human
Known Carcinogen			Toxic		

Suspect Carcinogen			Corrosive		
Mutagen			Irritant		
Teratogen			Target Organ Toxin	<b>X</b>	<b>X</b>
Allergic Sensitizer			Specify - Eye and Skin		
Highly Toxic			Hazard Freeze Burn; Lung-Simple Asphyxiate		

### First Aid and Emergency Procedures:

- Eye: Immediately flush eye with running water for at least fifteen minutes. If irritation develops, seek medical attention.
- Skin: Immediately flush skin with water for fifteen minutes. If irritations develops, seek medical attention.
- Inhalation: Remove from exposure. If breathing ceases, administer artificial respiration followed by oxygen. Seek medical attention.
- Ingestion: Seek immediate medical attention.

### G. Physical Data

- Appearance: Colorless Liquefied Petroleum Gas
- Odor: Odorless
- Boiling Point: -44F (-42 C)
- Vapor Pressure: 108-124 psia at 70F (21C)
- Vapor Density (Air = 1): 1.5
- Solubility in Water: Negligible

Specific Gravity (H2O = 1)	0.508-0.510 at 60/60 (15.6/15.6c)
Percent Volatile by Volume:	100
Evaporation Rate (Ethyl Ether=1):	>1
Viscosity:	Not Established

## H. Fire and Explosion Data

Flash Point (Method Used):	-156F (-104c) (Estimated)
Flammable Lmts % Volume to Air:	LEL -2.1 UEL -9.5
Fire Extinguishing Media:	Dry chemical, foam or carbon dioxide (CO2)
Special Fire Fighting Procedure:	Evacuate area of all unnecessary personnel. Use NIOSH/MSHA approved self-contained breathing apparatus and other protective equipment and/or garments described Section C if conditions warrant. Shut off source, if possible. Water fog or spray may be used to cool exposed containers and equipment. Allow fire to burn until gas flow is shut off, possible.
Fire and Explosion Hazards:	Carbon oxides formed when burned. Highly flammable vapor which are heavier than air may accumulate in low areas and/or spread along ground away from handling site.

## I. Spill, Leak and Disposal Procedures

Precautions Required if Material is released or Spilled:

Evacuate area of all unnecessary personnel. Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Shut off source, if possible. Protect from ignition. Ventilate area thoroughly.

Waste Disposal (Insure Conformity with all Applicable Disposal Regulation):

#### J. DOT Transportation

Shipping Name:	Liquefied Petroleum Gas
Hazard Class:	Flammable Gas
ID Number	UN 1075
Marking:	Liquefied Petroleum Gas/UN 1075
Label:	Flammable Gas
Placard:	Flammable Gas/1075
Hazardous Substance/RQ:	Not Applicable
Shipping Description:	Liquefied Petroleum Gas, Flammable Gas UN 1075
Packaging References:	49 CFR 173.304, 173.306, 173.314 and 173.315

#### K. RCRA Classification -

Unadulterated Product as a Waste  
Ignitable - D001

#### L. Protection Required for Work on

Contaminated Equipment

Wear protective equipment and/or garments described in Section C if exposed conditions warrant. Contact immediate supervisor for specific instructions before work is initiated.

#### M. Hazard Classification

X This product meets the following hazard definition(s) as defined by the Occupational Safety and Health Hazard Communication Standard (29 CFR Section 11910.1200):

Combustible Liquid	Flammable Aerosol	Oxidizer
X Compressed Gas	Explosive	Pyrophoric
X Flammable Gas	X Health Hazard (Sec F)	Unstable

Flammable Liquid  
Flammable Solid

Organic Peroxide

Water Reactive

\_\_\_ Based on information presently available, this product does not meet any of the hazard definitions of 29 CFR Section 1910.1200.

#### **N. Additional Comments**

This product contains the following chemical or chemicals subject to the report requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40CFR Part 372. (See Section B)

Propylene

This Material Safety Data Sheet and the information it contains is offered to you in good faith as accurate. We have reviewed any information contained in this data sheet which we received from sources outside our company. We believe that information to be correct but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission or recommendation for the use of any product in a manner that might infringe existing patents. No warranty is made, either express or implied.

#### **LIQUEFIED PETROLEUM GAS, 2.1, UN 1075 DANGER! EXTREMELY FLAMMABLE**

#### **POTENTIAL HAZARDS**

##### **FIRE OR EXPLOSION:**

##### **EXTREMELY FLAMMABLE:**

Will be easily ignited by heat sparks or flames. Will form explosive mixtures with air. Vapors from liquefied gas are initially heavier than air and spread along ground. Vapors may travel to source of ignition and flash back. Container may explode when heated. Ruptured cylinders may rocket.

##### **HEALTH:**

Vapors may cause dizziness or asphyxiation without warning. Some may be irritating if inhaled at high concentrations. Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite. Fire may produce irritating and/or toxic gases.

**PUBLIC SAFETY:**

Call customer Emergency Response Telephone Number on Shipping Paper first. If shipping Paper not available or no answer, call CHEMTREC at 1-800-424-9300. Isolate spill or leak area immediately for at least 50 to 100 meters (160 to 330 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basement, tanks). Keep out of low areas.

**PROTECTIVE CLOTHING:** Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection. Always wear thermal protective clothing when handling refrigerated/cryogenic liquids.

**EVACUATION:**

Large Spill: Consider initial downwind evacuation for at least 800 meters (1/2 mile).

Fire: If tank, rail car or tank truck is involved in a fire, isolate for 1600 meters (1 mile) in all directions, also consider initial evacuation for 1600 meters (1 mile) in all directions.

**EMERGENCY RESPONSE FIRE:**

DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.

Small Fires: Dry Chemical or CO2

Large Fires: Water spray or fog. Move container from fire areas if you can do it without risk.

**Fire Involving Tanks:** Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool Containers with flooding quantities of water until well after fire is out. Do not direct water at source of leak or safety devices, icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from the ends of tanks. For massive fire, use unmanned hose holders or monitor nozzles if this is impossible, withdraw from area and let fire burn.

**SPILL OR LEAK:** ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Stop leak if you can do it without risk. If possible, turn leaking containers so that gas escapes rather than liquid. Use water spray to reduce vapors or divert vapor cloud drift. Do not direct water at spill or source of leak. Prevent spreading of vapors through sewers, ventilation systems, and confined areas. Isolate area until gas has dispersed.

**CAUTION:** When in contact with refrigerated/cryogenic liquids, many materials become brittle and are likely to break without warning.

**FIRST AID:** Move victim to fresh air. Call emergency medical care. Apply artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult. Remove and isolate contaminated clothing and shoes. Clothing frozen to the skin should be thawed before being removed. In case of contact with liquefied gas, thaw frosted parts in lukewarm water. Keep victim warm and quiet. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Source: U.S. Department of Transportation, Emergency Response Guidebook. Guide 115 for ID No UN 1075 Liquefied Petroleum Gas.

## **Important Odorant Information**

Ethyl Mercaptan is the preferred warning agent in liquid propane applications. This is because in addition to meeting NFPA #98 guidelines for odorization of LP gases, its liquid/gas equilibrium properties more closely match that of propane and it has higher odor intensity at lower concentrations when compared to other odorized agents. Ethyl Mercaptan was first chosen as a viable warning agent in a study by the U.S. Bureau of Mines in 1931 and later confirmed in independent studies by the U.S. Energy Research and Development Administration (ERDA) in 1977.

Although ethyl mercaptan has excellent warning properties NFPA #58 A-1-4 states, "It is recognized that no odorant will be completely effective as a warning agent in every circumstance." Studies conducted by Gas Research Institute (GRI), Institute of Gas Technology (IGT), Bartlesville Energy Technology Center Natural Gas Odorizing Inc. and other highlight instance where odorants may not be as effective. For example, it has been reported that odor fading caused by chemical oxidation and absorption can occur in vessels and distribution systems carrying odorized propane. In an underground leak, the odorant may be absorbed by the soil as the gas passes through the soil to the surface. In a basement, the odorant may be absorbed by masonry surfaces. Extreme cold weather may also reduce the effectiveness of the odorant. It has also been reported that being exposed to an odor for a period of time may affect a person's ability to detect that odor. Other odors in the area, such as a musty basement may mask or cover up the L.P. Gas odor.

"CHEMICAL OXIDATION" Contact with air (oxygen) rust, or other oxidation agents over a period of time can result in odorant fading. Chemical Oxidation is most likely to occur in newly installed tanks and in rusty wet or improperly prepared tanks. For this reason it is extremely important for propane tanks to be properly purged especially when the tank is new or has been allowed to run empty, thus allowing potential air or water contamination. A purging procedure is described by the National L.P. Gas Association in their Bulletin NLGPA #133.80.1

## **ETHYL MERCAPTAN**

In order to detect its presence and prevent an explosion of built up propane gas, odorant (usually ethyl mercaptan) is added to liquid gas. Ethyl Mercaptan is normally used to stench propane because it is chemically stable when mixed with propane and has many of the same physical characteristics. It has a very distinct odor and has a fast odor impact which makes it easier to detect a leak. To familiarize yourself with this distinctive odor, you can request Scratch and Sniff leaflets from Hancock Gas Service, Inc., P.O. Box 761, Findlay, Oh 45839.

## **WARNING**

Under certain circumstances, not everyone can smell ethyl mercaptan. Some people simply cannot smell certain odors, including ethyl mercaptan. Physical conditions such as competing odors, common colds and allergies, smoking, eating, etc. temporarily may lessen a person's ability to smell. Additionally, high concentrations of odorous substances, including ethyl mercaptan, temporarily may shock, or essentially paralyze, a person's sense of smell. Cold weather also may have a negative effect: it reduces volatility, which may lower the ratio of mercaptan in the air, and may impair the sense of smell.

Some odorants, such as ethyl mercaptan, can oxidize under certain circumstances; oxidation diminishes the chance that a leak will be detected. Also, the odorant may be absorbed by surfaces under certain conditions (for example, movement of the gas through soil diminishes the distinctive odor). Oxidation can occur if the ethyl mercaptan comes into contact with oxidizing compounds, such as rust (iron oxide).

Oxidation may result in the partial “fading” of the perceived gassy smell of odorized propane. “Fading” has been demonstrated to occur in tanks containing rust. Because oxygen and water can form rust, it is important that all propane containers be purged of air and moisture before use and that the internal tank surface be passivated to neutralize any existing rust.

Despite these limitations, Ethyl Mercaptan remains the best odorant yet discovered for L.P. Gas. According to the Gas Processors Association 4 year study into the behavior of odorants in L.P. Gas, “its physical properties and high olfactory impact are superior in every way to those of other odorants tested”.